WASTEWATER TREATMENT PLANT UNIT 1 REHABILITATION

INVITATION FOR BID # PSUT-25-07

Issuance of Solicitation: Tuesday, June 24, 2025

Questions Due Date: Tuesday, July 15, 2025

Bid Submission Deadline: Tuesday, July 29, 2025

THE CITY OF PEMBROKE PINES
PROCUREMENT DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025
(954) 518-9020

For more information, please visit our online supplier portal, located at
https://procurement.opengov.com/portal/pembrokepines

Table of Contents

SECTION 1 - NOTICE

Notice is hereby given that the City Commission of the City of Pembroke Pines is seeking sealed proposals for:

IFB # PSUT-25-07

Wastewater Treatment Plant Unit 1 Rehabilitation

Solicitations may be found on the City of Pembroke Pines website under the Procurement Department at http://www.ppines.com/index.aspx?NID=667, and may be downloaded directly from the OpenGov platform at https://procurement.opengov.com/portal/pembrokepines.

For Technical Support, proposers can reach the OpenGov Service Desk between 7:00 am to 10:00 pm from Monday through Friday via the following methods:

- Chat (preferred method): Click the button in the lower right-hand corner of the portal.
- E-mail: procurement-support@opengov.com
- Phone: 1 (650) 336-7167

If additional help is needed with downloading the solicitation package please contact the Procurement Department at (954) 518-9020 or by email at purchasing@ppines.com. The Procurement Department hours are between 7:00 am to 6:00 pm on Monday through Thursday and is located at 8300 South Palm Drive, Pembroke Pines, FL 33025.

Bidders shall submit all questions regarding this bid via the City's e-Procurement Portal, located at https://procurement.opengov.com/portal/pembrokepines. Please note the deadline for submitting questions. All answers will be posted on the City's e-Procurement Portal. Bidders may also click "Follow" on this bid to receive an email notification when answers are posted. It is the bidder's responsibility to check the portal for updates. Only written responses issued through the OpenGov platform will be considered official for interpretations or clarifications.

Proposals will be accepted until 2:00 pm on Tuesday, July 29, 2025, electronically at https://procurement.opengov.com/portal/pembrokepines/projects/174010.

Bid Opening: The sealed electronic proposals will be publicly opened at 2:30 pm, on the bid due date, by the City Clerk's Office, in the **City Clerk's Office Conference Room located on the 4th Floor in the Charles F. Dodge City Center/**City Hall Administration Building, located at 601 City Center Way, Pembroke Pines, Florida, 33025.

Virtual Bid Opening: In light of public health concerns and to ensure accessibility for all, the City encourages interested parties, Contractors, and the public to participate virtually via live streaming instead of attending the meeting in person. As a result, meetings may be a combination of in-person and virtual, all as provided by law. To virtually attend the bid opening, please use the Cisco Webex Meetings platform.

Virtual Meeting Details:

- WebEx Meeting Link: https://ppines.webex.com/meet/purchasing
- Cisco Webex Meeting Number: 717 019 586
- Join by Phone Number: +1-408-418-9388

The public may download the **Cisco Webex Meetings app** from https://www.webex.com/downloads.html/.

To ensure an efficient meeting process, participants are requested to mute their audio and camera during the meeting. While the public is welcome to attend the virtual bid opening, **please note that active participation and commenting will not be allowed during the proceedings.**

For further information about the bid opening or assistance in accessing the virtual meeting, please contact:

Nicolas Rodriguez or other Procurement Staff in the Procurement Department
City of Pembroke Pines
8300 South Palm Drive,
Pembroke Pines, FL 33025
(954) 518-9020 Ext: 59021 or 954-518-9020
purchasing@ppines.com

SECTION 2 - GENERAL PROJECT INFORMATION & TIMELINE

2.1 Project Timeline

The work shall be completed within **365** calendar days from issuance of the City's Notice to Proceed (NTP), with an estimated start date of **TBD**.

2.2 Tentative Schedule of Events

Issuance of Solicitation (Posting Date):	June 24, 2025
Pre-Bid Meeting (Mandatory):	June 30, 2025, 9:00am Pembroke Pines Wastewater Treatment Plant - 13955 Pembroke Rd, Pembroke Pines, FL 33029
Question Due Date:	July 15, 2025, 11:00pm
Issuance of Final Answers to Questions:	July 21, 2025
Bid Submission Deadline:	July 29, 2025, 2:00pm
Bid Opening:	Will be held at 2:30 pm on the day of bid submissions are due.
Evaluations by Staff:	To Be Determined (TBD)

2.3 Mandatory Pre-Bid Meeting/Site Visit

There will be a **MANDATORY** scheduled pre-bid meeting on **Monday, June 30, 2025 at 9:00 am.** Meeting location will be at the **Pembroke Pines Wastewater Treatment Plant - 13955 Pembroke Rd, Pembroke Pines, FL 33029**

A. **Proof of Attendance:** Contractors may be required to sign in at any of the meetings to show proof of attendance. It is the Contractor's responsibility to make sure that they sign in at the meeting.

B. Please note, Contractors **must** bring the following **PPE** for the site visit:

   1. Hard Hat
   2. Eye Protection
   3. Close-Toed Shoes

2.4 Follow-Up Pre-Bid Meeting(s)

Follow-Up Meetings: In the event that a Contractor cannot attend the scheduled pre-bid meeting, or if a Contractor would like a follow up visit to the site, they may request a site visit by contacting **Nicolas Rodriguez** at **(954) 518-9020 Ext: 59021**. We urge all Contractors to attend the scheduled meeting, as a separate or follow-up meeting may not be afforded to the requester due to scheduling and availability of staff to assist with any additional meetings. In addition, if making a request for a separate or follow-up meeting, Contractors are urged to make these requests as early as possible.

2.5 Estimated Project Cost

Staff estimates this project to cost approximately $2,400,000.

2.6 Liquidated Damages

Liquidated damages for this project shall be **ONE THOUSAND AND FIVE HUNDRED DOLLARS AND NO CENTS ($1500.00)** per day.

2.7 Grant/Federal Funding

Not applicable for this project.

2.8 Proposal Security/Bid Bond

A Proposal Security shall be required for every bidder, regardless of proposal amount. Proposal Security shall be in the amount of 5% of the total cumulative base amount proposed.

2.9 Payment and Performance Bonds

Regardless of the awarded contract amount, two (2) separate bonds (Payment and Performance Bonds) are required, and both must be approved by the City. The penal sum stated in each bond shall be 100% of the contract price.

2.10 Permit, License, Impact or Inspection Fees

With the exception of the City related permit, license, impact or inspection fees (including the Building Department and Engineering Department Permit Fees), which will be waived for this project, the City does not anticipate any additional permit, license, impact or inspection fees for this project. Any related State or County fees, for the aforementioned permits, will be paid by the City.

In addition, the City shall cover the cost for any other permit fees related to external entities through the City's Owner's Contingency for this project**, therefore proposers should not include permit costs in their total proposal price.**

Furthermore, please note the City's average time for a Contractor to apply for and receive an approved permit is 30 days; delays in this timeline caused by the Contractor's failure to actively monitor the permit process and submit all required documentation in a timely manner, will count against the project's contractual completion period.

SECTION 3 - PURPOSE AND BACKGROUND

3.1 Purpose

The City of Pembroke Pines is seeking bids from qualified firms, hereinafter referred to as the Contractor, to furnish all labor, equipment, and materials, for the renovation and painting of the existing Wastewater Treatment Unit 1, in accordance with the terms, conditions, and specifications contained in this solicitation.

This work shall include, but not be limited to, cleaning and removing grit; removing and replacing the existing fine bubble diffuser system; removing and replacing the clarifier drive; removing and replacing the existing Return Activated Sludge (RAS) box and RAS valve; installing a new spray wash system for the effluent trough; renovating, preparing, and painting the entire unit; adding process air piping to create a closed-loop air header system; and performing electrical and instrumentation control modifications, all as shown and specified in the Contract Documents.

3.2 Background

Pembroke Pines, Florida, ranked as the eleventh largest city among the state's four hundred plus municipalities and the second largest in Broward County, maintains a welcoming small-town ambiance that resonates with its residents. Located conveniently in southwest Broward County, the city provides seamless access to major highways, employment centers, entertainment venues, parks, golf courses, and a diverse array of dining and shopping options.

With a population of approximately 170,000 residents spread across 32.68 square miles, Pembroke Pines is renowned as one of the best cities to live in America. The city boasts 28 superior parks, lush landscaping, and a distinctive South Florida charm that contributes to its natural beauty. Notably recognized as 2024's Best Place to Raise a Family in Florida, and 2024's Best City of Hispanic Entrepreneurs by WalletHub, Pembroke Pines also earned a place as the on Money Magazine's esteemed Best Places to Live list in 2014, as the sole Florida representative, ranking in at #32 in the nation.

Incorporated in 1960, Pembroke Pines is celebrated as a safe and desirable community, having received accolades such as the All-America City designation. The city's commitment to arts and culture, exceptional schools, diverse population, numerous parks, and forward-thinking approach in an ever-evolving world make it a standout destination.

Pembroke Pines is also the home to the largest municipal-run charter school system in the nation, serving over 6,000 students across five separate campuses. The City’s award-winning charter school system is located in the Broward County School District, which is the sixth largest school district in the nation.

SECTION 4 - SCOPE OF WORK

4.1 General Summary

Below is a general list of the services required for the construction. it is not intended to be complete. Refer to **attachment D: Unit 1 Rehabilitation Specifications** and **attachment E: Unit 1 Rehabilitation Plans** in conjunction to the requirements outlined in this bid package.

The project involves the following generalized descriptions of work:

1. Cleaning and grit removal.
2. Remove and replace existing fine bubble diffuser system.
3. Remove and replace Clarifier Drive.
4. Remove existing Return Activated Sludge (RAS) box and RAS valve. Replace with new RAS box and valve based on the manufacture design.
5. Install new froth spray system for the effluent trough.
6. Renovation, surface preparation and painting entire unit.
7. Additional process air piping needed to create a close loop air header system.
8. Electrical and instrumentation control modifications.

SECTION 5 - PRICE PROPOSAL / BID TABLE

The vendor must provide their pricing electronically through the designated line items listed on the Bid Sheet/Pricing Table via the City's e-Procurement portal on OpenGov.

Vendor Notes: The bid tables includes a "Vendor Notes" column for any additional comments regarding the requested line item(s). A comment is preferred in the "Vendor Notes" column. If the vendor does not need to submit any comments, they may leave it blank or enter N/A or similar.

Payment & Performance Bonds: There is a table specifically for the vendor to submit pricing for a Payment & Performance Bond. If the total cumulative base proposal amount does not exceed $200,000 and a Payment and Performance Bond is not required, please enter "0" on the "If Applicable, Cost for Payment and Performance Bond" column for each line item.

Primary Responses: The initial Bid Table is for the primary responses so that the vendors can submit the requested goods and/or services.

PRIMARY RESPONSE

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	Vendor Notes
1-1	Mobilization and Demobilization	1	Lump Sum			
1-2	Cleaning	1	Lump Sum			
1-3	Remove and Replace Fine Bubble Aeration System	1	Lump Sum			
1-4	Remove and Replace Clarifier Drive	1	Lump Sum			
1-5	Remove and Replace Return RAS/WAR Splitter Box and Valve	1	Lump Sum			
1-6	Remove and Replace Spray Wash System	1	Lump Sum			
1-7	Renovation	1	Lump Sum			
1-8	Surface Preparation and Painting	1	Lump Sum			
1-9	Closed Loop Air Header Addition	1	Lump Sum			

Line Item	Description	Quantity	Unit of Measure	Unit Cost	Total	Vendor Notes
1-10	Electrical, Instrumentation and Controls	1	Lump Sum			
TOTAL						

PAYMENT AND PERFORMANCE BOND

Line Item	Description	Unit of Measure	Percentage
2-1	Cost to provide a Payment & Performance Bond for the project, in the form of a percent	Percent	

SECTION 6 - SUBMITTAL DOCUMENTS

Bids must be submitted electronically at https://procurement.opengov.com/portal/pembrokepines on or before **2:00 pm on Tuesday, July 29, 2025.** Please note vendors should be registered on OpenGov under the name of the organization that they are operating as and it should match the organization name on the documents that they are submitting and utilizing when responding to the solicitation. In addition, the vendor must complete the required documents in this section and provide any additional information requested throughout this solicitation. Any additional information requested in the solicitation should be scanned and uploaded. The City recommends for proposers to submit their proposals as soon as they are ready to do so. Please allow ample time to submit your proposals on the https://procurement.opengov.com/portal/pembrokepines website. Proposals may be modified or withdrawn prior to the deadline for submitting Proposals.

PLEASE DO NOT SUBMIT ANY PROPOSALS VIA MAIL, E-MAIL OR FAX.

Prospective proposers interested in responding to this solicitation are requested to provide all of the applicable information listed in this section. Submittals that do not respond completely to all of the requirements specified herein may be considered non-responsive and eliminated from the process. Brevity and clarity are encouraged.

1 CONFIRMATION TO BIND

1.1 I certify that I have read, understood and agree to the terms in this solicitation, and that I am authorized to submit this response on behalf of my company.*

☐ Please confirm

*Response required

2 CERTIFICATION OF INSURANCE COMPLIANCE AND INTENT TO PROCURE REQUIRED COVERAGE

NOTE: Vendors are not required to purchase any additional insurance in order to submit a bid. However, they must certify that they either currently hold, or are able and willing to obtain, all required insurance coverages, endorsements, and limits prior to award and execution of the contract.

2.1 I certify that, if awarded this contract, I will be required to obtain and maintain all insurance policies as detailed in the INSURANCE REQUIREMENTS Section of this solicitation before any work may commence, and throughout the life of the contract.*

☐ Please confirm

*Response required

2.2 Do you confirm that you will only use insurance carriers licensed to do business in the State of Florida and rated no less than “A” as to management, and no less than “Class VI” as to financial strength by A.M. Best, and that you understand all endorsements required (e.g., Additional Insured, Waiver of Subrogation, etc.) must be included?*

☐ Yes

☐ No

*Response required

2.3 Do you currently carry insurance policies that meet or exceed the minimum requirements outlined in the INSURANCE REQUIREMENTS section of this solicitation?*

☐ Yes

☐ No

*Response required

When equals "Yes"

2.3.1 Please upload your current certificate(s) of insurance that demonstrate compliance with the insurance requirements outlined in this solicitation.*
*Response required

When equals "No"

2.3.2 Please upload documentation showing that you have obtained a letter from your insurance broker or carrier, such as a Letter of Intent to Insure, Evidence of Insurability, or a Conditional Certificate of Insurance.*
Documentation should show that:

- You can obtain the required insurance.
- The limits and types of coverage will meet the INSURANCE REQUIREMENTS outlined in the solicitation.
- You will provide a COI upon contract award.

*Response required

When equals "No"

2.3.3 Please upload your current certificate(s) of insurance.*
*Response required

2.4 Do you believe you are exempt from one or more insurance requirements (e.g., Workers' Compensation)?*

☐ Yes

☐ No

*Response required

When equals "Yes"

2.4.1 Please upload written documentation requesting an exemption on your company letterhead, subject to City approval.*
*Response required

2.5 Do you plan on using subcontractors for this project?*

☐ Yes

☐ No

*Response required

When equals "Yes"

2.5.1 Do you acknowledge that all subcontractors must also carry the same insurance or be covered under your policy, and that proof of such coverage must be provided to the City?*

☐ Yes

☐ No

*Response required

3 REFERENCE # 1

The minimum experience for this project is **five (5) years**. Provide specific examples of similar experience conducting licensed work of equal or similar scope of work, preferably delivered by the proposed team members. A **minimum of 3** references should be from the last **five years** and should be capable of explaining and confirming your firm's capacity to successfully complete the scope of work outlined herein. As part of the proposal evaluation process, the City may conduct an investigation of references, including a record check or consumer affairs complaints. Proposers' submission of a proposal constitutes acknowledgment of the process and consent to investigate. The City is the sole judge in determining Proposers qualifications. In this section you will have the ability to enter information for 5 different references including their contact details and specific project information.

Please note that the City prefers references who are not current employees of the City of Pembroke Pines, as we generally do not contact our own employees for reference checks.

Proposers are advised to confirm that:

A. Each reference provided by the Respondent has up to date contact persons and contact information;

B. The contact person provided for each reference is someone who has personal knowledge of the Proposer's performance during the referenced project; and

C. The contact person for each reference has been contacted by the Proposer regarding this specific bid submittal and such person confirmed their willingness to serve as a reference.

3.1 Reference Contact Information - Name of Firm, City, County or Agency*
*Response required

3.2 Reference Contact Information - Reference's Business Address*
*Response required

3.3 Reference Contact Information - Reference's Contact Name & Title*
*Response required

3.4 Reference Contact Information - Reference's E-mail Address*
*Response required

3.5 Reference Contact Information - Reference's Phone Number*
*Response required

3.6 Project Information - Was your firm the prime contractor for the listed project?*
☐ Yes
☐ No

*Response required

3.7 Project Information - Name of Contactor Performing the Work*
*Response required

3.8 Project Information - Name and location of the project*
*Response required

3.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for*
*Response required

3.10 Project Information - Project Duration*
*Response required

3.11 Project Information - Completion (Anticipated) Date*
*Response required

3.12 Project Information - Size of Project*
*Response required

3.13 Project Information - Cost of Project*
*Response required

4 REFERENCE # 2

4.1 Reference Contact Information - Name of Firm, City, County or Agency*
*Response required

4.2 Reference Contact Information - Reference's Business Address*
*Response required

4.3 Reference Contact Information - Reference's Contact Name & Title*
*Response required

4.4 Reference Contact Information - Reference's E-mail Address*
*Response required

4.5 Reference Contact Information - Reference's Phone Number*
*Response required

4.6 Project Information - Was your firm the prime contractor for the listed project?*

☐ Yes

☐ No

*Response required

4.7 Project Information - Name of Contactor Performing the Work*
*Response required

4.8 Project Information - Name and location of the project*
*Response required

4.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for*
*Response required

4.10 Project Information - Project Duration*
*Response required

4.11 Project Information - Completion (Anticipated) Date*
*Response required

4.12 Project Information - Size of Project*
*Response required

4.13 Project Information - Cost of Project*
*Response required

5 REFERENCE # 3

5.1 Reference Contact Information - Name of Firm, City, County or Agency*
*Response required

5.2 Reference Contact Information - Reference's Business Address*
*Response required

5.3 Reference Contact Information - Reference's Contact Name & Title*
*Response required

5.4 Reference Contact Information - Reference's E-mail Address*
*Response required

5.5 Reference Contact Information - Reference's Phone Number*
*Response required

5.6 Project Information - Was your firm the prime contractor for the listed project?*

☐ Yes

☐ No

*Response required

5.7 Project Information - Name of Contactor Performing the Work*
*Response required

5.8 Project Information - Name and location of the project*
*Response required

5.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for*
*Response required

5.10 Project Information - Project Duration*
*Response required

5.11 Project Information - Completion (Anticipated) Date*
*Response required

5.12 Project Information - Size of Project*
*Response required

5.13 Project Information - Cost of Project*
*Response required

6 REFERENCE # 4

6.1 Reference Contact Information - Name of Firm, City, County or Agency
6.2 Reference Contact Information - Reference's Business Address
6.3 Reference Contact Information - Reference's Contact Name & Title
6.4 Reference Contact Information - Reference's E-mail Address
6.5 Reference Contact Information - Reference's Phone Number
6.6 Project Information - Was your firm the prime contractor for the listed project?
☐ Yes
☐ No

6.7 Project Information - Name of Contactor Performing the Work
6.8 Project Information - Name and location of the project
6.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for
6.10 Project Information - Project Duration
6.11 Project Information - Completion (Anticipated) Date
6.12 Project Information - Size of Project
6.13 Project Information - Cost of Project

7 REFERENCE # 5

7.1 Reference Contact Information - Name of Firm, City, County or Agency
7.2 Reference Contact Information - Reference's Business Address
7.3 Reference Contact Information - Reference's Contact Name & Title
7.4 Reference Contact Information - Reference's E-mail Address
7.5 Reference Contact Information - Reference's Phone Number
7.6 Project Information - Was your firm the prime contractor for the listed project?

☐ Yes
☐ No

7.7 Project Information - Name of Contactor Performing the Work
7.8 Project Information - Name and location of the project
7.9 Project Information - Nature of the firm's responsibility on the project and work for which staff was responsible for
7.10 Project Information - Project Duration
7.11 Project Information - Completion (Anticipated) Date
7.12 Project Information - Size of Project
7.13 Project Information - Cost of Project

8 PROJECT DOCUMENTS

8.1 PROPOSERS BACKGROUND INFORMATION FORM*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Proposers_Background_Inform...

*Response required

8.2 PROPOSAL SECURITY (BID BOND FORM OR CASHIER'S CHECK)*

a. A Proposal Security shall be in an amount not less than of 5% of the total cumulative base amount proposed.

b. Therefore, proposal should be accompanied by a certified or cashier’s check or by a Bid Bond made payable to the City of Pembroke Pines on an approved form, duly executed by the Proposer as principal and having as surety thereon a surety company acceptable to CITY and authorized to write such Bond under the laws of the State of Florida.

c. Contingency is not to be counted in the total amount the proposal security is based on.

d. Proposers must submit a scanned copy of their bid security (bid bond form or cashier's check) with their bid submittal through OpenGov.

e. Proposers should also submit their original bid security (bid bond form or cashier’s check) at time of the bid due date, or they may be deemed as non-responsive.

f. The original Bid Bond or Cashier's Check should be in a sealed envelope, plainly marked "**BID SECURITY - PSUT-25-07 Wastewater Treatment Plant Unit 1 Rehabilitation** and sent to the City of Pembroke Pines, City Clerk's Office, 4th Floor, 601 City Center Way, Pembroke Pines, Florida, 33025.

g. Please see SPECIAL TERMS & CONDITIONS of this document for additional information.

*Response required

9 SWORN STATEMENT ON PUBLIC ENTITY CRIMES UNDER FLORIDA STATUTES CHAPTER 287.133(3)(a)

9.1 SWORN STATEMENT ON PUBLIC ENTITY CRIMES FORM*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Sworn_Statement_on_Public_E...

*Response required

9.2 Public Entity Crimes Status*

- Which option did you select on the Sworn Statement on Public Entity Crimes Form:
  - A) Neither the entity submitting this sworn statement, nor any officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, nor any affiliate of the entity have been charged with and convicted of a public entity crime subsequent to July 1, 1989.
  - B1) The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND There has been a proceeding concerning the conviction before a hearing officer of the State of Florida, Division of Administrative Hearings. The final order entered by the hearing officer did not place the person or affiliate on the convicted vendor list. (Please attach a copy of the final order.)
  - B2) The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND The person or affiliate was placed on the convicted vendor list. There has been a subsequent proceeding before a hearing officer of the State of Florida, Division of Administrative Hear¬ings. The final order entered by the hearing

officer determined that it was in the public interest to remove the person or affiliate from the convicted vendor list. (Please attach a copy of the final order.)

- B3) The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND The person or affiliate has not been placed on the convicted vendor list. (Please describe any action taken by or pending with the Department of General Services.)

☐ A) No convictions.
☐ B1) Convicted, final order did not place on the convicted vendor list.
☐ B2) Convicted, listed, then removed.
☐ B3) Convicted, not listed, action pending.
*Response required

9.3 Did you select option B1 or B2 above?*
☐ Yes
☐ No

*Response required

When equals "Yes"

9.3.1 Please upload a copy of the final order issued by the hearing officer of the State of Florida, Division of Administrative Hearings.*
*Response required

9.4 Did you select option B3 above?*
☐ Yes
☐ No

*Response required

When equals "Yes"

9.4.1 Please describe any action taken by or pending with the Department of General Services.*
*Response required

10 EQUAL BENEFITS CERTIFICATION FOR DOMESTIC PARTNERS AND ALL MARRIED COUPLES

10.1 EQUAL BENEFITS CERTIFICATION FORM*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Equal_Benefits_Certificatio...

*Response required

10.2 Equal Benefits Status*

- Which option did you select on the Equal Benefits Certification Form:
  - A. Contractor currently complies with the requirements of this section; or
  - B. Contractor will comply with the conditions of this section at the time of contract award; or
  - C. Contractor will not comply with the conditions of this section at the time of contract award: or
  - D. Contractor does not comply with the conditions of this section because of the following allowable exemption (Check only one box below):
    - 1. The Contractor does not provide benefits to employees' spouses in traditional marriages;
    - 2. The Contractor provides an employee the cash equivalent of benefits because the Contractor is unable to provide benefits to employees' Domestic Partners or spouses despite making reasonable efforts to provide them. To meet this exception, the Contractor shall provide a notarized affidavit that it has made reasonable efforts to provide such benefits. The affidavit shall state the efforts taken to provide such benefits and the amount of the cash equivalent. Cash equivalent means the amount of money paid to an employee with a Domestic Partner or spouse rather than providing benefits to the employee's Domestic Partner or spouse. The cash equivalent is equal to the employer's direct expense of providing benefits to an employee's spouse;
    - 3. The Contractor is a religious organization, association, society, or any non-profit charitable or educational institution or organization operated supervised or controlled by or in conjunction with a religious organization, association, or society;
    - 4. The Contractor is a governmental agency;

☐ A) Contractor currently complies.
☐ B) Will comply by contract award.
☐ C) Will not comply.
☐ D1) Does not comply due to an exemption: No spousal benefits for anyone.
☐ D2) Does not comply due to an exemption: Provides cash equivalent after trying.

☐ D3) Does not comply due to an exemption: Religious or related nonprofit.

☐ D4) Does not comply due to an exemption: Government agency.

*Response required

10.3 Did you select option D2 above?*

☐ Yes

☐ No

*Response required

When equals "Yes"

10.3.1 Please upload a notarized affidavit detailing the reasonable efforts made to provide benefits to employees' Domestic Partners or spouses, along with the amount of the cash equivalent provided.*

*Response required

11 DRUG-FREE WORKPLACE CERTIFICATION

11.1 VENDOR DRUG FREE WORKPLACE CERTIFICATION FORM*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Vendor_Drug-Free_Workplace_...

*Response required

11.2 Drug-Free Status*

☐ Complies fully.

☐ Does not comply.

*Response required

12 STANDARD DOCUMENTS

The following documents are standard documents that the City generally requires for every solicitation. As a result, we recommend vendors to keep these documents updated and readily available so that they can be easily uploaded for each project that the vendor would like to participate in. In the event that the City does not have one of the forms or documents listed below for your company, the City may reach out to your company after the bid has closed to obtain the document(s).

12.1 NON-COLLUSIVE AFFIDAVIT*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Non-Collusive_Affidavit.pdf

*Response required

12.2 SCRUTINIZED COMPANY CERTIFICATION*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Scrutinized_Company_Certifi...

*Response required

12.3 E-VERIFY SYSTEM CERTIFICATION*

a. Please download the attached document, complete all required fields, and upload the completed form here.

b. Effective January 1, 2021, pursuant to Section 448.095. Florida Statues, the City may not enter into a contract with a vendor/contractor/subcontractor unless that vendor/contractor/subcontractor is registered with and uses the E- Verify system administered by the U.S. Department of Homeland Security ("DHS").

c. Contractor shall also require all subcontractors to provide an affidavit attesting that the subcontractor does not employ, contract with, or subcontract with, an unauthorized alien. The Contractor shall maintain a copy of such affidavit for the duration of the contract.

- E-Verify_System_Certificati...

*Response required

12.4 HUMAN TRAFFICKING AFFIDAVIT*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Human_Trafficking_Affidavit...

*Response required

12.5 VENDOR INFORMATION FORM*

a. Please download the attached document, complete all required fields, and upload the completed form here.

- Vendor_Information_Form.pdf

*Response required

12.6 FORM W-9 (REVISED MARCH 2024)*

a. Please download the attached document, complete all required fields, and upload the completed form here.

b. Note - Please use the March 2024 version of the form as previously dated versions of this form may delay the processing of any payments to the selected vendor.

- Form_W-9_(Rev_March_2024).pdf

*Response required

13 OPTIONAL DOCUMENTATION

13.1 TRADE SECRETS

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

b. Any language contained in the Proposer's response to the solicitation purporting to require confidentiality of any portion of the Proposer's response to the solicitation, except to the extent that certain information is in the City's opinion a Trade Secret pursuant to Florida law, shall be void. If a Proposer submits any documents or other information to the City which the Proposer claims is Trade Secret information and exempt from Florida Statutes Chapter 119.07 ("Public Records Laws"), the Proposer shall clearly designate that it is a Trade Secret and that it is asserting that the document or information is exempt. The Proposer must specifically identify the exemption being claimed under Florida Statutes 119.07. The City shall be the final arbiter of whether any information contained in the Proposer's response to the solicitation constitutes a Trade Secret.

c. EXCEPT FOR CLEARLY MARKED PORTIONS THAT ARE BONA FIDE TRADE SECRETS PURSUANT TO FLORIDA LAW, DO NOT MARK YOUR RESPONSE TO THE SOLICITATION AS PROPRIETARY OR CONFIDENTIAL. DO NOT MARK YOUR RESPONSE TO THE SOLICITATION OR ANY PART THEREOF AS COPYRIGHTED. ALL DOCUMENTS THAT THE FIRM PURPORTS TO BE CONFIDENTIAL, PROPRIETARY OR A TRADE SECRET SHALL BE UPLOADED TO THE OPENGOV WEBSITE AS A SEPARATE ATTACHMENT, IN THIS SECTION, CLEARLY IDENTIFYING THE EXEMPTION BEING CLAIMED UNDER FLORIDA STATUTES 119.07.

d. The city's determination of whether an exemption applies shall be final, and the proposer agrees to defend, indemnify, and hold harmless the city and the city's officers, employees, and agent, against any loss or damages incurred by any person or entity as a result of the city's treatment of records as public records.

13.2 FINANCIAL STATEMENTS

a. The City is **NOT** requesting the vendor to submit any financial statements for this project and prefers if the vendor does not submit financial statements. In addition, if the City needs a copy of the vendor's financial statements, the City can contact the vendor after the bid due date to request those documents. However, if the vendor does submit the financial statements, they should be uploaded in this section.

b. Any claim of confidentiality on financial statements must be asserted at the time of submittal. The firm must identify the specific statute that authorizes the exemption from the Public Records Law. Please note that the financial statement exemption provided for in Section 119.071(1)c, Florida Statutes only applies to submittals in response to a solicitation for a "public works" project.

13.3 ALTERNATIVES

a. If you are submitting an alternative product, please upload any related information in this section (such as specification sheets, etc.).

b. In addition, pursuant to the **"Brand Names"** Section included in the GENERAL TERMS AND CONDITIONS Section if and wherever in the specifications a brand name, make, name of manufacturer, trade name, or vendor catalog number is mentioned, it is for the purpose of establishing a grade or quality of material only. Since the City does not wish to rule out other competition and equal brands or makes, the phrase "OR EQUAL" is added. However, if a product other than that specified is bid, Proposers shall indicate on their proposal and clearly state the proposed substitution and deviation. It is the vendor's responsibility to provide any necessary documentation and samples within their bid submittal to prove that the product is equal to that specified. Such samples are to be furnished before the date of bid opening, unless otherwise specified. Additional evidence in the form of documentation and samples may be requested if the proposed brand is other than that specified. The City retains the right to determine if the proposed brand shall be considered as an approved equivalent or not.

13.4 ADDITIONAL INFORMATION

a. Please provide any additional information that you deem necessary to complete your proposal in this section, if it has not been requested in another section.

13.5 PROFESSIONAL LICENSES

a. If applicable, please upload any professional licenses that may be required to perform the services outlined in the solicitation. The following licensing requirements shall apply when the applicable Florida statute mandates specific licensing for Contractors engaged in the type of work covered by this solicitation.

1. State of Florida, Department of Professional Regulation, Construction Industries Licensing Board and licensed by other federal, state, regional, county or municipal agencies having jurisdiction over the specified construction work.

2. Said licenses shall be in the Firm's name as it appears on the OpenGov registration and as appropriately registered with the applicable licensing entity. Proposer shall supply appropriate license numbers, with expiration dates, as part of their bid. Failure to hold and provide proof of proper licensing, certification and registration may be grounds for rejection of the bid.

3. Subcontractors contracted by the Prime Contractor shall be licensed in their respective fields to obtain construction permits as necessary. Said licenses must be in the name of the subcontractor.

14 VENDOR CLASSIFICATION

14.1 Is your firm a Local Pembroke Pines Vendor (LPPV) and Local Broward County Vendor (LBCV)?*

a. The evaluation of competitive bids is subject to section 35.36 of the City's Procurement Procedures which, except where contrary to federal and state law, or any other funding source requirements, provides that preference be given to local businesses. To satisfy this requirement, the vendor shall affirm in writing its compliance with either of the following objective criteria as of the bid or proposal submission date stated in the solicitation. A local business shall be defined as:

1. **"Local Pembroke Pines Vendor"** shall mean a business entity which has maintained a permanent place of business with full-time employees within the City limits for a minimum of one (1) year prior to the date of issuance of a bid or proposal solicitation. The permanent place of business may not be a post office box. The business location must actually distribute goods or services from that location. In addition, the business must have a current business tax receipt from the City of Pembroke Pines, **OR;**

2. **"Local Broward County Vendor"** shall mean or business entity which has maintained a permanent place of business with full-time employees within the Broward County limits for a minimum of one (1) year prior to the date of issuance of a bid or proposal solicitation. The permanent place of business may not be a post office box. The business location must actually distribute goods or services from that location. In addition, the business must have a current business tax receipt from the Broward County or the city within Broward County where the business resides.

b. A preference of five percent (5%) of the total evaluation point, or five percent (5%) of the total price, shall be given to the Local Pembroke Pines Vendor(s); A preference of two and a half percent (2.5%) of the total evaluation point for local, or two and a half percent (2.5%) of the total price, shall be given to the Local Broward County Vendor(s).

☐ Yes
☐ No

*Response required

When equals "Yes"

14.1.1 Please indicate your Local Vendor Status*

☐ Local Pembroke Pines Vendor (LPPV)
☐ Local Broward County Vendor (LBCV)

*Response required

When equals "Yes"

14.1.2 Local Vendor Preference Certification*

1. Please download the attached document, complete all required fields, and upload the completed form here.

- Local_Vendor_Preference_Cer...

*Response required

When equals "Yes"

14.1.3 Local Business Tax Receipts*

1. If claiming Local Vendor Preference, please upload any previous business tax receipts to indicate that the business entity has maintained a permanent place of business for a minimum of one (1) year.

*Response required

14.2 Is your firm a Veteran Owned Small Business (VOSB)?*

a. The evaluation of competitive bids is subject to section 35.37 of the City's Procurement Procedures which, except where contrary to federal and state law, or any other funding source requirements, provides that preference be given to veteran owned small businesses. To satisfy this requirement, the vendor shall affirm in writing its compliance with the following objective criteria as of the bid or proposal submission date stated in the solicitation.

b. A preference of two and a half percent (2.5%) of the total evaluation point, or two and a half percent (2.5%) of the total price, shall be given to the Veteran Owned Small Business (VOSB).

☐ Yes
☐ No

*Response required

When equals "Yes"

14.2.1 Upload the "Determination Letter" from the United States Department of Veteran Affairs Center notifying the business that they have been approved as a Veteran Owned Small Business (VOSB)

When equals "Yes"

14.2.2 Upload Veteran Owned Small Business Certification(s) from any relevant agency(ies)

14.3 Is your firm a Minority-Owned Business Enterprise (MBE)?*

☐ Yes
☐ No

*Response required

When equals "Yes"

14.3.1 Please indicate the classification of your Minority-Owned Business Enterprise (MBE)*
Select all that apply

☐ African-American MBE
☐ Asian-American MBE
☐ Hispanic-American MBE
☐ Native-American MBE
☐ Other option not listed above
*Response required

When equals "Yes"

14.3.2 MBE Certification Documentation*

1. Upload your MBE Certification Documentation here, preferably with the State of Florida's Office of Supplier Diversity. If you have multiple MBE certifications, please combine them into one (1) document and upload.

*Response required

14.4 Is your firm a Woman-Owned Business Enterprise (WBE)?*

☐ Yes
☐ No

*Response required

When equals "Yes"

14.4.1 WMBE Certification Documentation*

1. Upload your WMBE Certification Documentation here, preferably with the State of Florida's Office of Supplier Diversity. If you have multiple WMBE certifications, please combine them into one (1) document and upload.

*Response required

14.5 Is your firm a HubZone Business / Labor Surplus Area Firm?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.5.1 HubZone Business / Labor Surplus Area Firm Certification Documentation*

1. Upload your HubZone Business / Labor Surplus Area Firm Certification Documentation, preferably with the U.S. Small Business Administration (SBA). If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

14.6 Is your firm a Broward County Small Business Enterprise (SBE)?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.6.1 SBE Cerification Documentation*

1. Upload your SBE Certification Documentation from Broward County's Office of Economic and Small Business Development (OESBD). If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

14.7 Is your firm a Broward County Business Enterprise (CBE)?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.7.1 CBE Certification Documentation*

1. Upload your CBE Certification Documentation from Broward County's Office of Economic and Small Business Development (OESBD). If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

14.8 Is your firm a Broward County Disadvantaged Business Enterprise (DBE)?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.8.1 DBE Certification Documentation*

1. Upload your DBE Certification Documentation from Broward County's Office of Economic and Small Business Development (OESBD). If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

14.9 Does your firm have a Vendor Classification that was not listed above?*

☐ Yes

☐ No

*Response required

When equals "Yes"

14.9.1 Other Vendor Classification Certification Documentation*

1. Upload your other Certification Documentation here. If you have multiple certifications, please combine them into one (1) document and upload.

*Response required

14.10 Are you currently registered as an active entity on SAM.gov (System for Award Management)?*

a. All vendors submitting bids for this project must be registered and active in the System for Award Management (SAM.gov) at the time of bid award. This is a federal requirement for entities receiving federal funds, including contracts, grants, or other financial assistance. Registration on SAM.gov ensures that vendors are eligible to do business with the U.S. government and are not suspended, debarred, or otherwise excluded from participation in federal programs. SAM registration is free and can be completed at https://sam.gov. Bidders must provide their Unique Entity ID (UEI) and proof of active registration as part of their proposal.

☐ Yes
☐ No

*Response required

When equals "Yes"

14.10.1 If yes, please provide your Unique Entity ID (UEI)*
*Response required

When equals "Yes"

14.10.2 What is the expiration date of your current SAM.gov registration? (MM/DD/YYYY)*
*Response required

When equals "Yes"

14.10.3 Proof of Registration Upload*

1. Please upload a PDF copy or screenshot of your entity's active registration status from SAM.gov that includes:

   A. Entity Name

   B. Unique Entity ID (UEI)

   C. DUNS (if applicable)

   D. Registration Status ("Active")

   E. Expiration Date

2. *This document must be downloaded from https://sam.gov and must show the current status at the time of bid submission.*

*Response required

14.11 Debarment Status - Is your entity currently debarred, suspended, or otherwise excluded from receiving federal contracts or financial assistance?*

☐ Yes
☐ No

*Response required

When equals "Yes"

14.11.1 If yes, please provide an explanation.*
*Response required

When equals "Yes"

14.11.2 If yes, please upload any relevant documentation, if applicable.

14.12 I certify that the information provided above is true and correct to the best of my knowledge. I understand that false or misleading statements may disqualify this bid and subject the entity to federal penalties.*

☐ Please confirm

*Response required

SECTION 7 - EVALUATION OF PROPOSALS & PROCESS SELECTION

7.1 Qualifying & Selecting Firms

A. Staff will evaluate all responsive proposals received from proposers who meet or exceed the bid requirements contained in the solicitation. Evaluations shall be based upon the information and references contained in the proposals as submitted.

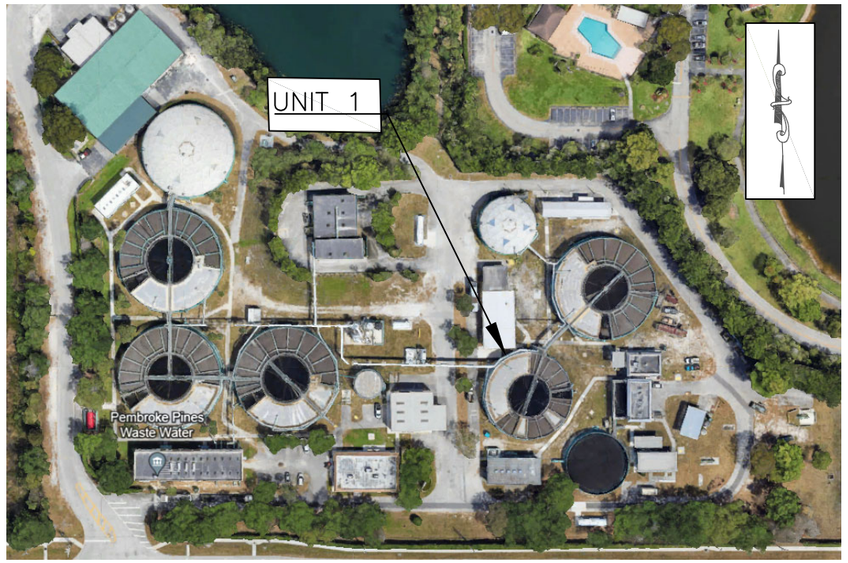
B. Staff will make a recommendation to the City Commission for award of contract.

C. The contract shall be awarded to the most responsive/responsible bidder whose bid is determined to be the most advantageous to the City taking into consideration the evaluation criteria.

Attachment D

CITY OF PEMBROKE PINES
WWTP UNIT 1 REHABILITATION PLAN

13995 PEMBROKE RD, PEMBROKE PINES, FL 33027



WASTEWATER TREATMENT PLANT MAP
NOT TO SCALE

DRAWING INDEX

SHEET No.	SHEET
C-0	COVER SHEET
C-1	SCOPE OF WORK
C-2	RENOVATION AND PAINTING
C-3	CLOSED LOOP AIR HEADER SYSTEM
E-1	ELECTRICAL LEGEND AND NOTES
E-2	ELECTRICAL SITE PLAN -DEMOLITION
E-3	PHOTOS AND EAST ELECTRICAL BUILDING
E-4	ONE LINE AND RISER DIAGRAM
E-5	MODIFIED TREATMENT UNIT ELECTRIC PLAN
E-6	ELECTRICAL DETAILS - SHEET 1
E-7	ELECTRICAL DETAILS- SHEET 2
I-1	INSTRUMENTATION LEGEND AND NOTES
I-2	P&ID - TREATMENT UNIT NO. 1
I-3	INSTRUMENTATION DETAILS

REVISIONS

NO.	DATE	BY	DESCRIPTION

CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FL 33025

PEMBROKE PINES COMMISSION

ANGELO CASTILLO	MAYOR
MICHAEL A. HERNANDEZ	VICE MAYOR - DISTRICT 4
THOMAS GOOD Jr.	DISTRICT 1
JAY D. SCHWARTZ	DISTRICT 2
MARIA RODRIGUEZ	DISTRICT 3
CHARLES F. DODGE	CITY MANAGER

DATE: MAY 23, 2025

COVER SHEET, C-0

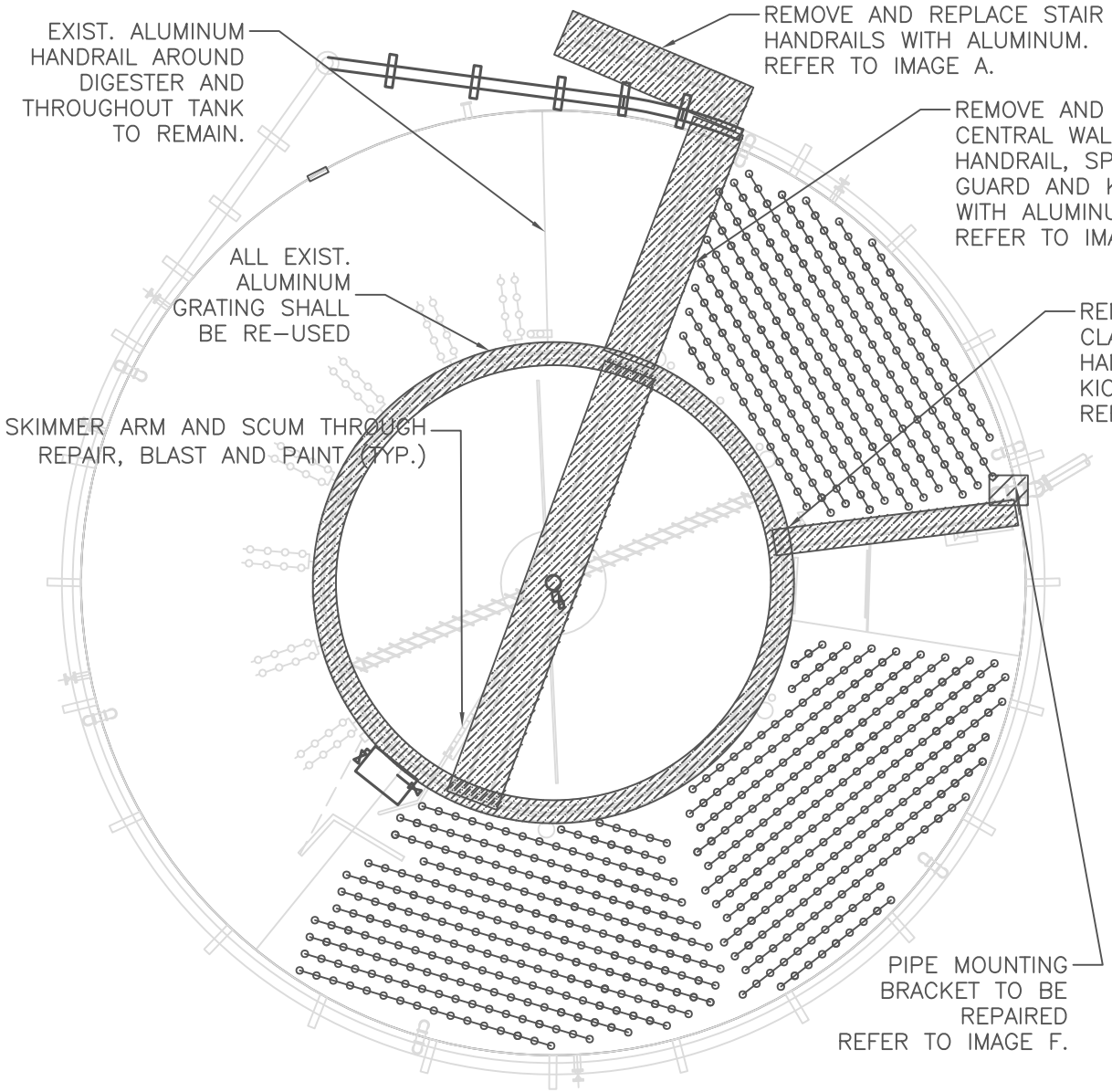
PROJECT TITLE: CITY OF PEMBROKE PINES WWTP UNIT 1 REHABILITATION PLAN

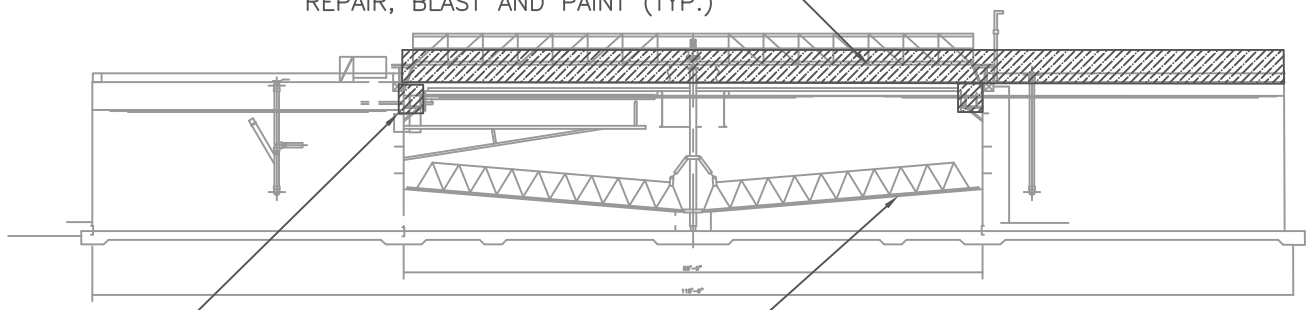
BID SET

File Name: S:\Public Works\UTILITIES\UTILITY ENGINEERING\WWTP\WWTP #1 Rehab 2025\Plans\WWTP UNIT 1 AutoCAD\2025-05-23 - WWTP REHABILITATION AT UNIT 1 FULL SET.dwg - (Plotted by: Cooper, Jonathan on Friday, May 23, 2025)

Attachment D

DRAFT DOCUMENT FOR COMMISSION REVIEW





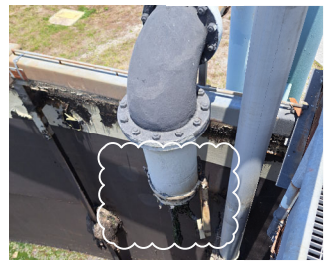

A. STAIRS


B.HANDRAIL, SPLASH GUARD AND KICKPLATE


C. CLARIFIER BRIDGE AND FROTH SPRAY SYTEM


D. HANDRAIL, KICKPLATE AND WALKWAY


E.HANDRAIL, KICKPLATE AND WALKWAY


F.PIPE MOUNTING BRACKET REPAIR


G. BLAST, WELD AND RECOAT

PART SIX – REMOVE AND REPLACE SPRAY WASH SYSTEM

A. FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND INCIDENTALS REQUIRED AND INSTALL, COMPLETE, READY FOR OPERATION AND FIELD–TESTED ONE SPRAY WASH SYSTEM AS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN.
B. REMOVE EXISTING AND INSTALL NEW SPRAY WASH SYSTEM INCLUDING SUBMERSIBLE PUMP, SCH. 80 PVC PIPE, FITTINGS, AND 316 STAINLESS STEEL NOZZLES. MATCH EXISTING SPRAY PUMP MODEL PROSSER ENPO ¾ HP, QUANTITY OF SPRAY NOZZLES, PIPE SIZES AND LOCATIONS.

PART SEVEN – RENOVATION

A. AFTER CLEANING AND PRIOR TO WORK, COORDINATE A TANK INSPECTION WITH OWNER.
B. REMOVE ALL UNUSED BRACKETS, PIPES, LINES AND CAP/WELD FLUSH WITH STEEL SURFACE.
C. REPAIR OR REINFORCE ALL STEEL AREAS WHERE THE CORROSION EXCEEDS 1/16" DEPTH. REPAIRS SHALL CONSIST OF 1/4" STEEL PLATE OR FLAT BAR WELDED ALL AROUND, MINIMUM.
D. REMOVE AND REPLACE EXISTING PIPE SUPPORTS AND LIGHT POLE BASES. MATCH EXISTING.
E. ALL NON–ALUMINUM HANDRAILS, SPLASH GUARDS AND KICK–PLATES SHALL BE BE REMOVED AND REPLACED WITH ALUMINUM. CONTRACTOR SHALL SUBMIT DRAWINGS SIGNED AND SEALED BY A FLORIDA REGISTERED ENGINEER.
F. ALL THE ALUMINUM GRATING AND ALUMINUM HANDRAILS TO REMAIN. RECORD THE LOCATION OF EACH ITEM TO ENSURE PROPER REMOVAL AND REPLACEMENT.
D. REMOVE AND REPLACE NEOPRENE EDGES ON EXISTING SKIMMER ARMS AND SLUDGE SCRAPERS. MATCH EXISTING THICKNESS AND DIMENSIONS.
E. INSPECT CONCRETE SLAB FOR CRACKS AND NOTIFY OWNER.

PART EIGHT – SURFACE PREPARATION AND PAINTING. SECTION 09900 – PROTECTIVE COATINGS

A. FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND INCIDENTALS REQUIRED TO PERFORM SURFACE PREPARATION AND PAINTING OF ALL SURFACES ON UNIT 1, INCLUDING BUT NOT LIMITED TO INTERIOR, EXTERIOR, STRUCTURAL MEMBERS, SKIMMER AND RAKER ARMS, PIPING, PIPE SUPPORTS AND WEIRS.
B. THE CONTRACTOR SHALL REQUIRE THE MANUFACTURER TO FURNISH A MANUFACTURER'S QUALIFIED TECHNICAL REPRESENTATIVE TO VISIT THE PROJECT SITE FOR TECHNICAL SUPPORT AS REQUIRED AND ORDERED AND AS MAY BE NECESSARY TO RESOLVE FIELD QUESTIONS OR PROBLEMS ATTRIBUTABLE TO OR ASSOCIATED WITH THE MANUFACTURER'S PRODUCTS FURNISHED UNDER THIS CONTRACT OR THE APPLICATION THEREOF.
C. THE CONTRACTOR SHALL COORDINATE INTERIOR PAINTING WITH DIFFUSER REMOVAL SO THAT THE TANK FLOOR IS CLEAR OF DIFFUSER EQUIPMENT DURING PAINTING.
D. EXTERIOR FERROUS METALS RE–COAT SHALL BE OPTION #2, PPG.
E. STRUCTURAL MEMBERS FOR FABRIC COVERS ARE NOT SHOWN FOR CLARITY AND ARE TO BE PREPARED AND PAINTED.

PROJECT DESCRIPTION IS CONTINUED ON THE FOLLOWING SHEET.

SEAL

CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

REVISIONS

NO	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
RENOVATION AND PAINTING
13955 Pembroke Rd, Pembroke Pines, FL 33029

SHEET NUMBER: C–2
SCALE: N.T.S
SHEET: 2 OF 3
CITY OF P.P. PLAN SUBMITTAL: BID SET
SUBMITTAL DATE: 5/23/2025

Attachment D

PART NINE – CLOSED LOOP AIR HEADER SYSTEM

1. FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED TO CONSTRUCT THE 12–INCH SCHEDULE 40 WELDED STEEL AIR HEADER EXTENSION AS DEPICTED IN THE DRAWINGS AND SPECIFIED HEREIN.
2. FURNISH ALL LABOR, MATERIALS, EQUIPMENT AND INCIDENTALS REQUIRED TO CONSTRUCT SIX (6) PIPE SUPPORTS FOR THE 12–INCH AIR HEADER EXTENSION AS DEPICTED IN THE DRAWINGS AND SPECIFIED HEREIN. MATCH EXISTING PIPE SUPPORTS. SEE IMAGE G.

NOTES:

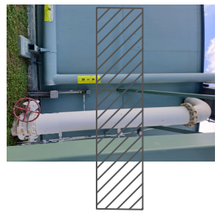
1. REMOVE EXIST. GRASS AND ORGANICS AND COMPACT EXISTING SOIL.
2. CONTRACTOR TO ADJUST THICKNESS OF PIPE SUPPORT FOUNDATION AS NEEDED TO INSURE TOP OF PROPOSED FOUNDATION IS FLUSH WITH EXIST. TANK SLAB AND BOTTOM OF THE FOUNDATION IS A MIN. OF 3" BELOW EXIST. GRADE. FOUNDATION TO BE MINIMUM OF 12" THICK AT ALL LOCATIONS.
3. CONTRACTOR TO ADJUST AIRLINE SUPPORT LOCATIONS & PIPE JOINT LOCATIONS TO AVOID EXISTING TANK PIPING, VALVES, ACCESS POINTS, ETC.
4. ALL SURFACES OF PIPE SUPPORTS, STRAPS AND AIR PIPING TO BE PRIMED AND PAINTED IN ACCORDANCE WITH SECTION 09900.

PART TEN – ELECTRICAL, INSTRUMENTATION AND CONTROLS – SECTION 13300 AND 16001

1. A. THE CONTRACTOR SHALL FURNISH, INSTALL AND PLACE INTO SERVICE ALL OPERATING PROCESS INSTRUMENTATION, CONTROL THE CONTRACTOR SHALL FURNISH, INSTALL AND PLACE INTO SERVICE ALL OPERATING PROCESS INSTRUMENTATION, CONTROL SYSTEMS AND PANELS INCLUDING ACCESSORIES AS SHOWN ON PLANS AND SPECIFIED HEREIN INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:
2. WWTU 1 CONTROL PANEL, ULTRASONIC LEVEL TRANSMITTERS, FLOW METERS, ELECTRIC VALVES, TRANSMITTERS, POWER SUPPLIES, WWTU 1 CONTROL PANEL, SURGE SUPPRESSORS, TERMINAL STRIPS, MODIFY EXIST. PLC PANEL AND SCADA PROGRAMMING.
3. ENGINEERING, FURNISHING, INSTALLING, CALIBRATING, ADJUSTING, TESTING, DOCUMENTING, STARTING UP, AND OWNER TRAINING ENGINEERING, FURNISHING, INSTALLING, CALIBRATING, ADJUSTING, TESTING, DOCUMENTING, STARTING UP, AND OWNER TRAINING FOR A COMPLETE INSTRUMENTATION AND CONTROL SYSTEM IN PLACE.
4. REFER TO SPECIFICATIONS AND THE FOLLOWING ELECTRICAL, INSTRUMENTATION AND CONTROL SHEETS.

A.EXIST. AIR HEADER SYSTEM

B. ABANDONED AIR HEADER PRESSURE GAUGE AND EXIST. HOSE BIBB



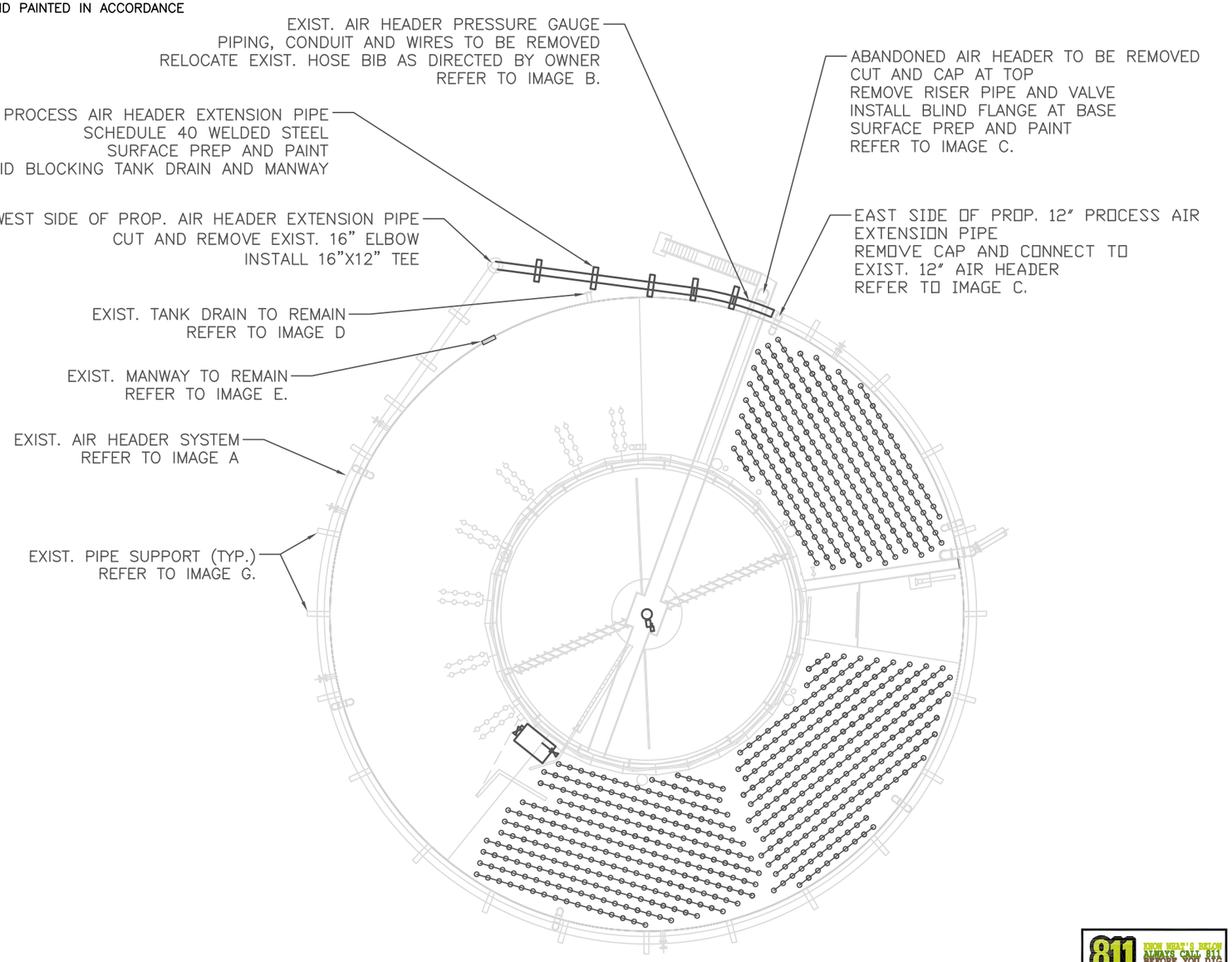
C. ABANDONED AIR HEADER AND EXIST. 12" AIR HEADER SYSTEM

D. EXIST. DRAIN

E. EXIST. MANWAY

F. REROUTE AIR HEADER TO AVOID BLOCKING MANWAY AND CONNECT TO EXIST. AIR HEADER

G. PIPE SUPPORT (TYP.)



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2025-05-23 – WWTP REHABILITATION AT UNIT 1
FULL SET.dwg

5/1/2023

SEAL

CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

REVISIONS

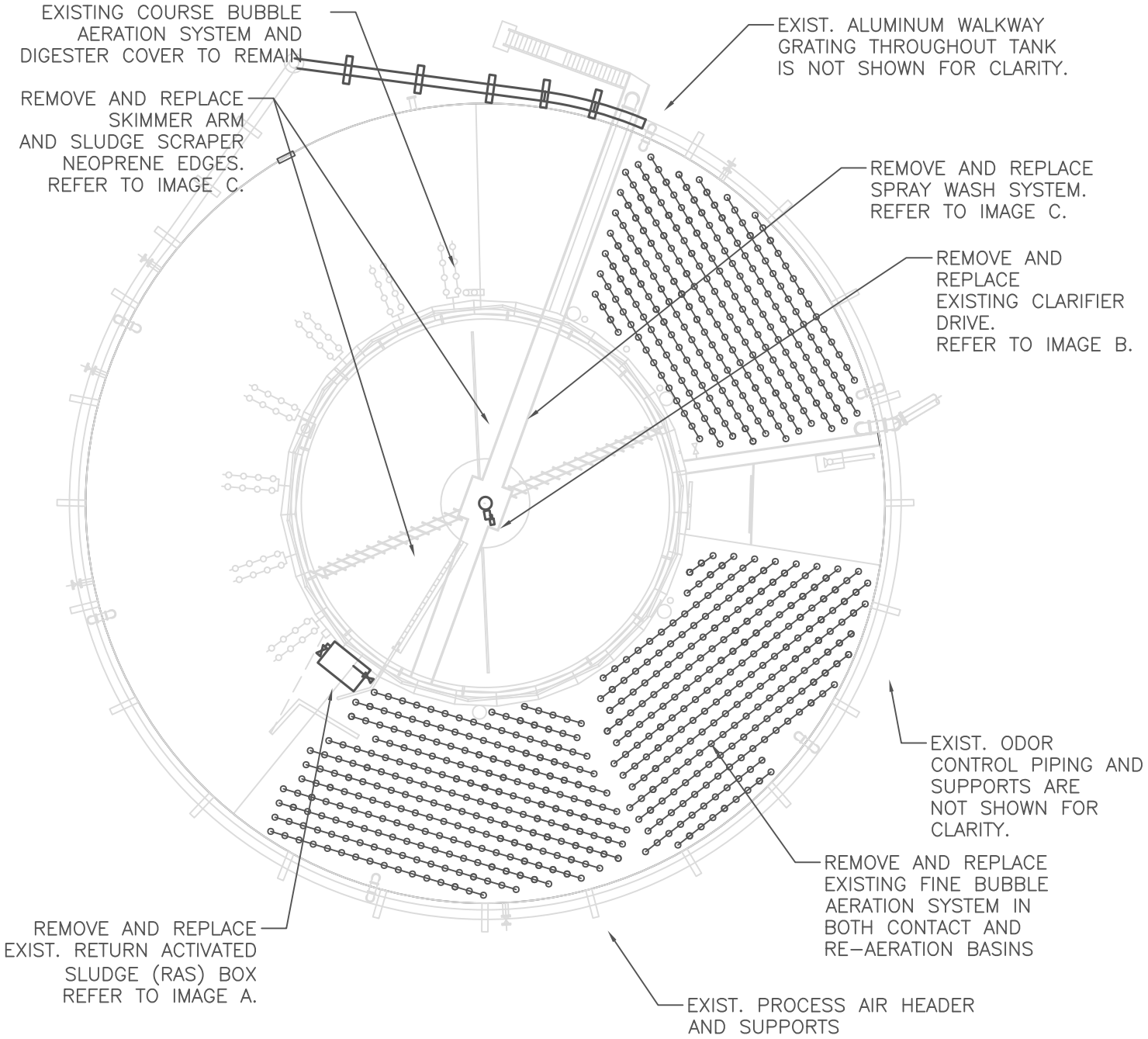
NO.	DATE	BY	DESCRIPTION
1			
2			
3			
4			

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
CLOSED LOOP AIR HEADER SYSTEM
13955 Pembroke Rd, Pembroke Pines, FL
33029

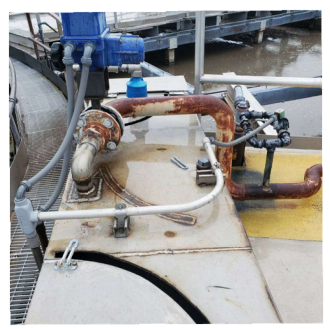
SHEET NUMBER: C-3
SCALE: N.T.S
SHEET: 3 OF 3
CITY OF P.P. PLAN SUBMITTAL: BID SET
SUBMITTAL DATE: 05/23/2025

Attachment D

DRAFT DOCUMENT FOR COMMISSION REVIEW



A. EXIST. RETURN ACTIVATED SLUDGE (RAS) BOX



B. EXIST. CLARIFIER DRIVE

C. SPRAY WASH SYSTEM

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www.callsunshine.com

PROJECT DESCRIPTION:

PART ONE – MOBILIZATION AND DEMOBILIZATION

A. THE CONTRACTOR SHALL INCLUDE COMPENSATION FOR ALL LABOR, MATERIALS, EQUIPMENT AND ALL INCIDENTALS REQUIRED FOR ALL TEMPORARY FACILITIES, TRANSPORTATION, COMMUNICATIONS, OFFICE, MAINTENANCE AND OTHER PRE– AND POST–CONSTRUCTION EXPENSES NECESSARY FOR THE START OR CESSATION OF THE WORK.

PART TWO – CLEANING

B. THE CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT AND DISPOSAL FEES ASSOCIATED WITH THE CLEANING OF WWTU #1 TREATMENT COMPARTMENTS INCLUDING THE CONTACT, RE–AERATION AND DIGESTER ZONES. CLEANING SHALL INCLUDE REMOVAL OF ALL SAND, GRIT, RAGS, SOLIDS AND THE LIKE, DOWN TO A CLEANED, PRESSURE WASHED SURFACE OF THE WALLS AND FLOOR.
C. CONTRACTOR SHALL REMOVE AND REPLACE EXISTING DIGESTER COVERS FOR CLEANING OF THE DIGESTER AND INSPECTION OF THE DIGESTER COMPARTMENT BY THE OWNER.
D. PAYMENT SHALL BE MADE ON A PER TON BASIS OF ACTUAL MATERIAL REMOVED AND HAULED AWAY AS MEASURED BY THE SCALES OF THE RECEIVING FACILITY.
E. THE CONTRACTOR SHALL PROVIDE RECEIPTS, IN TONS, FROM THE RECEIVING FACILITY.
F. QUANTITIES PROVIDED IN THE BID FORM BY THE CITY ARE FOR ESTIMATING PURPOSES ONLY

PART THREE – REMOVE AND REPLACE FINE BUBBLE AERATION SYSTEM. SECTION 11439.

A. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT NECESSARY FOR SUPPLY, INSTALLATION, TESTING, AND PLACING INTO SATISFACTORY OPERATION NEW FINE BUBBLE MEMBRANE DIFFUSED AERATION EQUIPMENT INCLUDING STAINLESS STEEL TO PVC TRANSITION COUPLING, PVC MANIFOLD AND DISTRIBUTOR PIPES, DIFFUSER HOLDERS, DIFFUSERS, STAINLESS STEEL SUPPORTS, PURGE SYSTEMS, AND RELATED ITEMS IN THE CONTACT ZONE AND SECONDARY AERATION ZONE WITHIN THE EXISTING PACKAGE PLANT NO. 1 AS DEPICTED IN THE DRAWINGS AND SPECIFIED HEREIN.
B. PRIOR TO SHOP DRAWING APPROVAL, THE CONTRACTOR SHALL COORDINATE AN INSPECTION WITH THE OWNER AFTER CLEANING TO INSPECT THE EXISTING FINE BUBBLE AERATION SYSTEM FOR THE PURPOSES OF DETERMINING WHICH COMPONENTS, IF ANY, MAY BE RE–USED.

PART FOUR – REMOVE AND REPLACE CLARIFIER DRIVE. SECTION 15050.

A. FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND INCIDENTALS REQUIRED AND INSTALL, COMPLETE, READY FOR OPERATION AND FIELD–TESTED CLARIFIER DRIVE AS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN.
B. THE CLARIFIER DRIVE SHALL BE DESIGNED TO MEET THE OPERATIONAL FUNCTIONALITY OF THE EXISTING UNIT #1 MODEL R OXIGEST BNR (BIOLOGICAL NUTRIENT REMOVAL) TREATMENT SYSTEM AS MANUFACTURED BY SMITH AND LOVELESS.
C. THE CLARIFIER DRIVE SHALL BE DESIGNED TO ACCOMMODATE THE EXISTING TREATMENT CAPACITY AND SHALL HAVE, AT A MINIMUM, THE SAME SHAFT SIZE, SPEED, GEAR REDUCTION AND TORQUE CAPACITY AS THE EXISTING CLARIFIER DRIVE AND GEAR.
D. REMOVE EXISTING CLARIFIER DRIVE AND GEAR, INCLUDING ALL MECHANICAL, ELECTRICAL AND OTHER APPURTENANCES AND SALVAGE ON–SITE AS DIRECTED BY THE OWNER.
E. INSTALL NEW NEOPRENE EDGES ON EXISTING SKIMMER ARMS.

PART FIVE – REMOVE AND REPLACE EXISTING RETURN ACTIVATED SLUDGE/RETURN ACTIVATED SLUDGE (RAS/WAS) FLOW SPLITTER BOX. SECTION 11300.

A. FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND INCIDENTALS REQUIRED AND INSTALL, COMPLETE, READY FOR OPERATION AND FIELD–TESTED ONE RAS/WAS FLOW SPLITTER BOX AND VALVE AS SHOWN ON THE DRAWINGS AND SPECIFIED HEREIN.
B. THE RAS/WAS FLOW SPLITTER BOX SHALL BE DESIGNED TO MEET THE OPERATIONAL FUNCTIONALITY AND CAPACITY OF THE EXISTING UNIT #1 MODEL R OXIGEST BNR (BIOLOGICAL NUTRIENT REMOVAL) TREATMENT SYSTEM AS MANUFACTURED BY SMITH AND LOVELESS.
C. THE RAS/WAS FLOW SPLITTER BOX SHALL BE FURNISHED WITH A PLUG VALVE WITH ELECTRIC ACTUATOR, A V–NOTCH WEIR AND FLOW SENSOR.

PROJECT DESCRIPTION IS CONTINUED ON THE FOLLOWING SHEETS.

SEAL

CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

REVISIONS

NO.	DATE	BY	DESCRIPTION
1			
2			
3			
4			

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
SCOPE OF WORK
13955 Pembroke Rd, Pembroke Pines, FL 33029

SHEET NUMBER: C–1
SCALE: N.T.S
SHEET: 1 OF 2
CITY OF P.P. PLAN SUBMITTAL: BID SET
SUBMITTAL DATE: 05/23/2025

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	CONNECTION POINT TO EQUIPMENT SPECIFIED, FURNISHED AND INSTALLED UNDER OTHER SECTIONS. RACEWAY, CONDUCTOR AND CONNECTION IN THIS SECTION.
1"C,2#12,1#12G 1"C,1–25/C TYPE 1	INDICATES RACEWAY AND CIRCUIT CONDUCTORS. FIRST NUMBER IS RACEWAY SIZE. THE FOLLOWING NUMBERS ARE THE CONDUCTOR QUANTITIES, SIZES, AND TYPES.
5	MOTOR, SQUIRREL CAGE INDUCTION – HORSEPOWER INDICATED
X	LUMINAIRE AND POLE – SEE SCHEDULE FOR TYPE
X	WALL MOUNTED LUMINAIRE – SEE SCHEDULE FOR TYPE
Y Z(TYP) X	LIGHTING FIXTURE POWER AND SWITCHING LEGEND X=FIXTURE TYPE. SEE SCHEDULE FOR TYPE Y=PANEL–CIRCUIT BRKR Z=SWITCH IF NO Z INDICATED, CONNECT DIRECTLY TO CIRCUIT BREAKER.
X	EXIT LIGHTS – SOLID SECTION IS DIRECTION OF FACE SEE SCHEDULE FOR TYPE
	EMERGENCY LIGHT WITH BATTERY PACK SEE SCHEDULE FOR TYPE
	GROUND ROD – 3/4" x 20' COPPER CLAD UNLESS OTHERWISE NOTED
	GROUND ROD WITH TEST WELL – 3/4" x 20' COPPER CLAD UNLESS OTHERWISE NOTED
S	WALL SWITCH: 2– DOUBLE POLE, 3– THREE WAY, 4– FOUR WAY, WP–WEATHERPROOF, P– PILOT LIGHT, K– KEY OPERATED, D– DIMMER, CRE–CORROSION RESISTANT
S_M	MANUAL MOTOR STARTER SWITCH, NEMA 4X UNLESS OTHERWISE NOTED. NUMBER OF POLES AS REQUIRED
G	GENERATOR
	CONVENIENCE RECEPTACLE 20A RATED– DUPLEX UNLESS SPECIFIED OTHERWISE WP–WEATHERPROOF, TL– TWIST LOCK, GFI–GROUND FAULT INTERRUPTER, C– CLOCK HANGER, CRE–CORROSION RESISTANT
J	JUNCTION BOX NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. 4X = NEMA 4X SS
[B2]	CONDUIT/CONDUCTOR – REFER TO CIRCUIT SCHEDULE
LPA–2	HOME RUN – PANEL AND CIRCUIT NUMBER SHOWN
	DIRECT BURIED UNDERGROUND CONDUIT SEE SPECIFICATION
G	GROUND WIRE, 4/0 BARE TINNED COPPER GROUND WITH MINIMUM #4 GROUND TAIL UNLESS OTHERWISE NOTED
	EXPOSED CONDUIT AND CONDUCTORS
YCX	YARD CONDUIT. REFER TO YARD CONDUIT SCHEDULE
	DIRECTIONAL DRILLED CONDUIT
	CONDUIT, STUBBED AND CAPPED AS SHOWN
30 4X	NONFUSED DISCONNECT SWITCH, SIZE INDICATED, 3 POLE UNLESS INDICATED OTHERWISE, NEMA 12 ENCLOSURE, 4X = NEMA 4X 316 STAINLESS STEEL
F 40 60 4X	FUSED DISCONNECT SWITCH, SIZE INDICATED (60 = SWITCH RATING: 40 = FUSE RATING) 3 POLE UNLESS INDICATED OTHERWISE, NEMA 12 ENCLOSURE, 4X = NEMA 4X 316 STAINLESS STEEL
2 4X	MAGNETIC STARTER, NEMA SIZE INDICATED, NEMA 12 ENCLOSURE, UNLESS INDICATED OTHERWISE. SEE CONTROL DIAGRAM. 4X = NEMA 4X 316 STAINLESS STEEL
2 4X	COMBINATION (FUSE OR CIRCUIT BREAKER AS INDICATED). MAGNETIC STARTER, NEMA SIZE INDICATED, NEMA 12 ENCLOSURE UNLESS INDICATED OTHERWISE. SEE CONTROL SCHEMATIC DIAGRAM. 4X = NEMA 4X 316 STAINLESS STEEL
	INSERTION TYPE MAGNETIC FLOWMETER

SYMBOL	DESCRIPTION
120V or 480–120/208V 15 KVA, 3ø	TRANSFORMER, VOLTAGES, PHASE AND RATING INDICATED AS APPLICABLE
	PUSH–BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY OPEN
	PUSH–BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY CLOSED
	REMOTE DEVICE
H O A 1 X00 2 00X	SELECTOR SWITCH: MAINTAINED CONTACT WITH CONTACT POSITION INDICATED, CHART IDENTIFIES OPERATION X – CLOSED CONTACT O – OPEN CONTACT
CRX	CONTACT – NORMALLY OPEN WITH COIL INDICATED
CRX	CONTACT – NORMALLY CLOSED WITH COIL INDICATED
	OVERLOAD RELAY HEATER
1	MAGNETIC STARTER WITH NEMA SIZE INDICATED
MCP	MOTOR CIRCUIT PROTECTOR, MAGNETIC, 3 POLE UNLESS INDICATED OTHERWISE.
400	CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 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.
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
	DEMOLITION TO BE REMOVED OR DELETED
	FUSE
CRX	CONTROL RELAY, X=SEQUENTIAL NUMBER
LRX (L)	LATCHING RELAY, X=SEQUENTIAL NUMBER L – LATCH, U – UNLATCH
NEW / EXISTING	LINE WEIGHT

ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIT	ANALYTICAL INSTRUMENT TRANSMITTER
AE	ANALYTICAL ELEMENT
BC	BARE COPPER
BTC	BARE TINNED COPPER
C	CONDUIT, CONTACTOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CT	CURRENT TRANSFORMER
ETM	ELAPSED TIME METER
EXST	EXISTING
F, FU	FUSE
FI	FLOW INDICATOR
FM	FLOW METER
FPL	FLORIDA POWER & LIGHT
FS01	FLOW SWITCH 01
FT	FLOW TRANSMITTER
FVNR	FULL VOLTAGE NON–REVERSING STARTER
GALV	GALVANIZED
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
HH	HANDHOLE
HOA	HAND/OFF/AUTO
HOR	HAND/OFF/REMOTE
HVAC	HEATING, VENTILATING & AIR CONDITIONING
IC	INTERRUPTING CAPACITY
I & C	INSTRUMENTATION AND CONTROL
IP	INSTRUMENT PANEL (PANELBOARD)
J, J–BOX	JUNCTION BOX
LC	LIGHTING CONTACTOR
LR	LOCAL/REMOTE
LS	LIMIT SWITCH
LT/TT/CT	LEVEL/TEMPERATURE/ CONDUCTIVITY
M	MAGNETIC CONTACTOR COIL OR MOTOR
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MDP	MAIN DISTRIBUTION PANEL
MH	MOTOR HEATER, MANHOLE
MLO	MAIN LUGS ONLY
MPZ	MINI POWER ZONE
MTD	MOTOR TEMPERATURE DETECTOR
N	NEUTRAL
NC	NORMALLY CLOSED
NEMA	NATIONAL ELECTRIC MANUFACTURER'S ASSOCIATION
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OL	OVERLOAD RELAY
SS	316 STAINLESS STEEL

ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
MSC	MAN. SUGGESTED CABLE
PB	PULL BOX
PCM	EXISTING PLANT CONTROL PANEL
PH	PHASE MONITOR
PM	POWER MONITOR
PNL	PANEL
PP	POWER PANEL (480VAC)
PS	PRESSURE SWITCH
PVC	POLYVINYL CHLORIDE CONDUIT
RTU	REMOTE TELEMETRY UNIT
RGS	RIGID GALVANIZED STEEL
SF	SUPPLY FAN
SH	SPACE HEATER
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER
SS	STAINLESS STEEL
SV	SOLENOID VALVE
SW	SWITCH
T	THERMOSTAT
TB	TERMINAL BOARD
TJB	TERMINAL JUNCTION BOX
TS	THERMAL SWITCH
TSP	TWISTED SHIELDED PAIR
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
V	VOLTMETER, VOLT
VD	VOLTAGE DROP
VFD	VARIABLE FREQUENCY DRIVE
WP	WEATHERPROOF – NEMA 4X
XFMR	TRANSFORMER

GENERAL NOTES:

1. THE SCOPE OF WORK IS DESCRIBED IN DRAWINGS AND AS PER SPECIFICATIONS.
2. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR TO INSTALL THE ELECTRICAL SYSTEMS AS INDICATED PER PLANS AND SPECIFICATIONS. ITEMS NOT SHOWN BUT OBVIOUSLY NECESSARY FOR COMPLETION OF THE WORK SHALL BE INCLUDED.
3. THE INSTALLATION SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, NATIONAL ELECTRICAL SAFETY CODE, LOCAL CODES, CITY CODES, LOCAL COUNTY CODES, AND FLORIDA BUILDING CODES WITH AMENDMENTS.
4. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, INSPECTIONS AND APPROVALS AND TO INCLUDE ALL FEES AS PART OF HIS BID IF NOT OTHERWISE NOTED. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE ENGINEER AND OWNER.
5. THE CONTRACTOR SHALL VISIT THE SITE OF THE PROJECT AND BECOME FAMILIAR WITH THE EXISTING CONDITIONS. NO ALLOWANCE WILL BE MADE FOR EXISTING CONDITIONS OR FAILURE OF THE CONTRACTOR TO OBSERVE THEM.
6. ALL CONTRACTOR EQUIPMENT AND MATERIAL SHALL BE NEW, UNUSED AND U.L. LISTED.
7. THE CONTRACTOR IS RESPONSIBLE TO TEST ALL SYSTEMS INSTALLED OR MODIFIED UNDER THIS PROJECT AND REPAIR OR REPLACE ALL DEFECTIVE WORK TO THE SATISFACTION OF THE ENGINEER AND OWNER.
8. COORDINATE ALL ELECTRICAL EQUIPMENT LOCATIONS AND VERIFY ALL OBSTRUCTIONS WITH ALL SUBCONTRACTORS AND EQUIPMENT SUPPLIERS PRIOR TO ANY INSTALLATION.
9. NOT ALL CONDUITS SHOWN ON RISER AND ON–LINE DIAGRAMS ARE SHOWN ON BUILDING OR SITE LAYOUTS. CONTRACTOR SHALL SUPPLY ALL CONDUITS AND CABLES AS SHOWN ON RISER AND ONE–LINE DIAGRAMS.
10. ALL REFERENCES TO A PARTICULAR MANUFACTURER ARE GIVEN ON AN "APPROVED EQUAL" BASIS.
11. THE DRAWINGS ARE NOT INTENDED TO SHOW THE EXACT LOCATION OF CONDUIT RUNS. DRAWINGS ARE SCHEMATIC AND SHOWN FOR CLARITY. THESE ARE TO BE COORDINATED WITH THE OTHER TRADES SO THAT CONFLICTS ARE AVOIDED PRIOR TO INSTALLATIONS.
12. ALL LOCATIONS OF EQUIPMENT, PANELS ETC. ARE SHOWN FOR ILLUSTRATION PURPOSES. CONTRACTOR SHALL VERIFY LOCATION AND SIZE AND INSTALL AS SUCH WITH CORRESPONDING CONDUIT STUB–UPS.
13. MINIMUM DEPTH FROM TOP OF DUCTBANKS OR CONDUITS TO FINISHED GRADE SHALL BE 24" UNLESS OTHERWISE NOTED.
14. ALL EXCAVATIONS INSIDE THE PLANT AREA FOR CONDUITS, HANDHOLES AND EQUIPMENT SHALL BE HAND EXCAVATED AND COORDINATED WITH PLANT ENGINEER.
15. CONDUCTOR PULLING TENSIONS SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATION. CONTRACTOR SHALL INSTALL PULL BOXES TO MEET MANUFACTURER'S REQUIREMENTS.
16. ALL POWER AND CONTROL CONDUCTORS SHALL BE COPPER. NO ALUMINUM ALLOWED UNLESS SPECIFICALLY INDICATED. CONDUCTORS 600 VOLTS AND BELOW SHALL BE THHN/THWN THERMOPLASTIC JACKETED 75 DEGREES C INSULATED. FOR OUTDOOR AND WET LOCATION, USE THWN INSULATION. FOR INSTRUMENTATION WIRES (ANALOG SIGNAL) SHALL BE TWISTED SHIELDED PAIRS (TSP) AND MINIMUM 16 AWG WITH INTERNAL CONDUCTORS RED AND BLACK.
17. MINIMUM DISTANCE ALLOWED BETWEEN POWER CONDUITS AND INSTRUMENTATION CONDUITS SHALL BE:

VOLTAGE	DISTANCE
480V TO INST. CONDUIT	2 FT
120V TO INST. CONDUIT	1 FT

18. INSTRUMENTATION IS LOW VOLTAGE SIGNALS SUCH AS 4–20mA, TELEPHONE COMMUNICATION, FIRE ALARM COMMUNICATION, POWER CONDUIT SHALL ONLY CROSS INSTRUMENTATION CONDUIT PERPENDICULARLY WITH 6" SEPARATION.
19. USE PVC SCHEDULE 40 FOR ALL UNDERGROUND APPLICATIONS. USE RIGID ALUMINUM CONDUIT FOR ALL EXPOSED CONDUIT APPLICATIONS. DO NOT INSTALL ALUMINUM CONDUIT IN DIRECT CONTACT WITH CONCRETE. PAINT BITUMASTIC COATING ON RIGID ALUMINUM CONDUIT WHERE CONDUIT TOUCHING CONCRETE.
20. PROVIDE CONDUIT DUCT SEAL AT ALL CONDUIT ENDS.
21. COLORED WARNING TAPE 6" WIDE SHALL BE INSTALLED 8" BELOW FINISHED GRADE DIRECTLY ABOVE ALL UNDERGROUND YARD CONDUITS ACCORDING TO THE FOLLOWING SCHEDULE:
    POWER: RED
    ALL OTHER CONDUITS: GREEN
22. ALL YARD CONDUITS (YC) SHALL BE CONCRETE ENCASED AS PER DETAILS. SEE DRAWING E–7 FOR YARD CONDUIT SCHEDULE.
23. CONTRACTOR SHALL RESTORE SIDEWALKS, ROADWAYS, SOD AND SPRINKLER SYSTEM PIPING TO AS GOOD AS OR BETTER CONDITION, AFTER THE COMPLETION OF THE CONDUIT AND PULLBOX INSTALLATION.
24. ALL MATERIAL IN DESIGNATED CORROSIVE AREAS SHALL BE NEMA 4X 316 STAINLESS STEEL OR NON–METALLIC.

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(561) 451–9165
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LICENSE NO: EB 0006877

SEAL

CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

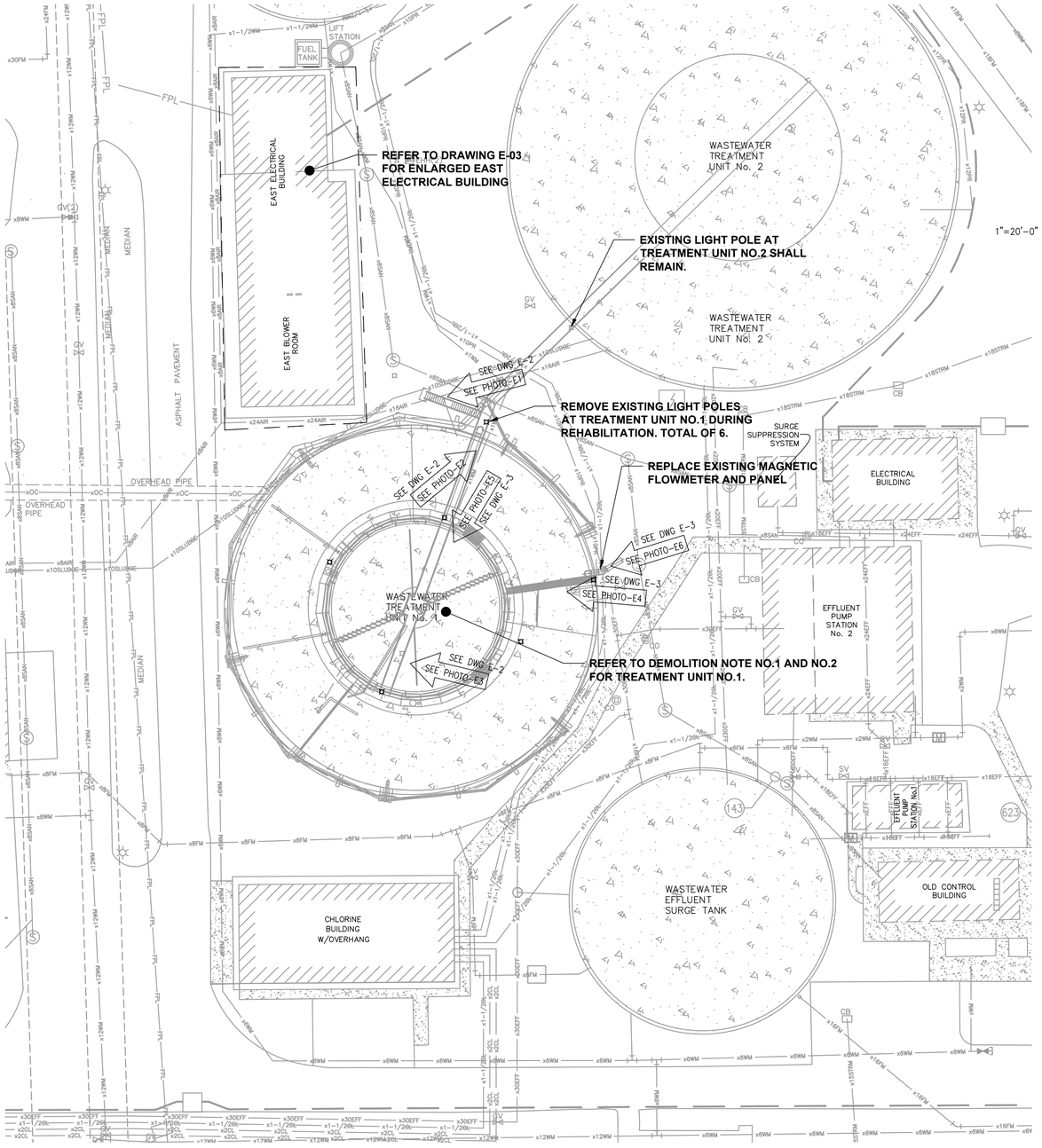
REVISIONS

NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
ELECTRICAL LEGEND AND NOTES
13955 Pembroke Rd, Pembroke Pines, FL 33029

SHEET NUMBER: E-1
SCALE: N.T.S.
SHEET: X OF X
CITY OF P.P. PLAN SUBMITTAL: 100% SET
SUBMITTAL DATE: MARCH 2025

Attachment D



DEMOLITION NOTES

1. CONTRACTOR SHALL COORDINATE WITH ALL OTHER DISCIPLINES FOR REHABILITATION OF THE EXISTING TREATMENT UNIT NO.1 AND ASSOCIATED STAIRWAY, WALKWAY, ETC. DISCONNECT POWER WIRES BEFORE DEMOLITION BEGINS. DISCONNECT ALL OTHER WIRES AND REMOVE BACK TO SOURCE. REMOVE ALL PANELS AND INSTRUMENTS BEFORE DEMOLITION BEGINS. COORDINATE WITH OWNER FOR EQUIPMENT TO BE SALVAGE AND TURN OVER TO THE OWNER. OTHERWISE, DISPOSE ALL OTHER ITEMS ACCORDINGLY. REMOVE ALL EXPOSED CONDUITS COMPLETELY. CUT UNDERGROUND CONDUITS FLUSH WITH FLOOR OR WALL OR GRADE AND CAP.

2. REMOVE THE EXISTING LIGHT POLES LOCATED ON WALKWAY OF TREATMENT UNIT NO.1 AND TURN OVER TO THE OWNER. DISPOSE THEM IF NOT WANTED BY OWNER. CONTRACTOR SHALL FIELD DETERMINE THE EXISTING LIGHTING CIRCUIT AT TREATMENT UNIT NO.1 LIGHT POLES THAT WILL BE REMOVED. MODIFY EXISTING LIGHTING CIRCUIT AS NEEDED TO KEEP THE REMAINING LIGHT POLES AT REMAINING LIGHTS, INCLUDING LIGHT POLES AT THE TREATMENT UNIT NO.2 FUNCTIONAL.

ELECTRICAL SITE PLAN - DEMOLITION

SCALE: 1" = 20'-0"

REMOVE ALL EXPOSED CONDUITS ON TREATMENT UNIT NO.1, INDICATED OR NOT BACK TO SOURCE. CUT CONDUITS TO THE GROUND ENTRY POINTS AND REMOVE WIRES BACK TO SOURCE.

REMOVE EXISTING PHOTOCELL

REMOVE ALL EXISTING JUNCTION BOXES DURING REMOVAL OF EXISTING EXPOSED CONDUITS (TYPICAL).

PHOTO E1: STAIRWAY TO TU-1

NOT TO SCALE

REFER TO OTHER DISCIPLINE DRAWINGS FOR REMOVAL OF THE EXISTING HANDRAIL, WALKWAY, GRATING, TREATMENT UNIT WALL, MECHANISM, ETC. AND PERFORM REMOVAL OF EXISTING CONDUITS AS WELL AS INSTALLATION OF NEW CONDUITS ACCORDINGLY.

REMOVE ALL EXPOSED CONDUITS ON TREATMENT UNIT NO.1, INDICATED OR NOT BACK TO SOURCE. CUT CONDUITS TO THE GROUND ENTRY POINTS AND REMOVE WIRES BACK TO SOURCE.

PHOTO E2: EXPOSED CONDUITS

NOT TO SCALE

REMOVE EXISTING LIMIT SWITCH. NEW LIMIT SWITCH SHALL BE INSTALLED SIMILARLY AT THE SAME LOCATION.

CONTRACTOR SHALL REMOVE THE EXISTING PANELS, DISCONNECTS, ETC. DURING REHAB OF TREATMENT UNIT NO.1

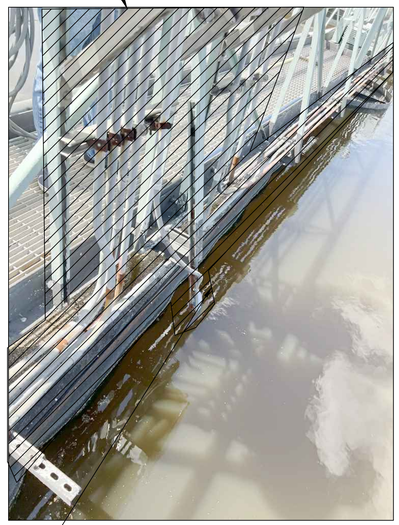


PHOTO E3: EXPOSED CONDUITS

NOT TO SCALE

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BOCA RATON, FLORIDA 33428
(561) 451-9165
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LICENSE NO: EB 0006877

SEAL

CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

REVISIONS

NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
ELECTRICAL SITE PLAN - DEMOLITION
13955 Pembroke Rd, Pembroke Pines, FL 33029

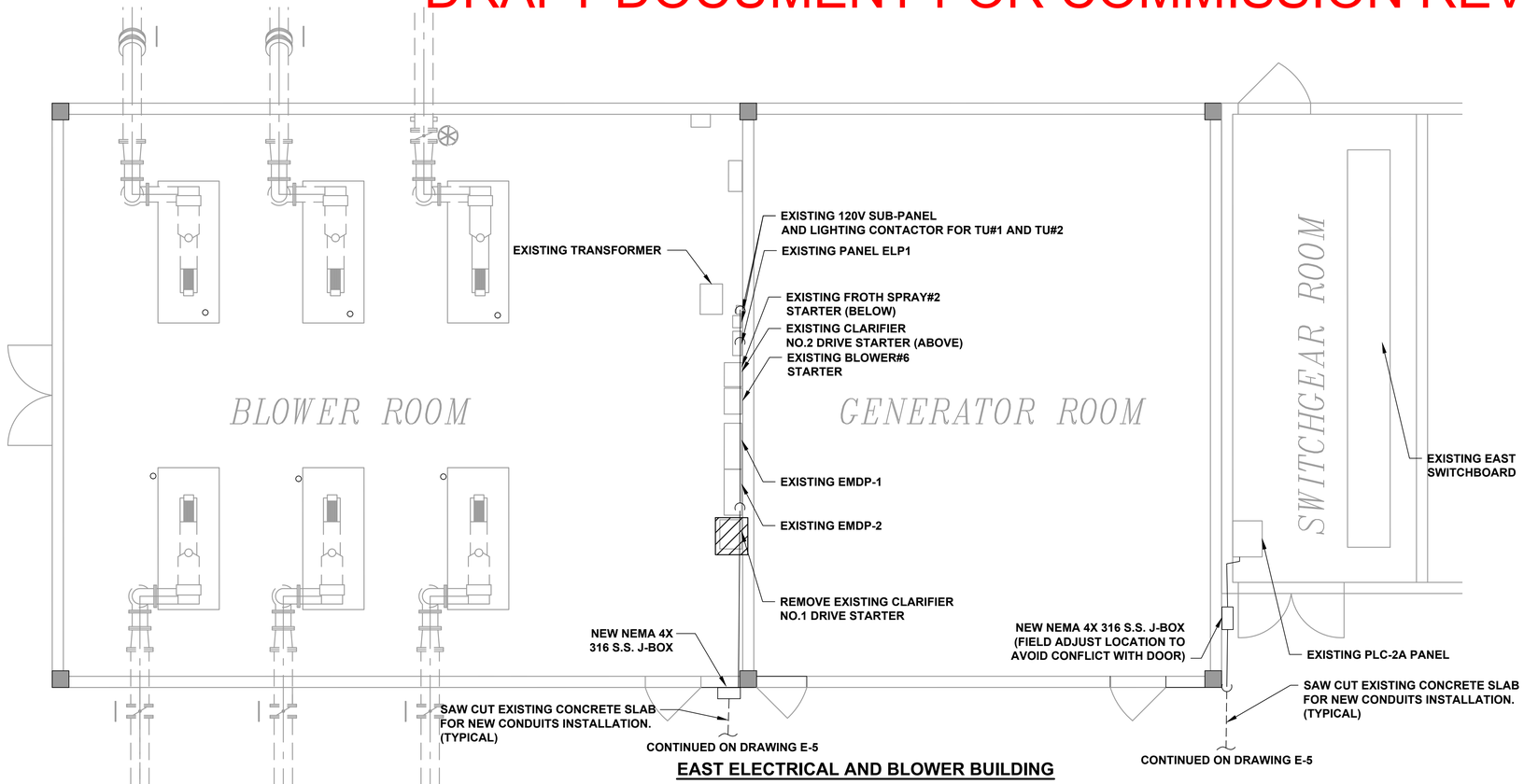
SHEET NUMBER: E-2

SCALE: N.T.S.

SHEET: X OF X

CITY OF P.P. PLAN SUBMITTAL: 100% SET

SUBMITTAL DATE: MARCH 2025



EAST ELECTRICAL AND BLOWER BUILDING

SCALE: 1/4" = 1'-0"

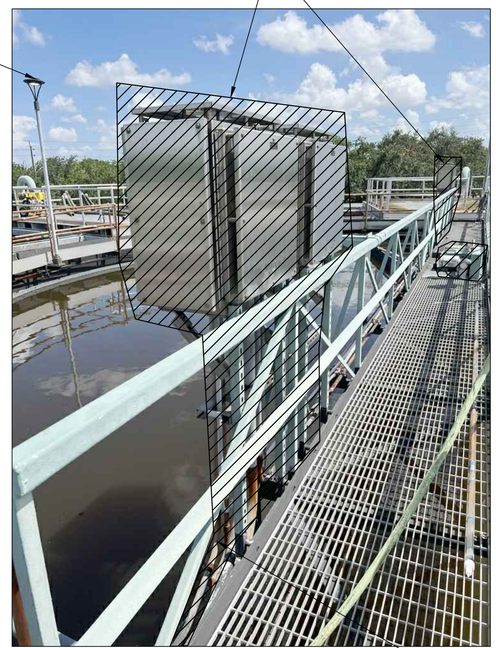
1/4"=1'-0"

EXISTING LIGHT POLE AT TREATMENT UNIT NO.1 SHALL BE REMOVED AND TURN OVER TO THE OWNER. TYPICAL

PHOTO E4: TREATMENT UNIT NO.1

NOT TO SCALE

CONTRACTOR SHALL REMOVE THE EXISTING PANELS, DISCONNECTS, ETC. DURING REHAB OF TREATMENT UNIT NO.1



REMOVE ALL EXPOSED CONDUITS ON TREATMENT UNIT NO.1, INDICATED OR NOT BACK TO SOURCE. CUT CONDUITS TO THE GROUND ENTRY POINTS AND REMOVE WIRES BACK TO SOURCE.

PHOTO E5: INSTRUMENT PANELS

NOT TO SCALE

REPLACE EXISTING MAGNETIC FLOWMETER AS SHOWN ON I-DRAWINGS

REPLACE EXISTING FLOWMETER DISPLAY PANEL AS SHOWN ON I-DRAWINGS

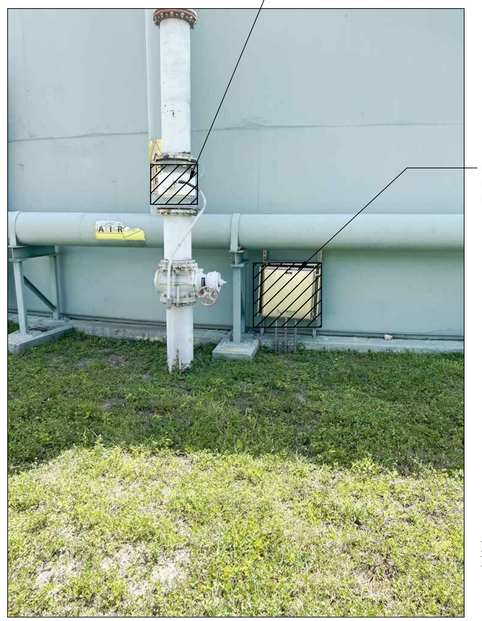


PHOTO E6: FLOWMETER AND PANEL

NOT TO SCALE

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LICENSE NO: EB 0006877

SEAL

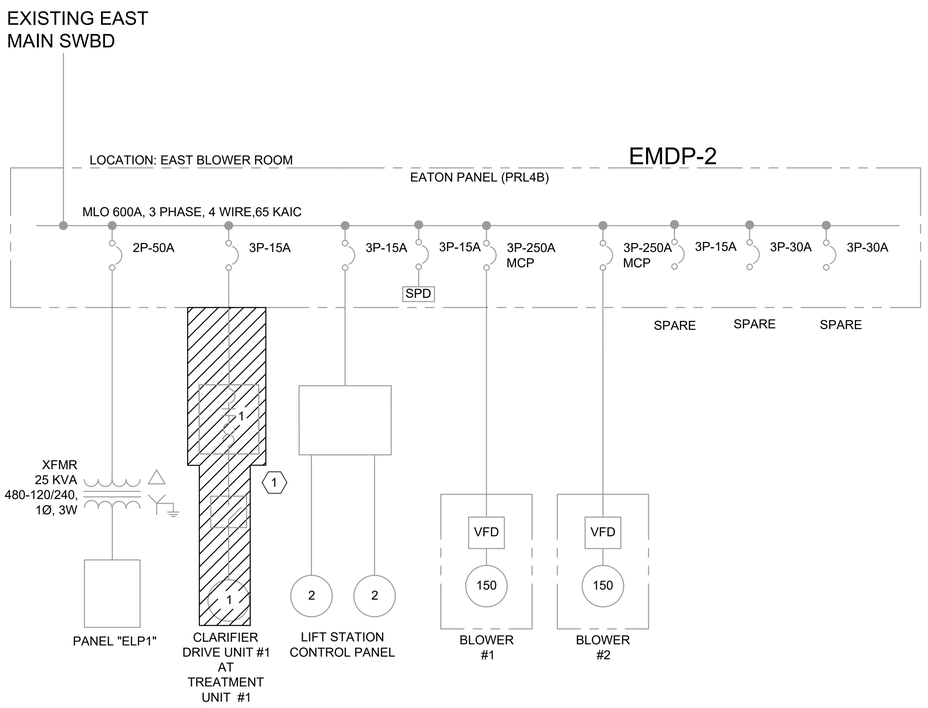
CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

NO.	DATE	BY	DESCRIPTION

REVISIONS

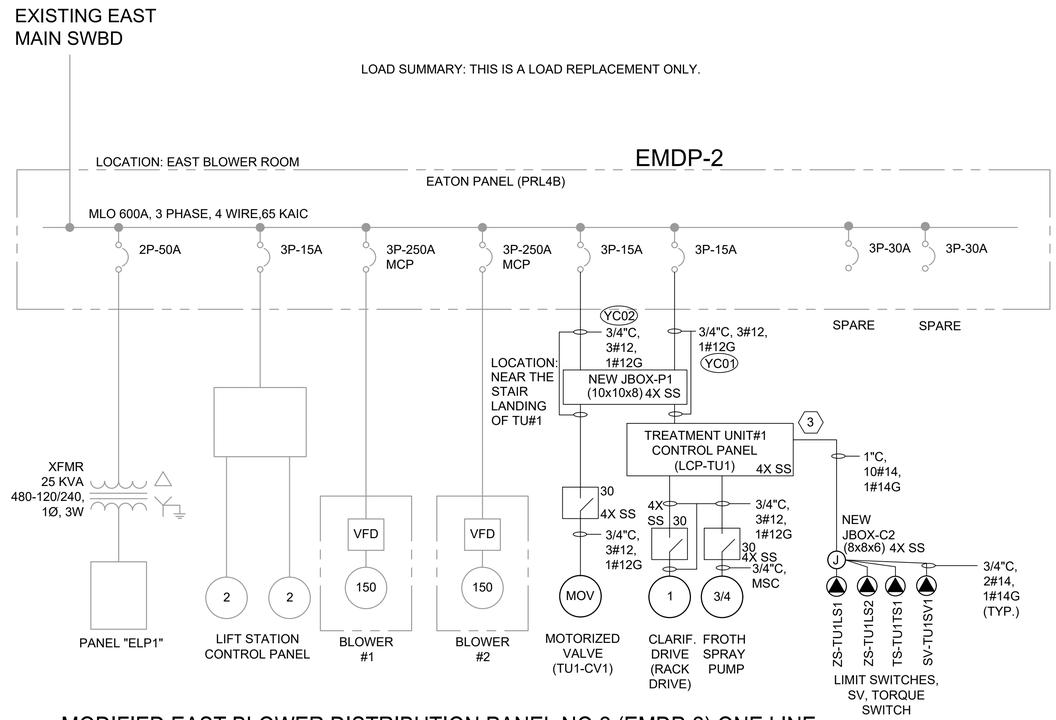
WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
PHOTOS AND EAST ELECTRICAL BUILDING
13955 Pembroke Rd, Pembroke Pines, FL 33029

SHEET NUMBER: E-3
SCALE: N.T.S.
SHEET: X OF X
CITY OF P.P. PLAN SUBMITTAL: 100% SET
SUBMITTAL DATE: MARCH 2025



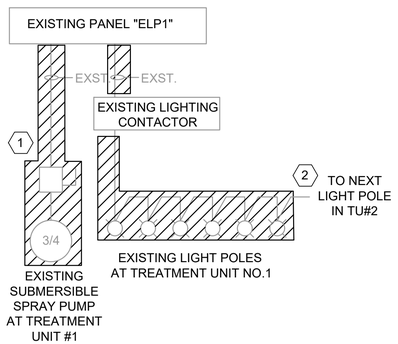
EXISTING EAST BLOWER DISTRIBUTION PANEL NO.2 (EMDP-2) ONE LINE

NOT TO SCALE



MODIFIED EAST BLOWER DISTRIBUTION PANEL NO.2 (EMDP-2) ONE LINE

NOT TO SCALE



EXISTING PANEL ELP-1

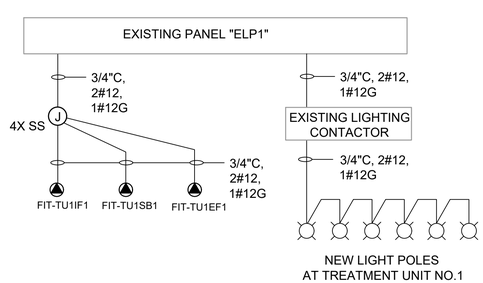
NOT TO SCALE

KEYED NOTES:

1. CONTRACTOR SHALL REMOVE THE EXISTING STARTER, CONDUITS/WIRES, ETC. ASSOCIATED WITH THE TREATMENT UNIT NO.1 DRIVE. TURN OVER STARTER, DISCONNECT, ETC. TO THE OWNER, DISPOSE THEM IF NOT WANTED BY THE OWNER. EXISTING BREAKER AT EMDP-2 SHALL BE REUSED TO POWER THE PROPOSED TREATMENT UNIT NO.1 CONTROL PANEL.

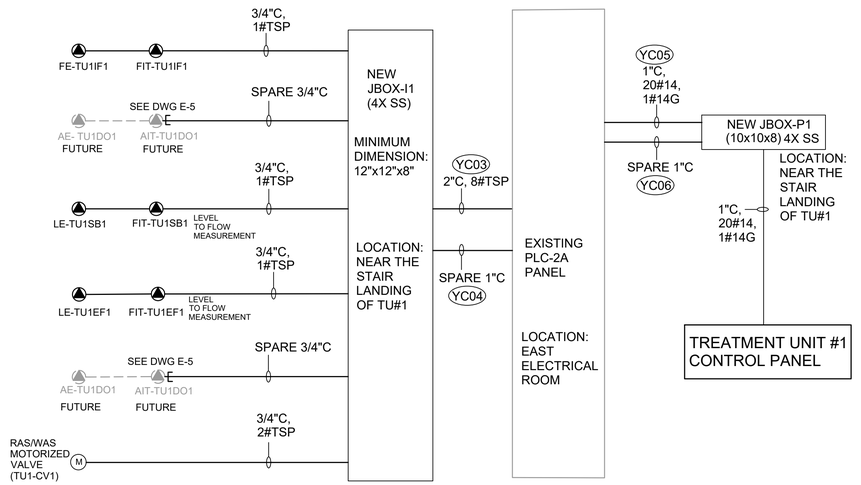
2. CONTRACTOR SHALL FIELD VERIFY THE EXISTING TU#1 AND TU#2 LIGHTING CIRCUIT FROM THE EXISTING LP PANEL THRU EXISTING LIGHTING CONTRACTOR/TIME CLOCK LOCATED IN THE EAST ELECTRICAL BUILDING - EAST BLOWER ROOM. DISCONNECT AND REMOVE EXISTING LIGHT POLES ON TOP OF TU#1 AND MODIFY THE LIGHTING CIRCUIT SO THAT TU#2 LIGHTING WILL STILL FUNCTIONAL. IF NEEDED, PROVIDE AND INSTALL NEW 3/4", 2#10, 1#10G FROM THE EXISTING LIGHTING CONTACTOR TO THE NEAREST LIGHT POLE AT TU#2 WALKWAY BEFORE DISCONNECTING LIGHTING CIRCUIT AT TU#1.

3. CONTRACTOR SHALL COORDINATE WITH PACKAGED SYSTEM SUPPLIER FOR EACH INDIVIDUAL COMPONENT LOCATION AND INSTALL CONDUITS/WIRES ACCORDINGLY.



MODIFIED PANEL ELP-1

NOT TO SCALE



PLC-2A PANEL RISER DIAGRAM

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LICENSE NO: EB 0006877

SEAL

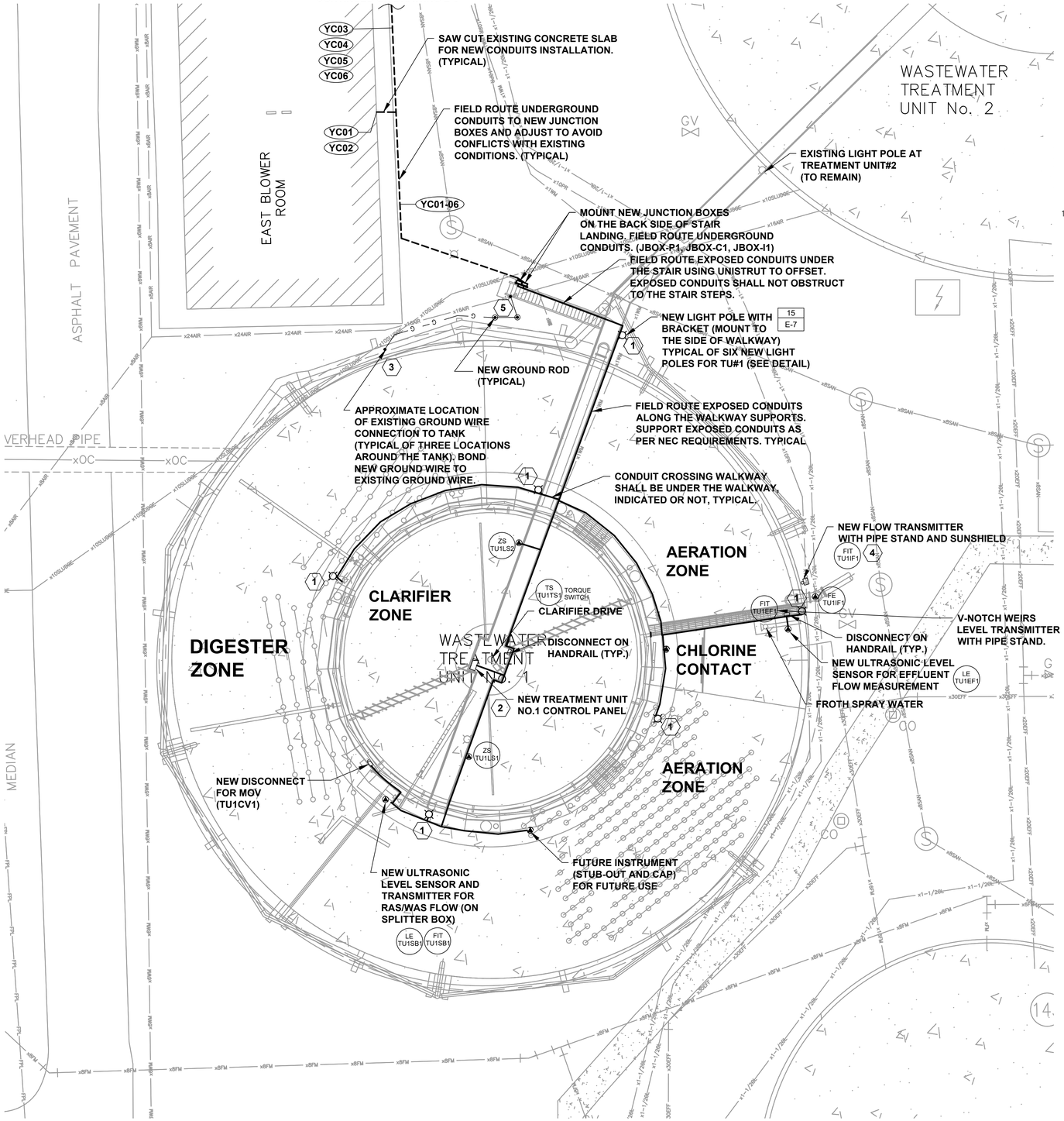
CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

REVISIONS

NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
ONE LINE AND RISER DIAGRAM
13955 Pembroke Rd, Pembroke Pines, FL 33029

SHEET NUMBER: E-4
SCALE: N.T.S.
SHEET: X OF X
CITY OF P.P. PLAN SUBMITTAL: 100% SET
SUBMITTAL DATE: MARCH 2025



MODIFIED TREATMENT UNIT NO.1 - ELECTRICAL PLAN (4)

SCALE: 1" = 10'-0"

ELECTRICAL NOTES

1. ELECTRICAL CONDUIT ROUTING IS SHOWN FOR ILLUSTRATION PURPOSES ONLY. CONTRACTOR SHALL FIELD VERIFY THE CONDUIT ROUTING WITH EXISTING CONDITIONS AND PROPOSED PIPING, DRAINAGE, ETC. TO AVOID CONFLICTS AND ADJUST ACCORDINGLY. CONTRACTOR SHALL VISIT THE SITE AND DETERMINE CONDITIONS AT THE EXISTING SITE BEFORE SUBMITTING HIS/HER BID. SOME CONDUIT ROUTINGS REQUIRE FIELD DETERMINATION OF THE ROUTINGS TO AVOID CONFLICTS WITH EXISTING CONDITIONS.
2. CONTRACTOR SHALL SAW CUT EXISTING SIDEWALK, ROADWAY, CONCRETE SLAB, ETC. FOR CONDUIT CROSSING AND REPAIR/RESTORE TO MATCH EXISTING CONDITION.
3. NO CONDUIT SHALL PENETRATE AN OUTDOOR ELECTRICAL PANEL FROM TOP. FOR OUTDOOR ELECTRICAL PANELS, ALL CONDUIT PENETRATIONS SHALL BE FROM THE BOTTOM OR SIDE. PROVIDE NEMA 4X 316 STAINLESS STEEL J-BOX AS NECESSARY TO ASSIST CONDUITS ENTERING OUTDOOR ELECTRICAL PANEL. OUTDOOR PANEL SHALL BE PROVIDED WITH HOFFMAN VENT DRAIN OR EQUAL.
4. CONTRACTOR SHALL KEEP THE SEPARATION BETWEEN POWER AND INSTRUMENTATION YARD CONDUITS AS PER DRAWING E-1, NOTE 17.

KEYED NOTES:

(1) CONTRACTOR SHALL PROVIDE AND INSTALL NEW LIGHT POLES WITH SUPPORT BRACKETS AS PER ELECTRICAL DETAIL DRAWING. FIELD ROUTE EXPOSED CONDUITS TO AVOID CONFLICT AND ADJUST ACCORDINGLY. ROUTE EXPOSED CONDUITS EITHER BELOW THE WALKWAY OR SIDE OF THE HANDRAIL AS DIRECTED BY THE FIELD ENGINEER DURING CONSTRUCTION.

(2) CONTRACTOR SHALL COORDINATE WITH APPROVED SHOP DRAWINGS OF THE CONTROL PANEL AND ADJUST THE MOUNTING BASED ON THE ACTUAL DIMENSION OF THE PANEL TO MEET THE NEC CODE CLEARANCES. IF NEEDED, OFFSET PANEL OUTSIDE THE HANDRAIL AS NEEDED TO HAVE CLEARANCE IN FRONT OF THE PANEL. PROVIDE AND INSTALL ALL NECESSARY "316 STAINLESS STEEL L" BRACKETS AND 316 STAINLESS STEEL HARDWARE FOR MOUNTING OF THE PANEL.

(3) RECONNECT EXISTING GROUND WIRES TO THE TANK AFTER REHABILITATION OF THE TREATMENT UNIT. EXTEND GROUND WIRES AS NEEDED. THERE ARE 3 EXISTING CONNECTIONS AT THE EXISTING TANK.

(4) ONLY INFLUENT FLOWMETER WILL BE INSTALLED AT THE GROUND LEVEL USING ELECTRICAL RACK. OTHER EQUIPMENT AND PANELS ARE LOCATED ON THE UPPER LEVEL OF THE TREATMENT UNIT. SEE OTHER DISCIPLINE DRAWINGS FOR ELEVATION VIEWS.

(5) CONTRACTOR SHALL PROVIDE AND INSTALL TWO NEW GROUND ROD NEXT TO THE EXISTING GROUND WIRE OF THE TREATMENT UNIT NO.1 TANK AND BOND THEM TOGETHER USING MECHANICAL LUG CONNECTION. FIELD LOCATE ACTUAL LOCATION TO INSTALL GROUND RODS AND INSTALL ACCORDINGLY.

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LICENSE NO: EB 0006877

SEAL

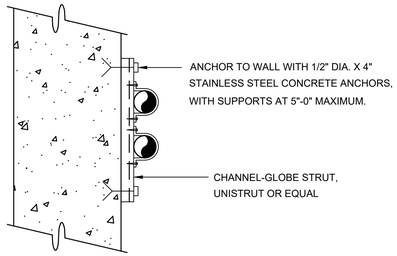
CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

REVISIONS

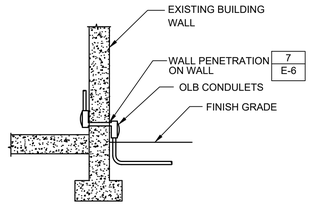
NO.	DESCRIPTION	BY	DATE

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
MODIFIED TREATMENT UNIT 1 ELECTRIC PLAN
13955 Pembroke Rd, Pembroke Pines, FL
33029

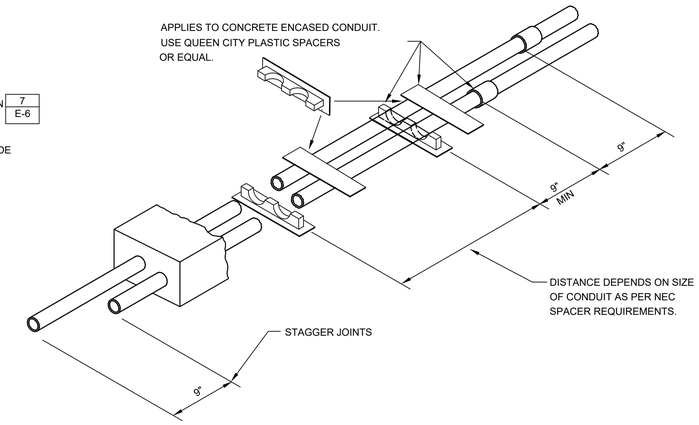
SHEET NUMBER: E-5
SCALE: N.T.S.
SHEET: X OF X
CITY OF P.P. PLAN SUBMITTAL: 100% SET
SUBMITTAL DATE: MARCH 2025



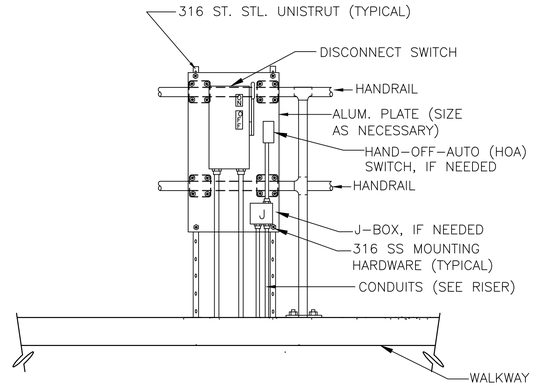
1 TYP **CONDUIT SUPPORT**
NOT TO SCALE



2 TYP **CONDUIT ENTRANCE**
NOT TO SCALE



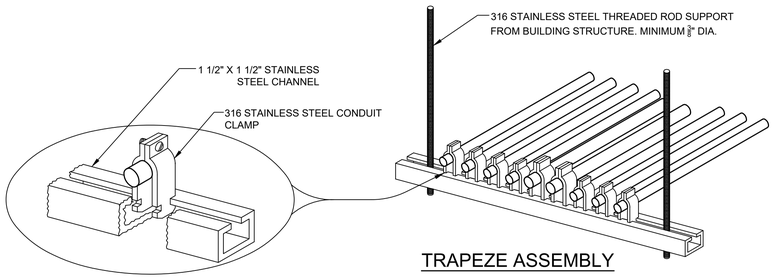
3 TYP **HORIZONTAL STAGGERING OF SPACERS AND JOINTS**
NOT TO SCALE



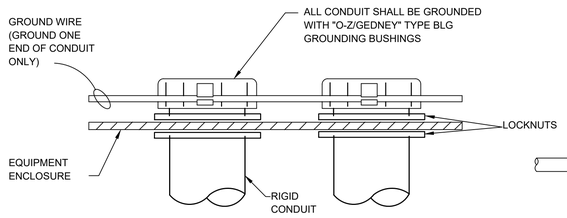
4 TYP **DISCONNECT MOUNTD ON HANDRAIL DETAIL**
NOT TO SCALE

NOTES:

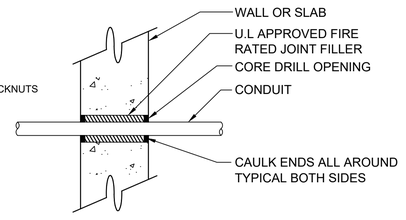
1. THIS DETAIL TYPICAL FOR BOTH VERTICAL AND HORIZONTAL MOUNTING
2. CHANNEL AND ALL SUPPORT DEVICES TO BE 316 STAINLESS STEEL.
3. CHANNELS TO BE SPACED 5' MAXIMUM.



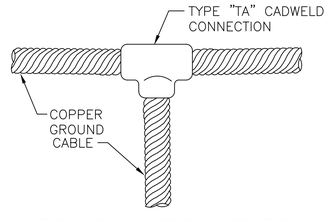
5 TYP **CONDUIT PIPE STRAP MOUNTING DETAILS**



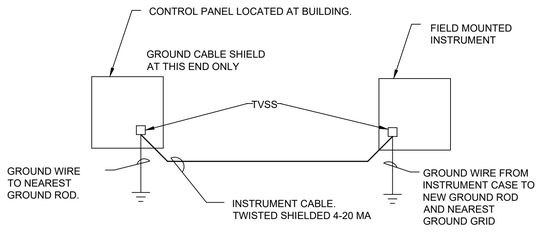
6 TYP **CONDUIT GROUNDING**
NOT TO SCALE



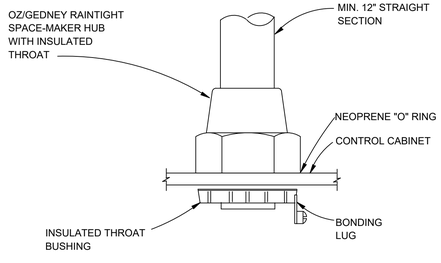
7 TYP **CONDUIT PENETRATION AT WALL OR SLAB**
NOT TO SCALE



8 TYP **GROUND CABLE CONNECTION**
NOT TO SCALE

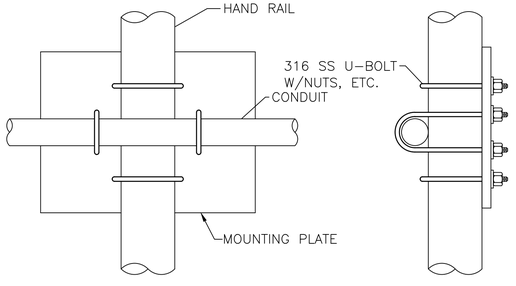


9 TYP **INSTRUMENTATION GROUNDING & SURGE PROTECTION**
NOTE: SEE SPEC. SECTIONS

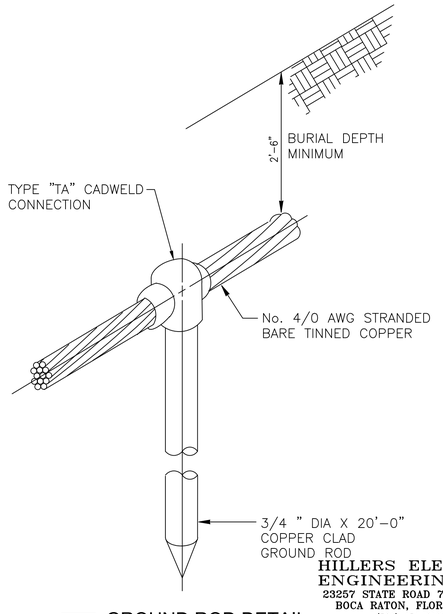


TYPICAL FOR ALL CONDUIT ENTRANCES INTO NEMA 3R, NEMA 4, OR NEMA 4X ENCLOSURES.

10 TYP **CONDUIT HUB**
NOT TO SCALE



11 TYP **CONDUIT MOUNTED TO HANDRAIL**
NOT TO SCALE



12 TYP **GROUND ROD DETAIL**
NOT TO SCALE

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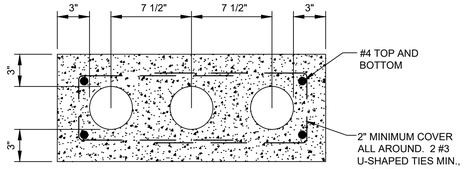
CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

REVISIONS

NO.	DATE	BY	DESCRIPTION

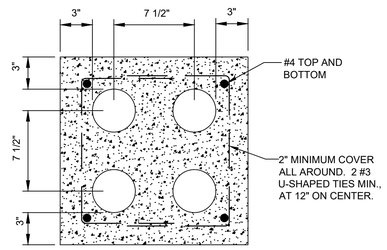
WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
ELECTRICAL DETAILS - SHEET 1
13955 Pembroke Rd, Pembroke Pines, FL 33029

SHEET NUMBER: E-6
SCALE: N.T.S.
SHEET: X OF X
CITY OF P.P. PLAN SUBMITTAL: 100% SET
SUBMITTAL DATE: MARCH 2025



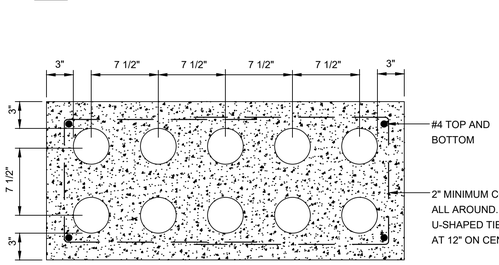
13 TYP 3-WAY CONCRETE ENCASED DUCTBANK

NOT TO SCALE



14 TYP 4-WAY DUCTBANK

NOT TO SCALE



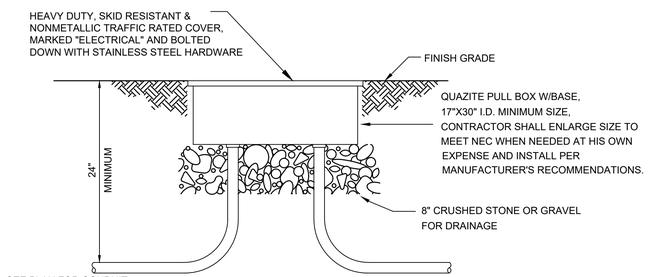
16 TYP 10-WAY DUCTBANK

NOT TO SCALE

NOTES:

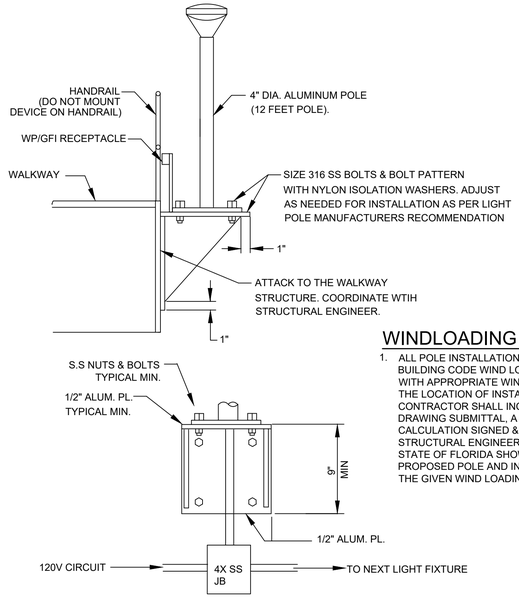
FOR DUCTBANK WITH DIFFERENT QUANTITY OF CONDUITS SHOWN, HORIZONTAL STAGGER THE ARRANGEMENT USING ABOVE DETAIL WITH REBAR, SPACING, AND POUR CONCRETE SIMILARLY.

KEEP MINIMUM DISTANCE SEPARATION ALLOWED BETWEEN POWER CONDUITS AND INSTRUMENTATION CONDUITS AS PER NOTE 17 (DRAWING E-1).



17 TYP ELECTRICAL PULL BOX DETAIL

NOT TO SCALE



DETAIL

15 TYP LIGHT FIXTURE MOUNTING ON WALKWAY

NOT TO SCALE

WINDLOADING NOTE:

1. ALL POLE INSTALLATIONS MUST MEET FLORIDA BUILDING CODE WIND LOADING REQUIREMENT WITH APPROPRIATE WIND GUST FACTOR FOR THE LOCATION OF INSTALLATION. THE CONTRACTOR SHALL INCLUDE WITH THE SHOP DRAWING SUBMITTAL, A POLE WIND LOADING CALCULATION SIGNED & SEALED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF FLORIDA SHOWING THAT THE PROPOSED POLE AND INSTALLATIONS WILL MEET THE GIVEN WIND LOADING REQUIREMENT.

EXISTING PANEL ELP1 SCHEDULE (EAST BLOWER ROOM)

BUS AMPS A	BUS AMPS B	LOAD	POLES	AMPS	BUS A	BUS B	AMPS	POLES	LOAD	BUS AMPS A	BUS AMPS B
-		UNKNOWN	2	50	1	2	20	1	BATT. CHRG	-	
	-				3	4	20	1	DAY TANK		-
-		UNKNOWN	1	15	5	6	20	1	FAN ATS	-	
	-	UNKNOWN	1	15	7	8	20	1	UNKNOWN		-
-		PLANT LIGHT	1	15	9	10	20	1	UNKNOWN	-	
	-	OUTLETS	1	15	11	12	20	1	UNKNOWN		-
-		UNKNOWN	1	15	13	14	20	1	PUMP	-	
	-	UNKNOWN	1	20	15	16	15	1	PUMP		-
-		UNKNOWN	1	20	17	18	20	1	UNKNOWN		
		PLANT 2 LIGHT	1	20	19	20	50	2	HEMS PUMP		
		FA	1	20	21	22					
	3.0	TREATMENT UNIT #1 FLOW TRANSMITTERS	1	20	23	24	20	1	TREATMENT UNIT #1 LIGHTING		3.0

NOTE: INSTALL TWO NEW BREAKERS IN EXISTING PANEL AS SHOWN.

MEASURED AMPS: BUS A____ BUS B_____ CONNECTED Kva____

RATED VOLTAGE: ■ 120/240 ☐ 277/480 1 PHASE, 3 WIRE		BRANCH POLES ☐ 12 ☐ 20 ■ 24 ☐ 42	
RATED AMPS: ■ 100 ☐ 225 ☐ 400 ☐ _____		CABINET: ■ SURFACE ☐ FLUSH	
NEUTRAL BUS ■ 100% ☐ 150% ☐ 200%	■ GROUND BUS	☐ HINGED DOOR	■ KEYED DOOR LATCH LOCATION: EAST BLOWER ROOM
■ CIRCUIT BREAKER (BOLT-IN) BRANCH DEVICES	■ SPD	ENCLOSURE TYPE ■ NEMA 1 ☐ NEMA 3R ☐ NEMA 4X ☐ NEMA 4X STAINLESS STEEL	
■ MAIN LUGS ONLY	MAIN ___ AMPS ☐ BREAKER	☐ _____ TO BE GFI BREAKERS	
PANELBOARD MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF ___10,000 AMPS SYMMETRICAL.			
MF'RS. EATON (CUTLER-HAMMER)	COPPER BUSSES	MAIN LUGS _____ SETS SIZE: _____	

EXISTING PANEL LP1 - A SCHEDULE

BUS AMPS A	BUS AMPS B	LOAD	POLES	AMPS	BUS A	BUS B	AMPS	POLES	LOAD	BUS AMPS A	BUS AMPS B
0.2		MOV 905	2	60	1	2	20	1	GEN ROOM RECEPS	3.0	
	0.2	MOV 907			3	4	20	1	GEN ROOM EXHAUST FAN		3.4
1.0		FUEL SYSTEM	1	20	5	6	20	1	PLC # 2	1.5	
	3.4	GAS TANK	3	30	7	8	20	1	EAST SWITCH KWH METER PANEL		0.1
3.4					9	10	30	2	LIFT STATION	12.0	
	-	SPACE			11	12					12.0

MEASURED AMPS: BUS A____ BUS B_____ CONNECTED Kva____

RATED VOLTAGE: ■ 120/240 ☐ 277/480 1 PHASE, 3 WIRE		BRANCH POLES ☐ 12 ☐ 20 ■ 24 ☐ 42	
RATED AMPS: ■ 100 ☐ 225 ☐ 400 ☐ _____		CABINET: ■ SURFACE ☐ FLUSH	
NEUTRAL BUS ■ 100% ☐ 150% ☐ 200%	■ GROUND BUS	☐ HINGED DOOR	■ KEYED DOOR LATCH LOCATION: EAST BLOWER ROOM
■ CIRCUIT BREAKER (BOLT-IN) BRANCH DEVICES	■ SPD	ENCLOSURE TYPE ■ NEMA 1 ☐ NEMA 3R ☐ NEMA 4X ☐ NEMA 4X STAINLESS STEEL	
☐ MAIN LUGS ONLY	MAIN 60 AMPS ■ BREAKER	☐ _____ TO BE GFI BREAKERS	
PANELBOARD MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF ___10,000 AMPS SYMMETRICAL.			
MF'RS. SQUARE D	COPPER BUSSES	MAIN LUGS _____ SETS SIZE: _____	

LUMINAIRE SCHEDULE							
TYPE	VOLTS	DESCRIPTION	MANUFACTURER	CATALOG NO	LAMPS	MOUNTING	REMARKS
1	120	POST TOP AREA LUMINAIRE, RADEAN FAMILY LED	LITHONIA LIGHTING	RADPTLED-P2-40K-SYM-MVOLT-RADPT20-SF-DNAXD	5000 LUM. 39 WATTS	POLE W/ POST TOP (SEE DETAIL)	COORDINATE WITH 4" POLE SUPPLIER FOR POST TOP MOUNTING OPTION AND PROVIDE ACCORDINGLY.
			(OR)				
		POST TOP AREA LUMINAIRE, INVUE LUXESCAPE LED	COOPER LIGHTING	LXS-VA-2-840-U-SYM-S-GM-F-MA1036-XX	5000 LUM. 48 WATTS		

YARD CONDUIT SCHEDULE (SEE NOTE 1 THRU 3)			
NO.	FROM	TO	REMARKS
YC01	EXISTING EMDP-2 PANEL	TU#1 CONTROL PANEL (LCP-TU1) VIA JBOX-P1	POWER, SEE DWG E-4
YC02	EXISTING EMDP-2 PANEL	TU#1 CONTROL PANEL (LCP-TU1) VIA JBOX-P1	POWER, SEE DWG E-4
YC03	EXISTING PLC-2A PANEL	JBOX-I1 LOCATED NEAR TU#1 STAIR LANDING	SIGNAL, SEE DWG E-4
YC04	EXISTING PLC-2A PANEL	JBOX-I1 LOCATED NEAR TU#1 STAIR LANDING	SPARE SIGNAL, SEE DWG E-4
YC05	EXISTING PLC-2A PANEL	JBOX-C1 LOCATED NEAR TU#1 STAIR LANDING	CONTROL, SEE DWG E-4
YC06	EXISTING PLC-2A PANEL	JBOX-I1 LOCATED NEAR TU#1 STAIR LANDING	SPARE CONTROL , SEE DWG E-4

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SEAL

CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

REVISIONS NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
ELECTRICAL DETAILS - SHEET 2
13955 Pembroke Rd, Pembroke Pines, FL 33029

SHEET NUMBER: E-7

SCALE: N.T.S.

SHEET: X OF X

CITY OF P.P. PLAN SUBMITTAL: 100% SET

SUBMITTAL DATE: MARCH 2025

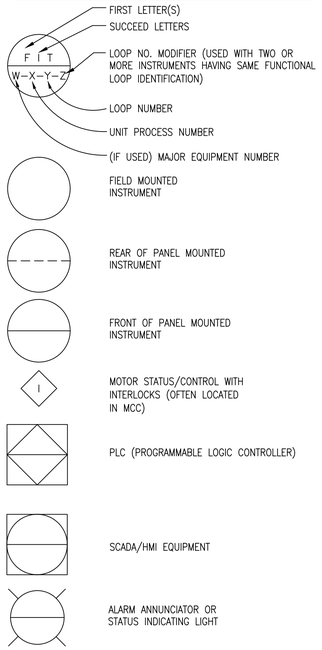
Attachment D

INSTRUMENT SOCIETY OF AMERICA TABLE

LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (*)		ALARM		USERS CHOICE (*)
B	BURNER FLAME		USERS CHOICE (*)	USERS CHOICE (*)	
C	CONDUCTIVITY			CONTROL	CLOSE
D	DENSITY (S.G.)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT		
F	FLOW RATE	RATIO			
G	GAUGE		GLASS	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTION				MIDDLE
N	STROKE		USERS CHOICE (*)	USERS CHOICE (*)	NORMAL
O	LOOP VEH. DETECTOR		OFFICE		OPEN
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT		INTEGRATE		
R	RATIO		RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE (*)		MULTIFUNCTION (*)		
V	VIBRATION			VALVE	
W	WEIGHT OR FORCE		WELL		
X	UNCLASSIFIED (*)		UNCLASSIFIED (*)	UNCLASSIFIED (*)	UNCLASSIFIED (*)
Y	PHOTO CELL		LIGHT SOURCE	RELAY OR COMPUTE (*)	
Z	POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL

INSTRUMENT IDENTIFICATION



NOTES:

1. COMPONENTS AND PANELS SHOWN WITH A DIAMOND (◆) ARE TO BE PROVIDED UNDER SECTION "INSTRUMENTATION & CONTROLS".
2. COMPONENTS AND PANELS SHOWN WITH A DOUBLE ASTERISK (**) ARE TO BE PROVIDED AS PART OF A PACKAGED OR MECHANICAL SYSTEM.
3. COMPONENTS AND PANELS SHOWN WITH A TRIANGLE (▲) ARE EXISTING. COMPONENTS AND PANELS WHICH HAVE NO SYMBOL ATTACHED TO IT ARE EXISTING.
4. COMPONENTS AND PANELS SHOWN WITH A HEXAGON (⬢) ARE EXISTING TO BE MODIFIED AND/OR RELOCATED.
5. COMPONENTS AND PANELS SHOWN WITH A SQUARE (■) ARE FUTURE. DURING SHOP DRAWING PREPARATION, THE CONTRACTOR SHALL FIELD VERIFY
6. ALL THE EXISTING ANALOG AND DISCRETE POINTS FOR DETAILED INTERFACE AND INCLUDE IT AS PART OF SUBMITTAL.
7. THE SINGLE INSTRUMENT & CONTROL SUPPLIER SHALL HAVE A U.L. APPROVED SHOP.
8. ALL PROCESS TUBING AND ISOLATION VALVES SHALL BE 1/4"– 316 S.S., UNLESS OTHERWISE NOTED.
9. ALL CONTROL PANELS SHALL BE FURNISHED AND INSTALLED WITH A 1P–15A CIRCUIT BREAKER, UNLESS OTHERWISE NOTED.
10. SEE MECHANICAL PLANS AND SPECIFICATIONS FOR EQUIPMENT NUMBERS.

INSTRUMENT LINE SYMBOLS

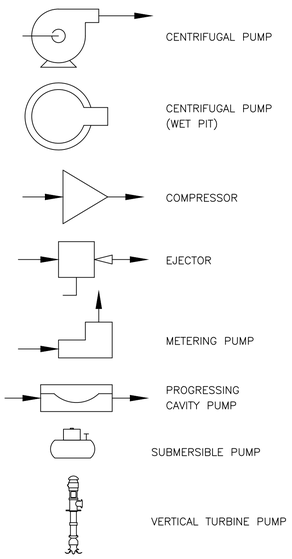
- PRIMARY PROCESS FLOW
- FUTURE PRIMARY PROCESS FLOW
- SECONDARY PROCESS FLOW, CONNECTION TO PROCESS FLOW, MECHANICAL LINK OR INSTRUMENT SUPPLY
- ELECTRICAL SIGNAL (DISCRETE)
- –––A––– ELECTRICAL SIGNAL (ANALOG)
- PNEUMATIC SIGNAL
- FIBER OPTIC
- PROCESS OR SIGNAL CONTINUED SOMEWHERE ELSE (X=1,2,3,...)
- ETHERNET

INSTRUMENT ABBREVIATION

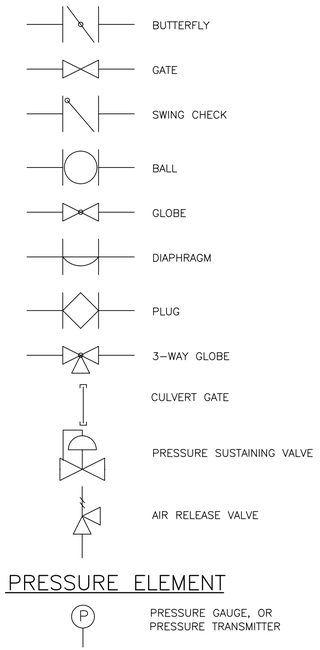
ACC	ACCELATOR
BFP	BELT FILTER PRESS
CL2	CHLORINE
CLW	CLEARWELL
COM	COMMON
COND	CONDUCTIVITY
CP	CONTROL PANEL
DI, AI	DISCRETE INPUT, ANALOG INPUT
DO, AO	DISCRETE OUTPUT, ANALOG OUTPUT
D.O.	DISSOLVED OXYGEN
DR	DISTANCE RELAY
EFFL	EFFLUENT
EP	ELECTRICAL PANEL
ES	EMERGENCY STOP
ETM	ELAPSED TIME METER
FD	CHEMICAL FEEDER
FIL	FILTER
GEN	GENERATOR
HLO	HIGH–LOW–OFF
HLOR	HIGH–LOW–OFF–REMOTE
HOA	HAND–OFF–AUTO
HOR	HAND–OFF–REMOTE
HOTC	HAND–OFF–TIMER–COMPUTER
H/L	HIGH/LOW
HSP	HIGH SERVICE PUMP
INFL	INFLUENT
JP	JOCKEY PUMP
LOS	LOCK–OUT–STOP
LPU	LINE PROTECTION UNIT
MCC	MOTOR CONTROL CENTER
MCP	MAIN CONTROL PANEL
ME	MISCELLANEOUS EQUIPMENT
M.G.	MILLION GALLON
MOD.	MODULATING VALVE
MOV	MOTOR OPERATED VALVE
OCA	OPEN–CLOSE–AUTO
OC, O/C	OPEN–CLOSE
OO	ON–OFF
ORP	OXIDATION REDUCTION POTENTIAL
OSC	OPEN–STOP–CLOSE
OSCR	OPEN–STOP–CLOSE–REMOTE
PH	HYDROGEN ION CONCENTRATION
PRES	PRESSURE
RES	RESTORE
RF	RF (ADMITTANCE) LEVEL MONITOR
RIP, RIO	REMOTE I/O PANEL
R/L	REMOTE/LOCAL
RSP	REMOTE SETPOINT
SA	SURGE ARRESTER
SEC	SECONDARY
SL	SLAKER
SF	SONIC FLOWMETER
SP	SETPOINT
SS	START/STOP
ST	STEP
STOR	STORAGE
SUS	SUSPENDED SOLIDS
SSRVS	SOLID STATE REDUCED VOLTAGE STARTER
TD	THERMAL DISPERSION
TP	TRANSFER PUMP
TURB	TURBIDITY
VFD	VARIABLE FREQUENCY DRIVE

INSTRUMENTATION LEGEND

PUMPS & COMPRESSORS

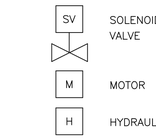


VALVES & GATES

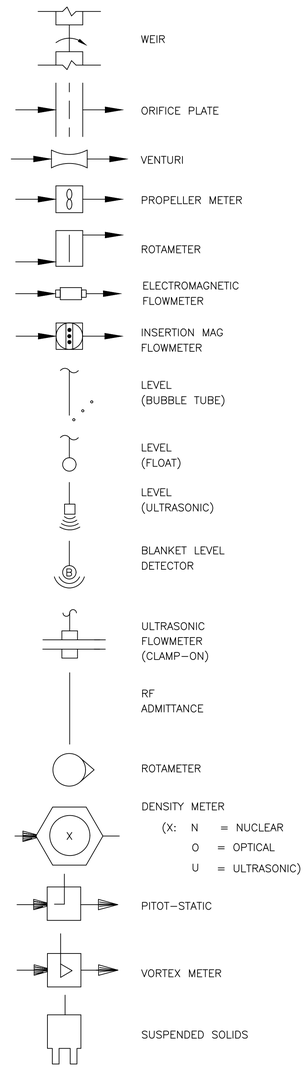


PRESSURE ELEMENT

ACTUATOR OR OPERATORS



PRIMARY ELEMENTS



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LICENSE NO: EB 0006877

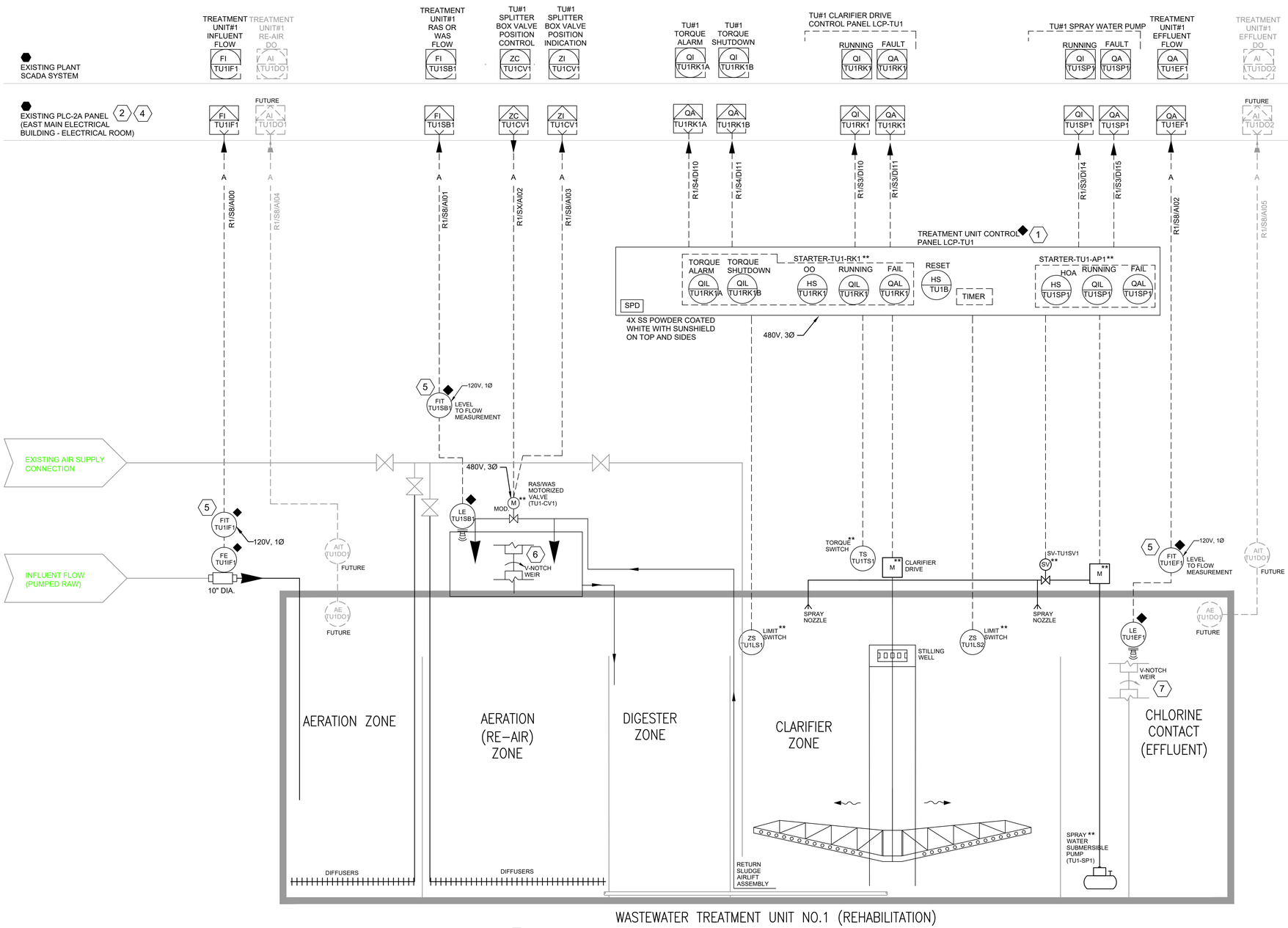
SEAL

CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

REVISIONS			
NO.	DATE	BY	DESCRIPTION

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
INSTRUMENTATION LEGEND AND NOTES
13955 Pembroke Rd, Pembroke Pines, FL 33029

SHEET NUMBER: I-1
SCALE: N.T.S.
SHEET: X OF X
CITY OF P.P. PLAN SUBMITTAL: 100% SET
SUBMITTAL DATE: MARCH 2025



WASTEWATER TREATMENT UNIT NO.1 (REHABILITATION)

KEYED NOTES:

1. CONTRACTOR SHALL PROVIDE AND INSTALL NEW LOCAL CONTROL PANEL FOR TREATMENT UNIT NO.1 LOCAL CONTROL PANEL, INCLUDING STARTER, SPD, BREAKERS, TIMER, RELAY, LED PUSH TO TEST INDICATION LIGHTS, ETC. IN A NEMA 4X 316 STAINLESS STEEL CONTROL PANEL. NEW PANEL SHALL BE POWDER COATED WHITE WITH SUNSHIELD ON TOP AND SIDES. CONNECT LCP TO PLC-2 PANEL AS SHOWN AND AS REQUIRED. THERE ARE EXISTING SPARE I/O POINTS IN THE PLC-2 PANEL AND CONTRACTOR SHALL FIELD VERIFY AND ADJUST THE I/O POINTS AS NEEDED.
2. CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY RELAYS, TERMINAL BLOCKS, SURGE ARRESTORS, WIRING, ETC. AS NEEDED FOR NEW SIGNALS AT THE PLC-2 PANEL. MAKE ALL NECESSARY CONNECTIONS, TERMINATIONS, MODIFICATIONS, ETC. FOR A COMPLETE AND FUNCTIONAL PLC SYSTEM IN PLACE.
3. EXISTING ANALOG SIGNALS ASSOCIATED WITH THE EXISTING TREATMENT UNIT NO.1 (TU#1) AT THE PLC-5 PANEL (EFFLUENT ELECTRICAL BUILDING) SHALL BE DISCONNECTED DURING THE REHABILITATION OF THE TU#1. UPDATE THE I/O LOOP DIAGRAMS AND LABEL THEM AS SPARE. ALL NEW SIGNALS ASSOCIATED WITH THE REHABILITATED TU#1 SHALL BE CONNECTED TO THE PLC#2 PANEL AS SHOWN ON DRAWINGS AND AS PER SPECIFICATIONS.
4. CONTRACTOR SHALL PROVIDE AND INSTALL ONE NEW ANALOG INPUT MODULE (8 CHANNEL) IN THE EXISTING PLC-2 RACK SPARE SLOT LOCATION. EXISTING PLC IS CONTROLLOGIX (1756-L61) MODEL. PROVIDE AND INSTALL NEW SURGE ARRESTORS, TERMINAL BLOCKS, WIRING, ETC. FOR A COMPLETE AND FUNCTIONAL PLC SYSTEM IN PLACE.
5. PROVIDE AND INSTALL SUNSHIELD AND PIPE STAND, SPD, ETC. FOR ALL FLOW AND LEVEL TRANSMITTER. TYPICAL.
6. COORDINATE WITH SPLITTER BOX SUPPLIER FOR THE ACTUAL DIMENSIONS OF SPLITTER BOX AND V-NOTCH WEIR LAYOUT TO DETERMINE THE LOCATION TO INSTALL THE FLOW/LEVEL SENSOR. REQUEST ALL NECESSARY PARAMETERS OF THE V-NOTCH WEIR FOR FLOW CALCULATION AND SETUP THE FLOWMETER ACCORDINGLY.
7. FIELD OBTAIN AND COPY THE EXISTING V-NOTCH WEIR PARAMETERS FROM THE EXISTING FLOWMETER BEFORE REPLACEMENT AND SETUP NEW FLOWMETER ACCORDINGLY.

EXISTING I/O POINTS ADDRESS FOR TU#1 AT PLC-2 PANEL: (1)
PLC2:R1/S3/DI10: WWTU NO.1 CLARIFIER DRIVE ON/OFF
PLC2:R1/S3/DI11: WWTU NO.1 CLARIFIER DRIVE FAIL
PLC2:R1/S3/DI12: SPARE INPUT
PLC2:R1/S3/DI13: SPARE INPUT
PLC2:R1/S3/DI14: SPARE INPUT
PLC2:R1/S3/DI15: SPARE INPUT
PLC2:R1/S4/DI10: SPARE INPUT
PLC2:R1/S4/DI11: SPARE INPUT
PLC2:R1/S4/DI12: SPARE INPUT
PLC2:R1/S4/DI13: SPARE INPUT
PLC2:R1/S4/DI14: SPARE INPUT
PLC2:R1/S4/DI15: SPARE INPUT
PLC2:R1/S7/AO02: SPARE ANALOG OUTPUT
PLC2:R1/S7/AO03: SPARE ANALOG OUTPUT
PLC2:R1/S7/AO04: SPARE ANALOG OUTPUT
PLC2:R1/S7/AO05: SPARE ANALOG OUTPUT
PLC2:R1/S7/AO06: SPARE ANALOG OUTPUT
PLC2:R1/S7/AO07: SPARE ANALOG OUTPUT

EXISTING I/O POINTS ADDRESS FOR TU#1 AT PLC-5 PANEL: (3)
(NOTE: PLC-5 PANEL IS LOCATED IN EFFLUENT ELECTRICAL ROOM)
PLC5:R1/S5/AI00: WWTU NO.1 RE-AIR DO (0-10 PPM)
PLC5:R1/S5/AI01: WWTU NO.1 CHLORINE CONTACT DO (0-10 PPM)
PLC5:R1/S5/AI03: WWTU NO.1 INFLUENT FLOW (0-4 MGD)
PLC5:R1/S5/AI05: WWTU NO.1 EFFLUENT FLOW (0-3 MGD)
PLC5:R1/S5/AI06: WWTU NO.1 AIR FLOW (0-6000 SCFM)
PLC5:R1/S9/AO04: WWTU NO.1 SPLITTER BOX ACTUATOR VALVE (0-100%)

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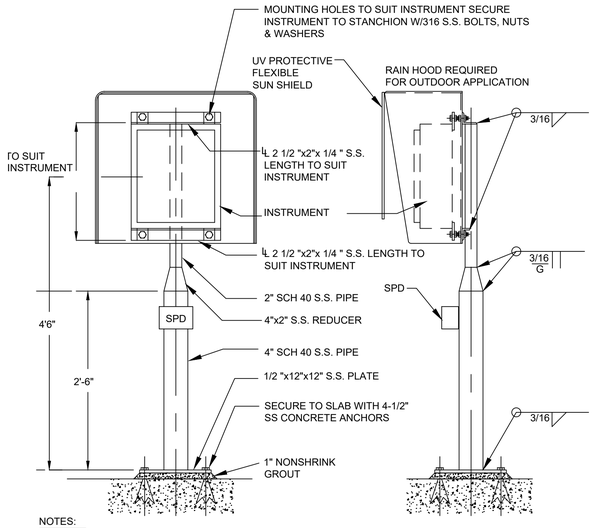
CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

NO.	DESCRIPTION	DATE	BY
REVISIONS			

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
P&ID - TREATMENT UNIT NO.1
13955 Pembroke Rd, Pembroke Pines, FL
33029

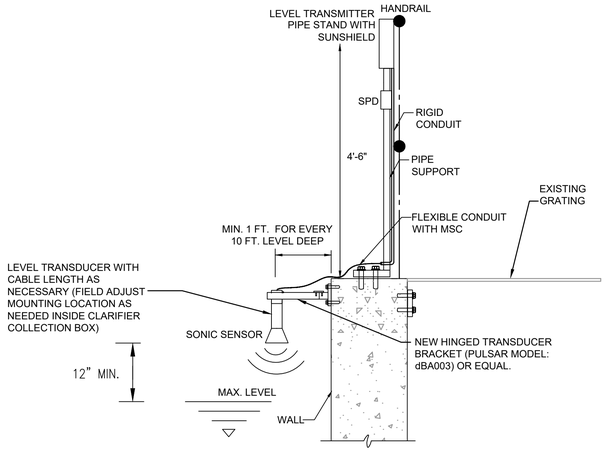
SHEET NUMBER: I-2
SCALE: N.T.S.
SHEET: X OF X
CITY OF P.P. PLAN SUBMITTAL: 100% SET
SUBMITTAL DATE: MARCH 2025



NOTES:
1. ROUND OFF ALL EXPOSED EDGES AND CORNERS. ALL S.S. SHALL BE 316 STAINLESS STEEL
2. SEE SPECIFICATIONS FOR SPD INFORMATION

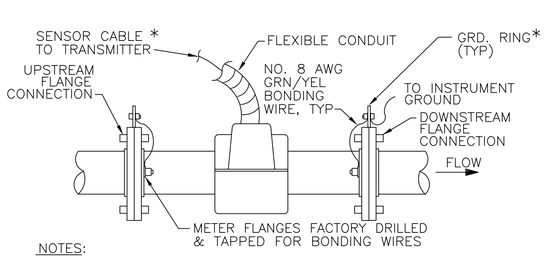
1 VAR. **STANCHION SUPPORT FOR CASE MOUNTED INSTRUMENTS**

NOT TO SCALE



3 VAR. **ULTRASONIC LEVEL TRANSMITTER INSTALLATION DETAIL**

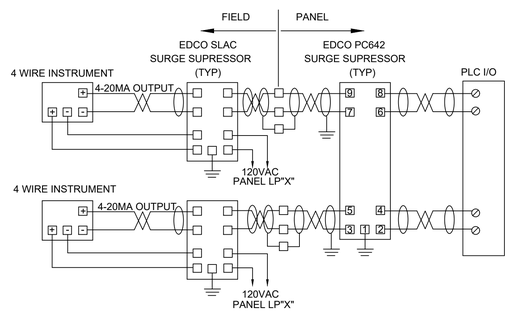
NOT TO SCALE



NOTES:
1. COMPONENTS DESIGNATED BY * ARE SUPPLIED BY INSTRUMENT MANUFACTURER.
2. IF PIPE IS NON-CONDUCTIVE BOND MAGMETER TO ONE OF THE FOLLOWING ACCEPTABLE GROUNDS:
   A) METALLIC WATER PIPE IF BURIED PORTION IS MORE THAN 10'.
   B) STRUCTURAL STEEL.

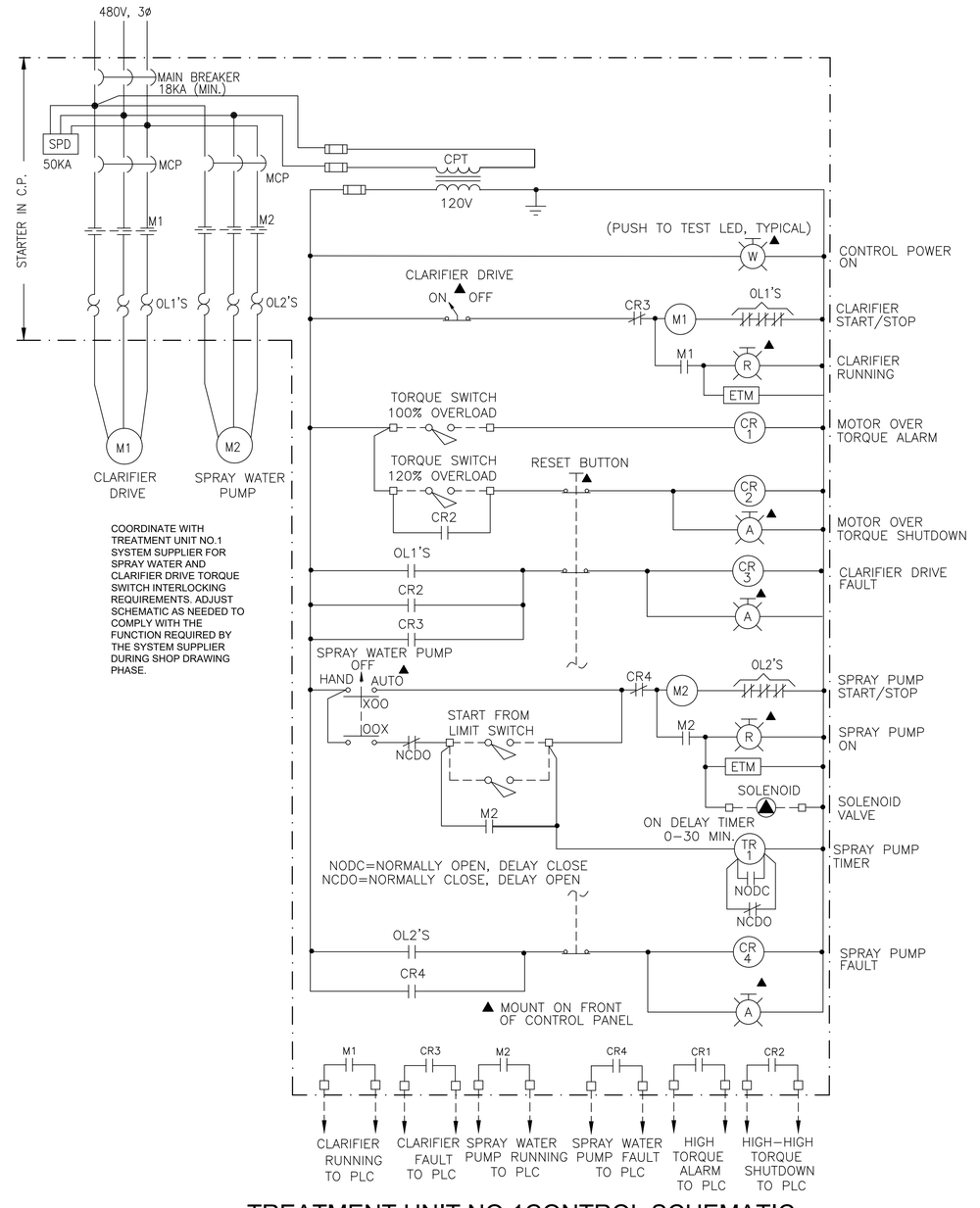
2 VAR. **MAGNETIC FLOWMETER INSTALLATION DETAIL**

NOT TO SCALE



4 VAR. **TYPICAL 4 WIRE INSTRUMENT ISOLATOR**

NOT TO SCALE



COORDINATE WITH TREATMENT UNIT NO.1 SYSTEM SUPPLIER FOR SPRAY WATER AND CLARIFIER DRIVE TORQUE SWITCH INTERLOCKING REQUIREMENTS. ADJUST SCHEMATIC AS NEEDED TO COMPLY WITH THE FUNCTION REQUIRED BY THE SYSTEM SUPPLIER DURING SHOP DRAWING PHASE.

TREATMENT UNIT NO.1CONTROL SCHEMATIC

NOT TO SCALE

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CITY OF PEMBROKE PINES
UTILITIES DEPARTMENT
8300 SOUTH PALM DRIVE
PEMBROKE PINES, FLORIDA 33025

NO.	DATE	BY	DESCRIPTION

REVISIONS

WASTEWATER TREATMENT PLANT
UNIT 1 REHABILITATION
INSTRUMENTATION DETAILS
13955 Pembroke Rd, Pembroke Pines, FL 33029

SHEET NUMBER: I-3
SCALE: N.T.S.
SHEET: X OF X
CITY OF P.P. PLAN SUBMITTAL: 100% SET
SUBMITTAL DATE: MARCH 2025

TABLE OF CONTENTS

CITY OF PEMBROKE PINES

WWTP UNIT 1 REHABILITATION

PROJECT SPECIFICATIONS

SECTION 01010

SUMMARY OF WORK

PART 1 - PART 1 - GENERAL

1.01 DESCRIPTION

A. Section includes: Identification and summary description of the Project, the Work, location, Owner-furnished products, activities by others, coordination, and early occupancy by Owner.

1.02 RELATED SECTIONS

A. Section 01015 - General Requirements

B. Section 01025 - Measurement and Payment

C. Other Sections as applicable.

1.03 REFERENCES (NOT USED)

1.04 CONTRACTOR USE OF SITE

A. The Contractor shall limit his area of work to remain within those properties and easements as depicted in the Drawings or as approved in writing by the Owner.

B. Contractors' use of lands other than those depicted in the Drawings shall require written approval from the land owner and be at the Contractors risk and cost.

1.05 LOCATION OF WORK

A. The work is located at Pembroke Pines Wastewater Treatment Plant, located at 13995 Pembroke Road in the City of Pembroke Pines, Florida.

1.06 DESCRIPTION OF WORK

A. Treatment Unit 1 (TU No.1).

1. Cleaning and grit removal.

2. Remove and replace existing fine bubble diffuser system.

3. Remove and replace Clarifier Drive.

4. Remove existing Return Activated Sludge (RAS) box and RAS valve. Replace with new RAS box and valve based on the manufacture design.

5. Install new froth spray system for the effluent trough.

6. Renovation, surface preparation and painting entire unit.

7. Additional process air piping needed to create a close loop air header system.

8. Electrical and instrumentation control modifications.

1.07 GENERAL WORK SEQUENCE

A. Incorporate sequence of the work into the Critical Path Method Schedule.

B. Coordinate all required modifications with Owner's Operations

C. Remove all the equipment and materials specified for replacement.

D. Clean and remove all sand, grit, solids and debris from the unit and then prep for the unit for rehabilitation.

E. Coordinate Owners inspection of tank interior.

F. Continue with the repairs inside the unit.

G. Install new RAS box and valve.

H. Install new clarifier drive.

I. Perform surface preparation and paining.

J. Replace all the equipment, handrails, and light stands.

K. Install electrical and instrumentation conduits, control panels and wiring.

L. Restore all work areas and test, start up and train personnel on new system modifications.

M. Coordinate all required modifications with Owner's Operations to bring Treatment Unit No. 1 into service.

1.08 OWNER OCCUPANCY

A. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

B. Schedule the Work to accommodate this requirement.

1.09 WORK BY OTHERS

A. The Contractor is advised that work by others may take place during the duration of the contract time. It shall be the Contractor's responsibility to coordinate and schedule all Work as not to delay or hinder his work or the work by others.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01015

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section provides for miscellaneous provisions applicable to the Work.

1.02 RELATED SECTIONS

A. Section 01010 – Summary of work

B. Section 01090 - References

C. Section 01310 – Construction Schedules

D. Section 01340 – Shop Drawings, Working Drawings and Samples

E. Section 01530 – Existing Utilities

F. Section 01720 – Project Record Documents

G. Other Sections as applicable.

1.03 TERMINOLOGY

A. Throughout the Contract Documents, the following definitions apply:

1. Owner- The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

2. Work- The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services and documentation necessary to produce such construction, and furnishing, installing and incorporating all materials and equipment into such construction, all as required by the Contract documents.

3. Engineer – The term Engineer and Owner may be used interchangeably in this project.

1.04 SAFETY

A. All work shall be done in a safe manner and in strict compliance with all requirements of the Federal Occupational Safety and Health Act (OSHA), The Florida Trench Safety Act and all other State and local safety and health regulations.

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, his 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. Failure of the Owner to direct the correction of unsafe conditions or practices shall not relieve the Contractor of his responsibilities.

C. The Contractor shall provide, erect and maintain as necessary, strong and suitable barricades, danger signs and warning lights for the protection of the public.

1.05 APPLICABLE CODES

A. The Contractor shall comply with the applicable standards codes and specifications governing the Contract Documents whether City, County, State or Federal. The Contractor is obligated to notify the Owner and Engineer of any deficiency contained in the Contract Documents immediately upon discovery. Where conflicts exist in such, the more stringent shall govern.

1.06 APPLICABLE PERMITS AND LICENSES

A. The Contractor shall abide by all permit conditions, whether, general, specific, limited or otherwise. A copy of all applicable permits and licenses, with the exception of City permits obtained by the Contractor, are attached hereto and made a part of the Contract Documents.

1.07 PUBLIC BID DISCLOSURE ACT 218.80 FS

A. All the local governmental entity permits or fees are to be disclosed, including, but not limited to, all license fees, permit fees, impact fees, or inspection fees, payable by the contractor to the unit of government that issued the bidding documents or other governmental agency,

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PRE-CONSTRUCTION RESPONSIBILITIES

A. Upon receipt of the Notice To Proceed, the Contractor shall arrange for a Pre-Construction meeting. The meeting shall be held with a minimum of one weeks' notice and shall include the Engineer, the Owner, and Representatives for all affected utility companies.

3.02 TEMPORARY UTILITIES

A. The Contractor shall be responsible to arrange for and supply all temporary utilities including, but not limited to, water, sewer, and electricity.

B. The cost of temporary utilities shall be considered incidental to the cost of the Work and is therefore included in the Bid.

3.03 UNDERGROUND LOCATING SERVICE

A. Prior to underground construction, the Contractor is required by the Underground Facility Damage Prevention and Safety Act, Chapter 556 FS to contact Sunshine 811, for the location of underground utilities.

3.04 HURRICANE PREPAREDNESS PLAN

A. Should the Performance of the work occur during Hurricane Season, within thirty days of the date of Notice to Proceed, the Contractor shall submit to the Engineer and Owner a Hurricane Preparedness Plan. The Plan should outline the necessary measures that the contractor proposes to perform at no additional cost to the owner

in case of a hurricane warning. The plan shall detail these measures with specific action items defining responsible personnel.

3.05 INCLEMENT WEATHER

A. In the event of inclement weather, or whenever Engineer shall direct; Contractor will cause Subcontractors to carefully protect the work and materials against damage or injury from the weather. If in the opinion of the Engineer, any portion of Work or materials shall have been damaged or injured by reason of failure on the part of Contractor or any Subcontractor to so protect the Work, such Work and materials shall be removed and replaced at the expense of the Contractor.

3.06 ADVANCE INVESTIGATIONS

A. The Contractor shall be responsible for uncovering and exposing existing utilities sufficiently in advance of pipe laying operations to confirm elevation, size, material and clearance separation(s). If, upon excavation, an existing utility is found to be in conflict with the proposed construction or be of a size or material different from what is shown on the plans, the Contractor shall immediately notify the Engineer, who will in turn prepare a recommendation. Failure of the Contractor to perform advance investigations shall not relieve it of any claims for delay or damages.

3.07 PRESERVATION AND RESTORATION

A. Contractor shall be responsible for the preservation and protection of property adjacent to the work site against damage or injury as a result of his operations under this project. 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.

3.08 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 his own expense. Protection measures shall be subject to the approval of the CITY.

3.09 CONTRACTOR USE OF PREMISES

A. Contractor shall have limited use of the premises for construction operations, including limited use of the site. The Contractor's use of the premises is further limited to the Owner's right to perform construction operations with its own forces or to employ separate Contractors on portions of the project.

B. The Contractor shall be responsible for coordinating his daily activities in conjunction with any Contractors presently working within the vicinity of this project.

C. Confine operations to areas within rights-of-way and easements.

D. Keep existing driveways and entrances serving the premises clear and available to the Owner, Residents and the Owner's employees at all times.

1. Do not use these areas for parking or storage of materials.

2. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

3.10 DISPOSAL

A. Do not dispose of any unsuitable fill, hazardous or organic material onsite. All such material shall be disposed of in a legal manner by the Contractor, the cost of which shall be included in the Bid.

3.11 ENVIRONMENTAL PROTECTION

A. Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result.

3.12 MATERIAL AND EQUIPMENT

A. Substitutions: After Bidding period, up to 30 days after date of Notice to Proceed, the Engineer will consider written requests from Contractor for proposed substitutions of products. Subsequent requests will be considered only in case of product unavailability or other condition beyond control of the Contractor. Submit a separate request for each proposed substitution;

1. Do not order or install substitute products without written acceptance from the Engineer of Record.

2. Do not imply or indicate substitutions on shop drawings or product data submittals without a separate formal request.

3. Engineer will determine acceptability of substitution.

4. Only one request for substitution for each product will be considered. If not accepted, Contractor shall provide specified product.

B. Product selection is governed by the Contract Documents and governing regulations, not by previous project experience.

1. Where a single or multiple products or manufacturers are named, provide one of the products indicated or submit a request for substitution for any product or manufacturer not named unless no substitution is permitted.

2. Where the Specifications only require compliance with performance requirements, an imposed code, standard or regulation, select a product that complies with the requirements, standards, codes or regulations specified.

3. Manufacturers named in a Specification section are those manufacturers considered capable of manufacturing products conforming to the specified requirements. The naming of a particular manufacturer does not imply acceptance or approval of just any standard product of that manufacturer.

3.13 ADJUSTMENT OF EXISTING UTILITIES

A. The Contractor shall raise or lower all manholes, valve boxes, etc. to finished grade. The cost of these adjustments shall be considered incidental to the cost of the Work and is therefore included in the Bid.

3.14 EXISTING IRRIGATION

A. All existing irrigation systems within the area of the Work shall be restored to original condition or better and adjusted to finished grade. The cost of repairs and/or adjustment to existing irrigation shall be considered incidental to the cost of the Work and is therefore included in the Bid.

3.15 DEWATERING

A. In accordance with SFWMD criteria contained in 40E-2.061 F.A.C., a dewatering permit is not required provided the following provisions are met:

1. Maximum daily pumpage is less than 5 million gallons (MG) and a maximum total project pumpage of less than 100 MG over a one year period;
2. All discharge shall remain on the project site;
3. No dewatering shall occur to a depth below elevation 0.0 feet NGVD within 1,000 feet of saline water, except when dewatering water with a chloride concentration of greater than 1,000 milligrams per liter;
4. No dewatering shall occur within 100 feet of a wastewater treatment plant rapid-rate land application system permitted under Part IV of Chapter 62-610, F.A.C.;
5. No dewatering shall occur within 1,000 feet of a known landfill or contamination; and,
6. No dewatering shall occur within 1,000 feet of a freshwater wetland unless dewatering activities are completed within 60 days.
7. All dewatering operations are subject to the Permit Conditions in Section 5.0 of the SFWMD APPLICANT'S HANDBOOK FOR WATER USE PERMIT APPLICATIONS (07-16-2014), including responsibility for mitigating any harm that may occur as a result of the dewatering to existing legal uses, off-site land uses, or natural resources.

B. The Contractor shall apply for a dewatering permit through the SFWMD if any of the above conditions cannot be met.

3.16 DEMOLITION

A. Limits of demolition which may be shown in the Contract Documents are general in nature. Actual limits of demolition shall be as determined by the field conditions in conformance with the requirements of the Work.

B. All sidewalks within the limits of construction which are not ADA compliant (cross-slopes which exceed 2% and/or running slopes which exceed 5% and/or changes in level of ¼" or greater) shall be demolished and reconstructed to meet these requirements.

C. When sidewalk tie-ins exist outside the limits of construction which are not ADA compliant, the Contractor shall replace those sections as directed by the Owner.

END OF SECTION

SECTION 01021

OWNER CONTINGECY ALLOWANCES

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section provides for administrative procedures for the Contractors utilization of monetary amounts for Owner contingency allowances when contained in the Contract Sum or Total Base Bid.

B. The Contractor has included in the Contract Price all Allowances so named in the Contract Documents and Shall cause the Works so covered to be performed for such sums and by such person or entities as may be acceptable to Owner and Engineer.

C. The contractor agrees that an Allowance, if any, is for the sole use of Owner to cover unanticipated or undetermined costs.

D. All owner Allowances which remain unused, in whole or in part, remain the property of the Owner.

1.02 RELATED SECTIONS

A. Section 01025 – Measurement and Payment.

B. Section 01152 – Application for Payment

C. Section 01152 – Application for Payment

D. Section 01310 - Construction Schedules.

E. Section 01340 – Shop Drawings, Working Drawings and Samples

F. Other Sections as Applicable.

1.03 PROCEDURES FOR ADMINISTRATION OF ALLOWANCES.

A. Funds will only be drawn from Owner contingency allowances by Change Order.

B. Costs shall be as represented in the Unit Price Schedule or Unit Price Bid Form.

C. Payment shall be as represented in Section 01025 – Measurement for Payment.

1.04 COST INCLUDED IN PERMITTING ALLOWANCES

A. Cost of the permit application fee determined by the agency at the time of the Contractor's submittal. All other costs associated with obtaining the required permits shall be the responsibility of the Contractor.

1.05 COSTS INCLUDED IN ALLOWANCES

A. Cost of product to Contractor, less applicable trade discounts.

B. Delivery to site, products handling at site, including unloading, uncrating, and storage.

C. Applicable taxes unless covered by Owner Furnished Equipment clause.

D. Protection of products from elements and from damage.

E. Labor, insurance, payroll, bonding, equipment rental and installation and finishing, except when installation is specified as part of allowance.

F. Other expenses required to complete installation.

G. Contractor field and home office overhead and profit.

1.06 CONTRACTOR RESPONSIBILITIES

A. Promptly notify Engineer of any reasonable objections from supplier.

B. On notification of selection, execute purchase agreement with designated supplier.

C. Arrange for process shop drawings, product data, and samples.

D. Arrange for delivery. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Install, adjust, and finish products.

F. Provide warranties for products and installation.

1.07 CORRELATION WITH CONTRACTOR SUBMITTALS

A. Schedule shop drawings, product data, samples, and delivery dates, in Progress Schedule for products selected under allowances.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section includes administrative and procedural requirements for determining Work completed under the unit price contract.

1.02 RELATED SECTIONS

A. Section 01152 – Applications for Payment

B. Section 01370 – Schedule of Values

C. Other Sections as applicable.

1.03 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

B. Occupational Safety and Health Act (OSHA)

C. American Society of Mechanical Engineers (ASME)

D. American Institute of Steel Construction (AISC)

E. American Waterworks Association (AWWA)

F. American Welding Society (AWS)

G. Underwriters Laboratories (UL)

H. National Electric Code (NEC)

I. Steel Structures Painting Council (SSPC)

1.04 GENERAL REQUIREMENTS

A. Prices shall include all costs required for the completed, in-place construction of the specified unit of work. This may include but not be limited to, materials and delivery; cost of installation; incidentals; labor including social security, insurance, and other required fringe benefits; workman's compensation insurance; bond premiums; rental of equipment and machinery; taxes; testing; surveys; incidental expenses; and supervision.

B. Installation, acceptance and payment shall be in accordance with the REFERENCE STANDARDS.

C. The Owner reserves the right to reject the Contractor's measurement of completed work that involves use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

D. Contract Sum adjustments will be by Change Order on basis of net accumulative change for each unit price category.

E. Except as otherwise specified, unit prices shall apply to both deductive and additive variations of quantities.

F. Lump sum and unit prices in the Agreement shall remain in effect until date of final completion of the entire Work.

G. Partial payment for material and equipment properly stored and protected will be made in accordance with requirements of the General Conditions.

H. No separate payment will be made for Record Drawings.

I. Abbreviations:

1. Acre - AC
2. Allowance - AL
3. Cubic Yard - CY
4. Each - EA
5. Furnish and Install - F & I
6. Gallons - GA
7. Gross Mile - GM
8. Linear Feet – LF
9. Lump Sum - LS
10. Million Gallons – MG
11. Net Mile - NM
12. Square Foot – SF
13. Square Yard – SY
14. Ton - TN

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 MEASUREMENT AND PAYMENT

A. Payment shall constitute full compensation and will be made as indicated in the RELATED SECTIONS.

B. The Contractor shall submit a Schedule of Values for Engineer approval in accordance with Section 01370 prior to the first Application for Payment.

1. The Schedule of Values shall include Lump Sum prices or Measured quantities for each pay item broken down from the Bid Items, subject to approval by the Owner.

C. The quantity approved for payment shall be either:

1. Percentage of the Lump Sum price - A percentage of the lump sum price equivalent to the percentage of the project completion as determined by the Engineer as of the date of the pay request submitted. The percent completion of the project shall be based on the percent of the total project actually constructed and not on the percent of the Contract price completed.

D. Measured Quantities - The actual quantities in-place and accepted as measured by the Engineer on the date of the pay request submitted in the units specified in the bid form or schedule of values.

3.02 PROTECTION

A. Where pavement, pipes, valves, appurtenances, trees, shrubbery, fences, other property, or structures are in proximity to the WORK, adequate protection shall be provided. Such protection is considered incidental to construction and shall not be assigned to any pay item.

3.03 RESTORATION

A. Where pavement, pipes, valves, structures, appurtenances, trees, shrubbery, fences, other property or structures not designated as pay items, have been damaged, removed or disturbed by the Contractor, whether deliberately or through failure to carry out the requirements of the Contract Documents, state laws, municipal ordinances or the specific direction of the Engineer, or through failure to employ usual and reasonable safeguards, such property and surface structures shall be replaced or repaired at the expense of the Contractor to a condition equal to that before work began within a time frame approved by the Engineer. Such restoration is considered incidental to construction and shall not be assigned to any pay item.

PART 4 - BID ITEMS

4.01 BID ITEM NO. 1 - MOBILIZATION AND DEMOBILIZATION

A. The Lump Sum Price shall include compensation for all labor, materials, equipment, and all other incidents required for all temporary facilities, transportation, communications, office, maintenance and other pre- or post- construction expenses necessary for the start or cessation of the work.

B. The Lump Sum Price shall exclude the cost for construction material and installation.

C. No further payment shall be made for remobilization unless all the work is suspended by the owner for a period in excess of three months and through no fault to the Contractor.

D. The Lump Sum Price shall not exceed five percent (5%) of the contract price.

E. Payment shall be made as a percentage of the Lump Sum Price.

4.02 BID ITEM NO. 2 – CLEANING

A. The contractor shall furnish all labor, equipment and disposal fees associated with the cleaning of WWTU #1 treatment compartments including the contact, re-aeration and digestor zones. Cleaning shall include removal of all sand, grit, rags, solids and the like down to a cleaned, pressure washed surface of the walls and floor.

B. Contractor shall remove and replace all existing digestor covers for cleaning of the digester and inspection of the digester compartment by the Owner.

C. Payment shall be made on a per ton basis of actual material removed and hauled away as measured by the scales of the receiving facility.

D. The contractor shall provide receipts, in tons, from the receiving facility.

E. Quantities provided in the Bid Form by the City are for estimating purposes only.

4.03 BID ITEM NO. 3 – REMOVE AND REPLACE FINE BUBBLE AERATION SYSTEM

A. The Contractor shall furnish all labor, materials, tools and equipment necessary for supply, installation, testing, and placing into satisfactory operation new fine bubble membrane diffused aeration equipment including stainless steel to PVC transition coupling, PVC manifold and distributor pipes, diffuser holders, diffusers, stainless steel supports, purge systems, and related items in the Contact zone and Secondary Aeration zone within the existing Package Plant No. 1 as depicted in the Drawings and specified herein.

B. Prior to shop drawing approval, the Contractor shall coordinate an inspection with the Owner after cleaning to inspect the existing fine bubble aeration system for the purposes of determining which components, if any, may be re-used.

C. Payment shall be made based on a percentage of the Lump Sum Price for each component depicted in the Schedule of Values.

4.04 BID ITEM NO. 4 - REMOVE AND REPLACE CLARIFIER DRIVE

A. Furnish all labor, materials, equipment, and incidentals required and install, complete, ready for operation and field-tested clarifier drive as shown on the Drawings and specified herein.

B. The clarifier drive shall be designed to meet the operational functionality of the existing Unit #1 Model R Oxigest BNR (Biological Nutrient Removal) Treatment system as manufactured by Smith and Loveless.

C. Remove existing clarifier drive and gear, including all mechanical, electrical and other appurtenances and salvage on-site as directed by the Owner.

D. The clarifier drive shall be designed to accommodate the existing treatment capacity and shall have, at a minimum, the same shaft size, speed and torque capacity as the existing clarifier drive and gear.

E. Payment shall be made based on a percentage of the Lump Sum Price for each component depicted in the Schedule of Values.

4.05 BID ITEM NO. 5 - REMOVE AND REPLACE RETURN RAS/WAR SPLITTER BOX AND VALVE

A. Furnish all labor, materials, equipment, and incidentals required and install, complete, ready for operation and field-tested one RAS/WAS Flow Splitter Box and valve as shown on the Drawings and specified herein.

B. The RAS/WAS Flow Splitter Box shall be designed to meet the operational functionality and capacity of the existing Unit #1 Model R Oxigest BNR (Biological Nutrient Removal) Treatment system as manufactured by Smith and Loveless.

C. The RAS/WAS Flow Splitter Box shall be furnished with a plug valve with electric actuator, a V-notch weir and flow sensor.

1. Payment for the plug valve with electric actuator shall be included in this pay item.

2. Payment for the flow sensor shall be under the Pay Item for Instrumentation and Controls.

D. Payment shall be made based on a percentage of the Lump Sum Price for each component depicted in the Schedule of Values

4.06 BID ITEM #6 – REMOVE AND REPLACE SPRAY WASH SYSTEM

A. Furnish all labor, materials, equipment and incidentals required to install, complete, ready for operation and field testing one spray wash system as shown on the Drawings and specified herein.

B. Remove existing and install new spray wash system including submersible pump, sch. 80 PVC pipe, fittings, 316 stainless steel nozzles,

C. Match existing spray pump model Prosser Enpo ¾ HP, quantity of spray nozzles, pipe sizes and locations.

D. Payment shall be made based on a percentage of the Lump Sum Price for each component depicted in the Schedule of Values

4.07 BID ITEM #7 – RENOVATION.

A. After cleaning and prior to WORK, coordinate a tank inspection with the Owner.

B. Remove all unused brackets, pipes, etc. and cap/weld flush with unit structural steel.

C. Remove and Replace existing pipe supports and light pole bases. Match existing.

D. Repair or reinforce all steel areas where corrosion exceeds 1/16-inch depth. Repairs shall consist of ¼" steel plate or flat bar welded all around, minimum.

E. All non-aluminum handrails, splash guards and kickplates shall be removed and replaced with aluminum. Contractor shall submit shop drawings signed and sealed by a Florida Registered Engineer.

F. All aluminum grating, handrails, splash guards and kickplates shall remain. Record the location of each item to ensure proper removal and replacement.

G. Install new neoprene edges on existing skimmer arms and sludge racker arms. Match existing dimension and thickness.

H. Payment shall be made based on a percentage of the Lump Sum Price for each component depicted in the Schedule of Values

4.08 BID ITEM #8 – SURFACE PREPARATION AND PAINTING

A. Furnish all labor, materials, equipment and incidentals required to perform surface preparation and painting of all surfaces on unit 1 including, but not limited to, interior, exterior, structural members, skimmer and raker arms, piping, supports and weirs.

B. The Contractor shall require the manufacturer to furnish a manufacturer's qualified technical representative to visit the project site for technical support as required and ordered and as may be necessary to resolve field questions or problems attributable to or associated with the manufacturer's products furnished under this Contract or the application thereof.

C. The Contractor shall remove coordinate interior painting with diffuser removal so that the tank floor is clear of diffuser equipment during painting.

D. Exterior ferrous metals re-coat shall be option #2, PPG.

E. Structural members for fabric covers are not shown for clarity and must be prepared and painted.

F. Payment shall be made based on a percentage of the Lump Sum Price for each component depicted in the Schedule of Values

4.09 BID ITEM #9 – CLOSED LOOP AIR HEADER ADDITION

A. Furnish all labor, materials, equipment and incidentals required to construct the 12-inch schedule 40 welded steel air header as depicted in the Drawings and specified herein.

B. Furnish all labor, materials, equipment and incidentals required to construct six (6) pipe supports for the 12-inch air header as depicted in the Drawings and specified herein. Match existing pipe supports.

C. Includes but not limited to, all necessary fittings, fabrications, structural modifications, installation of supports, testing, and commissioning.

D. Payment shall be made based on a percentage of the Lump Sum Price for each component depicted in the Schedule of Values

END OF SECTION

SECTION 01045

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Contractor shall be responsible for all cutting, fitting and patching required to complete the work or to:

1. Make its several parts fit together properly.
2. Uncover portions of the Work to provide for installation of ill-timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to requirements of Contract Documents.
5. Remove samples of installed work as specified for testing.
6. Investigate subsurface conditions or utilities.

1.02 RELATED SECTIONS

A. Section 01010 - Summary of Work

B. Section 01015 – General Requirements

C. Other Sections as applicable.

1.03 SUBMITTALS

A. Submit a written request to the Engineer in advance of executing any cutting or alteration which affects:

1. Work of the Owner or any separate contractor.
2. Structural value or integrity of any element of the Project.
3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
4. Efficiency, operational life, maintenance or safety of operational elements.
5. Visual qualities of sight-exposed elements.

B. Request shall include:

1. Identification of the Project.
2. Description of affected work.
3. The necessity for cutting, alteration or excavation.
4. Effect on work of Owner or any separate contractor, or on structural or weatherproof integrity of Project.
5. Description of proposed work:

a. Scope of cutting, patching, alteration, or excavation.

b. Trades who will execute the work.

c. Products proposed to be used.

d. Extent of refinishing to be redone.

6. Alternatives to cutting and patching.

7. Cost proposal, when applicable.

8. Written permission of any separate contractor whose work will be affected.

9. Submit written notice to the Engineer designating the date and the time work will be uncovered.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Comply with specifications and standards for each specific project involved.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting or patching.

B. After uncovering work, inspect conditions affecting installation of Products, or performance of work.

C. Report unsatisfactory or questionable conditions to the Engineer in writing; do not proceed with work until the Engineer has provided further instructions.

3.02 PREPARATION

A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.

B. Provide devices and methods to protect other portions of Project from damage.

C. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work, and maintain excavations free from water.

3.03 PERFORMANCE

A. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.

B. Execute cutting methods which will prevent settlement or damage to other work.

C. Employ original Installer or Fabricator to perform cutting and patching for:

1. Weather-exposed or moisture-resistant surfaces.

2. Sight-exposed finished surfaces.

D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

E. Restore work which has been cut or removed; install new products to provide completed Work in accord with requirements of Contract Documents.

F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:

1. For continuous surfaces, refinish to nearest intersection.

2. For an assembly, refinish entire unit.

END OF SECTION

SECTION 01046

MODIFICATIONS TO EXISTING STRUCTURES, PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnish all labor, materials, equipment and incidentals required to modify, alter and convert existing structures as shown or specified and as required for the installation of new mechanical equipment, piping and appurtenances. Existing piping and equipment shall be removed, abandoned or dismantled as necessary for the performance of the work.

1.02 RELATED SECTIONS

A. Section 01045 - Cutting and Patching

B. Section 01310 - Construction Scheduling

C. Other Sections as applicable.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall cut, repair, reuse, excavate, demolish or otherwise remove parts of the existing structures or appurtenances, as indicated on the Contract Drawings, herein specified, or necessary to permit completion of the work under this Contract.

B. The above work shall include the cutting of grooves and chases in existing masonry to permit the proper bonding of new masonry to old, repainting of existing masonry, the drilling of holes into bolts, or other appurtenances, and the cutting of holes in masonry for the installation of pipe, conduits, and other appurtenances. The work shall include all necessary cutting and bending of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.

C. Blasting with explosives will not be permitted to complete any work under this Contract. Care shall be taken not to damage any part of existing buildings, foundations and exterior structures both below and above ground.

D. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or otherwise altered except with the express approval of and to the extent approved by the Engineer.

E. When removing materials or portions of existing structures and when making openings in walls and partitions, the Contractor shall take all precautions and use all necessary barriers and other protective devices so as not to damage the structures or contents by falling or flying debris and not to damage the structures from excavation

or undermining of existing structural supports, beams, footings, columns or any structural member.

F. Materials and equipment removed in the course of making alterations and additions shall remain the property of the Owner, except that items not salvageable, as determined by the Engineer and the Owner shall become the property of the Contractor to be disposed of by him off the site of the work at his own place of disposal. The Contractor shall assist the Owner in loading and hauling of salvageable materials within the City limits of the project.

G. All work of altering existing structures shall be done at such time and in such manner as will comply with the approved time schedule. So far as possible before any part of the work is started, all tools, equipment, and materials shall be assembled and made ready so that the work can be completed without delay.

H. All workmanship and new materials involved in constructing the alterations shall conform to the General Specifications for the classes of work insofar as such specifications are applicable.

I. All cutting of existing masonry or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective section of these specifications covering the new work. When not covered, the work shall be carried on in the manner and to extent directed by the Engineer.

J. Where holes in existing masonry are required to be sealed, unless otherwise herein specified, they shall be sealed with cement mortar or concrete. The sides of the openings shall be provided with keyed joints and shall be suitably roughened to furnish a good bond and make a watertight joint. All loose or unsound material adjacent to the opening shall be removed and, if necessary, replaced with new material. The method of placing the mortar seal shall provide a suitable means of releasing entrapped air.

K. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.

L. Non-shrink grout shall be used for setting wall castings, sleeves, leveling pump bases, doweling anchors into existing concrete, and elsewhere as shown.

M. Operating equipment shall be thoroughly cleaned and then lubricated and greased for protection during prolonged storage.

N. The Contractor shall provide flumes, hoses, piping, etc. to divert or provide suitable plugs, bulkheads or other means to hold back the flow of wastewater, water or other liquids, all as required in the performance of the work under this Contract.

3.02 SALVAGE

A. Any existing equipment or material, including but not limited to, motors, electrical components or controls, pipe, fittings, couplings, etc., which is removed or replaced as a result of construction under this project may be designated as salvage by the Engineer or Owner, and if so, shall be removed or excavated, if necessary, and delivered to the Owner at a location directed by the Owner. Any equipment or

material not worthy of salvaging, as directed by the Owner, shall be disposed of by the Contractor at a suitable location.

3.03 CONNECTING TO EXISTING PIPING AND EQUIPMENT

A. The Contractor shall verify exact location, material, alignment, joint, etc. of existing piping and equipment prior to making the connections called out in the Drawings. The verifications shall be performed with adequate time to correct any potential alignment or other problems prior to the actual time of connection.

B. The Contractor shall dismantle and remove all existing equipment, piping and other appurtenances required, he shall cut existing pipelines for the purpose of making connections thereto. Anchor bolts for equipment and structural steel removed shall be cut off one inch below the concrete surface. Surface shall be finished as specified in Division 3.

C. At the time that a new connection is made to an existing pipeline, additional new piping, extending to and including the most convenient new valve, shall be installed.

D. Where necessary or required for the purpose of making connections, the Contractor shall cut existing pipe lines in a manner to provide an approved joint. Where required, he shall weld beads, flanges or provide Dresser Couplings, all as specified and required.

END OF SECTION

SECTION 01050

FIELD ENGINEERING AND SURVEYING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide and pay for field engineering and surveying services required for Project as follows:

1. Surveying work required for the lay-out and execution of Work.

2. Surveying work required to identify and maintain existing control points, bench marks and property line corners.

3. Surveying work required to verify existing utility locations.

4. Surveying work as required to create Project Record Documents.

5. Civil, structural, or other professional engineering services specified, or required to execute the Contractor's construction methods.

6. Testing, sampling, calibrating and training services specified, or required to execute the Contractor’s construction methods including soils, concrete, material, etc.

1.02 RELATED SECTIONS

A. Other Sections as applicable.

1.03 QUALIFICATIONS OF PROFESSIONAL

A. Florida Registered Professional Surveyor and Mapper, acceptable to the Owner and the Engineer.

B. Florida Registered Professional Engineer(s) of the specialty required for on the Project, acceptable to the Owner and the Engineer.

1.04 SURVEY REFERENCE POINTS

A. Horizontal and vertical control points for the Project are to be established by the Engineer and provided to the Contractor.

B. Locate and protect control points prior to starting work, and preserve all permanent reference points during construction.

1. Make no changes or relocations without prior written notice to the Engineer.

2. Report to the Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

3. Require surveyor to replace project control points which may be lost or destroyed.

a. Establish replacements based on original survey control.

1.05 PROJECT SURVEY REQUIREMENTS

A. Establish a minimum of two temporary benchmarks on site, referenced to data by survey control points.

1. Record locations, with horizontal and vertical data, on Project Record Documents.

B. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means:

1. Site Improvements

a. Line and grade of pipe and structure installation; top of pipe, invert, slope, etc.

b. Grading for fill and topsoil placement, roadway sub-base and base installation.

2. Controlling lines and levels required for all trades.

C. From time to time, verify layouts by same methods.

1.06 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses in accordance with Section 01720.

1.07 SUBMITTALS

A. Submit name and address of Professional Surveyor and Mapper or Professional Engineer to the Engineer.

B. On request of the Engineer, submit documentation to verify accuracy of field engineering work.

C. Submit certificate signed by registered surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.

D. Submit Project Record Documents in accordance with Section 01720.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 ADVANCE INVESTIGATIONS

A. The Contractor shall be responsible for uncovering and exposing existing utilities sufficiently in advance of pipe laying operations to confirm elevation, size, material and clearance separation(s). If, upon excavation, an existing utility is found to be in conflict with the proposed construction or be of a size or material different from what is shown on the plans, the Contractor shall immediately notify the Engineer, who will in turn prepare a recommendation. Failure of the Contractor to perform the advance investigation shall not relieve it of any claims for delay or damages.

END OF SECTION

SECTION 01090

REFERENCES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Applicable Publications: Whenever in these specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the WORK is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the drawings shall be waived because of any provision of, or omission from, said standards or requirements.

B. 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 assignments 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. 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 the following documents to the extent that the provisions of such documents are not in conflict with the requirements of these Specifications nor the applicable codes.

B. References herein to "Building Code" or “Code” shall mean the Florida Building Code. The latest edition of the code as approved and used at the local agency having jurisdiction, shall apply to the WORK herein, including, all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflicts between codes, reference standards, drawings and other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the ENGINEER for clarifications and directions prior to ordering or providing any materials or labor. The CONTRACTOR shall bid the most stringent requirements.

D. Applicable Standard Specifications: The CONTRACTOR shall construct the WORK specified herein in accordance with the requirements of the Contract Documents and the referenced portion of those referenced codes, standards, and specifications listed

herein; except, that wherever references to "Standard Specifications" are made, the provisions therein for measurement and payment shall not apply.

E. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations, 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.

1.03 TRADE NAMES AND ALTERNATIVES

A. For convenience in designation in the Contract Documents, materials to be incorporated in the WORK may be designated under a trade name or the name of a manufacturer and its catalog information. The use of alternative material which is equal in quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

1. The burden of proof as to the quality and suitability of such alternative equipment, products, or other materials shall be upon the CONTRACTOR.

2. The ENGINEER will be the sole judge as to the comparative quality and suitability of such alternative equipment, products, or other materials and its decisions shall be final.

3. Base Bid requirements outlined in the Supplement to Bid Form, shall supersede any language contained hereinafter.

B. Whenever in the Contract Documents the name or the name and address of the manufacturer or distributor is given for a product or other material, or if any other source of a product or material is indicated therefore, such information is given for the convenience of the CONTRACTOR only, and no limit, restriction, or direction is indicated or intended thereby, nor is the accuracy or reliability of such information guaranteed. It shall be the responsibility of the CONTRACTOR to determine the accurate identity and location of any such manufacturer, distributor, or other source of any product or material called for in the Contract Documents.

C. The CONTRACTOR may offer any material, process, or equipment which it considers equivalent to that indicated. Unless otherwise authorized in writing by the ENGINEER, the substantiation of offers of equivalency must be submitted within 30 days after execution of the Agreement. The CONTRACTOR, at its sole expense, shall furnish data concerning items it has offered as equivalent to those specified. The CONTRACTOR shall have the material as required by the ENGINEER to determine that the quality, strength, physical, chemical, or other characteristics, including durability, finish, efficiency, dimensions, service, and suitability are such that the items will fulfill its intended function. Installation and use of a substitute item shall not be made until accepted by the ENGINEER. If a substitute offered by the CONTRACTOR is found to be not equal to the specified material, the CONTRACTOR shall furnish and install the specified material.

D. The CONTRACTOR'S attention is further directed to the requirement that failure to submit data substantiating a request for the substitution of an "or equal" item within

said 30-day period after the execution of the Agreement, shall be deemed to mean that the CONTRACTOR intends to furnish one of the specific brand-named products named in the specification, and the CONTRACTOR does hereby waive all rights to offer or use substitute products in each such case. Wherever a proposed substitute product has not been submitted within said 30-day period, or wherever the submission of a proposed substitute product fails to meet the requirements of the specifications and an acceptable resubmittal is not received by the ENGINEER within said 30-day period, the CONTRACTOR shall furnish only one of the products originally-named in the Contract Documents.

1.04 ABBREVIATION

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 acronyms or abbreviation only. As a guide to the user of these specifications, the following acronyms and abbreviations which may appear in these specifications shall have the meanings indicated herein.

1.05 ABBREVIATIONS AND ACRONYMS

A. Abbreviations and acronyms contained in the Contract Documents may include, but not be limited to, the following:

AAMA	Architectural Aluminum Manufacturer's Association
AAR	Association of American Railroads
AASHTO	American Association of the State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ACPPA	American Concrete Pressure Pipe Association
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturer's Association
AHAM	Association of Home Appliance Manufacturers
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 Movement and Control Association
ANS	American Nuclear Society
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASA	Acoustical Society of America
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASQC	American Society for Quality Control
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

BBC	Basic Building Code, Building Officials and Code Administrators International
BHMA	Builders Hardware Manufacturers Association
CBM	Certified Ballast Manufacturers
CEMA	Conveyors Equipment Manufacturers Association
CGA	Compressed Gas Association
CLPCA	California Lathing and Plastering Contractors Association
CLFMI	Chain Link Fence Manufacturers Institute
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
DCDMA	Diamond Core Drill Manufacturers Association
DIPRA	Ductile Iron Pipe Research Association
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
HI	Hydraulic Institute
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineering Society
IME	Institute of Makers of Explosives
IP	Institute of Petroleum (London)
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
ISO	International Organization for Standardization

ITE	Institute of Traffic Engineers
MBMA	Metal Building Manufacturers Association
MPTA	Mechanical Power Transmission Association
MTI	Marine Testing Institute
NAAM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NBS	National Bureau of Standards
NCCLS	National Committee for Clinical Laboratory Standards
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NGLI	National Grease Lubricating Institute
NMA	National Microfilm Association
NRCA	National Roofing Contractors Association
NWMA	National Woodwork Manufacturers Association
NWWA	National Water Well Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Precast Concrete Institute
PDI	Plumbing and Drainage Institute
RIS	Redwood Inspection Service
RVIA	Recreational Vehicle Industry Association
RWMA	Resistance Welder Manufacturers Association
SAE	Society of Automotive Engineers

SAMA	Scientific Apparatus Makers Association
SBC	Southern Building Code Congress International, Inc. (SBCCI)
SIS	Swedish Standards Association
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SPR	Simplified Practice Recommendation
SSBC	Southern Standard Building Code, Southern Building Code Congress
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
TAPPI	Technical Association of the Pulp and Paper Industry
TFI	The Fertilizer Institute
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
USGS	United States Geological Survey
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WIC	Woodwork Institute of California
WPCF	Water Pollution Control Federation
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01152

APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Submit Applications for Payment to the Engineer in accordance with the schedule established by Conditions of the Agreement between Owner and Contractor and the Contract Documents.

1.02 RELATED SECTIONS

A. Section 01050 - Field Engineering

B. Section 01370 - Schedule of Values

1.03 FORMAT AND DATA REQUIRED

A. Submit applications typed on forms provided by the Owner (or forms provided by Contractor and agreed to by Owner), Application for Payment, with itemized data typed on 8 1/2 inch x 14 inch white paper and continuation sheets.

B. Payment forms shall show significant detail to substantiate request. Additional detail may be required by the Engineer.

1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

A. Application Form:

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.

2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.

3. Execute certification with signature of a responsible officer of Contract firm.

B. Continuation Sheets:

1. Fill in total list of scheduled component items of work, with item number and scheduled dollar value for each item.

2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.

a. Round off values to nearest dollar, or as specified.

3. List each Change Order Number, and description, as for an original component item or work.

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When the Owner or the Engineer requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:

1. Project

2. Application number and date
3. Detailed list of enclosures
4. For stored products:
    a. Item number and identification as shown on application.
    b. Description of specific material.
    c. Copy of material invoice.
    d. Address of location where item is stored
    e. Photographs of item (if requested)

B. Submit one copy of data cover letter for each copy of application.

C. As a prerequisite for payment, Contractor is to submit the following:
1. a "Surety Acknowledgment of Payment Request" letter showing amount of progress payment which the Contractor is requesting,
2. updated record drawings for review by the Engineer,
3. updated construction schedule for review by the Engineer,
4. construction photographs.

1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

A. Fill in Application form as specified for progress payments.

B. Provide FINAL COMPLETION documentation for the final statement of accounting as specified in Section 01700 - Contract Closeout.

C. Submit final record drawings.

1.07 SUBMITTAL PROCEDURE

A. Submit Applications for Payment to the Engineer at the times stipulated in the Agreement.

B. Number: Five copies of each Application.

C. When the Engineer finds Application properly completed and correct, he will transmit certificate of payment to Owner, with copy to Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Engineer shall schedule and administer preconstruction meetings, periodic progress meetings, and specially called meetings throughout the progress of work. The Engineer shall:

1. Prepare agenda for meetings.
2. Make physical arrangements for meetings.
3. Preside at meetings.
4. Record in writing the minutes; include significant proceedings and decisions.
5. Record the meeting with an audio recording device.
6. Reproduce and distribute copies of minutes within five working days after each meeting:
    a. To participants in the meeting.
    b. To parties affected by decisions made at the meeting.

B. Representatives of contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

C. The Contractor shall attend meetings to ascertain that work is executed consistent with Contract Documents and construction schedules.

1.02 RELATED SECTIONS

A. Section 01310 - Construction Schedules.

B. Other Sections as applicable.

1.03 PRECONSTRUCTION MEETING

A. Schedule a preconstruction meeting no later than 15 days after date of Notice to Proceed.

B. Location: A central site, convenient for all parties designated by the Owner.

C. Attendance:

1. Owner's Representative.
2. Engineer and his Professional Consultants.
3. Resident Project Representative.
4. Contractor's Superintendent.
5. Major Subcontractors.

6. Major Suppliers.
7. Utilities.
8. Others as appropriate.

D. Suggested Agenda:

1. Distribution and discussion of:
    a. List of major subcontractors and suppliers.
    b. Projected Construction Schedule.
2. Critical work sequencing/critical path scheduling.
3. Major equipment deliveries and priorities.
4. Project Coordination.
    a. Designation of responsible personnel.
5. Procedures and processing of:
    a. Field decisions.
    b. Proposal requests.
    c. Submittals.
    d. Change Orders.
    e. Applications for Payments.
6. Adequacy of Distribution of Contract Documents.
7. Procedures for maintaining Record Documents.
8. Use of Premises:
    a. Office, Work and Storage Areas.
    b. Owner's Requirements.
9. Construction facilities, controls and construction aids.
10. Temporary Utilities.

1.04 PROGRESS MEETINGS

A. Schedule regular periodic meetings. The progress meetings will be held as required by progress of the work.

B. Hold called meetings as required by progress of the work.

C. Location of the meetings: Project field office of the Contractor or Engineer.

D. Attendance:

1. Engineer, and his professional consultants as needed.
2. Subcontractors as appropriate to the agenda.
3. Suppliers as appropriate to the agenda.

4. Others as appropriate.

E. Suggested Agenda:

1. Review, approval of minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems and conflicts.
4. Problems which impede Construction Schedule.
5. Review of off site fabrication, delivery schedule.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Progress, schedule, during succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Maintenance of quality standards.
12. Pending changes and substitutions.
13. Review proposed changes for:
    a. Effect on Construction Schedule and on a completion date.
    b. Effect on other contracts of the Project.
14. Other business.
15. Construction schedule.
16. Critical/long lead items.

F. The Contractor is to attend progress meetings and is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as deliveries of materials and equipment, progress of work, etc.

G. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section 01340.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Promptly after Award of the Contract and within ten days after the effective date of the Agreement, prepare and submit to the Engineer a Critical Path Method (CPM) construction schedule for the work, with sub-schedules of related activities which are essential to its progress.

B. Submit revised progress schedules on a monthly basis.

C. No partial payments shall be approved by the Engineer until there is an approved up to date construction progress schedule on hand.

D. The Contractor shall designate an authorized representative of his firm who shall be responsible for development and maintenance of the schedule and of progress and payment reports. This representative of the Contractor shall have direct project control and complete authority to act on behalf of the Contractor's schedule.

1.02 RELATED SECTIONS

A. Section 01010 - Summary of Work

B. Section 01152 - Applications for Payment

C. Section 01200 - Project Meetings

D. Other Sections as applicable.

1.03 FORM OF SCHEDULES

A. Prepare schedules for submittal each month with pay request. The form of the schedule is to be Microsoft Project or approved equal. The Schedule is to indicate work completed to date and additions to or deletions from the schedule.

1. Provide separate horizontal bar for each trade or operation within each structure or item.

2. Horizontal time scale: In weeks from start of construction and identify the first work day of each month.

3. Scale and spacing: To allow space for notations and future revisions.

B. Format of listings: The chronological order of the start of each item of work for each structure.

C. Identification of listings: By major specification section numbers as applicable and structure.

1.04 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity.

2. Show the dates for the beginning of, and completion of, each major element of construction in no more than a two week increment scale. Specifically list, but not limited to:

a. Receiving Materials

b. Pipeline Installations

c. Testing

d. Restoration

e. Startup

f. Record Drawings

g. Permit Close-out

h. Punch List

i. Owner Activities, Including Inspections

1. Show projected percentage of completion for each item, as of the first of each month.
2. Show projected dollar cash flow requirements for each month of construction.
3. 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 the Owner and Contractor.
4. 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.
5. If the Contractor provides an accepted schedule with an early completion date, the Owner reserves the right to reduce the duration of the work to match the early completion date by issuing a deductive Change Order at no change in Contract Price.

B. Submittal Schedule for Shop Drawings and Samples in accordance with Section 01340. Must show:

1. The dates for Contractor's submittals.

2. The dates submittals will be required for owner furnished products, if applicable.
3. The dates approved submittals will be required from the Engineer.
4. A list of all long lead items (equipment, materials, etc).

1.05 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

B. Show changes occurring since previous submission of schedule:

1. Major changes in scope.
2. Activities modified since previous submission.
3. Revised projections of progress and completion.
4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.
2. Corrective action recommended, and its effect.
3. The effect of changes on schedules of other prime contractors.

1.06 SUBMISSIONS

A. Submit initial schedules to the Engineer within 10 days after the effective date of the Agreement.

1. The Engineer will review schedules and return review copy within 21 days after receipt.
2. If required, resubmit within 7 days after return of review copy.

B. Submit a minimum of five (5) copies of revised monthly progress schedules with that month's application for payment.

1.07 DISTRIBUTION

A. Distribute copies of reviewed schedules to:

1. Owner (Two copies)
2. Engineer (Two copies)
3. Job Site File (One copy)
4. Subcontractors (As needed)
5. Other Concerned Parties (As needed)

B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedule.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01340

SHOP DRAWINGS, WORKING DRAWINGS AND SAMPLES

PART 1 - GENERAL

1.01 DESCRIPTION

A. The contractor shall submit to the Engineer for review, such working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this article called data), and material samples (hereinafter in this article called samples) as are required for the proper control of work, including but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.

B. The Contractor shall submit five (5) copies of shop drawings or other data to the Engineer.

C. Within thirty (30) calendar days after the effective date of the Agreement, the Contractor shall submit to the Engineer a complete list of preliminary data for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specific items. Review of this list by the Engineer shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Specifications. This procedure is required in order to expedite final review of Shop Drawings.

D. The contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and Engineer. This log should include the following items:

1. Submittal-Description and Number assigned.
2. Date to Engineer.
3. Date returned to Contractor (from Engineer).
4. Status of Submittal (Approved/Resubmit/Rejected).
5. Date of Resubmittal and Return (as applicable).
6. Date material released (for fabrication).
7. Projected date of fabrication.
8. Projected date of delivery to site.
9. Status of O & M submittal.

1.02 RELATED SECTIONS

A. Section 01310 - Construction Schedules

B. Other Sections as applicable.

1.03 CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the Contractor to check all drawings, data and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents.

B. Determine and verify:

1. Field measurements
2. Field construction criteria
3. Catalog numbers and similar data
4. Conformance and Specifications

C. The Contractor shall furnish the Engineer a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.

D. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that reviewed Shop Drawings, Working Drawings and Samples will be needed.

E. The Contractor shall not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and returned to him, approved by the Engineer.

F. The Contractor shall submit to the Engineer all shop drawings, working drawings and samples sufficiently in advance of construction requirements and shall account for Engineers Shop Drawing review time accordingly.

G. The Contractor shall submit two (2) copies of descriptive or product data submittals to complement shop drawings for the Engineer plus the number of copies which the Contractor requires. The Engineer will retain two (2) sets. All blueprint shop drawings shall be submitted with one (1) set of reproducible and four (4) sets of print. The Engineer will review the drawings and return to the Contractor the set of marked-up drawings with appropriate review comments.

H. The Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of work prior to the review and Approval by Engineer of the necessary Shop Drawings.

1.04 ENGINEER'S REVIEW OF SHOP DRAWINGS

A. The Engineer's review of drawings, data and samples submitted by the Contractor will cover only general conformity to the Specifications, external connections, and dimensions which affect the installation. The Engineer's review and exception if any, will not constitute an approval of dimensions, quantities, and details of the material, equipment, device, or item shown.

B. The review of drawings and schedules will be general, and shall not be construed:

1. as permitting any departure from the Contract requirements;
2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;
3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.

C. If the drawings or schedule as submitted describe variations and/or show a departure from the Contract requirements which Engineers finds to be in the interest of the Owner and to be minor as not to involve a change in the Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.

D. When reviewed by the Engineer, each of the Shop Drawings will be identified as having received such review being so stamped and dated. Shop Drawings stamped "REJECTED" and with required corrections shown will be returned to the Contractor for correction and resubmittal.

E. Resubmittals will be handled in the same manner as the first submittals. On resubmittals, the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.

F. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.

G. The Engineer will review one submittal and one re-submittal after which cost of review will be borne by the Contractor. The cost of engineering shall be equal to the Engineer's charges to the Owner under the terms of the Engineer's agreement with the Owner.

H. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

I. No partial submittals will be reviewed. Submittals not complete will be returned to the Contractor, and will not be considered "Rejected" until resubmitted.

J. The Engineer shall return Shop Drawing submittals to the Contractor within twenty-one (21) days calendar days from the date the Engineer receives them.

1.05 SHOP DRAWINGS

A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature, and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above.

B. Drawings and schedules shall be checked and coordinated with work of all trades involved, before they are submitted for review by the Engineer and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the Contractor for resubmission.

C. Each Shop Drawing, shall have a blank area 3 1/2 inches by 3 1/2 inches, located adjacent to the title block. The title block shall display the following:

1. Number and title of the drawing.
2. Date of drawing or revision.
3. Name of project building or facility.
4. Name of contractor and subcontractor submitting drawing.
5. Clear identification of contents and location of work.
6. Specification title and number.

D. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed.

E. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.

F. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name, address and telephone number of the manufacturer's representative and service company so that service and spare parts can be readily obtained. In addition, a maintenance and lubrication schedule for each piece of equipment shall be submitted along with each shop drawing submittal.

G. All manufacturers or equipment supplier who proposes to furnish equipment or products under Divisions 11, 12, 13, 14, 15 and 16 shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include at least five installations where identical equipment has been installed and has been in operation for a period of at least five (5) years.

H. Only the Engineer will utilize the color "red" in marking Shop Drawing submittals.

I. Before final payment is made, the Contractor shall furnish to Engineer two (2) sets of record shop drawings all clearly revised, complete and up to date showing the permanent construction as actually made for all reinforcing and structural steel, miscellaneous metals, process and mechanical equipment, piping, electrical system and instrumentation system.

1.06 WORKING DRAWINGS

A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and false-work; for underpinning; and for such other work as may be required for construction, but does not become an integral part of the project.

B. Copies of working drawings as noted in subparagraph 1.06A above, shall be submitted to the Engineer where required by the Contract Documents or requested by the Engineer, and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the Engineer) in advance of their being required for work.

C. Working drawings shall be signed by a Registered Professional Engineer, currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the Engineer, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. The Contractor assumes all risks of error; the Owner and Engineer shall have no responsibility therefore.

1.07 SAMPLES

A. The Contractor shall furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until approved by the Engineer.

B. Samples shall be of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of the product, with integrally related parts and attachment devices.

2. Full range of color, texture and pattern.

3. A minimum of two samples of each item shall be submitted.

C. Each sample shall have a label indicating

1. Name of Project

2. Name of Contractor and Subcontractor

3. Material or Equipment Represented

4. Place of Origin

5. Name of Producer and Brand (if any)

6. Location in Project

(Samples of finished materials shall have additional marking that will identify them under the finished schedules.)

D. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required in subparagraph 1.07B above. He shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.

E. Approved samples not destroyed in testing shall be sent to the Engineer or stored at the site of the work. Approved samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the approved samples. Samples which failed testing or were not approved will be returned to the Contractor at his expense, if so requested at time of submission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

Attachment E

SECTION 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Submit to the Engineer a Schedule of Values allocated to the various portions of the Work, within 14 days after the effective date of the Agreement.

B. Upon request of the Engineer, support the values with data which will substantiate their correctness.

C. The Schedule of Values shall be used as the basis for the Contractor's Applications for Payment.

1.02 RELATED SECTIONS

A. Section 01152 - Applications for Payment

B. Other Sections as applicable.

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Present schedule on an 8-1/2 inch x 11 inch white paper; Contractor's standard forms and automated printout will be considered for approval by the Engineer upon Contractor's request. Identify schedule with:

1. Title of Project and location
2. Engineer and Project number
3. Name and Address of Contractor
4. Contract designation
5. Date of submission

B. Schedule shall list the installed value of the component parts to include individual equipment, piping, electrical, paving, of the Work (as required) in sufficient detail to serve as a basis for computing values for progress payments during construction and for additions and deletions to the Work.

C. For the various portions of the Work:

1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.

D. The sum of all values listed in the schedule shall equal the total Contract Sum.

E. Schedules are subject to Engineer's approval wherein additional line item detail may be required.

1.04 ENGINEERS APPROVAL

A. The schedule of Values is subjected to the Engineer’s approval.

1. Additional line item detail may be required.
2. Supporting information may be required.

3. Additional comparison trade bids may be required.

PART 2 - PRODUCTS (NOT USED)

PART 3 - PRODUCTS (NOT USED)

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section describes the Contractor minimum responsibilities in meeting the quality requirements of the Contractor Documents.

1.02 RELATED SECTIONS

A. Section 01050 – Field Engineering and Surveying

B. Section 01410 – Materials and Installation Testing

C. Section 02200 – Earthwork

D. Other Sections as applicable.

1.03 OBSERVATION AT PLACE OF MANUFACTURE

A. Unless otherwise specified, all products, materials, and time and equipment shall be subject to observation by the Owner at the place of manufacture.

B. The presence of the OWNER at the place of manufacture however, shall not relieve the Contractor or of the responsibility for furnishing products, materials, and equipment which comply with all requirements of the Design Criteria Package. Compliance is a duty of the Contractor.

C. The Contractor shall advise the Owner and Engineer promptly upon placing orders for materials and equipment so that arrangements may be made, if desired, for observation before shipment from the place of manufacture.

D. The Engineer may require the contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contractor documents. All costs of this testing and providing statements and certificates shall be subsidiary obligation of the Contractor and no extra charge to the Owner shall be allowed on account of such testing and certification.

1.04 SAMPLING AND TESTING

A. Unless otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered.

B. The Owner and the Engineer reserve the right to use any generally accepted system of sampling and testing which will insure the Owner that the quality of the workmanship is in full accord with the Contract Documents.

C. Any waiver by the Owner of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial Work, shall not be construed as a waiver of any requirements.

D. The Owner and the Engineer reserve the right to make independent investigations and tests at any time.

E. Failure of any portion of the Work to meet any of the requirements of the Design Criteria Package, shall be reasonable cause for the OWNER to require the removal or correction and reconstruction of any such Work at the cost of the Contractor.

1.05 SITE INVESTIGATION AND CONTROL

A. The Contractor shall verify all dimensions in the field and shall check field conditions continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the Work due to its failure to comply with this requirement.

B. The Contractor shall inspect related and appurtenant work, and shall report in writing to the Owner and the Engineer any conditions that will prevent proper completion of the Work. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor at its cost.

1.06 OBSERVATION AND TESTING

A. The work or actions of the testing laboratory shall in no way relieve the CONTRACTOR of its obligations under the Contract. The laboratory testing work will include such observations and testing required by the OWNER. The testing laboratory will have no authority to change the requirements of the Design Criteria Package, nor perform, accept or approve any of the CONTRACTOR's Work.

B. The Contractor shall allow the Owner and the Engineer ample time and opportunity for field observation and testing materials and equipment to be used in the Work.

C. The Contractor shall advise the Owner and the Engineer promptly upon placing orders for materials and equipment so that arrangements may be made, if desired, for observation before shipment from the place of manufacture. The Contractor shall at all times furnish the owner and the Engineer facilities including labor, and allow proper time for inspecting and testing materials, equipment, and workmanship.

D. The Contractor must anticipate that possible delays may occur in the execution of its work due to the necessity of materials and equipment being inspected and accepted for use. The Contractor shall furnish, at its own expense, all samples of materials required by the Owner and the Engineer for testing, and shall make its own arrangements for providing water, electric power, or fuel for the various observations and tests of structures and equipment.

1.07 RIGHT OF REJECTION

A. The Owner and the Engineer shall have the right, at all times and places, to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of the Contract Documents, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the Work at the site.

B. If the Owner or its representative, through an oversight or otherwise, has accepted materials or work which is defective or which is contrary to the Design Criteria Package, such materials, no matter in what stage or condition of manufacture, delivery, or erection, may be subsequently rejected.

C. The Contractor shall promptly remove rejected articles or materials from the site of the Work after notification of rejection. All costs of removal and replacement of rejected articles or materials as specified herein shall be borne by the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 BUOYANCY

A. The Contractor shall be completely responsible for any tanks, pipelines, manholes, foundations or similar improvements that may become buoyant during the construction operations due to groundwater levels. Should there be any possibility of buoyancy, the Contractor shall take the necessary steps to prevent damage due to floating or flooding, and shall repair or replace said improvements at no additional cost.

3.02 DEVIATION FROM SPECIFICATIONS

A. If any part of a submittal deviates from the plans and specifications, it is up to the Contractor to indicate such deviation—in writing—to the Engineer, for determination as to acceptance of the deviation. If no deviation is submitted, it is assumed that the Contractor has fully and completely followed the plans and specifications, and that any discrepancy discovered during construction shall be corrected completely at the expense of the Contractor.

3.03 AMERICANS WITH DISABILITIES ACT (ADA)

A. The Contractor shall make every effort to ensure all concrete work including, but not limited to accessible sidewalks, routes, ramps and curb ramps is compliant with the ADA and Florida Building Code Accessibility.

B. Prior to and during concrete placement, the contractor shall verify the formwork for compliance. Any and all concrete work which is not compliant shall be removed and replaced at no cost to the Owner.

END OF SECTION

SECTION 01410

MATERIALS AND INSTALLATION TESTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Contractor shall employ and pay for the services of an independent testing laboratory approved by the Engineer, to perform materials and installation testing of the type and frequency specified in the Contract Documents including, but not limited to, Geotechnical Testing Services and concrete testing.

B. Geotechnical Testing Services shall include, but not be limited to, periodic site inspections, soil proctor tests, soil classification tests and soil densities or compaction tests.

C. The engineer may, at any time, elect to have materials and equipment tested for conformity with the Contract Documents.

D. Contractor shall include cost of testing in the Contract Price.

E. Piping pressure test and bacteriological testing shall be in accordance with the applicable Section.

1.02 RELATED SECTIONS

A. Section 01050 – Field Engineering

B. Section 02200 – Earthwork

C. Section 03300 – Cast-In-Place Concrete

D. Other Sections as applicable.

1.03 REFERENCES

A. FDOT Design Standards.

B. FDOT Standard Specifications for Road and Bridge Construction.

C. Broward County Traffic Engineering Division (BCTED) Minimum Standards and the BCTED Pavement Markings & Signs Detail Sheet.

1.04 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents

2. Approve or accept any portion of the Work

3. Perform any duties of the Contractor

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 CONTRACTOR'S RESPONSIBILITIES

A. Provide all testing required by the Contract Documents as well as laws, ordinances, rules, regulations, orders, or approvals of public authorities.

B. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.

C. Cooperate with laboratory personnel, and provide access to Work and to Manufacturer's operations.

D. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.

E. Provide to the laboratory the preliminary design mix proposed to be used for concrete and other materials mixes which require control by the testing laboratory.

F. Materials and equipment used in the performance of work under this Contract are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents. The Engineer may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided by them are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contractor Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the Owner shall be allowed on account of such testing and certification.

G. Furnish incidental labor and facilities:

1. To provide access to Work to be tested

2. To obtain and handle samples at the Project site or at the source of the product to be tested

3. To facilitate inspections and tests

4. For storage and curing of test samples

H. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.

I. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.

J. Employ and pay for the services of the same or a separate, equally qualified independent testing laboratory to perform additional inspections, sampling, and testing required for the Contractor's convenience.

K. If the Owner requests tests in addition to those specified in the contract, and if the test results indicate the material or equipment complies with the Contract Documents, the Owner shall pay for the cost of the testing laboratory. If the tests and any subsequent retests indicate the materials and equipment fail to meet the requirements of the Contract Documents, the Contractor may pay for the laboratory

costs directly to the testing firm or the total of such costs shall be deducted from any payments due the Contractor.

L. The Contractor shall pay costs for additional trips to the project by the agency when scheduled times for tests and inspections are canceled and agency is not notified sufficiently in advance of cancellation to avoid the trip.

3.02 TESTING

A. The Contractor shall obtain the services of a professional testing laboratory approved by the Engineer to perform the following type of tests and test frequencies. Copies of all reports are to be sent to the Engineer as soon as possible.

B. Density tests for trench backfill at a minimum rate of three (3) tests per lift in 1,000 feet of trench, but not less than two (2) tests per lift if less than 500 feet of trench, at Engineer's discretion based on field observation.

C. Density tests for subgrade compaction at a minimum rate of three (3) tests in 1,000 feet of roadway, but not less than two (2) tests, at Engineer's discretion based on field observation.

D. Density tests for lime rock base at a minimum rate of three (3) tests per day on each course of completed compacted base, but not less than two (2), at Engineer's discretion based on field observation.

E. Density tests for roadway crossings at the rate of one test per lane per lift of compacted material, beginning one foot above the normal water table.

F. If in the opinion of the Engineer, suitable compaction has not been achieved around structures, density tests may be required.

G. Concrete compressive strength at the rate of three (3) cylinders per the lesser of 50 cubic yards or per day.

H. Should the above test results indicate deficiencies, the Engineer may order additional tests at the Contractor's expense, and all reworked areas shall be retested at the Contractor's expense.

I. Testing in the County right-of-way shall meet the requirements of the Florida Department of Transportation.

END OF SECTION

SECTION 01505

CONTROL OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall furnish personnel and equipment which will be efficient, appropriate and a quantity large enough to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Proposal. If at any time such personnel appear to the Engineer to be inefficient, inappropriate, or insufficient for securing the quality of work required or for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the Engineer to give such order shall in no way relieve the Contractor of his obligations to secure the quality of the work and rate of progress required.

1.02 RELATED SECTIONS

A. Section 01010 – Summary of Work

B. Section 01015 – General Requirements

C. Section 01030 – Special Project Procedures

D. Other Sections as applicable.

1.03 PIPE LOCATIONS

A. Pipeline shall be located substantially as indicated on the Drawings, but the Engineer reserves the right to make such modifications in locations as may be found desirable to avoid interference with existing structures or for other reasons.

1.04 OBSTRUCTIONS

A. The attention of the Contractor is drawn to the fact that during digging at the Project site, the possibility exists of the Contractor encountering various water, sewer, gas, telephone, electrical, or other lines not shown on the Drawings. The Contractor shall exercise extreme care before and during digging to locate and flag these lines so as to avoid damage to the existing lines. Should damage occur to an existing line, The Contractor shall repair the line at no cost to the Owner.

B. The Contractor shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.

C. The Contractor shall verify the exact locations and depths of all utilities shown and the Contractor shall make exploratory excavations of all utilities that may interfere with the work. All such exploratory excavations shall be performed as soon a practicable after award of the contract and, in any event, a sufficient time in advance

of construction to avoid possible delays to the Contractor's work. When such exploratory excavations show the utility location as shown to be in error, the Contractor shall so notify the Engineer.

D. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility. Test pits shall be dug at the Contractor's expense, as directed.

E. The Contractor shall protect all Underground Utilities and other improvements which may be impaired during construction operations. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.

F. In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the Contractor, be notified by the Owner to move such property within a specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Engineer a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

G. Where the proper completion of the work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is indicated, the Contractor shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the owner of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

H. Existing utility lines that are indicated or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired or replaced by the Contractor at the Contractor's expense. Sewer laterals are included.

I. All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement owner before being concealed by backfill or other work.

J. All power, telephone or the communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and any other cables encountered along the line of the work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The Contractor shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event

such damage occurs after backfilling or is not discovered until after completion of the backfilling.

1.05 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. The length of open trench will be controlled by the particular surrounding conditions but shall always be confined to the limits prescribed by the Engineer. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the Engineer may require special construction procedures such a limiting the length of open trench or prohibiting stacking excavated material in the street, and requiring that the trenches shall not remain open overnight.

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night.

1.06 TEST PITS

A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor at his cost at the direction of the Consultant. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the Consultants.

1.07 UTILITY CROSSINGS

A. It is intended that wherever existing utilities such as service lines must be crossed, deflection of the pipe within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when in the opinion of the City or Consultant this procedure is not feasible, he may direct the use of fittings.

1.08 SITE CLEANLINESS

A. Dust Abatement - The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for any damage resulting from any dust originating from its operations. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer.

B. Rubbish Control - During the progress of the work, the Contractor shall keep the site of the work and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste

materials of any nature occurring at the work site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

C. Sanitation

1. Toilet Facilities - Fixed or portable chemical toilets shall be provided wherever needed for the use of employees. Toilets at construction job sites shall conform to the requirements of Part 1926 of the OSHA Standards for Construction.

2. Sanitary and Other Organic Wastes - The Contractor shall establish a regular daily collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor's operations shall be disposed of away from the site in a manner satisfactory to the Engineer and in accordance with all laws and regulations pertaining thereto.

1.09 RELOCATIONS

A. The Contractor shall be responsible for the relocation of structures, including but not limited to light poles, signs, sign poles, fences, piping, conduits and drains that interfere with the positioning of the work as set out on the Drawings. The cost of all such relocations shall be included in the bid for the project and shall not result in any additional cost to the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 COOPERATION WITHIN THIS CONTRACT

A. All firms or persons authorized to perform any work under this Contract shall cooperate with the General Contractor and his subcontractors or trades, and shall assist in incorporating the work of other trades where necessary or required.

B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the Engineer.

3.02 PROTECTION OF CONSTRUCTION AND EQUIPMENT

A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions injured shall be reconstructed by the Contractor at his own expense.

B. Further, the Contractor shall take all necessary precaution to prevent damage to any structure due to water pressure during and after construction and until such structure is accepted and taken over by the Owner.

3.03 PRIVATE LAND

A. The Contractor shall not enter or occupy private land outside of easements, except by written permission of the landowner.

3.04 RESTORATION

A. Temporary restoration shall be completed within five days of pipe installation. Temporary restoration shall include all driveways, sidewalks and roadways. They shall be swept clean and be maintained free of dirt and dust. All areas disturbed by the construction activities shall be restored to proper grade, cleaned up, including the removal of debris, trash, and deleterious materials. All construction materials, supplies, or equipment, including piles of debris shall be removed from the area. All temporarily restored areas shall be maintained by the Contractor. These areas shall be kept clean and neat, free of dust and dirt, until final restoration operations are completed. The Contractor is responsible to utilize dust abatement operations in the temporarily restored areas as required, to the satisfaction of the Consultant.

B. Wherever sidewalks or private roads have been removed for purposes of construction, the Contractor shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition for the period of time fixed by the authorities having jurisdiction over the affected portions before proceeding with the final restoration or, if no such period of times is so fixed, the Contractor shall maintain said temporary sidewalks or roadways until the final restoration thereof has been made.

C. Final restoration shall be completed within thirty days of pipe acceptance. Final restoration shall include the completion of all required pavement replacement of roadways, driveways, curbs, gutters, sidewalks and other existing improvements disturbed by the construction; final grading, placement of sod, pavement marking, etc., all complete and finished, acceptable to the Consultant.

D. 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 the adjacent undisturbed pavement.

E. The Contractor shall test an installed section of pipeline within five calendar days from completion of the pipeline. A section of pipe is defined as a pipe section which can be isolated by valves for appurtenances is satisfactorily completed, the Contractor shall provide the Consultant with a "Schedule of Existing Facilities Restoration" which will be reviewed and be acceptable to the Consultant. The schedule shall show the existing facilities to be restored and schedule of beginning and completion dates for each item of restoration. The work for completing the final restoration of existing facilities for a tested section of work shall be completed within 30 days of acceptance of the pipeline testing.

END OF SECTION

SECTION 01510

Error! Bookmark not defined.TEMPORARY UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnish, install, and maintain temporary utilities required for construction, remove on completion of work.

B. Pay all fees associated with temporary utilities including water consumption charges.

1.02 RELATED SECTIONS

A. Section 01010: Summary of Work

B. Other Sections as applicable.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with Federal, State and Local codes and regulations and with utility company requirements.

C. Comply with County Health Department and Environmental Regulations.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials may be new or used but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

A. Arrange with utility company, provide service required for power and lighting, and pay all costs for service and for power used in the construction, testing and trial operation prior to final acceptance of the work by the Owner.

B. Install circuit and branch wiring, with the area distribution boxes located so that power and lighting is available throughout the construction by the use of construction type power cords.

C. Provide adequate artificial lighting for all areas of work when natural light is not adequate to work, and all areas accessible to the public.

2.03 TEMPORARY WATER

A. Arrange with the CITY to provide water for construction purposes.

B. Install branch piping with taps located so that water is available throughout the construction by the use of hoses.

C. C. Install at each and every connection to the Owner water supply a backflow preventer meeting the requirements of ANSI A40.6 and AWWA C511. Contractor shall be required to meter and pay for all water used.

2.04 TEMPORARY SANITARY FACILITIES

A. Provide sanitary facilities in compliance with laws and regulations.

B. Service, clean and maintain facilities and enclosures.

PART 3 - EXECUTION

3.01 GENERAL

A. Maintain and operate systems to assure continuous service.

B. Modify and extend systems as work progress requires.

3.02 REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required.

B. Clean and repair damage caused by temporary installations or use of temporary facilities.

C. Restore permanent facilities used for temporary services to specified condition.

END OF SECTION

SECTION 01530

EXISTING UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section provides for specifications related to construction in the vicinity of existing utilities.

1.02 RELATED SECTIONS

A. Section 01010 – Summary of Work

B. Section 01015 – General Requirements

C. Other Sections as applicable.

1.03 CONTRACTOR RESPONSIBILITIES

A. The term existing utilities shall be deemed to refer to both publicly-owned and privately-owned utilities including, but not limited to, electric power and lighting, telephone, water, gas, storm drains, process lines, sanitary sewers and all appurtenant structures.

B. Prior to underground construction, the Contractor is required by the Underground Facility Damage Prevention and Safety Act, Chapter 556 FS to contact Sunshine 811, for the location of underground utilities.

C. Where existing utilities and structures are indicated in the Contract Documents, 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.

1.04 NOTIFICATION OF UTILITY OWNER

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 may be present during such excavation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 RESTORATION OF PAVEMENT

A. General: All paved areas including concrete, 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.

B. Temporary Resurfacing: Wherever required by the public authorities having jurisdiction, the CONTRACTOR shall place temporary surfacing 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.

END OF SECTION

SECTION 01531

PROTECTION OF EXISTING PROPERTY

PART 1 - GENERAL

1.01 DESCRIPTION

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 his operations under this project. 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. In the event of any claims for damage or alleged damage to property as a result of work, 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 his 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 RELATED SECTIONS

A. Section 01015 – General Requirements

B. Section 01570 – Traffic Regulation

C. Other Sections as applicable.

1.03 PRESERVATION AND RESTORATION

A. Contractor shall be responsible for the preservation and protection of property adjacent to the Work site against damage or injury as a result of this project. 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.

1.04 ADJACENT PROPERTY OWNER NOTIFICATION

A. The Contractor shall prepare a written Notice to Property owners adjacent to the project Work site notifying them of the schedule of work affecting them and anticipated inconveniences they may expect. The notice shall meet the approval of the Engineer and be delivered to property owners at least 72 hours prior to construction adjacent to their property. This notice shall indicate the work to be performed, the time it will take to perform the work, the time when the water service to the property owner will be disrupted.

1.05 BARRICADES, WARNING SIGNS AND LIGHTS

A. In addition to the requirements of Section 01570 – Traffic Regulation, the Contractor shall provide, erect and maintain as necessary, strong and suitable barricades, danger

signs and warning lights for the preservation and protection of property adjacent to the work site. 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.

1.06 TREES AND LANDSCAPING PROTECTION

A. General: The Contractor shall exercise all necessary precautions so as not to damage or destroy any trees or landscaping in or near the project site, and shall not trim or remove any trees or landscaping unless such trees or landscaping have been approved for trimming or removal by the jurisdictional agency or owner. All existing trees or landscaping which are damaged during construction shall be replaced by the Contractor or a certified tree/landscaping company to the satisfaction of the owner.

B. Replacement: The Contractor shall immediately notify the jurisdictional agency or owner if any tree or landscaping is damaged by the Contractor's operations. If, in the opinion of the jurisdictional agency or owner, the damage is such that replacement is necessary, the Contractor shall replace the tree or landscaping at its own expense. The tree or landscaping shall be of a like size and variety as the tree or landscaping damaged, or, if of a smaller size, the Contractor shall pay any compensatory payment.

C. All permit fees associated with the removal and replacement of trees and landscaping damaged or destroyed shall be the responsibility of the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01540

SECURITY

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section provides for requirements of security, entry control, personnel identification and miscellaneous restrictions.

1.02 RELATED SECTIONS

A. Section 01010 - Summary of Work

B. Other Sections as applicable.

1.03 SECURITY PROGRAM

A. Protect Work, existing premises and Owner's operations from theft, vandalism and unauthorized entry.

B. Initiate program in coordination with Owner's existing security system at job mobilization.

C. Maintain program throughout construction period until Owner occupancy as directed by Engineer.

1.04 ENTRY CONTROL

A. Restrict entrance of persons and vehicles into project site and existing facilities.

B. Allow entrance only to authorized persons with proper identification.

C. Maintain log of workmen and visitors, make available to Owner on request.

D. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.

1.05 PERSONNEL IDENTIFICATION

A. All personnel shall wear clothing bearing the company information of which they are employed.

B. Provide additional security as required by the Owner.

C. Become familiar with Owner and Engineer representatives and restrict access to job site to these representatives.

PART 2 - PART 2 – PRODUCTS (NOT USED)

PART 3 - PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01550

SITE ACCESS AND STORAGE

PART 1 - GENERAL

1.01 GENERAL

A. This section provides general specifications for the contractors' access to the site and limitations on storage or lay-down area.

1.02 RELATED SECTIONS

A. Section 01015 – General Requirements

B. Section 01505 – Control of Work

C. Other Sections as applicable.

1.03 HIGHWAY LIMITATIONS

A. The Contractor shall make his own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the work.

1.04 TEMPORARY ACCESS RESTORATION

A. All areas disturbed by the construction activities shall be restored to proper grade, cleaned up, including the removal of debris, trash, and deleterious materials..

B. Temporary restoration shall include all driveways, sidewalks and roadways. They shall be swept clean and be maintained free of dirt and dust

C. All construction materials, supplies, or equipment, including piles of debris shall be removed from the area.

D. All temporarily restored areas shall be maintained by the Contractor. These areas shall be kept clean and neat, free of dust and dirt, until final restoration operations are completed.

E. Temporary restoration shall be completed within five days of pipe installation or as specified.

F. The Contractor is responsible to utilize dust abatement operations in the temporarily restored areas as required, to the satisfaction of the Engineer.

G. Final restoration shall be completed within thirty days of pipe acceptance. Final restoration shall include the completion of all required pavement replacement of roadways, driveways, curbs, gutters, sidewalks and other existing improvements disturbed by the construction; final grading, placement of sod, pavement marking, etc., all complete and finished, acceptable to the Engineer.

H. 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 the adjacent undisturbed pavement.

1.05 CONTRACTOR'S WORK AND STORAGE AREA

A. Contractors on-site work and storage area plan shall be submitted for Owners approval no later than 30 days after NTP.

1. Owner approval of the work are and storage plan is required prior to commencement.

B. The Contractor shall make his own arrangements for any necessary off-site storage or shop areas necessary for the proper execution of the work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01570

TRAFFIC REGULATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Work to be performed under this section shall include furnishing all materials and labor necessary to regulate vehicular and pedestrian traffic.

B. Provide, operate and maintain equipment, services and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow around the construction area.

C. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

1.02 RELATED SECTIONS

A. Section 01015 – General Requirements

B. Section 01505 – Control of Work

C. Other Sections as applicable.

1.03 REFERENCES

A. The Work under this Contract shall be in strict accordance with the following codes and standards.

1. The applicable municipality

2. Broward County Traffic Engineering Division

3. Florida Department of Transportation Design Standards and Specifications

4. OSHA Safety and Health Standards for Construction.

5. Federal Highway Administration Manual of Uniform Traffic Control Devices for Streets and Highways (MUTCD)

6. Federal Highway Administration Traffic Controls for Street and Highway Construction and Maintenance Operations

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 MAINTENANCE OF TRAFFIC

A. For the maintenance and protection of vehicular and pedestrian traffic in public or private streets and ways, the Contractor shall provide, place, and maintain all necessary barricades, traffic cones, warning signs, lights and other safety devices in accordance with the requirements of the "Manual of Uniform Traffic Control Devices, Part VI - Traffic Controls for Street and Highway Construction and Maintenance Operations," published by U.S. Department of Transportation, Federal Highway Administration (ANSI D6.1).

B. The Contractor shall provide a Maintenance of Traffic Plan, sealed by a Professional Engineer registered in the State of Florida. The plan, and subsequent revisions, must be approved by the Broward County or the Florida Department of Transportation and the applicable local municipality.

C. The Contractor shall take all necessary precautions for the protection of the work and the safety of the public. All barricades and obstructions shall be illuminated at night, and all lights shall be kept burning from sunset until sunrise. The Contractor shall station such guards or flaggers and shall conform to such special safety regulations relating to traffic control as may be required by the public authorities within their respective jurisdictions. All signs, signals, and barricades shall conform to the requirements of OSHA and Subpart G, Part 1926, of the OSHA Safety and Health Standards for Construction.

D. The Contractor shall remove traffic control devices when no longer needed, shall repair all damage caused by installation of the devices, and shall remove post settings and backfill the resulting holes to match grade.

3.02 CORRECTIONS

A. Upon notification by the owner either verbally or in writing, the contractor shall correct any noted deficiencies within one hour.

B. Inspection of all traffic control items shall be accomplished at least twice per day. One of these inspections shall be at the end of the work day or at night.

3.03 TRAFFIC AND VEHICULAR ACCESS:

A. Emergency Vehicles: No single family residence, multi-family residence, apartment, commercial building or place of employment shall be without access to emergency vehicles for a period longer than three hours. The Contractor shall notify in writing the Engineer, the police, fire and other emergency departments and agencies when and where work is to be accomplished that will affect their operations at least two days in advance of such work.

B. Commercial Properties: Access to commercial property shall not be blocked for a period of more than 30 minutes during the time such properties are open for business.

C. Residential Property: Access to residential property shall not be blocked for a period of more than 4 hours.

3.04 ROAD CLOSURE

A. No roads shall be blocked to traffic without adequate detour facilities for a period of more than 30 minutes or as directed by the governing authority.

B. At least seven days prior to a proposed road closure, the contractor shall submit to the City Engineer a complete traffic control plan. This plan shall include the following minimum information:

1. Sketch of work site and all area roads, streets and mark driveways.

2. Proposed detour route.

3. All necessary traffic control devices to be used.

4. Emergency contractor contact person name and phone to be available 24 hours a day.

5. Estimated times/dates of road closure.

3.05 CONSTRUCTION IN OTHER THAN STATE HIGHWAY RIGHT-OF-WAY:

A. Construction within right-of-way other than State highway shall be made in full compliance with all requirements of the Florida Department of Transportation and to the satisfaction of the local governing bodies. All necessary barricades, detours, lights and other protective measures shall be provided for the protection of both pedestrian and vehicular traffic.

B. The 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 or those visiting the site.

3.06 FLAGMEN

A. Provide qualified and suitably equipped flagmen when construction operations encroach on traffic lanes, as required for regulation of traffic.

3.07 FLARES AND LIGHTS

A. Provide lights as required to clearly delineate traffic lanes and to guide traffic as required.

B. Provide lights for use by flagmen in directing traffic.

C. Provide illumination of critical traffic and parking areas as required.

3.08 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.

B. Monitor parking of construction personnel's private vehicles.

C. Maintain free vehicular access to and through parking areas and driveways.

D. Prohibit parking on or adjacent to access roads, or in non-designated areas.

END OF SECTION

SECTION 01580

PROJECT IDENTIFICATION SIGNS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish, install and maintain one project identification sign.

B. Remove sign upon completion of construction.

C. Allow no other signs to be displayed without approval of Owner.

1.02 PROJECT IDENTIFICATION SIGN

A. One painted or printed sign of size, design and lettering as shown on sample provided by Owner.

1. Locate as directed by Owner.

2. Colors as indicated.

1.03 QUALITY ASSURANCE

A. Provide one electronic proof for Owner approval prior to release for printing or painting.

PART 2 - PRODUCTS

2.01 SIGN MATERIALS

A. Structure and framing shall be pressure treated (2) 4”x4”x10’ posts .

B. Foundation shall be two eighty pound bags of concrete per post.

C. Sign Surfaces shall be exterior grade plywood 8 feet wide by 4 feet high with a minimum thickness of 5/8 inch.

D. Rough Hardware: Galvanized

E. Finishes and painting shall be adequate to resist weathering and fading for scheduled construction period.

PART 3 - EXECUTION

3.01 PROJECT IDENTIFICATION SIGN

A. Paint exposed surfaces of supports, framing and surface material; one coat of primer and one coat of exterior paint.

B. Paint graphics in styles, sizes and colors selected.

C. Lettering shall be as noted.

D. City Logo shall be shown as directed by Owner.

E. Background shall be white.

3.02 SIGN LOCATION

A. Sign shall be located within the City right of way in an area approved by the Owner.

3.03 MAINTENANCE

A. Maintain sign and supports in a neat, clean condition; repair damages to structure, framing or sign.

B. Relocate sign as required by progress of the work.

3.04 REMOVAL

A. Remove sign, framing, supports and foundations at completion of project or at direction of Engineer.

END OF SECTION

SECTION 01590

FIELD OFFICES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnish, install and maintain temporary field offices for the Engineer and the Contractor during entire construction period.

B. Furnish, install and maintain storage and work sheds needed for construction.

C. At completion of work, remove field offices, sheds and contents.

1.02 RELATED SECTIONS

A. Section 01010- Summary of Work

B. Section 01510- Temporary Utilities

C. Section 01600- Material and Equipment

D. Other Sections as applicable.

1.03 OTHER REQUIREMENTS

A. Prior to installation of offices, consult with the Engineer and Owner regarding the location, access and related facilities.

1.04 REQUIREMENTS FOR FACILITIES

A. Construction:

1. Structurally sound, weathertight, with floors raised above ground.

2. Temperature transmission resistance: Compatible with occupancy and storage requirements.

3. At Contractor's option, portable or mobile buildings may be used.

a. Mobile trailers, when used, shall be modified for office use.

b. Do not use mobile trailers for living quarters.

B. Office for the Engineer:

1. A separate space for the sole use of designated occupants, with secure entrance doors and one key per occupant.

2. Area: 150 sq. ft. minimum, with minimum dimension 8 feet.

3. Air Conditioned

4. 120V, electric outlet

5. Desk & Chair - reference table

6. Plan rack

7. Telephone

C. Contractor's Office and Facilities:

1. Size: As required for general use and to provide space for project meetings.

2. Lighting and temperature control: As specified for the Engineer's office.
3. Telephone: One direct line instrument.
4. Racks and files for Project Record Documents.
5. Other furnishings: Contractor's option.
6. Sanitary Facilities
7. FAX Machine
8. Copier Machine (not FAX Machine)

D. The Contractor shall make all provisions and pay all installations and other costs for the Engineer's construction office in order to provide telephone service, power service, exterior lights, and any local code and OSHA requirements. With the exception of charges for long distance and toll calls, the Contractor shall pay all monthly charges for the various services provided to the Engineer's office throughout the construction period.

1.05 USE OF PERMANENT FACILITIES

A. Permanent facilities shall not be used for field offices or for storage.

PART 2 - PRODUCTS

2.01 MATERIALS, EQUIPMENT, FURNISHINGS

A. May be new or used, but must be serviceable, adequate for required purpose, and must not violate applicable codes or regulations.

PART 3 - EXECUTION

3.01 PREPARATION

A. Fill and grade sites for temporary structures to provide surface drainage.

3.02 INSTALLATION

A. Construct temporary field offices on proper foundations, provide connections for utility service.

1. Secure portable or mobile buildings when used.
2. Provide steps and landings at entrance doors.

B. Locate construction office facilities at the location approved by the Owner within the Project.

3.03 MAINTENANCE AND CLEANING

A. Provide periodic maintenance and cleaning for temporary structures, furnishings, equipment and services.

3.04 REMOVAL

A. Remove temporary field offices, contents and services at a time when no longer needed.

B. Remove foundations and debris; grade site to required elevations and clean the area.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Material and equipment incorporated into the Work.

1. Conform to applicable specifications and standards.

2. Comply with size, make, and type and qualify specified, or as specifically approved in writing by the Engineer.

3. Manufactured and Fabricated Products.

a. Design, fabricate, and assemble in accord with the best engineering and shop practices.

b. Manufacture like part of duplicate units to standard sizes and gauges, to be interchangeable.

c. Two or more items of the same kind shall be identical, by the same manufacturer.

d. Products shall be suitable for service conditions.

e. Equipment capacities, sizes, and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.

4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

1.02 RELATED SECTIONS

A. Section 01340: Shop Drawings, Product Data, and Samples

B. Other Sections as applicable.

1.03 APPROVAL OF MATERIALS

A. Only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by the Contractor shall be subject to the inspection and approval of the Engineer. No material shall be delivered to the work without prior approval of the Engineer.

B. Within 30 days after the effective date of the Agreement, the Contractor shall submit to the Engineer, data relating to materials and equipment he proposes to furnish for the work. Such data shall be in sufficient detail to enable the Engineer to identify the particular product and to form an opinion as to its conformity to the specifications. The data shall comply with Paragraph 1.07 of this Section.

C. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. If the Engineer requires, either prior to beginning or during progress of the work, the Contractor shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the specifications. Such samples shall be furnished, stored, packed, and shipped as

directed at the Contractor's expense. Except as otherwise noted, the Owner will make arrangements for and pay for the tests.

D. The Contractor shall submit data and samples sufficiently early to permit work. Any delay of approval resulting from the Contractor's failure to submit samples or data promptly shall not be used as a basis of claim against the Owner or the Engineer.

E. In order to demonstrate the proficiency of workmen or to facilitate the choice among several textures, types, finishes, and surfaces, the Contractor shall provide such samples of workmanship or finish as may be required.

F. The materials and equipment used on the work shall correspond to the approved samples or other data.

1.04 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

A. When Contract Documents require that installation of work shall comply with manufacturer's printed instruction, obtain, and distribute copies of such instructions to parties involved in the installation, including copies to the Engineer.

1. Maintain one set of complete instructions at the job site during installation and until completion.

B. Handle, install, connect, clean, condition, and adjust products in strict accord with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.

2. Do not proceed with work without clear instructions.

C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.05 TRANSPORTATION AND HANDLING

A. Arrange deliveries of Products in accord with construction schedules; coordinate to avoid conflict with work and conditions at the site.

1. Deliver Products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

2. Immediately upon delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that Products are properly protected and undamaged.

B. Provide equipment and personnel to handle Products by methods to prevent soiling or damage to Products or packaging.

1.06 STORAGE AND PROTECTION

A. The Contractor shall furnish a covered, weather-protected storage structure, providing a clean, dry, noncorrosive environment for all mechanical equipment, valves, electrical and instrumentation equipment, and special equipment to be incorporated into this project. Storage of equipment shall be performed to allow easy access and be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including weather/humidity protection, connection of heaters, placing of storage lubricants in equipment, blocking, or skid

storage, etc. Corroded, damaged, or deteriorated equipment and parts shall be replaced before acceptance of the project.

B. Store Products in accord with manufacturer's instructions, with seals and labels intact and legible.

1. Store products subject to damage by the elements in weather-tight enclosures.

2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

3. Store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings. Provide adequate ventilation to avoid condensation.

4. Store loose granular materials in a well drained area on solid surfaces to prevent mixing with foreign matter.

C. All materials and equipment to be incorporated in the work shall be handled and stored by the Contractor before, during, and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.

D. Cement, sand, and lime shall be stored under a roof, off the ground, and shall be kept completely dry at all times. All structural and miscellaneous steel and reinforcing steel shall be stored off the ground, or otherwise, to prevent accumulations of dirt or grease, and to minimize rusting. Brick, block, and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking, and spalling to a minimum.

E. Moving parts shall be rotated a minimum of once weekly to insure proper lubrications, and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half-load, once weekly, for an adequate period of time to insure that the equipment does not deteriorate from lack of use.

F. All materials which, in the opinion of the Engineer, have become so damaged as to be unfit for the use intended or specified, shall be promptly removed from the site of the work, and the Contractor shall receive no compensation for the damaged material or its removal.

G. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored Products to assure that Products are maintained under specific conditions, and free from damage or deterioration.

H. Contractor shall be responsible for protection after installation by providing substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations.

I. The Contractor shall be responsible for all materials, equipment, and supplies sold and delivered to the Owner under this Contract, until final inspection of the work and acceptance thereof by the Owner. In the event any such material, equipment, and supplies are lost, stolen, damaged, or destroyed prior to final inspection and acceptance, the Contractor shall replace same without additional cost to the Owner.

J. Should the Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within seven days after written notice to do so has been given, the Owner retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from the Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering, and any other costs associated with making the necessary corrections.

1.07 SUBSTITUTIONS AND PRODUCT OPTIONS

A. Products List

1. Within 30 days after the effective date of the Agreement, submit to the Engineer a complete list of major products proposed to be used, with the name of the manufacturer and the installing subcontractor.

B. Contractor's Options

1. For Products specified only by reference standard, select any product meeting that standard.

2. For Products specified by naming several products or manufacturers, select any one of the products or manufacturers named, which complies with the specifications, subject to the base bid procedures outlined under Document 00400 – Supplemental Bid Form.

3. For products specified by naming one or more Products or Manufacturers and an "or equal", the Contractor must submit a request for substitutions of any Product or Manufacturer not specifically named.

C. Substitutions

1. For a period of 30 days after the effective date of the Agreement, the Engineer will consider written requests from Contractor for substitution of Products.

2. Submit a separate request for each Product, supported with complete data, with drawings and samples as appropriate, including:

a. Comparison of the qualities of the proposed substitution with that specified

b. Changes required in other elements of the work because of the substitution

c. Effect on the construction schedule

d. Cost data comparing the proposed substitution with the Product specified

e. Any required license fees or royalties

f. Availability of maintenance service, and source of replacement materials

3. The Engineer shall be the judge of the acceptability of the proposed substitution.

4. No substitutions will be considered by the Engineer after 30 days from the Contract Date.

D. Contractor's Representation

1. A request for a substitution constitutes a representation that Contractor:

a. Has investigated the proposed Product and determined that it is equal to or superior in all respects to that specified

b. Will provide the same warranties or bonds for the substitution as for the Product specified

c. Will coordinate the installation of an accepted substitution into the Work, and make such other changes as may be required to make the Work complete in all respects

d. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.

E. The Engineer will review requests for substitutions with reasonable promptness, and notify Contractor, in writhing, of the decision to accept or reject the requested substitution.

1.08 SPECIAL TOOLS

A. Manufacturers of equipment and machinery shall furnish any special tools (including grease guns or other lubricating devices) required for normal adjustment, operations and maintenance, together with instructions for their use. The Contractor shall preserve and deliver to the Owner these tools and instructions in good order no later than upon completion of the Contract.

1.09 STORAGE AND HANDLING OF EQUIPMENT ON SITE

A. Because of the long period allowed for construction, special attention shall be given to the storage and handling of equipment on site. As a minimum, the procedure outlined below shall be followed.

1. Equipment shall not be shipped until approved by the Engineer. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the Engineer, unless upon arrival it is to be stored as specified in Paragraph 1.06. Operation and maintenance data, as described in Paragraph 1.08 of Section 01730 shall be submitted to the Engineer for review prior to shipment of equipment.

2. All equipment having moving parts, such as gears, electric motors, etc. and/or instruments, shall be stored in a temperature and humidity controlled building approved by the Engineer, until such time as the equipment is to be installed.

3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.

4. Manufacturer's storage instructions shall be carefully studied by the Contractor and reviewed with the Engineer by him. These instructions shall be carefully followed and a written record of this kept by the Contractor.

5. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication, and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half-load, once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.

6. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. Mechanical equipment to be used in the work, if stored for longer than ninety (90) days, shall have the bearings cleaned, flushed, and lubricated prior to testing and start up, at no extra cost to the Owner.

7. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested, and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

1.10 WARRANTY

A. For all major pieces of equipment, submit a warranty from the equipment manufacturer as specified in Section 01740.

1.11 SPARE PARTS

A. Spare parts for certain equipment provided under Division 11 through 16 have been specified in the pertinent sections of the Specifications. The Contractor shall collect and store all spare parts so required in an area to be designated by the Engineer. In addition, the Contractor shall furnish to the Engineer an inventory listing all spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost.

1.12 LUBRICANTS

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

1.13 GREASE, OIL AND FUEL

A. All grease, oil, and fuel required for testing of equipment shall be furnished with the respective equipment. The Owner shall be furnished with a year's supply of required lubricants including grease and oil of the type recommended b the manufacturer with each item of the equipment supplied under Division 11 through 16.

B. The Contractor shall be responsible for changing the oil in all drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event shall be any longer than three weeks of operation.

1.14 PROTECTION AGAINST ELECTROLYSIS

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

1.15 FASTENERS

A. All necessary bolts, anchor bolts, nuts, washers, plates and bolt sleeves shall be furnished by the Contractor. Bolts shall have suitable washers and, where so required, their nuts shall be hexagonal.

B. All bolts, anchor bolts, nuts, washers, plates, and bolt sleeves shall be Type 316 stainless steel unless otherwise specifically indicated or specified.

C. Unless otherwise specified, stud, tap, and machine bolts shall be of the best quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 EQUIPMENT, TESTING, AND INSPECTION

A. Regardless of the number of days specified in the individual sections for the manufacturer's representative to be present on the site for inspection and testing, if the equipment fails to perform as specified, then the representative shall remain on site until the malfunction is corrected.

B. The cost for the additional days shall not be added to the cost for the Owner, but shall be to the account of the contractor.

END OF SECTION

SECTION 01630

SUBSTITUTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnish and install products specified and named in their respective Specifications or on the Drawings unless substitution is allowed by the requirements stated in this Section.

B. For products specified only by reference standard, select product meeting that standard, by any manufacturer.

C. For products specified by naming several products or manufacturers, select any one of those products and manufacturers names which complies with their respective Specifications.

D. For products specified by naming only one or more products or manufacturers and stating "or equal", submit a request as for substitutions, for any product or manufacturer which is not specifically named.

E. Requests for any substitutions not submitted in accordance with the instructions herein will be denied.

1.02 RELATED SECTIONS

A. Section 01340 – Shop Drawings, Working Drawings and Samples

B. Other Sections as applicable.

1.03 PRODUCTS LIST

A. Within 30 days after award of Contract, submit to Engineer five copies of complete list of major Products which are proposed for installation.

B. Tabulate Products by specification section number and title.

C. For products specified only by reference standards, list for each such Product:

1. Name and address of manufacturer.

2. Trade Name.

3. Model or catalog designation.

4. Manufacturer's data:

5. Reference standards.

6. Performance test data.

1.04 SUBSTITUTION SUBMITTAL REQUIREMENTS – “OR APPROVED EQUAL”

A. Within a period of 30 days after award of Contract, Engineer will consider formal requests from the Contractor for substitution of products in place of those specified.

B. After the end of that period, the request will be considered only in case of product unavailability or other conditions beyond the control of the Contractor.

C. Submit a separate request for each substitution. Support each request with:

1. Complete data substantiating compliance of the proposed substitution with requirements stated in the Contract Documents:

a. Product identification, including manufacturer's name and address.

b. Manufacturer's literature; identify:

1) Product description.

2) Reference standards.

3) Performance and test data.

c. Samples, as applicable.

d. Name and address of similar projects on which product has been used, and the date of each installation

2. Itemized comparison of the proposed substitution with product specified; List significant variations.

3. Data relating to changes in the construction schedule.

4. Any effect of the substitution on separate contracts.

5. List of changes required in other work or products.

6. Accurate cost data comparing proposed substitution with product specified.

7. Designation of required license fees or royalties.

8. Designation of availability of maintenance services, and sources of replacement materials.

D. Substitute products shall not be ordered or installed without written acceptance of Engineer.

E. Engineer will determine the acceptability of proposed substitutions.

1.05 SUBSTITUTIONS WILL NOT BE CONSIDERED FOR ACCEPTANCE WHEN:

A. They are indicated or implied on Shop Drawings or product data submittals without a formal request from Contractor.

B. The manufacture of the product substitution does not meet the Qualifications as stated in the specifications.

C. They are requested directly by a subcontractor or supplier.

D. No data is provided relating to changes in construction schedule.

E. There is any effect of substitution on separate contracts.

F. Changes are required in other work or products.

G. There is no accurate cost data comparing proposed substitution with product specified.

H. There are required license fees or royalties above and beyond the specified vendor.

I. Availability of maintenance services, sources of replacement materials does not equal that provided by the specified vendor.

J. Acceptance will require substantial revision of Contract Documents.

1.06 CONTRACTOR'S REPRESENTATION

A. In making formal request for substitution Contractor represents that:

1. He has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.

2. He will provide the same warranties or bonds for substitution as for product specified.

3. He will coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects.

4. He waives claims for additional costs caused by substitution which may subsequently become apparent.

5. Cost data is complete and includes related costs under his Contract, but not:

a. Costs under separate contracts.

b. Engineer's costs of redesign or revision of Contract Documents.

1.07 ENGINEER DUTIES

A. Review Contractor's requests for substitutions in accordance the Shop Drawing review requirements.

B. Notify Contractor, in writing, of decision to accept or reject requested substitution.

1.08 SUBSTITUTION SUBMITTAL REQUIREMENTS – “NO SUBSTITUTIONS PERMITTED”

A. Contractor may not request a substitute item or vendor/manufacturer for which the specifications indicate “No Substitutions Permitted “.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Administrative and procedural requirements for project closeout.

1. Inspection procedures.

2. Project Record Document submittal.

3. Final cleaning.

B. Warranty and bond submittal.

C. Closeout submittals, warranties and bonds required for specific products of work.

1.02 RELATED SECTIONS

A. Section 01310 - Construction Schedules

B. Section 01370 - Schedule of Values

C. Other Sections as applicable.

1.03 SUBSTANTIAL COMPLETION

A. Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in the request.

1. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.

2. Advise Owner of pending insurance change-over requirements.

3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.

4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.

5. Submit record drawings, maintenance manuals, and similar final record information.

6. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

B. When the Contractor considers the Work to be substantially complete, he shall submit a written notice to the Engineer that the Work, or designated portion of the Work, is complete and ready for inspection.

C. Within a reasonable time of receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfulfilled requirements. When the Engineer and Owner concur that the Work, or designated portion of the Work, is substantially complete, the Engineer will prepare the Certificate of Substantial Completion following inspection.

D. Should the Engineer determine that the Work is not substantially complete, he will advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

1.04 FINAL COMPLETION

A. When Contractor considers the Work to be complete, he shall submit written certification to the Engineer that the Work is completed and ready for final inspection. Include the following:

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

3. Submit a certified copy of the Engineer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, the list has been endorsed and dated by the Engineer.

4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.

5. Submit consent of surety to final payment.

6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. The Engineer will inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the - Engineer.

1. Upon completion of inspection, the Engineer will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete, or of obligations that have not been fulfilled but are required for final acceptance.
2. If necessary, re-inspection process will be repeated.

1.05 RECORD DOCUMENT SUBMITTALS (REFER TO SECTION 01720 – RECORD DRAWINGS.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01710

CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Execute cleaning, during progress of the Work, and at completion of the Work, as required by General Conditions.

1.02 RELATED SECTIONS

A. Section 01010 – Summary of Work

B. Section 01505 – Control of Work

C. Section 01550 – Site Access and Storage

D. Other Sections as applicable.

1.03 DISPOSAL REQUIREMENTS

A. Conduct cleaning and disposal operations to comply with applicable codes, ordinances, regulations, and anti-pollution laws.

B. Do not dispose of any unsuitable fill, hazardous or organic material onsite. All such material shall be disposed of in a legal manner by the Contractor, the cost of which shall be included in the Bid.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property, and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

A. The Contractor shall keep the area of the Work and other areas utilized or impacted by construction in a neat and clean condition, free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Work site and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations.

B. Disposal of all rubbish and surplus materials shall be off the site of construction in accordance with local codes and ordinances governing locations and methods of

disposal, and in conformance with all applicable safety laws, and to the requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

C. Provide on-site containers for the collection of waste materials, debris, and rubbish as required.

3.02 DUST ABATEMENT

A. The Contractor shall furnish all labor, equipment, and means required and shall carry out effective measures wherever and as often as necessary to prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. Means for the control of dust shall include, but not be limited to, sweeping and water trucks. The Contractor shall be responsible for any damage resulting from any dust originating from its operations. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer.

3.03 FINAL CLEANING

A. Remove temporary protection and facilities installed for protection of the Work during construction.

B. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

C. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION

DOCUMENT 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section includes the requirements for maintaining, recording, and submitting Project Record Documents including, but not limited to,

1. Record Drawings or As-Built Drawings
2. Record Specifications and other Contract Documents
3. Record Samples, Shop Drawings or Record Product Data

1.02 RELATED SECTIONS

A. Section 01050 - Field Engineering
B. Section 01152 – Applications for Payment
C. Section 01340 - Shop Drawings, Working Drawings and Samples
D. Other Sections as applicable.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Maintain at the site for the Owner and Engineers review one record copy of:

1. Drawings
2. Specifications
3. Addenda
4. Change Orders and other Modifications to the Contract
5. Engineer's Field Orders or Written Instructions
6. Approved Shop Drawings, Working Drawings, and Samples
7. Field Test Reports
8. Construction Photographs

B. Store Record Documents in the Contractor's field office apart from documents used for construction.

C. File Record Documents in accordance with the CSI format number system utilized in the Contract Documents.

D. Maintain Record Documents in a clean, dry, legible condition and in good order. Do not use Record Documents for construction purposes.

E. Make Record Documents available at all times for inspection by the Engineer.

F. As a prerequisite for monthly progress payments, the Contractor is to exhibit the currently updated Record Documents for review by the Engineer and the Owner.

1.04 RECORDING

A. Record Drawings:

1. Maintain a clean, undamaged set of prints of Contract Drawings to serve as the project Record Drawings.
2. Label each sheet "RECORD DRAWING" in neat large printed letters with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
3. The Record Drawings shall be presented at the same scale as the Contract Drawings.
4. The Record Drawings shall correctly and accurately show all changes from the Contract Drawings made during construction.
5. All information shall be verified and certified by an independent Professional Surveyor and Mapper registered in the State of Florida.
6. All vertical information shall be provided in the datum indicated in the Contract Drawings.
7. Horizontal and vertical locations referenced to base-line or permanent surface improvements.
8. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross reference at the corresponding location on the Record Drawings.
9. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
10. Mark new information that was not shown on Contract Drawings or Shop Drawings.
11. Note related Change Order numbers where applicable.
12. Organize Record Drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
13. Do not use Record Drawings for construction purposes.
14. Record information concurrently with construction progress.

B. The Record Drawings shall be neat and legible including the following:

1. Above ground piping and equipment:
    a. All equipment locations, dimensions and elevations as indicated in the Contract Drawings.
    b. All building and tank locations, dimensions and elevations as indicated in the Contract Drawings.
    c. All above ground piping size, material, class, lengths, dimensions, and elevations as indicated in the Contract Drawings.
    d. Horizontal locations of piping, fittings, valves and appurtenances.

e. Elevations of the top of pipe, fittings, valves and appurtenances.as indicated in the Contract Drawings and at 50' maximum increments

f. All changes from the original design.

2. Underground pressure pipe including potable water mains sanitary sewer force mains, drainage force mains and the like:

a. All piping size, material, class, lengths, dimensions, bury depth and elevations as indicated in the Contract Drawings.

b. Horizontal locations of piping, fittings, valves and appurtenances.

c. Elevations of the top of pipe, fittings, valves and appurtenances.

d. Elevations as indicated in the Contract Drawings and at 50' maximum increments

e. Lengths of restrained pipe.

f. Water service locations.

g. Meter sizes.

h. All changes from the original design.

3. Gravity sanitary sewer:

a. All piping size, material, class, lengths, slopes, dimensions, and elevations as indicated in the Contract Drawings.

b. Horizontal locations of manholes.

c. Rim, invert, and size of all manholes.

d. Service terminal end locations.

e. Wet well construction including diameter, bottom, invert and float elevations.

f. All changes to piping from the original design.

4. Stormwater Drainage:

a. All piping size, material, class, lengths, dimensions and elevations as indicated in the Contract Drawings.

b. Horizontal locations of manholes and catch basins.

c. Rim, invert, bottom elevations and size of all manholes and catch basins.

d. All surface elevations indicated on the Contract Drawings including, but not limited to, swales, berms, yards, sidewalks, and the like.

e. Horizontal location and elevation of all storm water retention or detention areas.

f. All changes from the original design.

5. Limerock base:

a. Upon completion of all underground utilities and limerock base, and before placement of asphalt, provide the following for Engineer review:

1) Finished limerock base elevations taken at the location of finished asphalt elevations as indicated in the Contract Drawings.

2) Additional elevations as required by the Engineer, including, but not limited to:

(a) Finished limerock base at centerline, edge of median and edge of pavement.
(b) Back of sidewalk or right of way.
(c) Bottom of swale or flow line of gutter.
(d) Top of curb.
(e) High points, low points and grade breaks.
(f) Intersections.

6. Electrical, instrumentation and controls

a. Horizontal location of all electrical equipment and control cabinetry.

b. Elevations of the bottom of all electrical and control panels.

c. Horizontal location and elevation of all conduits including conduit size, route and wire size.

d. Horizontal location of all light poles and junction boxes.

7. Miscellaneous:

a. Horizontal location and elevation of all concrete slabs.

b. Horizontal location, size and material of all fencing.

c. Location size and material of all existing utilities whether indicated on the Contract Drawings or not.

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

e. Depths of various elements of foundation in relation to finish first floor datum.

f. Field changes of dimensions and details.

g. Details not on original contract drawings.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.

2. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation.

3. Note related record drawing information and Product Data.

4. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

5. Changes made by field order or by Change Order.

D. Record Product Data (Shop Drawings): Maintain one copy of each Product Data submittal.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations.

2. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned later by direct observation.

3. Note related Change Orders and mark-up of record drawings and Specifications.

E. Record Sample Submitted: Immediately prior to the date or dates of Substantial Completion, the Contractor will meet at the site with the Engineer and the Owner to determine which of the submitted Samples that have been maintained during progress of the Work are to be transmitted to the Owner for record purposes. Comply with delivery to the Owner's Sample storage area.

F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work.

1.05 SUBMITTAL

A. Project Record Documents, demonstrating construction progress, shall be submitted with each Application for Payment.

B. Interim Project Record Drawings shall be submitted at significant project milestones including:

1. Construction of wet well or other structures.

2. Construction of catch basins, manholes, pipes and appurtenances.

3. As required by the Engineer.

C. Project Record Documents, demonstrating construction completion shall be submitted with the balance of Closeout documents at the conclusion of construction including:

1. Three sets of signed and sealed sets of prints.

2. One compact disc copy of record drawings in AutoCAD format.

D. Accompany submittals with transmittal letter in duplicate, containing:

1. Date
2. Project Title and Number
3. Contractor's Name and Address
4. Title and Number of each Record Document
5. Signature of Contractor or his Authorized Representative

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01730

OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 DESCRIPTION

A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under Contract.

1. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.

B. Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.

1.02 RELATED SECTIONS

A. Section 01340 – Shop Drawings, Working Drawings and Samples

B. Section 01700 – Contract Closeout

C. Section 01740 – Warranties & Bonds

D. Other Sections as applicable.

1.03 QUALITY ASSURANCE

A. Preparation of data shall be done by personnel:

1. Trained and experienced in maintenance and operation of described products.

2. Familiar with requirements of this Section.

3. Skilled as technical writers to the extent required to communicate essential data.

4. Skilled as draftsman competent to prepare required drawings.

1.04 FORM OF SUBMITTALS

A. Prepare data in form of an instructional manual for use by Owner's personnel.

B. Format

1. Size: 8 1/2 inches x 11 inches

2. Paper: 20 pound minimum, white, for typed pages.

3. Text: Manufacturer's printed data, or neatly typewritten.

4. Drawings:

a. Provide reinforced punched binder tab, bind in with text.

b. Reduce larger drawings and fold to size of text pages, but not larger than 11 inches x 17 inches.

5. Provide fly-leaf for each separate product, or each piece of operating equipment.

a. Provide types description of product, and major component parts of equipment.

b. Provide indexed tabs.

6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:

a. Title of Project

b. Identity of separate structure as applicable.

c. Identity of general subject matter covered in this manual.

C. Binders

1. Commercial quality three-ring binders with durable and cleanable plastic covers.

2. Maximum ring diameter shall be 2 inches.

3. When multiple binders are used, correlate the data into related consistent groupings.

1.05 CONTENT OF MANUAL

A. Neatly typewritten Table of Contents for each volume, arranged in systematic order.

1. Contractor, name of responsible principal, address, and telephone number.

2. A list of each product required to be included, indexed to content of the volume.

3. List, with each product, name, address, and telephone number of:

a. Subcontractor of installer

b. Maintenance contractor, as appropriate

c. Identify area of responsibility of each

d. Local source of supply for parts and replacement.

4. Identify each product name and other identifying symbols as set forth in Contract Documents.

B. Product Data

1. Include only those sheets which are pertinent to the specific product.

2. Annotate each sheet to:

a. Clearly identify specific product or part installed.

b. Clearly identify data applicable to installation.

c. Delete references to inapplicable information.

C. Drawings

1. Supplement product date with drawings as necessary to clearly illustrate:

a. Relations of component parts of equipment and systems.

b. Control and flow diagrams.

2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.

3. Do not use Project Record Documents as maintenance drawing.

D. Written text, as required to supplement product date for the particular installation:

1. Organize in consistent format under separate headings for different procedures.

2. Provide logical sequence of instructions of each procedure.

E. Copy of each warranty, bond and service contract issued:

1. Provide information sheet for Owner's personnel, give:

a. Proper procedures in event of failure.

b. Instances which might affect validity of warranties or bonds

1.06 MANUAL FOR MATERIALS AND FINISHES

A. Submit five copies of complete manual in final form.

B. Content for architectural products, applied materials and finishes

1. Manufacturer's data, giving full information on products.

a. Catalog number, size, composition.

b. Color and texture designations.

c. Information required for re-ordering special-manufactured products.

2. Instructions for care and maintenance.

a. Manufacturer's recommendation for types of cleaning agents and methods.

b. Cautions against cleaning agents and methods which are detrimental to product.

c. Recommended schedule for cleaning and maintenance.

C. Content, for moisture-protection and weather-exposed products

1. Manufacturer's data, giving full information on products

a. Applicable standards.

b. Chemical composition.

c. Details of installation.

2. Instructions for inspection, maintenance, and repair.

D. Additional requirements for maintenance data: Respective sections of Specifications.

E. Provide complete information for products specified.

1.07 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit five copies of complete manual in final form.

B. Content, for each unit of equipment and system, as appropriate:

1. Description of unit and component parts.
    a. Function, normal operating characteristics and limiting conditions
    b. Performance curves, engineering data and tests
    c. Complete nomenclature and commercial number of replaceable parts
2. Operating procedures
    a. Start-up, break-in, routine and normal operating instructions
    b. Regulation, control, stopping, shut-down and emergency instructions
    c. Summer and winter operating instructions
    d. Special operating instructions
3. Maintenance Procedures
    a. Routine operations
    b. Guide to "trouble-shooting"
    c. Disassembly, repair and reassembly
    d. Alignment, adjusting and checking
4. Servicing and lubrication schedule
    a. List of lubricants required
5. Manufacturer's printed operating and maintenance instructions
6. Description of sequence of operation by control manufacturer
7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance
    a. Predicted list of parts subject to wear
    b. Items recommended to be stocked as spare parts
8. As-installed control diagrams by controls manufacturer
9. Each contractor's coordination drawings
    a. As-installed color coded piping diagrams
10. Charts of valve tag numbers, with location and function of each valve
11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage
12. Other data as required under pertinent sections of specifications

C. Contents, for each electric and electronic system, as appropriate

1. Description of system and component parts

a. Function, normal operating characteristics, and limiting conditions

b. Performance curves, engineering data and tests

c. Complete nomenclature and commercial number of replaceable parts

2. Circuit directories of panel-boards

a. Electrical service

b. Controls

3. As-installed color coded wiring diagrams

4. Operating procedures:

a. Routine and normal operating instructions

b. Sequences required

c. Special operating instructions

5. Maintenance procedures

a. Routine operations

b. Guide to "trouble-shooting"

c. Disassembly, repair and reassembly

d. Adjustment and checking

6. Manufacturer's printed operating and maintenance instructions

7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

8. Other data as required under pertinent sections of specifications

D. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

E. Additional requirements for operating and maintenance data: Respective sections of Specifications.

F. Provide complete information for product specified.

1.08 SUBMITTAL SCHEDULE

A. Submit two copies of preliminary draft of proposed formats and outlines of contents of Operation and Maintenance Manuals within 30 days after Notice to Proceed.

1. The Engineer will review the preliminary draft and return one copy with comments.

B. Submit two copies of completed data in final form no later than 30 days following the Engineer's review of the last shop drawing and submittal specified under Section 01340.

1. One copy will be returned with comments to be incorporated into final copies.

C. Submit specified number of copies of approved data in final form directly to the offices of the Engineer, Calvin, Giordano & Associates, within 30 calendar days of product shipment to the project site and preferably within 30 days after the reviewed copy is received.

D. Submit six copies of addendum to the operation and maintenance manuals as applicable and certificates as specified in paragraph 1.01B of Section 01030 within 30 days after final inspection and plant start-up test.

E. Final Operation and Maintenance submittals shall be in large three-ring binders organized by specification Section and plainly marked per paragraph 1.04Ca.

1.09 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment, and maintenance of products, equipment and systems.

B. Operating and maintenance manual shall constitute the basis of instruction.

1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

1.10 ENGINEER'S O & M CHECKLIST

A. The Engineer will review Operation and Maintenance Manuals submittals on operating equipment for conformance with the requirements of this Section. The review will generally be based upon the O&M Review Checklist (presented on the pages at the end of this section for the benefit of the Contractor and his suppliers).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

O & M REVIEW CHECKLIST

EQUIPMENT SUBMITTED	_____	DATE OF SUBMITTAL	_____
MANUFACTURER	_____	DEGREE OF APPROVAL	_____
SPECIFICATION SECTION	_____	DRAWING NUMBER	_____

_____ Is the submittal correct for model/series/configuration originally submitted with shop drawings?

_____ Is the binding correct with assigned color/printing etc.? (Pertains to final three volumes)

_____ Is the submittal properly indexed?

_____ Does the submittal pertain only to equipment being furnished?

_____ Is the submittal easily understood and instructively arranged?

_____ Does the submittal include start-up, shutdown and troubleshooting procedures?

_____ Are sufficient drawings and schematics included to supplement written descriptions?

_____ Is the listing of name plate data for each piece of supplied equipment provided and attached?

_____ Are all submitted “C” and “D” size drawings printed on paper that is 11 inches high and folded to 8 1/2 inches wide?

_____ Is proper and complete instruction for servicing included?

_____ Is there a suggested operating log sheet for equipment?

_____ Is schedule for lubrication provided?

_____ Is there a recommended preventative maintenance schedule?

_____ Are necessary safety precautions clearly indicated where they relate to the equipment?

_____ Is the Area Representative information provided, i.e., Name, Address, Telephone Number?

_____ Are specified spare parts indicated and listed?

The following are the points of rejection requiring resubmittal by Contractor:

_____

_____

_____

END OF SECTION

SECTION 01740

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Compile warranties and bonds as specified in the Contract Documents.

B. Co-execute submittals when so specified.

C. Review submittals to verify compliance with Contract Documents.

D. Submit to the Engineer for review and transmittal to Owner.

1.02 RELATED SECTIONS

A. Section 01030 - Special Project Procedures

B. Section 01700 - Contract Closeout

C. Other Sections as applicable.

1.03 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bond, service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: two (2) each.

C. Table of Contents: neatly typed, in orderly sequence. Provide complete information for each item.

1. Product or work item

2. Firm, with name of principal, address and telephone number

3. Scope

4. Date of beginning of Warranty, bond or service and maintenance contract

5. Duration of warranty, bond or service maintenance contract

6. Provide information for Owner's personnel:

a. Proper procedure in case of failure

b. Instances which might affect the validity of warranty or bond

7. Contractor, name of responsible principal, address and telephone number

1.04 FORM OF SUBMITTALS

A. Prepare in duplicate packets

B. Format:

1. Size 8 1/2 inches x 11 inches, punch sheets for standard 3-post binder

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:

a. Title of Project

b. Name of Contractor

C. Binders: Commercial quality, three-post (3) binder, with durable and cleanable plastic covers and maximum post width of 2 inches.

1.05 WARRANTY SUBMITTAL REQUIREMENTS

A. For all equipment, submit a one-year warranty from the equipment manufacturer, unless otherwise specified. The manufacturer's warranty period shall be concurrent with the Contractor's for one year commencing at the time of acceptance by the Owner.

B. The Contractor shall be responsible for obtaining certificates for equipment warranty for all major equipment and which has a 1 HP motor or which lists for more than $1,000. The Engineer reserves the right to request warranties for equipment not classified as major. The Contractor shall still warrant equipment not considered to be "major" in the Contractor's one-year warranty period even though certificates of warranty may not be required.

C. In the event that the equipment manufacturer or supplier is unwilling to provide a one-year warranty commencing at the time of Owner acceptance, the Contractor shall obtain from the manufacturer a two (2) year warranty commencing at the time of equipment delivery to the job site. This two-year (2) warranty from the manufacturer shall not relieve the Contractor of the one-year warranty starting at the time of Owner acceptance of the equipment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 03700

MODIFICATIONS AND REPAIR TO EXISTING CONCRETE

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to cut, repair, demolish, excavate or otherwise modify parts of existing structures or appurtenances as shown on the Drawings and as specified herein as necessary to complete the work under this Contract.

1.02 RELATED WORK

A. Section 03300 - Concrete and non-shrink grout.

B. Other Sections as applicable.

1.03 GENERAL

A. No existing structure or concrete shall be shifted, cut, removed, or otherwise altered until authorization is given by the Engineer.

B. When removing materials or portions of existing structures and when making openings in existing structures, the Contractor shall take all precautions and use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work, nor to damage the structures or contents by falling of flying debris. Unless otherwise permitted, line drilling will be required in cutting existing concrete.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Epoxy Bonding Compound:

1. The epoxy bonding compound shall be furnished in two components for combining immediately prior to use in accordance with the manufacturer's written instructions and as stipulated in these Specifications.

2. The components of the epoxy resin system shall conform to the following requirements.

a. Component A - Component A shall be a modified epoxy resin of the epichlorohydrin bisphenol A condensation type, containing suitable viscosity control agents and having an apoxide equivalent of 180-200.

b. Component B - Component B shall be primarily a reaction product of an alkyl glycidyl ether and a polyfunctional aliphatic amine containing suitable viscosity agents modified with 2, 4, 6 tri (dimethylamino-methyl) phenol.

c. The component ratio of B:A shall be 1:1 by volume.

d. The resultant compound shall be polysulfide free.

3. PROPERTIES OF MIXED COMPONENTS

2.1 Solids Content	100% by weight
2.2 Pot Life	20-30 min @ 73°F
2.3 Track-Free Time (thin film)	3-5 hours @ 73°F
2.4 Final Cure ASTM D-695 (75% ultimate strength)	3 Days @ 73°F
2.5 Initial Viscosity (A+B)	2400-3200 cps min at 73°F
2.6 Color Mixed	Straw

4. PROPERTIES OF CURED MATERIAL

3.1	Neat Material	
3.1.1	Tensile Strength (ASTM D-638)	5300 PSI min at days 73°F cure
3.1.2	Tensile Elongation (ASTM D-638 modified)	4.8% @ 14 days, 73°F cure
3.1.3	Compressive Strength (ASTM D-695)	700 PSI min @ 28 days 73°F cure
3.1.4	Compressive Modulus (ASTM D-695)	250,000 PSI min @ 28 days, 73°F cure

3.1.5	Water Pick Up (ASTM D-570)	1.0% max
3.1.6	Bond Strength (Plastic to Hardened)	1500 PSI min 14 days, 73°F cure
3.1.7	Deflection Temperature (ASTM D-1525)	180°F min.

5. Epoxy bonding compound shall be Sikadur Hi-Mod as manufactured by Sika Chemical Corp., Lyndhurst, N.J., or equal as manufactured by W.R. Grace Co., Cambridge, MA or Adhesive Engineering Co., Lawrence, MA.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Field measurements shall be taken in the required buildings and at the required yard structures to determine the amount of concrete to be removed and/or repaired and the amount of patching to be done.

3.02 CONSTRUCTION METHODS

A. Where new concrete is to be made integral with existing concrete, either of the following methods as noted, shown or specified in Contract Drawings shall be used by the Contractor:

1. Bonding to a saturated surface.

2. Bonding by using bonding agent.

3. Use of anchor bolts, expansion bolts or dowels in connecting concrete.

3.03 MODIFYING OR REPAIRING EXISTING CONCRETE

A. Remove concrete to the depths shown or required. Roughen contact surfaces by chipping, sandblasting, scarifying or other approved methods. Thoroughly clean the surface removing loose particles and dust.

B. Cut off projecting reinforcement when required to provide at least l inch cover. Where shown, reinforcement shall be bent across cut face and covered with new concrete.

C. Thoroughly wash the roughened concrete surfaces and keep the surfaces saturated for at least 6 hours before placing new concrete. All free water shall be removed prior to placing the concrete. An epoxy bonding compound as specified may be used in lieu of saturating surface for 6 hours.

D. Cement mortar, where required, shall be placed to a thickness slightly in excess of the finished surface and shall be steel-trowel-finished, flush with the adjacent surface.

E. When the finish surface is not specified to be coated the color of new concrete in the exposed surfaces shall match the color of the existing adjoining concrete as closely as possible.

F. Cement mortar shall consist of 1 part portland cement and two parts of sand by volume. No accelerating admixtures shall be employed in surface treatment. Where shown on the Drawings, a non-shrink grout shall be used for patching and filling.

3.04 CONNECTIONS, NEW CONCRETE TO EXISTING CONCRETE

A. The Contractor shall drill 1 1/2 inch holes for dowels. The drilled hole shall first be filled with epoxy bonding compound, then dowels shall be inserted by tapping. These holes shall be blown clear of loose particles and dust prior to installing epoxy bonding compound. Where shown on the Drawings, expansion bolts shall be installed in place of bonded dowels.

B. Unless otherwise noted on the Drawings, No. 5 dowels set 12 inches into the concrete, and projecting 12 inches, 24 inches on center shall be used.

C. Where it is necessary to expose existing reinforcement, the reinforcing rods shall be cleaned by wire brushing and new reinforcement shall be hooked into existing reinforcement and lapped or welded as directed. Reinforcing rods shall have at least 3/4 inch clearance around each bar.

D. All mixing and application of the epoxy shall be done in strict accordance with the printed instructions of the approved manufacturer. The Contractor shall submit to the Engineer, when requested, evidence indicating that the proposed applicators are fully qualified to perform the work and any proposed applicator found to be not qualified shall, be removed forthwith by the Contractor.

E. Preparation of Concrete Surfaces:

1. Surfaces must be clean and sound. Surfaces may be dry, damp, or wet, but free of standing water. Remove dust, laitance, grease, curing compounds, impregnations, waxes, foreign particles, and disintegrated materials by mechanical abrasion methods such as sandblasting.

2. If the concrete surfaces are sound and it is only necessary to remove laitance, grease or dust, the Contractor may, with the prior written approval of the Engineer, forego sandblasting and wash the concrete with a degreasing and etching chemical applied in accordance with the manufacturer's (ProSoCo, Inc., Kansas City, Kansas, Sure-Klean Degresser & Etch, or approved equal) written instructions and as stipulated in these Specifications hereinafter.

3. Degreasing and Etching Chemical:

Color: Water White; Flash Point: Above 150 Deg.VF; Weight/gallon: 9.0 lbs.; Composition and Materials: A blend of organic and inorganic acids with a special solvent system incorporating wetting agents for emulsification.

4. Application of degrease and etching compound. Pre-wet concrete surfaces with clean water. Brush concentrated cleaner onto concrete surface. Let stand 3 to 4 minutes and reapply, brushing stained areas vigorously. Rinse

off with fresh water applied at a minimum pressure of 800 psi and a minimum volume of five gallons per minute.

F. Proportioning/Mixing/Applying Epoxy Compound:

1. Volumetric ratio of bonding compound is 1:1 (B:A). To mix, proportion 1 part B and 1 part A into clean pail. Mix thoroughly for 3 minutes with a steel mixing paddle on low-speed (400 to 600 rpm) drill until blend is a uniform straw color. Mix only that amount of epoxy that can be used in 30 minutes at 73 degrees F.

2. Application for Bonding:

a. The area to be overlaid shall be covered with one coat of the epoxy compound applied with long-nap paint rollers, brushes, brooms or by spray. The rate of application shall be 80 sq. ft./gal. maximum or smooth concrete (20 mils). As the concrete increases in roughness, the rate of coverage decreases proportionally.

b. While the epoxy compound is still tacky (3-5 hrs. at 73oF) place the concrete. If the bonding compound should harden before the concrete is placed, apply a fresh coat over the hardened coat and proceed.

3. Application for Grouting: To prepare a grout to anchor bolts or level base plates, mix the epoxy compound with granules recommended and supplied by the epoxy manufacturer. The amount granules used should be the maximum amount possible while still maintaining a pourable consistency. The ratio should be approximately 1:1-1/2 by loose volume (Granules). See technical data on anchor bolt grouting and grouting base plates published by the manufacturer.

4. Limitations:

a. Do not thin the epoxy bonding compound. Solvents will prevent proper cure.

b. Use only oven-dry granules to avoid encapsulation of moisture. Exposure to temperatures (after cure) above 180 degrees F (dry) and 120 degrees F (wet) not recommended.

G. WEATHER LIMITATIONS

1. The epoxy compound shall be placed only when both the concrete surface temperature and the ambient temperature is 40 degrees F and rising.

H. SAFETY

1. The Contractor shall require applicators to wear protective clothing, gloves, goggles and barrier creams.

3.05 OPENINGS IN CONCRETE

A. Where openings are required for pipes, thimbles for gates, gate stems or other installations in existing concrete structures, the Contractor shall cut the existing concrete within the limits required, as shown on the Drawings or specified, expose the existing reinforcing steel and perform the work in such a manner as to prevent damage to the existing adjacent structures or equipment.

B. Unless otherwise permitted, line drilling will be required.

C. Where concrete is cut to provide openings for gate stems, pipe sleeves shall be accurately installed and grouted in place in an approved manner.

1. The exposed reinforcement shall be cleaned by wire brushing, then cut and bent to permit the installation and finally bent around the new pipe or thimble. Additional reinforcement shall be provided as shown on the Contract Drawings for typical reinforcing details of openings in walls and slabs, except as otherwise shown, specified or required.

2. After installation of pipelines and thimbles, etc., the existing concrete shall be prepared as specified above in Paragraph 3.03C and the void between the outside of the pipe or thimble and the existing concrete shall be filled with non-shrink grout.

END OF SECTION

SECTION 05100

STRUCTURAL STEEL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Requirements contained in the General Specification and Special Provisions shall apply to and govern this work under this Section.

B. Work included in this Section covers structural steel, complete, including supports for mechanical and electrical equipment shown on drawings.

C. Related work specified elsewhere: the following related work is to be performed under the designed sections.

1. Division 03 - Concrete.
2. Division 09 - Finishes.
3. Division 15 - Mechanical
4. Division 16 - Electrical

D. All work shall be fabricated and performed in accordance with the requirements and recommendations of the following Codes and Standards, including, but not limited to:

1. South Florida Building Code, (Broward Edition).
2. American Institute of Steel Construction (AISC).
3. Manual of Steel Construction, 8th Edition.
4. American Welding Society (AWS).
5. American Society for Testing Materials (ASTM).
6. American Society of Civil Engineers (ASCE7).

E. Shop Drawings:

1. Submit complete shop drawings for all structural components in accordance with the requirements of the General Specifications and Special Provisions.
2. No shop drawings shall be submitted to the Engineer until after they have been checked by the contractor for all coordination items and for field elevations and dimensions. No material shall be fabricated or delivered to the site before the shop drawings have been reviewed and made acceptable to the Engineer. Drawings shall include all shop and erection details. Including cuts, copes, connections, holes, bolts, shim plates and welds in structural steel. All welds, both shop and field, shall be indicated on the details on the shop drawings by standard welding symbols given in the AISC Manual. Drawings shall show the size, length, and type of each weld
3. Substitutions: Proposed substitutions of sections or modifications of details and the reasons therefore, shall be submitted with the shop drawings for review. No changes or modifications shall be made without the consent of the Engineer. Approved substitutions, modifications, and necessary changes in related portions of the work shall be coordinated by the Contractor and

shall be accomplished at no additional cost to the Owner. This also applies to any changes in framing or building necessitated by the Contractor's proposal to provide a different type or size equipment than that specified.

4. Responsibility for Errors: The Contractor alone shall be responsible for all errors on Shop Drawings, errors or fabrication and for the correct fitting of the structural members shown on the shop drawings.

F. Qualification of Welders:

1. Welders to be employed on the work shall have passed qualification tests using procedures covered in the American Welding Society Standard Specification D1.1 and they shall have evidence of this certification available for inspection at all times. If required, the Contractor shall submit identifying, stenciled, test coupons made by any operator whose workmanship is subject to question. The Contractor shall require any welder to retake the test, when, in the opinion of Architect/Engineer there is reasonable doubt as to the proficiency of the welder. Test for welder qualification, when required shall be conducted at no additional expense to the Owner. Recertification of the welder shall be made only after the welder has taken and passed the required retest. Welders shall have evidence of having been engaged in welding for at least nine months in the preceding twelve month period, and welders who fail to meet the requirement must pass the qualification test.

G. Product Handling:

1. Delivery of materials to be installed under other sections:

a. Anchor bolts and other anchorage devices which are embedded cast-in-place concrete or masonry construction shall be delivered to the project site in time to be installed before the start of cast-in-place concrete operations or masonry work.

b. Provide setting drawings, templates, and directions for the installation of the anchor bolts and other device.

2. Storage and Materials:

a. Structural steel members which are stored at the project site shall be above ground on platforms skids or other supports.

b. Steel shall be protected from corrosion.

c. Other materials shall be stored in a weather tight and dry place, until ready for use in the work.

d. Packaged material shall be stored in their original unbroken package or container.

PART 2 - PRODUCTS

2.01 MATERIALS AND PRODUCTS

A. Materials

1. Structural steel: All structural steel shall be new and of U.S. Domestic manufacture.

a. Rolled Sections: Rolled structural steel sections and plate shall meet the requirements of ASTM Specification A 36.

b. Tubular Sections: Rectangular tubular sections shall be steel 46 ksi equivalent to ASTM A-500 Grade "B". Round tubular sections shall meet the requirements of ASTM Specification A501 and A53, Type E or S, Grade B, open hearth or basic oxygen steel with maximum sulfur content of 0.05%.

c. Steel grating for metal stairs shall be of non slip galvanized steel grating with serrated surface. The grating shall be 1 1/4" deep, with minimum 3/16" thick bearing bars and galvanized steel saddle clip to keep grating in place. New grating to match existing. Submit shop drawings for approval prior to fabrication.

2. Bolts, nuts and washers shall conform to the following requirements: No bolt, nut or washer having a visible defect shall be acceptable for use on the job.

a. Anchor bolts shall be of ASTM A-307, and high strength anchor bolt shall conform to ASTM A-449.

b. High strength connection bolts shall be of ASTM A-325N steel and shall conform to standard AISC details unless otherwise indicates.

c. Stainless steel unless otherwise shown or specified shall be type 18-8.

3. Welding electrodes: Electrodes shall be of the low hydrogen type consistent with the type of steel being welded and in keeping with good commercial practice, subject to approval by the Engineer. Type and designation number of electrodes to be used in different positions shall be shown on shop drawings. The E70 series shall be used for A 36 steel and A 53, Grade B tubular sections. All electrodes shall be from new cans initially opened for this job. Once a can is opened, all electrodes except for welder's hand-full supply shall be stored in a drying oven. Electrodes that have not been so treated or which have been allowed to come in contact with dampness or atmospheric moisture may be rejected from use on the job.

2.02 FABRICATION

A. Fabricate structural steel in accordance with the SFBC and AISC, with modifications and additional requirements specified in this Section.

B. Where a conflict occurs between the standard specified above, the most stringent shall govern.

C. Shop connections: shall be welded wherever possible.

D. Field Connections: Provide A-325 bolted connections according to Section 1.15.12 of the AISC Specification except where welded connections are indicated.

E. Shop Painting:

1. Surface Preparation: Prepare steel surfaces in accordance with Steel Structures Painting Council Specification SSPC-SP 6.

2. Painting: After preparing steel surfaces, paint with Koppers No. 654 Epoxy or approved equal primer to provide a total dry film thickness of not less than 3 mils in accordance with the manufacturer's printed instructions. Paint shall be applied immediately after sand blast cleaning, thoroughly and evenly and well worked into the joints and other open spaces. Paint shall be applied only to dry surfaces.

2.03 GALVANIZING

A. All structural steel to be galvanized shall be hot-dip galvanized after shop fabrication but before shipping. All items will be galvanized in accordance with ASTM A123 or A153. All items to be galvanized shall be thoroughly cleaned, pickled, fluxed and completely immersed in a bath of molten zinc.

B. The resulting coating shall be adherent and shall be the normal coating to be obtained by immersing the items in a bath of molten zinc and allowing them to remain in the bath until their temperature becomes the same as the bath.

C. Zinc coating which has been burned by field welding, abraded, or otherwise damaged shall be cleaned and repaired after erection of structural steel. The damaged area shall be thoroughly cleaned by wire brushing and all traces of welding flux and loose or cracked zinc coating removed prior to painting. The cleaned area shall be painted with two coats of zinc oxide-zinc dust paint conforming to the requirements of Military Specifications MIL-P-15145. The paint shall be properly compounded with a suitable vehicle in the ratio of one part zinc oxide to four parts zinc dust by weight.

D. Steel members to be galvanized are specified on drawings and in Section 09900. Wherever possible, galvanize the assembly.

PART 3 - EXECUTION

3.01 DESIGN

A. The design of members and connections for any portions of the structure not indicated on the design drawings must be detailed by steel fabricator on the shop drawings. Connections not specifically detailed shall conform to the character and intent of the detailed connections. Such connections shall be detailed for required load, but in no case for less than 100% of the capacity of the member. Such design shall conform to the requirements of the AISC Manual of Steel Construction. All items specified to be designed by the Contractor shall be designed by an Engineer hired by G.C. or fabricator. Design calculations and shop drawings signed and sealed by a Florida Registered Engineer shall be submitted for approval prior to fabrication.

3.02 WORKMANSHIP:

A. Connections: Connections shall be as indicated. One sided or other types of eccentric connections will not be permitted unless shown on detail on the Contract Drawings or unless designed and approved on shop drawings in advance. Shim plates 3/16" and under shall be furnished in assorted sizes varying in thickness by approximately 1/64" or less (metal gage thicknesses). Space in bolted joints caused by variation in member sizes, plate thicknesses, or other causes shall be completely filled for all practical purposes by fill and/or shim plates that a tight joint will exist before bolts are tightened. Where members of different sizes are spliced, fill and/or shim plates shall be so arranged that member centerlines will remain in line to within 1/16".

B. Welded Connections:

1. All welding shall be done by the shielded metal-arc process. Welded connections shall be as indicated on the drawings or as specifically authorized by the Engineer. Wherever possible, welding shall be done in a flat position. All slag shall be removed from each pass before proceeding.

2. All those connections which are shown to be welded on drawings and weld size not specified shall be welded to achieve the full capacity of the members.

3. All back gouging shall be done with arcair followed by clean up grinding. Oxyacetylene torch shall not be used for gouging.

C. Shop Splices: Members of the required length between field joints shall be provided without splicing except where specifically indicated on contract drawings.

3.03 HANDLING

A. Handling equipment shall be suitable and safe for the workmen. Care shall be taken in handling members, particularly long slender members, by picking them up at appropriate points and moving them carefully so that they will not be overstressed or deformed. Errors in shop fabrication or deformation resulting from handling and/or transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the Engineer, and approval of the method of correction shall be obtained. Approved corrections shall be made at no additional cost to the Owner.

3.04 ERECTION

A. Generally splices and field connections shall be made as indicated on drawings. Unfinished bolts may be used where indicated or to temporarily facilitate field erection. Field welding will be permitted only where indicated on drawings or as approved. Fasteners shall be installed as specified in paragraph "Workmanship". Erecting equipment and shoring shall be suitable and safe for the workmen. Members shall not be distorted, deflected, bent or placed in a condition of heavy stress during erection and bolt tightening. Where members are too long to properly fit, they shall be corrected by refabrication or as directed. Where members are slightly short, shims shall be provided at the bolted connections. Approved corrections shall be made at no additional cost to the Owner.

B. Anchor bolts shall be properly located and built into connecting work. Bolts and anchors shall be preset by the use of templates made from base or bearing plates.

C. Base and bearing plates shall be supported and aligned on leveling nuts, steel wedges or shims and then grouted. Grout shall be a low slump non-shrink type, equivalent to Embeco Non-Shrink Grout by Master Builders, SikaGrout 212 by Sika, Hi-Flow Grout by Euclid Chemical Company, or approved equal.

D. Gas cutting: The use of a gas-cutting torch in the field for correcting fabrication errors will not be permitted on any major member in the structural framing. Its use will only be permitted on minor members when the member is not under stress, and then, only after the approval of the Architect/Engineer has been obtained.

3.05 FIELD PAINTING AND TOUCH-UP

A. After erection, paint exposed steel surfaces, including field welds, bolt heads and nuts, and touch-up abrasions with primer to match shop painted surfaces.

END OF SECTION

SECTION 05500

MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 SCOPE

A. Furnish all labor, materials, equipment and incidentals required and install covers, grates, frames, manhole rings, catch basin castings and other miscellaneous metals as shown on the Drawings and specified herein. The miscellaneous metal items include but are not limited to the following:

1. All metal frames, ladders, stair rails, floor opening frames including gratings and supports.
2. Prefabricated access hatches and frames.
3. Anchors or anchor bolts except those specified to be furnished with all equipment.
4. Railings, posts and supports both interior and exterior.
5. Cast iron frames, covers, grates, drain leaders and drains.
6. Stair nosings, steel plates, overhead steel door frames, angle frames, plates and channels.

1.02 RELATED WORK

A. Section 05100- Structural steel.

B. Anchor bolts for equipment are included in the respective Sections of Division 11, 13 and 15.

C. Metal louvers, pipe hangers, supports and concrete inserts are included under Division 15.

D. Pipe sleeves, wall sleeves and wall castings are included in the respective Sections of Division 15

E. Other Sections as applicable.

1.03 COORDINATION

A. The work of this Section shall be completely coordinated with the work of other Sections. Verify at the site both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.

B. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.

1.04 SHOP DRAWINGS AND SAMPLES

A. Detail drawings, as provided for in the General Conditions and Section 01340, showing sizes of members, method of assembly, anchorage and connection to other members shall be submitted to the Engineer for approval before fabrication. ICBO recommendations regarding safe allowable loads shall be provided for wedge anchors, expansion anchors, epoxy or adhesive anchors.

B. Samples shall be submitted at the request of the Engineer for concurrent review with Shop Drawings.

1.05 FIELD MEASUREMENTS

A. Field measurements shall be taken at the site to verify or supplement indicated dimensions and to insure proper fitting of all items.

1.06 REFERENCE SPECIFICATIONS

A. Unless otherwise specified, materials shall conform to the following:

Structural Steel - ASTM A36

Welded & Seamless Steel Pipe - ASTM A53

Gray Iron Castings - ASTM A48, Class 30

Galvanizing, general - ASTM A123

Galvanizing, hardware - ASTM A153

Galvanizing, assemblies - ASTM A386

Aluminum (Extruded Shapes) - 6063 T5 (Alum. Alloy)

Aluminum (Extruded Pipe) - 6063 T6 (Alum. Alloy)

Aluminum Bars Structural - 6061 T6 (Alum. Alloy)

Bolts and Nuts - ASTM, A307 or Type 316

Stainless Steel Bolts, Fasteners - AISI, Type 304L

Stainless Steel Plate & Sheet, Wire - AISI, Type 316L

Welding Rods for Steel - AWS Spec. for Arc Welding

PART 2 - PRODUCTS

2.01 ANCHORS, BOLTS AND FASTENING DEVICES

A. Anchors, bolts, etc., shall be furnished as necessary for installation of the work of this Section.

B. Compound masonry anchors shall be of the type shown or required and shall be equal to Star Slug in compounded masonry anchors manufactured by Star Expansion Industries, equal by Phillips Drill Co., Rahlplug, or approved equal. Anchors shall be minimum "two unit" type.

C. The bolts used to attach the various members to the anchors shall be the sizes shown or required. Stainless steel shall be attached to concrete or masonry by means of

stainless steel machine bolts and iron or steel shall be attached with steel machine bolts unless otherwise specifically noted.

D. For structural purposes, unless otherwise noted, expansion bolts shall be Wej-it "Ankr- Tite", Phillips Drill Co. "Wedge Anchors", or Hilti "Kwik-Bolt". When length of bolt is not called for on the Drawings, the length of bolt provided shall be sufficient to place the wedge portion of the bolt a minimum of 1 inch behind the reinforcing steel within the concrete. Material shall be as noted on the Drawings. If not listed, 316L stainless steel shall be used. In submerged conditions, use adhesive anchors.

2.02 ALUMINUM

A. Grating:

1. All grating for stairways, platforms, landings, cross-walk, floor plates, etc. shall be constructed of cold-forged plain aluminum bearing bars Type 6053-T6 Alloy by IKG/Borden, or as shown on the plans. Bars shall be welded together to form a diamond shaped pattern between bearing bars spaced per loading requirements. The bearing bars shall be sized and spaced according to the manufacturers. "Table of Safe Loads" for the anticipated loading conditions. Gratings shall be capable of supporting a minimum live loading of 60 psf over the entire span of the grating.

2. Aluminum gratings shall be of the size shown on the drawings. All openings 2 inches and greater in diameter shall be banded with a bar of the same depth and thickness as the main bearing bars of the grating, or furnished with continuous cross bridges. Each cut bar shall be welded to the band if banding is utilized. The ends of all grating sections shall be likewise banded. Clamps and bolts used for attaching grating to supporting member shall be stainless steel. All grating shall be clamped unless noted otherwise. Clamps shall be as recommended by the manufacturer.

B. Stair treads shall be as notified above for grating and shall have nonslip nosing.

C. Aluminum ladders shall be fabricated to the dimensions and details and installed as shown on the Drawings. Treads to be of cast aluminum by Dixie Metals, Inc. of Fort Lauderdale, Florida or approved equal.

D. Handrails, Mechanically Fastened Type:

1. All new handrails are to be aluminum mechanically fastened type pipe handrails and guardrails shall be clear anodized aluminum finish and installed as specified herein and indicated on the Drawings. Handrails shall be made of nominal 2 inches outside diameter pipe (Schedule 40) fabricate of seamless aluminum alloy meeting the requirements of Florida Department of Transportation (FDOT) index 870, 2010 Design Standards. All work shall meet the requirements of FDOT index 870, 2010 Design Standards.

2. Spacing of posts where posts are required shall be as noted on shop drawings, but in all cases shall be uniform and shall not exceed the requirements of FDOT index 870, 2010 Design Standards. Shorter spacing may be used where required to align the proposed handrail with the aluminum beams. The fabricator of the aluminum handrail and guardrail system shall be responsible for the design and preparation of shop drawings

and design calculations to meet the requirements of FDOT index 870, 2010 Design Standards. All handrail bases shall have base plates, bolts and neoprene pads as shown on FDOT index 870, except that bolts and washers shall be 316L stainless steel.

3. All railings shall be erected in line and plumb. Field splicing and expansion compensation shall be accomplished using sleeve methods shown in index 870.

4. Make provisions for removal/replacement of handrail sections as detailed and where shown on the Drawings or as needed to install the aluminum covers.

E. Toeboards:

1. Contractor shall furnish and install aluminum toeboards conforming to latest OSHA requirements on all railings and other locations where indicated on the Drawings.

2. Toeboards shall consist of an extruded 6063-T6 aluminum shape bolted by means of a pipe clamp to the railing posts without required any drilling or welding of the toeboard to the railing posts as manufactured by Reynolds Aluminum, Julius Blum & Company, or Thompson Fabricating Company. Toeboards shall have pitched top and tear drop bottom to prevent accumulation of dirt, or other materials.

3. Toeboards shall be aluminum alloy 6063-T6. All fastening hardware shall be Type 304 stainless steel.

F. Kickplates, if required, shall be fabricated and installed as shown on the Drawings.

G. Checkerplate aluminum cover plates shall be fabricated to the details shown and installed at the locations shown.

H. Structural aluminum angle and channel door frames shall be provided as shown on the Drawings and shall be anodized. Frames shall be fabricated with not less than three anchors on each jamb.

I. Miscellaneous aluminum shapes and plates shall be fabricated as shown. Angle frames for hatches, beams, grates, etc., shall be furnished complete with welded strap anchors attached. Furnish all miscellaneous aluminum shown but not otherwise detailed. Structural shapes and extruded it ems shall conform to the detail dimensions or the plans within the tolerances published by the American Aluminum Association.

2.03 STEEL ITEMS

A. Sleeves shall be steel or cast iron pipe in walls and floors with end joints as shown on the Drawings. All pipe sleeves shall have center anchor around circumference as shown.

B. Structural steel angle and channel door frames shall be provided as shown on the Drawings and shall be galvanized. Frames shall be fabricated with not less than three anchors on each jamb.

C. All miscellaneous lintels and closures not shown on the Drawings shall be galvanized steel and shall be provided as a part of this Section.

D. Miscellaneous steel pipe for sleeves and lifting attachments and other uses as required shall be Schedule 40 pipe fabricated according to the details as shown on the Drawings.

E. Frames, covers and grates for manholes, catch basins and inlets shall be of a good quality, strong, tough even grained cast iron except as otherwise specified below. Castings shall be as manufactured by the U.S. Foundry, or equal. Sizes shall be as shown on the Drawings. covers to have letters "WATER", "SEWER" or "DRAIN", as applicable, embossed on top.

F. Provide solid manhole and handhole covers and frames for electrical and telephone underground systems. Covers to have letters "HIGH VOLTAGE", "SIGNAL", "TELEPHONE", as applicable, embossed on top).

G. Stringers for stairways, platforms, landings, cross walks, cross overs, etc., shall be structural steel of the shape and size required to support the anticipated loads for the purposes intended.

H. Miscellaneous steel shall be fabricated and installed in accordance with the Drawings and shall include: beams, angles, support brackets, closure angles in roof at edge of T-beam; base plates to support end of T-beams, door frames. Splice plates, anchor bolts (except for equipment furnished in Divisions 11, 13, 14 and 15); lintels and any other miscellaneous steel called for on the Drawings and not otherwise specified.

PART 3 - EXECUTION

3.01 FABRICATION

A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength of durability.

B. Connections and accessories shall be of sufficient strength to safely withstand stresses and strains to which they will be subjected. Steel accessories and connections to steel or cast iron shall be steel, unless otherwise specified. Threaded connections shall be made so that the threads are concealed by fitting.

C. Welded joints shall be rigid continuously welded or spot welded as specified or shown. The face of welds shall be dressed flush and smooth. Exposed joints shall be close fitting and jointed where least conspicuous.

D. Welding of parts shall be in accordance with the Standard Code for Arc and Gas Welding in Building Construction of the AWS and shall only be performed where shown, specified, or permitted by the Engineer. All welding shall be performed only by welders certified as to their ability to perform welding in accordance with the requirements of the AWS Code. Component parts of built-up members to be welded shall be adequately supported and clamped or held by other adequate means to hold the parts in proper relation for welding.

E. Welding of aluminum work shall be on the unexposed side as much as possible in order not to expose pitting or discoloration.

F. All aluminum finish exposed surfaces, except as specified below, shall have manufacturer's standard mill finish. Aluminum handrails shall be given an anodic oxide treatment in accordance with the Aluminum Association Specification AA-C22-

A41. A coating of methacrylate lacquer shall be applied to all aluminum before shipment from the factory.

G. Castings shall be of good quality, strong, tough, even-grained, smooth, free from scale, lumps, blisters, sand holes, and defects of any kind which render them unfit for the service for which they are intended. Castings shall be thoroughly cleaned and will be subjected to a hammer inspections in the field by the Engineer. All finished surfaces shown on the Drawings and/or specified shall be machined to a true plane surface and shall be true and seat at all points without rocking. Allowances shall be made in the patterns so that the thickness specified or shown shall not be reduced in obtaining finished surfaces. Castings will not be acceptable if the actual weight is less than 95 percent of the theoretical weight computed from the dimensions shown. The Contractor shall provide facilities for weighing castings in the presence of the Engineer showing true weights, certified by the supplier.

H. All steel finish work shall be thoroughly cleaned, by effective means, of all loose mill scale, rust, and foreign matter before shipment and shall be given one shop coat of primer compatible with finish coats specified in Painting Section after fabrication, but before shipping. Paint shall be applied to dry surfaces and shall be thoroughly and evenly spread and well worked into joints and other open spaces. Abrasions in the field shall be touched up with primer immediately after erection. Final painting is specified in Painting Section 09900.

I. Galvanizing, where required, shall be the hot-dip zinc process after fabrication. Following all manufacturing operations, all items to be galvanized shall e thoroughly cleaned, pickled, fluxed, and completely immersed in a bath of molten zinc. The resulting coating shall be adherent and shall be the normal coating to be obtained by immersing the items in a bath of molten zinc and allowing them to remain in the batch until their temperature becomes the same as the bath. Coating shall be not less than 2 oz. per sq. ft. of surface.

3.02 INSTALLATION

A. Install all items furnished except items to be imbedded in concrete or other masonry which shall be installed under Division 3 and Division 4 respectively. Items to be attached to concrete or masonry after such work is completed shall be installed in accordance with the details shown. Fastening to wood plugs in masonry will not be permitted. All dimensions shall be verified at the site before fabrication is started.

B. All steel surfaces to come in contact with exposed concrete or masonry shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions prior to installation.

C. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-cromate primer followed by two coats of aluminum metal and masonry paint to the dissimilar metal.

D. Where aluminum contacts masonry or concrete, apply a heavy coat of approved alkali resistant paint to the masonry or concrete.

E. Where aluminum contacts wood, apply two coats of aluminum metal and masonry paint to the wood.

F. Where stainless steel contacts carbon steel, the carbon steel shall be coated with 3-6 mil of Thermic Series 60 paint to prevent contact of the dissimilar metals.

END OF SECTION

SECTION 09900

PROTECTIVE COATINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. All work required to provide labor, materials, equipment and incidentals to perform all of the necessary surface preparation and painting required to complete this contract in its entirety.

B. The Contractor shall furnish all supervision, labor, tools, materials, equipment, scaffolding or other structures, and supervision required for the transportation, unloading, storage, and application of the paint and associated products covered by this specification.

C. The work includes painting and finishing of all new interior and exterior exposed items above and below grade and surfaces, such as structural steel, miscellaneous metals, ceilings, walls, floors, doors, frames, transoms, roof fans, construction signs, guardrails, posts, fittings, valves, tanks, equipment and all other work obviously required to be painted unless otherwise specified herein or on the Drawings. The omission of minor items in the Schedule of Work shall not relieve the Contractor of his obligation to include such items where they come within the general intent of the Specification as stated herein.

D. All work shall be done in strict accordance with this Specification, the Design Drawings and the painting package, including manufacturer's instructions for surface preparation and painting.

E. The Contractor will obtain, at its own expense, 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".

F. It is the Contractor’s responsibility to examine areas and conditions under which coating systems are to be applied, and to notify the Owner of areas or conditions which are not acceptable. Do not begin surface preparation or application until areas or conditions have been corrected.

G. The Contractor shall remove coordinate interior painting with diffuser removal so that the tank floor is clear of diffuser equipment during painting.

H. The following surfaces or items are "NOT" required to be coated:

1. Any code-requiring labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.

2. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts, unless otherwise indicated.

3. Aluminum handrails (except where in contact with concrete) walkways, windows, louvers and grating unless otherwise specified herein.

4. Signs and nameplates.
5. Finish hardware.
6. Chain link fence.
7. Piping buried in the ground or embedded in concrete.
8. Concealed surfaces of pipe or crawl space.
9. Nonferrous metals, unless specifically noted otherwise.
10. Electrical switchgear and motor control centers.
11. Stainless steel angles, tubes, pipe, etc.
12. Products with polished chrome, aluminum, nickel or stainless steel finish.
13. Plastic switch plates and receptacle plates.
14. Flexible couplings, lubricated bearing surfaces, insulation and metal and plastic pipe interior.
15. Sprinkler heads.
16. Lifting chain on cranes and hoists
17. Electrical cable, festooned conductor system, cables, collector pole brackets, etc.

1.02 DEFINITIONS

A. The abbreviations and definitions listed below, when used in this Appendix, shall have the following meanings:

ANSI	American National Standards Institute
ASTM	American Society of Testing Materials
AWWA	American Water Works Association
DFT	Dry Film Thickness
FPP	Fiberglass Reinforced Plastic
HCI	Hydrochloric Acid
MDFT	Minimum Dry Film Thickness
MDFTPC	Minimum Dry Film Thickness Per Coat
mil	Thousandths of an Inch
MIL-P	Military Specification - paint
NACE	National Association of Corrosion Engineers
NSF	National Sanitary Foundation
OSHA	Occupational Safety and Health Act
SFPG	Square Feet Per Gallon
SFPGPC	Square Feet Per Gallon Per Coat
SP	Surface Preparation
SSPC	Steel Structures Painting Council

B. Wherever the word “Engineer” occurs in this specification, it shall apply to the authorized representative of the City of Pembroke Pines. Where the word “Contractor” occurs in this specification, it shall apply to the contractor performing any part of or all of this work.

C. Field Painting is the painting of new or rebuilt items at the job site. Field painting

shall be the responsibility of the Contractor.

D. Shop Painting is the painting of new or rebuilt items in the shop prior to delivery to the jobsite.

1.03 PROJECT SITE CONDITIONS

The location of this project is Broward County, Florida requires observance and conformance with EPA Volatile Organic Compound (VOC) restrictions. EPA limits the content of VOC's in painting materials to 2.5 lb/gallon. Information regarding the VOC content of proposed paints will be required during submittals.

1.04 RESOLUTION OF CONFLICTS

A. It shall be the responsibility of the Contractor to arrange a meeting prior to the start of any coatings applications between the Contractor, the Coating Manufacturer whose products are to be used, and the Owner. All aspects of surface preparation, application and coating systems as covered by this Specification will be reviewed at this meeting.

B. Clarification shall be requested promptly from the Owner when instructions are lacking, conflicts occur in the Specifications, or the procedure seems improper or inappropriate for any reason.

C. Copies of all manufacturer's instructions and recommendations shall be furnished to the Owner by the Contractor.

D. It shall be the responsibility of the Coating Manufacturer to have their representative meet in person with the Contractor and Owner before and during the job as a consultant on proper preparation and application of the coating materials unless a meeting is determined to be unnecessary by the Owner.

1.05 SUBMITTALS

A. All submittals must comply with City-specified submittal procedures.

B. Product Data Sheets.

C. Contractor shall submit coating material manufacturer's printed technical data sheets for products intended for use in each coating system.

1. Data sheets shall fully describe material as to its intended use, generic description, recommended surface preparation and application conditions, primers, material mixing and application (including recommended dry mil thickness recoat time), precautions, safety and maintenance cleaning directions.

2. Safety Data Sheets. Safety Data Sheets (SDS) shall accompany all submittals and shall be easily available for access at the job site during all activities.

D. Coating Schedule: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.06 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Specialize in manufacture of high-performance coatings with a minimum of 25 years successful experience.

2. Able to demonstrate successful performance on comparable projects.

3. Single-Source Responsibility: All coatings shall be products of a single manufacturer for their respective system.

B. Manufacturer's Representative:

1. The Contractor shall require the manufacturer to furnish a manufacturer's qualified technical representative to visit the project site for technical support as required and ordered and as may be necessary to resolve field questions or problems attributable to or associated with the manufacturer's products furnished under this Contract or the application thereof.

C. Contractor's Qualifications:

1. Contractor must have a minimum of an AMPP Level 1 Basic Coatings Inspector on staff for no less than 6 months, and must submit proof of this credential with their bid.

2. Experience in application of specified coatings for a minimum of 10 years on projects of similar size and complexity to this work.

3. Contractor must comply with all relevant OSHA safety regulations.

4. Use best practices to carry out corrosion prevention activities in the field.

5. Use best practices in environmental protection to prevent environmental degradation, and to ensure careful handling of all hazardous materials.

6. The Contractor must submit, with their bid, a letter of recommendation from the product manufacturer. This letter shall confirm the Contractor's ability to apply the specified coatings.

7. The Contractor must submit, with their bid, a list of a minimum 5 completed projects of similar size and complexity to this work. Include for each project:

a. Project name & location

b. Name and contact of owner

c. Name and contact of specifier

d. Approximate area of coatings applied

e. Total project amount value

f. Date of completion

D. Pre-Application Meeting:

1. A pre-application meeting shall be held at least two (2) weeks before the start of application of coating systems. All parties who directly affect the project shall attend, including the Contractor, Manufacturer, and Owner.

2. The pre-application meeting shall include a review of any circumstances which may impact the project including, but not limited to, the following:

a. Environmental requirements

b. Protection of Surfaces not scheduled to be coated

c. Surface Preparation

d. Ventilation

e. Application

f. Cleaning

g. Disinfection

h. Repair

i. Field Quality Control

j. Protection of coating systems

k. 11-month walkthrough

l. Coordination with other projects

E. 11-Month Walkthrough:

1. The Owner shall organize a project meeting for 11 months after the final completion date which the Contractor, Manufacturer, and Owner shall attend. Participants will perform a walkthrough of the project and resolve any workmanship or materials discrepancies.

F. DELIVERY, STORAGE, AND HANDLING

1. All coatings shall be delivered to the mixing room in unbroken containers, bearing the manufacturer's brand, date of manufacture, and name. They shall be used without alteration and mixed, thinned, and applied in strict accordance with manufacturer's directions for the applicable materials and surface before using.

2. Coatings shall be delivered to the job site in the original unopened containers, bearing the manufacturer's label. A Product Data Sheet and Safety Data Sheets for all coatings shall be obtained from the Manufacturer for each shipment of materials to the job site. Coatings shall be stored in a dry, well-ventilated area, not in direct contact with the ground, where the temperature is maintained within the Manufacturer’s written recommended limits.

3. Damaged materials and/or materials exceeding the shelf life shall not be used.

4. The Contractor will be responsible for storing coatings onsite in accordance with the Manufacturer’s latest written recommendations.

5. Coatings shall be mixed in proper containers of adequate capacity. All coatings shall be mixed in accordance with the Manufacturer’s latest written recommendations. No unauthorized thinners or other materials shall be added to any coatings. Air shall not be used directly for agitation. Pigmented material shall be strained after mixing. Catalyzed materials may not be used beyond the recommended pot life.

6. Owner may request a notarized statement from Contractor detailing all materials used on the project.

7. Work areas will be designated by the Owner for storage and mixing of all materials. Materials shall be in full compliance with the requirements of pertinent codes and fire regulations. Proper containers outside of the buildings shall be provided and used for wastes, and no plumbing fixture shall

be used for this purpose.

8. Contractor will be responsible for disposal of all waste, empty containers, etc.

9. Coating shall be performed in strict accordance with the safety recommendations of the coating manufacturer; with the safety recommendations of the national Association of Corrosion Engineers contained in the publication, Manual for Painter Safety; Federal, state and local agencies having jurisdiction.

G. FIELD CONDITIONS

1. All coatings shall be applied in dry and dust-free environment.

2. No coating shall be applied when temperatures are outside the manufacturers written recommended limits.

rain, fog, or mist.

3. No coating shall be applied when the temperature is less than 5°F above the dew point.

4. No coating shall be applied when unsuitable environmental conditions are expected within 1 hour of the listed “Dry to Touch” time for a coating.

5. The Contractor's scaffolding shall be erected, maintained and dismantled without damage to structures, machinery, equipment or pipe. Drop cloths shall be used as needed to protect buildings and equipment.

6. All surfaces required to be clear for visual observation shall be cleaned prior to inspection.

7. Painting shall not be performed on insulated pipe within three (3) feet of insulation operations or on insulation whose covering and surface coat have not had time to set and dry. Painting shall not be performed on uninsulated pipe within one (1) foot of any type of connection until the connection has been made, except as directed by the Owner.

PART 2 - PRODUCTS

2.01 GENERAL

Products containing lead will not be allowed. Oil shall be pure boiled linseed oil.

2.02 MANUFACTURER

A. Products shall be as manufactured by Tnemec Company, Inc., PPG or approved equal.

2.03 COATING PERFORMANCE CRITERIA

A. The following shall serve as a basis of comparison for material substitution requests. Any substitutions which decrease the total film thickness, change the generic type of coating, or fail to meet the performance criteria of the specified materials shall not be approved.

1. Series 1 Omnithane - Zinc/Micaceous Iron Oxide Urethane:

a. Adhesion: ASTM D4541 (Method B, Type II) - No less than 1,433 psi (9.88 MPa) adhesion, average of three tests.

b. Immersion: ASTM D870 – No blistering, cracking, rusting or delamination of film after 2,000 hours continuous immersion in deionized water at 140°F.

c. Salt Spray (Fog): ASTM B117 - No blistering, cracking or delamination of film. No more than .03% rusting on plane and no more than 3/16" rust creepage at scribe after 10,000 hours exposure.

2. Series 21 Epoxoline – Modified Polyamine Epoxy:

a. Special Qualification: Meets the requirements of approval for potable water use as established by NSF Std 600 for tanks and reservoirs of 20,000 gallons capacity or greater (max thickness: 20.0 mils).

b. Adhesion: ASTM D4541 (Type V Tester) – No less than 1,840 psi (12.68 MPa) adhesion, average of three trials.

c. Cyclic Salt Fog / UV Exposure: ASTM D5894 – No blistering, cracking, rusting or delamination of the film after 9,744 hours (29 cycles) of cyclic salt fog/UV cycling.

d. Dielectric Strength: ASTM D149 – No less than 927 V/mil dielectric strength, average of five trials.

e. Prohesion: ASTM G85 – No blistering, cracking, rusting or delamination of the film and no rust creepage at the scribe after 10,000 hours exposure.

f. Salt Spray (Fog): ASTM B117 (2 Coats Series 21) - No blistering, cracking, rusting or delamination of the film and no rust creepage at the scribe after 10,000 hours exposure.

3. Series 22 Epoxoline – Modified Polyamine Epoxy

a. Special Qualification: Meets the requirements of approval for potable water use as established by NSF Std 600 for tanks and reservoirs of 50 gallons capacity or greater (Max thickness: 50.0 mils).

b. Special Qualification: Meets the requirements set forth in AWWA C210-07 testing.

c. VOC Content: 0.10 lbs/gallon (12 grams/litre)

d. Adhesion: ASTM D4541 (Type V Tester) – No less than 1,765 psi (12.17 MPa) pull, average of three tests.

e. Cyclic Salt Fog / UV Exposure: ASTM D5894 – No rusting, blistering, cracking or delamination of film after 5,000 hours exposure.

f. Dielectric Strength: ASTM D149 – No less than 559 volts/mil dielectric strength, average of six tests.

g. Immersion: ASTM 870 – No blistering, cracking, rusting or delamination of film after 2,000 hours continuous immersion in deionized water at 140°F (60°C), average of three tests.

h. Salt Spray (Fog): ASTM B117 – No blistering, cracking, rusting or delamination of film after 10,000 hours exposure, average of two

panels.

4. Series 46H-413 Hi-Build Tneme-Tar – Polyamide Epoxy-Coal Tar:

   a. Adhesion: ASTM D4541 (Steel) – No less than 1,150 psi (7.93 MPa) pull, average of three tests.

   b. Adhesion: ASTM D4541 (Concrete) - Exceeds the cohesive strength of the concrete substrate (400 psi), average of three tests.

   c. Abrasion: ASTM D4060 (CS-17 wheel, 1,000 gram load) - No more than 142 mg loss after 1,000 cycles.

   d. Salt Spray (Fog): ASTM B117 - No blistering, cracking, checking, rusting or delamination of film. No rust creepage at scribe after 9,000 hours continuous exposure.

5. Series 61 Tneme-Liner – Cycloaliphatic Amine Epoxy:

   a. Chemical Immersion: NACE TM-01-74, Procedure B – No blistering, cracking, rusting or delamination of film after six months continuous immersion.

   b. Immersion: ASTM D870 - No blistering, cracking or delamination of film after 12 months continuous immersion in deionized water at 200°F (93°C).

6. Series N69 Hi-Build Epoxoline II – Polyamidoamine Epoxy:

   a. Adhesion: ASTM D4541 – No less than 1,943 psi (13.40 MPa) pull, average of three tests.

   b. Exterior Exposure: ASTM D1014 - No blistering, cracking, checking, rusting or delamination of film. No rust creepage at scribe after 5 years exposure.

   c. Humidity: ASTM D4585 - No blistering, cracking, checking, rusting or delamination of film after 10,000 hours exposure.

   d. Immersion: ASTM D870 - No blistering, cracking, rusting or delamination of film after 2,000 hours continuous immersion in deionized water at 140°F, average of three tests.

   e. Prohesion: ASTM G85 – No blistering, cracking, checking, rusting or delamination of film. No more than 1/8" rust creepage at scribe after 5,000 hours exposure.

   f. Salt Spray: ASTM B117 (2 Coats Series N69) - No blistering, cracking or delamination of film. No more than 1% rusting on plane. No more than 1/16" rust creepage at scribe after 6,700 hours exposure.

   g. Salt Spray: ASTM B117 (Series 90-97 with 2 Coats Series N69) - No blistering, cracking, rusting or delamination of film. No more than 1% rusting on plane. No more than 3/16" rust creepage at scribe after 20,000 hours exposure.

7. Series 90-97 Tneme-Zinc – Aromatic Zinc-Rich Urethane:

   a. Zinc Pigment: 83% by weight in dried film

b. Adhesion: ASTM D4541 (Type II) - No less than 1,516 psi (10.46 MPa) adhesion, average of three tests.

c. Adhesion: ASTM D4541 (Type V) – No less than 2,083 psi (14.36 MPa) adhesion, average of three tests.

d. Prohesion: ASTM G85 – No blistering, cracking or delamination of film. No more than 1/64" rust creepage at scribe after 15,000 hours exposure.

e. Salt Spray: ASTM B117 - No blistering, cracking or delamination of film. No more than 1/8" creepage at scribe and no more than 1% rusting on plane after 50,000 hours exposure.

8. Series 104 HS Epoxy – Cycloaliphatic Amine Epoxy:

a. Adhesion: ASTM D4541 (Steel) – No less than 900 psi (6.21 MPa) pull, average of three tests.

b. Adhesion: ASTM D4541 (Concrete) – No less than 400 psi (2.76 MPa) pull, average of three tests.

c. Chemical Immersion: NACE TM-01-74, Procedure B – No blistering, cracking or delamination of film after seven days (Contact Tnemec for complete list).

d. Salt Spray (Fog): ASTM B117 - No blistering, cracking, rusting or delamination of film. No more than 1/32" (.8 mm) rust creepage at scribe after 1,500 hours exposure.

9. Series 113 Tneme-Tufcoat – Waterborne Acrylic Epoxy:

a. Adhesion: ASTM D4541 - No less than 380 psi (2.6 MPa) pull, average of three tests (applied directly to concrete block).

b. Humidity: ASTM D2247 - No blistering, cracking or delamination after 1,000 hours exposure.

c. Scrubbability: ASTM D4213 – After 1,000 cycles, less than .8 mils (20.3 microns) removed and less than 2 units gloss change. Erosion rate of dry film less than 25 microlitres per 100 cycles.

10. Series N140 Pota-Pox Plus – Polyamidoamine Epoxy:

a. Adhesion: ASTM D4541 - No less than 1,943 psi (13.40 MPa) pull, average of three tests.

b. Exterior Exposure: ASTM D1014 - No blistering, cracking, checking, rusting or delamination of film. No rust creepage at scribe after 5 years exposure.

c. Humidity: ASTM D4585 - No blistering, cracking or delamination of film after 10,000 hours exposure.

d. Immersion: ASTM D870 - No blistering, cracking, rusting or delamination of film after 2,000 hours continuous immersion in deionized water at 140°F, average of three tests.

e. Prohesion: ASTM G85 – No blistering, cracking, checking, rusting or

delamination of film. No more than 1/8" rust creepage at scribe after 5,000 hours exposure.

f. Salt Spray (Fog): ASTM B117 (2 Coats Series N140) - No blistering, cracking or delamination of film. No more than 1% rusting on plane. No more than 1/16" rust creepage at scribe after 6,700 hours exposure.

g. Salt Spray (Fog): ASTM B117 (Series 91H_2O and 2 Coats Series N140) - No blistering, cracking, checking or delamination of film. No more than 1% rusting on plane and no more than 3/16" rust creepage at scribe after 20,000 hours exposure.

11. Series 156 Enviro-Crete – Modified Waterborne Acrylate:

a. Adhesion: ASTM D7234 – Exceeds the cohesive strength of concrete substrate (400 psi), average of three tests.

b. Fungal/Mold/Mildew Resistance: ASTM D3273 – No More than slight mold growth after five weeks exposure.

c. QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking, chalking or delamination of the film. No less than 69% gloss retention, no more than 1.1 units gloss loss, and no more than 3.59 DE (FMC-2) color change (white) after 5,000 hours QUV exposure.

d. Salt Spray: ASTM B117 - No blistering, cracking or delamination of film. No visible damage to coating or substrate after 5,000 hours.

e. Tensile Strength, Elongation, Modulus of Elasticity: ASTM D2370 - Elongation no less than 200 percent, average of five tests. Tensile strength no less than 250 psi (1.7 MPa), average of three tests.

f. Wind Driven Rain Resistance: TT-C-555B (Formerly FED TT-C-555B), Section 4.4.7.3 - No damage to coating or substrate. No visible moisture on the back of lightweight block after 48 hours exposure.

12. Series 222 Deco-Tread – Colored Quartz-Filled Modified Polyamine Epoxy:

a. Coefficient of Friction: ASTM D2047 – 1.2 static coefficient of friction, average of 12 tests.

b. Compressive Strength: ASTM C579 - 15,567 psi (107.33 MPa) compressive strength.

c. Flexural Strength and Modulus of Elasticity: ASTM D790 - No less than 2,867 psi (19.77 MPa) flexural strength and 127,876 psi (881.67 MPa) flexural modulus of elasticity, average of five tests.

d. Tensile Strength: ASTM C307 - 2,100 psi (14.5 MPa) tensile strength, average of three tests.

e. Thermal Expansion: ASTM C531 - No more than 1.85 x 10-5 linear coefficient of thermal expansion per °F, average of two rounds of six tests.

13. Series 241 Ultra-Tread MVT – Polyurethane Modified Concrete:

a. Can be applied to 10 day old concrete

b. Withstands moisture vapor transmission up to 20 lbs per ASTM F1869

c. Withstands relative humidity up to 99% per ASTM F2170

d. Adhesion: ASTM D7234 - Exceeds the cohesive strength of the concrete substrate (˜400 psi), average of three tests.

e. Compressive Strength: ASTM C579 - No less than 4,922 psi (33.94 MPa) compressive strength, average of six tests.

f. Flexural Strength and Modulus of Elasticity: ASTM C580 - No less than 2,438 psi (16.81 MPa) flexural strength and 313,614 psi (2,162 MPa) modulus of elasticity (tangent), average of five tests.

g. Tensile Strength: ASTM C307 - No less than 1,015 psi (7.00 MPa) tensile strength, average of six tests.

14. Series 257 Excellathane SS – Modified Aliphatic Polyaspartic:

a. Abrasion: ASTM D4060 (CS-17 Wheel, 1,000 grams load) – No more than 39 mg loss after 1,000 cycles with 1,000 gram load, average of three tests.

b. Hardness: ASTM D2240 – No less than 69 Shore Type D hardness, average of five tests.

c. Impact: MIL D3134 – No more than 1/16" permanent indentation. No cracking, checking or delamination of the film after 240 in-lb (27 J) direct impact, average of three tests.

d. QUV Exposure: ASTM D4587 (Over Series 700) – No blistering, cracking, chalking or delamination of the film. No less than 94% gloss retention, no more than 5.8 units gloss loss, and no more than 0.41 DE00 color change after 500 hours QUV exposure.

e. Rate of Burning: Self-extinguishing (HB Classification), average of ten tests.

f. Water Absorption: ASTM C413 – No more than a 0.0194 grams of water absorption, average of six tests.

g. Water Vapor Transmission: ASTM D1653 (Method B Wet Cup, Condition C) – No more than 7.68 g/m^2 per 24h water vapor transmission, and no more than 0.56 perms (0.37 metric perms) water vapor permeance, average of three trails.

15. Series 700 Hydroflon – Advanced Thermoset Solution Fluoropolymer:

a. Exterior Exposure: AAMA 2605 (South Florida Marine Exposure) – Exceeds the exterior weathering requirements of the American Architectural Manufacturers Association (AAMA) 2605 standard.

b. Exterior Exposure: AAMA 2604 (South Florida Marine Exposure) – Exceeds the exterior weathering requirements of the American Architectural Manufacturers Association (AAMA) 2604 standard.

c. Exterior Exposure: ASTM D4141, Method C (EMMAQUA) – No blistering, cracking, chalking or delamination. No less than 80% gloss retention and no more than 0.18 DE00 (DEHunter 0.29) color change after 5,000 MJ/m^2 of UV exposure (166,820 MJ/m^2 total).

d. QUV Exposure: ASTM D4587 - No blistering, cracking or chalking. No less than 61% gloss retention (31.4 units gloss change) and 1.89 DEFMC2 (MacAdam units) color change (white) after 25,000 hours exposure.

e. Xenon Arc Weathering: ASTM D6695 - No blistering, cracking or chalking. No less than 87% gloss retention (11.9 units gloss change) and no greater than 0.37 DE00 color change (white) after 8,000 hours Xenon Arc exposure.

16. Series 1094 Endura-Shield – Aliphatic Acrylic Polyurethane:

a. Volatile Organic Compounds (Thinned 15%): 0.80 lbs/gallon (96 grams/litre)

b. Cyclic Salt Fog / UV Exposure: ASTM D5894 – No blistering, cracking, rusting or delamination of film after 5,000 hours (15 cycles) of cyclic salt fog/UV cycling.

c. Hardness: ASTM D3363 – No less than 3B scratch hardness after 30 days cure.

d. Prohesion: ASTM G85 – No blistering, cracking, rusting or delamination of film and no rust creepage at the scribe after 3,000 hours of exposure.

e. QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking or delamination of film. No less than 80% gloss retention, no more than 16 units gloss loss and no more than 1.89 DECIE2000 color change after 4,000 hours QUV exposure

17. Series 1095 Endura-Shield – Aliphatic Acrylic Polyurethane:

a. Volatile Organic Compounds (Thinned 15%): 0.80 lbs/gallon (96 grams/litre)

b. Cyclic Salt Fog / UV Exposure: ASTM D5894 – No blistering, cracking, rusting or delamination of film or creepage at the scribe after 5,376 hours of exposure.

c. Hardness: ASTM D3363 – No gouging or scratching with an HB or less pencil.

d. Prohesion: ASTM G85 – No blistering, cracking, rusting or delamination of film after 5,000 hours exposure.

e. QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking or delamination. No less than 58% gloss retention or 15.2 units gloss change and 1.40 DECIE2000 color change (white) after 4,000 hours exposure.

18. Series 1096 Endura-Shield – Aliphatic Acrylic Polyurethane:

a. Volatile Organic Compounds (Thinned 10%): 0.69 lbs/gallon (82 grams/litre)

b. Cyclic Sale Fog/ UV Exposure: ASTM D5894 - No blistering, cracking, rusting or delamination of film after 5,000 hours (15 cycles) of cyclic salt fog/UV cycling.

c. Hardness: ASTM D3363 – No less than H scratch hardness after 30 days cure.

d. Prohesion: ASTM G85 – No blistering, cracking, rusting or delamination of film and no rust creepage at the scribe after 1,500 hours of exposure.

e. QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking or delamination of the film. No less than 57% gloss retention, no more than 3.2 units gloss loss, and no more than 1.71 DECIE 2000 color change after 5,000 hours QUV exposure.

f. Salt Spray (Fog): ASTM B117 - No blistering, cracking, rusting or delamination of film and no rust creepage at the scribe after 2,500 hours of continuous salt spray exposure.

2.04 COLORS

A. Refer to Utilities Division Color Coding guidance found in Appendix A

B. Formulate with colorants free of lead, lead compounds, or other materials which might be affected by presence of hydrogen sulfide or other gas likely to be present at the project.

C. Proprietary identification of colors if for identification only. Any authorized manufacturer may supply matches.

2.05 TESTING GAUGES

A. Furnish a magnetic type dry film thickness gauge, to test coating thickness specified in mils, as manufactured by:

1. Nordson Corp., Anaheim, CA, Mikrotest

2. Or equal

B. Furnish an electrical holiday detector, low voltage, wet sponge type to test finish coat, except zinc primer, high-build elastomeric coatings, and galvanizing, for holidays and discontinuities as manufactured by:

1. Tinker and Rasor, San Gabriel, CA, Model M-1

2. Or equal

C. Furnish a high voltage holiday detector for elastomeric coatings in excess of 25 mils dry film thickness. Unit to be as recommended by the coatings manufacturer.

2.06 PRODUCT SUBSTITUTIONS

A. Proposed product substitutions may be considered. A complete submittal by the alternate manufacturer must be received by the Engineer. To be complete, the submittal must contain the following:

1. A letter on Manufacture letterhead which explains why the proposed product substitution meets or exceeds every paragraph of this specification.
2. Manufacturer's literature for each product giving the name, generic type, descriptive information and evidence of satisfactory past performance.
3. Independent laboratory certification that their product meets or exceeds the performance criteria of the specified materials.
4. An installation list and references for a minimum of 20-years of similar applications.

PART 3 - EXECUTION

3.01 CLEANING AND PROTECTION

A. It shall be the responsibility of the Contractor to 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. Cover all electric plates, surface hardware, nameplates, gauge glasses, etc., before start of painting work.

B. At the option of the Owner during the course of this project, the Contractor will contain all spent abrasives, old paint chips, paint overspray and debris by means suitable to the Owner, including, but not limited to, full shrouding of the area.

C. If shrouding is required, the Contractor must provide a complete design of the intended shroud or cover. Care must be taken not to modify or damage the structure during the use of the shroud. If damage should occur, the Contractor is held responsible for all repairs.

D. At completion of the work, remove all paint where spilled, splashed, spattered, sprayed or smeared on all surfaces, including glass, light fixtures, hardware, equipment, painted and unpainted surfaces.

E. After completion of all painting, the Contractor shall remove from job site all painting equipment, surplus materials and debris resulting from this work.

F. The Contractor is responsible for the removal and proper disposal of all hazardous materials from the job site in accordance with Local, State and Federal requirements as outlined by the Environmental Protection Agency.

G. A notarized statement shall be presented to the Owner that all hazardous materials have been disposed of properly including, but not limited to: name of disposal company, disposal site, listing of hazardous materials, weights of all materials, cost per pound and EPA registration number.

3.02 ENVIROMENTAL CONDITIONS

A. Coatings shall not be applied in temperature exceeding the manufacturer's recommended maximum and minimum allowable, nor under adverse conditions such as dust, smoke-laden atmosphere, damp or humid weather.

3.03 PREPARATION OF SURFACES

A. All surfaces to be coated shall be prepared as specified herein and shall be dry and clean before coating. Specific surface preparation shall be specified for the individual coating systems.

B. The surface shall be cleaned as specified for the paint system being used. All cleaning shall be as outlined in the Society for Protective Coatings Surface Preparation Specification, unless otherwise noted. If surfaces are subject to contamination, other than mill scale or normal atmospheric rusting, the surfaces shall be pressure washed, and acid or caustic pH residues neutralized, in addition to the specified surface preparation.

C. Standards for Surface Preparation

1. SSPC-SP1: Solvent Cleaning: Remove all grease, oil, salt, acid, alkali, dirt, dust, wax, fat, foreign matter and contaminates, etc. by one of the following methods: steam cleaning, alkaline cleaning, or volatile solvent cleaning.

2. SSPC-SP2: Hand Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by hand chipping, scraping, sanding and wire brushing.

3. SSPC-SP3: Power Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by power tool chipping, descaling, sanding, wire brushing and grinding.

4. SSPC-SP5/NACE No.1: White Metal Blast Cleaning: Complete removal of all mill scale, rust, rust scale, previous coating, etc., leaving the surface a uniform gray-white color.

5. SSPC-SP6/NACE No.3: Commercial Blast Cleaning: Complete removal of all dirt, rust scale, mill scale, foreign matter and previous coating, etc., leaving only shadows and/or streaks caused by rust stain and mill scale oxides. At least 66% of each square inch of surface area is to be free of all visible residues, except slight discoloration.

6. SSPC-SP7/NACE No.4: Brush-Off Blast Cleaning: Removal of rust scale, loose mill scale, loose rust and loose coatings, leaving tightly-bonded mill scale, rust and previous coatings. On concrete surfaces, brush-off blast cleaning shall remove all laitance, form oils and solid contaminates. Blasting should be performed sufficiently close to the surface so as to open up surface voids, bugholes, air pockets and other subsurface irregularities, but so as not to expose underlying aggregate.

7. SSPC-SP10/NACE No.2: Near-White Blast Cleaning: Removal of all rust scale, mill scale, previous coating, etc., leaving only light stains from rust, mill scale and small specks of previous coating. At least 95% of each square inch of surface area is to be free of all visible residues and the remainder shall be limited to slight discoloration.

8. SSPC-SP11: Power Tool Cleaning to Bare Metal: Complete removal of rust, rust scale, mill scale, foreign matter and previous coatings, etc., to a standard as specified on a Commercial Grade Blast Cleaning (SSPC-SP-6, NACE-3) by means of power tools that will provide the proper degree of cleaning and surface profile.

a. SSPC-SP13/NACE No.6: Surface Preparation of Concrete: Provides requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.

9. International Concrete Restoration Institute (ICRI):
   a. ICRI 310.1R - Exposed Reinforcing bar (Rebar) Repair
   b. ICRI-CSP 1 – 10: Concrete Surface Profiles 1 through 10
10. SSPC-SP14/NACE No.8: Industrial Blast Cleaning: An industrial blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, and dirt. Traces of tightly adherent mill scale, rust, and coating residues are permitted to remain on 10% of each unit area of the surface if they are evenly distributed.
11. SSPC-SP15: Commercial Grade Power Tool Cleaning: A commercial grade power tool cleaned steel surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, rust, coating, oxides, mill scale, corrosion products, and other foreign matter, except as noted. Random staining shall be limited to no more than 33% of each unit area of surface as defined.
12. SSPC-SP16: Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steel, and Non-Ferrous Metals: brush-off blast cleaned non-ferrous metal surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, metal oxides (corrosion products), and other foreign matter. Intact, tightly adherent coating is permitted to remain. Bare metal shall have a uniform angular anchor profile of at least 0.75 mils.
13. SSPC-SP18: Thorough Spot and Sweep Blast Cleaning for Industrial Coating Maintenance: A thorough spot and sweep blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, and dirt. Areas of exposed steel shall be cleaned to near white metal level (Reference SSPC-SP10). Retained coatings shall have no visible chalk, cracks, blisters, residual corrosion staining, delamination, or other defects after the blasting, and shall be uniformly roughened. Retained existing coating shall have sufficient adhesion that it cannot be removed by lifting with a dull putty knife. No loose or lifted edges may remain.
14. Visual standards "Pictorial Surface Preparation Standards for Painting Steel Surfaces", and the National Association of Corrosion Engineer, "Blasting Cleaning Visual Standards" TM-01-70 and TM-01-75 shall be considered as standards for proper surface preparation.
15. NAPF 500-03-04:
   a. Internal Pipe Surface: When viewed without magnification, the internal surfaces shall be free of all visible dirt, dust, annealing layer, rust, mold, coatings, and other foreign matter. Random staining and tightly adhered annealing oxide residue shall be limited to no more than 5%.
   b. External Pipe Surface: When viewed without magnification, the exterior surfaces shall be free of all visible dirt, dust, loose annealing oxide, rust, mold, coatings, and other foreign matter.
16. NAPF 500-03-05: Fitting Blast Clean #2: When viewed without magnification, no more than 5% staining may remain on the surface and the exterior surfaces shall be free of all visible dirt, dust, annealing oxide, rust, mold, coatings, and other foreign matter.

17. Oil, grease, soil, dust, etc., deposited on the surface preparation that has been completed shall be removed prior to painting according to SSPC-SP1 Solvent Cleaning.

18. Weld flux, weld spatter and excessive rust scale shall be removed by Power Tool Cleaning as per SSPC-SP11-87T.

19. All weld seams, sharp protrusions, and edges shall be ground smooth prior to surface preparation or application of any coatings.

20. All areas requiring field welding shall be masked off prior to shop coating, unless waived by the Engineer.

21. All areas which require field touch-up after erection, such as welds, burn backs, and mechanically damaged areas, shall be cleaned by thorough Power Tool as specified in SSPC-SP11-87T.

22. Touch-up systems will be same as original specification except that approved manufacturer's organic zinc-rich shall be used in lieu of inorganic zinc where this system was originally used. Also strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the Engineer's attention; otherwise, Contractor assumes full responsibility.

23. Steel shall be blasted unless otherwise specified. Blasting shall be done with a centrifugal wheel or compressed air blasting equipment, using proper abrasives to attain an average profile depth of 1.5 mils. Do not re-use sand or flint abrasives. Short abrasives must be thoroughly clean of contamination before re-use. Blow dust and grit from surface with clean, dry air. Coat within 8 hours or before rust contamination occurs.

24. All concrete shall have cured for 28 days unless otherwise specified.

25. When specified, the surface shall be pretreated in accordance with the specified pretreatment prior to application of the prime coat of paint.

3.04 COATING SYSTEMS

A. Paint systems in this article are based on "MPI Manual." For renovation projects, consult "MPI Maintenance Repainting Manual" and revise paint systems accordingly.

B. Refer to Paragraph 3.03 for general surface preparation guidelines.

C. All surface preparation listed within this section is to be performed in addition to the surface preparation listed in Article 3.3.

D. General (Stripe Coating, Inaccessible Areas, Touch-Ups):

1. Surfaces that will be inaccessible after assembly shall receive either the full specified paint system or three shop coats of the specified Primer/1st Coat before assembly.

2. All edges and weld seams in immersion service shall receive a "stripe coat" (applied by brush) of the 2nd coat prior to application of the full 2nd coat.

3. All open seams in the roof area of storage tanks shall be filled after application of the final coat with a flexible sealant that is suitable for the exposure.

4. Touch-Up and Touch-Up Materials:

a. All areas which require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be prepared per the Manufacturer's latest written recommendations.

b. Strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the Owner and Manufacturer's attention. Otherwise, Contractor assumes full responsibility.

c. The Contractor shall provide, at the end of the Project, at least one (1) gallon of each generic topcoat in each color as specified by the Owner for future touch-up. Two gallons may be required for (2) component materials.

E. EXTERIOR FERROUS METAL, STEEL AND DIP – UV EXPOSED, NON-IMMERSION, ABOVE GRADE, RE-PAINT:

1. Option 1 – TNEMEC System No. 700-1: Zinc/Urethane/Fluoropolymer

a. This system must provide outstanding resistance to ultra-violet light degradation and the absolute best color and gloss retention available. This system shall have excellent resistance to abrasion and chalking, and is recommended for coastal environments and on structures where extremely long-term maintenance cycles are desired (such as elevated tanks and surfaces with custom artwork).

b. Surface Preparation: New Construction - SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile. Re-paint – Spot SSPC-SP1 and SP3, SSPC/NACE #4 for remainder.

c. Primer: Series 90-97 Tneme-Zinc @ 2.5 - 3.5 mils

d. 2nd Coat: Series N69 Hi-Build Epoxoline @ 2.0 - 6.0 mils

e. 3rd Coat: Series 1095 Endura-Shield @ 2.0 - 5.0 mils

f. 4th Coat: Series 700 Hydroflon @ 2.0 - 3.0 mils (Specify 700 for gloss, 701 for semi-gloss)

g. Total Dry Film Thickness: 8.5 - 17.5 mils

h. Minimum Dry Film Thickness: 10.0 mils

i. Note: for re-paint conditions, the above system may be reduced in accordance with the manufacturer's recommendations after inspecting the project.

2. Option 2 – PPG PSX 700

a. This system must provide outstanding resistance to ultra-violet light degradation and the absolute best color and gloss retention available. This system shall have excellent resistance to abrasion and chalking, and is recommended for coastal environments and on structures where extremely long-term maintenance cycles are desired (such as elevated tanks and surfaces with custom artwork).

b. Surface Preparation: New Construction - SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile. Re-paint – Spot SSPC-SP1 and SP3, SSPC/NACE #4 for remainder.

c. Spot-Amerilock 400 / Series 2 @ 4.0 - 6.0 mils

d. Full-Amerilock 400 / Series 2 @ 4.0 - 6.0 mils

e. PPG PSX 700 @ 3.0 - 5.0 mils

f. Colored Surface Areas - PPG PSX 700 @ 3.0 - 5.0 mils

g. Total Dry Film Thickness: 10.0-22.0 mils

h. Minimum Dry Film Thickness: 10.0 mils

i. Note: for re-paint conditions, the above system may be reduced in accordance with the manufacturer's recommendations after inspecting the project.

j.

F. EXTERIOR FERROUS METALS, STEEL AND DIP – BELOW GRADE:

1. System No. N69-1: Epoxy/Epoxy/Epoxy or Urethane

a. This system provides exceptional corrosion protection in buried environments. It offers better corrosion protection and a healthier application process than coal-tar epoxies. The 3rd coat is dependent on the exposure – for buried areas use an extra coat of high-solids epoxy, for UV-exposed, non-immersion areas use an aliphatic acrylic urethane. Series 1094 has a gloss finish. For a different sheen, apply Series 1095 (semi-gloss) or Series 1096 (eggshell) at the same thickness.

b. Surface Preparation: SSPC-SP10/NACE No. 2 Near-White Blast Cleaning with a minimum angular anchor profile of 1.5 mil

c. Shop Coat: Series N140 or Series N69 @ 2.0 – 10.0 mils

d. 2nd Coat: Series N69 Hi-Build Epoxoline @ 4.0 - 10.0 mils

e. 3rd Coat (Buried Areas Only): Series N69 Hi-Build Epoxoline @ 4.0 - 10.0 mils

f. 3rd Coat (UV Exposed, Non-immersion Areas Only): Series 1094 @ 2.5 - 5.0 mils

g. Total Dry Film Thickness: 10.0 – 30.0 mils

h. Minimum Dry Film Thickness: 11.0 mils

G. Exterior Ferrous Metals, Steel and DIP - Above Grade, Misc. Metals.

1. System No. 1094-3: Epoxy Mastic/Urethane (Overcoat)

a. This system can be used over factory finish paint or over non-sandblasted steel and offers the high performance of an epoxy/urethane system. Series 1094 has a gloss finish. For a different sheen, apply Series 1095 (semi-gloss) or Series 1096 (eggshell) at the same thickness. Note: It is recommended Tnemec be contacted for

an overcoat evaluation prior to specifying an overcoat system.

b. Surface Preparation: High Pressure Water Clean (min. 3500 psi, 3 to 5 gallons per minute, using an oscillating tip and potable water). A cleaning detergent such as Trisodium Phosphate should be used to facilitate cleaning. A degreaser may be required for oil soaked areas or heavily contaminated areas.

c. Some spot areas may require Hand Tool (SSPC-SP2), Power Tool Cleaning (SSPC-SP3), or Brush Blast (SSPC-SP7/NACE No. 4) to remove loose surface rust.

d. Existing coatings must be clean, dry, and tightly adhering prior to application of coatings.

e. Spot Prime (Areas of Bare Steel): Series 135 Chembuild @ 4.0 – 6.0 mils
f. 1st Coat: Series 135 Chembuild @ 4.0 - 6.0 mils
g. 2nd Coat: Series 1094 Endura-Shield @ 2.0 - 5.0 mils
h. Total Dry Film Thickness: 6.0 - 11.0 mils*

H. Minimum Dry Film Thickness: 7.0 mils

I. EXTERIOR FERROUS METALS, STEEL, DIP – IMMERSION, NON-POTABLE, CORROSIVE:

1. System No. 104-1: Cycloaliphatic Amine Epoxy (Non-Potable Water)

a. This system will provide chemical and corrosion resistance for protection against moisture, corrosive fumes, chemical contact and immersion in mild to moderate wastewater, such as clarifiers, chlorine contact basins, aeration basins, settling basins and other open top (aerobic) structures. Shop coat must be touched-up before second coat is applied.

b. Surface Preparation: SSPC-SP10/NACE No.2 Near-White Blast Cleaning with a minimum 1.5 mil angular anchor profile.

c. Shop Coat: Series 1 Omnithane @ 2.5 - 3.5 mils

d. 2nd Coat: Series 104 Hi-Build Epoxoline @ 6.0 - 8.0 mils

e. 3rd Coat: Series 104 Hi-Build Epoxoline @ 6.0 - 8.0 mils

f. Total Dry Film Thickness: 14.5 - 19.5 mils

g. Minimum Dry Film Thickness: 15.5 mils

h. Allow Series 104 to cure for 7 days at 75°F prior to immersion service.

J. FERROUS METALS, STEEL, DIP – IMMERSION, POTABLE WATER

2. System No. 21-1: Polyamide Epoxy (Potable Water)

a. This system meets American Water Works Association AWWA D 102 Inside Coating System Number 5. Series 21 meets the requirements of approval for potable water use as established by NSF Std 600 for tanks and reservoirs of 20,000

gallons capacity or greater.

b. Surface Preparation: SSPC-SP10/NACE No.2 Near-White Blast Cleaning with a minimum angular anchor profile of 2.0 mils.

c. Shop Coat: Series 94H_2O Hydro-Zinc @ 2.5 – 3.5 mils
d. Stripe Coat (Weld Seams and Edges): Apply Series 21 by brush
e. 2nd Coat: Series 21 Epoxoline @ 6.0 - 10.0 mils
f. 3rd Coat: Series 21 Epoxoline @ 6.0 - 10.0 mils
g. Total Dry Film Thickness*: 14.5 - 23.5 mils**
h. Minimum Dry Film Thickness: 16.0 mils

i. *Total Dry Film Thickness excludes stripe coat
j. **In order to maintain NSF Std. 600 approval, maximum Series 21 DFT is 20 mils.

K. Allow Series 21 to cure for 7 days at 75°F prior to service.

L. EXTERIOR CONCRETE & MASONRY – ABOVE GRADE, UV-EXPOSED (NON-IMMERSION):

1. System No. 156-1: Modified Waterborne Acrylate (Elastomeric)

a. This system provides a breathable elastomeric with exceptional elongation for spanning hairline cracks in concrete structures. It also provides mold & mildew resistance, as well as wind-driven rain resistance. If a textured finish is preferred, use 157 Enviro-Crete TX (medium texture) @ 6.0 – 9.0 mils dry film thickness per coat.

b. Existing Conditions: Prior to coating, bare concrete shall have a "broom" or "rubbed" finish and be free of bugholes. If necessary, apply Tnemec Series 218 in accordance with the manufacturer's recommendations to achieve this finish.

c. Surface Preparation: Allow concrete to cure for 28 days. Surface must be clean and dry.

d. Block Filler (CMU only): 1254 Epoxoblock @ 100 – 150 ft^2/Gallon

e. 1st Coat: Series 156 Enviro-Crete @ 4.0 - 8.0 mils

f. 2nd Coat: Series 156 Enviro-Crete @ 4.0 - 8.0 mils

g. Total Dry Film Thickness: 8.0 - 16.0 mils

h. Minimum Dry Film Thickness: 10.0 mils

M. EXTERIOR CONCRETE & MASONRY – EXTERIOR, BELOW GRADE:

a. System No. 46H-413-3: Polyamide Epoxy-Coal Tar

b. This system provides a high-build coating for underground conditions.

c. Surface Preparation: Allow new concrete to cure for 28 days. Surface shall be clean and dry.

d. One or Two Coats: 46H-413 Hi-Build Tneme-Tar

e. Total Dry Film Thickness: 16.0 - 20.0 mils*

N. INTERIOR CONCRETE & MASONRY – NON-IMMERSION:

1. System No. 113-1: Acrylic-Epoxy

a. This system will provide high performance and can be applied directly over existing coatings without lifting. Can be used when low odor is required during application. Note: Series 113 has a Satin finish. For a gloss finish, specify Series 114 Tneme-Tufcoat.

b. Existing Conditions: Prior to coating, bare concrete shall have a "broom" or "rubbed" finish and be free of bugholes. If necessary, apply Tnemec Series 218 in accordance with the manufacturer's recommendations to achieve this finish.

c. Surface Preparation: Allow new concrete and masonry to cure for 28 days. Surface must be clean and dry.

d. Block Filler (CMU only): Series 1254 Epoxoblock WB @ 100 – 150 ft^2/Gallon

e. 1st Coat: 113 Tneme-Tufcoat @ 4.0 – 6.0 mils

f. 2nd Coat: 113 Tneme-Tufcoat @ 4.0 – 6.0 mils

g. Total Dry Film Thickness: 8.0 - 12.0 mils

h. Minimum Dry Film Thickness: 9.0 mils

O. EXTERIOR CONCRETE & MASONRY – IMMERSION, NON-POTABLE:

1. System No. 104-3: Cycloaliphatic Amine Epoxy (Non-Potable Water)

a. This system will provide chemical and corrosion resistance for protection against abrasion, moisture, corrosive fumes, chemical contact and immersion in mild to moderate Wastewater, such as clarifiers, chlorine contact basins, aeration basins, settling basins and other open top (aerobic) structures.

b. Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater on vertical surfaces, and an ICRI-CSP 3-5 surface profile on horizontal surfaces.

c. Surfacer / Patcher: Apply Tnemec Series 218 to all vertical surfaces at a minimum of 1/16" and as needed to bring all surfaces (vertical and horizontal) to level. Series 218 is to re-surface concrete, fill voids and bugholes, mitigate concrete outgassing, and to create a monolithic, paintable surface.

d. 1st Coat: Series 104 H.S. Epoxy (backrolled) @ 6.0 - 8.0 mils

e. 2nd Coat: Series 104 H.S. Epoxy @ 6.0 - 8.0 mils

f. 3rd Coat: Series 104 H.S. Epoxy @ 6.0 - 8.0 mils

g. Total Dry Film Thickness: 18.0 - 24.0 mils

h. Minimum Dry Film Thickness: 20.0 mils

i. Allow Series 104 to cure for 7 days at 75°F prior to immersion service.

P. EXTERIOR CONCRETE & MASONRY – IMMERSION, POTABLE:

1. System No. 21-2: Polyamide Epoxy (Potable Water)

a. This system meets American Water Works Association AWWA D 102 Inside Coating System No. 1. Series 21 meets the requirements of approval for potable water use as established by NSF Std 600 for tanks and reservoirs of 20,000 gallons capacity or greater.

b. Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater on vertical surfaces, and an ICRI-CSP 3-5 surface profile on horizontal surfaces.

c. Surfacer / Patcher: Apply Tnemec Series 218 to all vertical surfaces at a minimum of 1/16" and as needed to bring all surfaces (vertical and horizontal) to level. Series 218 is to re-surface concrete, fill voids and bugholes, mitigate concrete outgassing, and to create a monolithic, paintable surface.

d. 1st Coat: Series 21 @ 6.0 - 10.0 mils

e. 2nd Coat: Series 21 @ 6.0 - 10.0 mils

f. Total Dry Film Thickness: 12.0 - 20.0 mils*

g. Minimum Dry Film Thickness: 13.0 mils

h. *In order to maintain NSF Std. 600 approval, maximum allowable DFT is 20 mils. Allow Series 21 to cure for 7 days at 75°F prior to service

Q. INTERIOR CONCRETE FLOORS (RESINOUS FLOORING SYSTEMS):

1. System No. 222-1: Decorative Quartz Flooring (Decorative Non-Slip, Interior)

a. This system provides a decorative, chemical, abrasion, impact resistant, non-slip, seamless flooring system with a moisture mitigating base coat that resists up to 20 lbs of moisture vapor pressure, 99% relative humidity, and can be applied on 10-day old concrete. This floor utilizes clear resins, allowing for visibility of the quartz or other aggregate. For a solid-color floor, tint the 2nd and 3rd coats with Series 820 field tint.

b. Surface Preparation: Allow new concrete to cure for 10 days. Mechanically abrade in accordance with NACE No.6/SSPC-SP13 to provide a minimum surface profile equal to ICRI-CSP4-5.

c. 1st Coat: 241 Ultra-Tread MVT @ 70 ft^2 per small kit. Broadcast 1st Coat with Quartz or aggregate of choice.

d. 2nd Coat: 222 Deco-Tread @ 1/16", or about 80 ft^2 / gallon. Broadcast 2nd Coat with Quartz or aggregate of choice.

e. 3rd Coat: 257 Excellathane SS (clear) @ 8.0 - 16.0 mils, or 100-201 ft^2 / gallon

f. Minimum Dry Film Thickness: 1/8"

3.05 APPLICATION

A. Paint shall be applied only on thoroughly dry surfaces and during periods of favorable weather, unless otherwise allowed by the paint manufacturer. Except as provided below, painting shall not be permitted when the atmospheric temperature is below 50° F, or when freshly painted surfaces may be damaged by rain, fog, dust, or condensation, and/or when it can be anticipated that these conditions will prevail during the drying period.

B. No coatings shall be applied unless surface temperature is a minimum of 5° above dew point; temperature must be maintained during curing.

C. 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. 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 Vol. 1, Chapter 4, "Practical Aspects, Use and Application of Paints" and/or with manufacturer's recommendations.

D. Catalysts or thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction.

E. No coatings shall be applied unless the relative humidity is below 85%.

F. Suitable enclosures to permit painting during inclement weather may be used if provisions are made to control atmospheric conditions artificially inside the enclosure, within limits suitable for painting throughout the painting operations.

G. Field Painting in the immediate vicinity of, or on, energized electrical and rotating equipment, and equipment and/or pipes in service shall not be performed without the approval of the Engineer.

H. Extreme care shall be exercised in the painting of all operable equipment, such as valves, electric motors, etc., so that the proper functioning of the equipment will not be affected.

I. The Contractor's scaffolding shall be erected, maintained, and dismantled without damage to structures, machinery, equipment or pipe.

J. Drop cloths shall be used where required to protect buildings and equipment. All surfaces required to be clear for visual observations shall be cleaned immediately after paint application.

K. Painting shall not be performed on insulated pipe within three (3) feet of insulation operations or on insulation who's covering and surface coat have not had time to set and dry.

L. Painting shall not be performed on uninsulated pipe within one (1) foot of any type

of connection until the connection has been made, except as directed by the Engineer.

M. The prime coat shall be applied immediately following surface preparation and in no case later than the same working day.

N. All paint shall be applied by brushing, paint mitt and roller, conventional spraying, or airless spraying, using equipment approved by the paint manufacturer.

O. Each coat of paint shall be recoated as per manufacturer's instructions. Paint shall be considered re-coatable when an additional coat can be applied without any detrimental film irregularities such as lifting or loss of adhesion.

P. Surfaces that will be inaccessible after assembly shall receive either the full specified paint system or three shop coats of the specified primer before assembly.

Q. Finish colors shall be in accordance with the COLOR SCHEDULE and shall be factory mixed (i.e., there shall be no tinting by the Contractor, unless authorized by the Engineer).

R. All edges and weld seams in immersion service shall receive a "stripe coat" (applied by brush) of the 1st coat prior to application of the full 1st coat.

S. All open seams in the roof area of tanks shall be filled after application of the topcoat with a flexible caulking such as Sika Flex 1A.

T. Top quality, properly styled brushes and rollers shall be used. Rollers with a baked phenol core shall be utilized.

U. The brushing or rolling shall be done so that a smooth coat as nearly uniform in thickness as possible is obtained. Brush or roller strokes shall be made to smooth the film without leaving deep or detrimental marks.

V. Surfaces not accessible to brushes or rollers may be painted by spray, by dauber or sheepskins, and paint mitt.

W. It may require 2 coats to achieve the specified dry film thickness if application is by brush and roller.

X. The equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the paint to be applied and shall be equipped with suitable pressure regulators and gauges.

Y. Paint shall be applied in a uniform layer, with a 50% overlap pattern. All runs and sags should be brushed out immediately or the paint shall be removed and the surface resprayed.

Z. High build coatings should be applied by a crosshatch method of spray application to ensure proper film thickness of the coating.

AA. Areas inaccessible to spray shall be brushed; if also inaccessible to brush, daubs or sheepskins shall be used, as authorized by the manufacturer.

BB. Special care shall be taken with thinners and paint temperatures so that paint of the correct formula reaches the receiving surface.

CC. Nozzles, tips, etc., shall be of sizes and designs as recommended by the manufacturer of the paint being sprayed.

DD. The first coat on concrete surfaces in immersion service should be sprayed and back

rolled.

3.06 UNIDENTIFIED SURFACES

Any surfaces not specifically named in the schedule and not specifically accepted shall be prepared, primed and coated in the manner and with material consistent with these Specifications. The Engineer shall select which of the manufacturer's products, whether the type is indicated herein or not, shall be used for such unnamed surfaces. The painting shall be done within the scope of the contract.

3.07 WORKMANSHIP

A. On metal surfaces apply each coat of paint at the rate specified by the manufacturer to achieve the minimum dry mil thickness required. If material has thickened or must be diluted for application by spray gun, the coating shall built up to the same film thickness achieved with undiluted material. One gallon of paint as originally furnished by the manufacturer shall not cover a greater area when applied by spray gun than when applied unthinned by the application of an additional coat(s). On masonry, application rates will vary according to surface texture; however, in no case shall the manufacturer's stated coverage rate be exceeded. On porous surfaces, it shall be the painter's responsibility to achieve a protective and decorative finish either by decreasing the coverage rate or applying additional coats of paint.

B. All safety equipment shall be painted in accordance with OSHA Standards as approved.

C. Materials shall be mixed in proper containers of adequate capacity. All materials shall be thoroughly stirred before use and shall be kept stirred while using. No unauthorized thinners or other materials shall be added to any paint.

D. Only skilled painters shall be used on the work and specialists shall be employed where required.

E. Steel members, metal castings, mechanical and electrical equipment and other metals which are shop primed before deliver at the site will not require a prime coat on the job. All piping and other bare metals to be painted shall receive one coat of primer before exposure to the weather, and this prime coat shall be the first coat as specified in the painting schedule.

F. Finish surfaces shall not show brush marks or other irregularities. Undercoats shall be thoroughly and uniformly sanded with No. 00 sandpaper or equal to remove defects and provide a smooth, even surface.

G. Before final acceptance of the work, all damaged surfaces of coating shall be cleaned and repainted as directed by the Engineer.

3.08 CLEANUP

A. It shall be the responsibility of the Contractor to collect and dispose of property, all waste materials from the site in accordance with all requirements of the Federal, state, and local environment protection agencies.

B. At completion of the work, remove all paint where it has been spilled, splashed, splattered, sprayed, or smeared on all surfaces, including glass, light fixtures, hardware, equipments, painted and unpainted surfaces.

C. It shall be the responsibility of the Contractor to 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. Cover all electric plates, surface hardware, nameplates, gauge glasses, etc., before start of painting work.

D. At the option of the Engineer during the course of this project, the Contractor will contain all spent abrasives, old paint chips, paint overspray and debris by means suitable to the Engineer, including but not limited to, full shrouding of the area.

E. If shrouding is required, the Contractor must provide a complete design of the intended shroud or cover. Care must be taken not to modify or damage the structure during the use of the shroud. If damage should occur, the Contractor is held responsible for all repairs.

F. 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.

G. After completion of all painting, the Contractor shall remove from job site all painting equipment, surplus materials, and debris resulting from this work.

H. The Contractor is responsible for the removal and proper disposal of all hazardous materials from the jobsite in accordance with Local, State, and Federal requirements as outlined by the Environmental Protection Agency.

I. A notarized statement shall be presented to the Engineer that all hazardous materials have been disposed of properly including but not limited to: name of Disposal Company, disposal site, listing of hazardous materials, weights of all materials, cost per pound and EPA registration number.

3.09 TOUCH-UP MATERIALS

A. The Contractor shall provide at the end of the project at least one (1) gallon of each generic topcoat in each color as specified by the Engineer for future touch-up. Two gallons may be required for (2) component materials.

3.10 MANUFACTURER'S SERVICE

Furnish paint manufacturer representative to visit job site at intervals during surface preparation and painting as may be required for product application quality assurance, and to determine compliance with manufacturer's instructions and these specifications, and as may be necessary to resolve field problems attributable to, or associated with, manufacturer's products furnished under this Contract.

COATING SYSTEM DATA SHEET

(to be included with submittal)

Coating System Number (From Spec): _____

Coating System Title (From Spec): _____

Coating Supplier Name & Address: _____

_____

_____

Local Representative Name & Address: _____

_____

Manufacturer Representative Authorized to

Certify Proper Installation Name & Address: _____

_____

Surface Preparation: _____

_____

Coating Materia (Generic)	Product Number/Nam e (Proprietary)	Coats/Minimu m Coverag e	Colo

Notes:

_____

_____

_____

_____

SECTION 11300

RAS/WAS FLOW SPLITTER BOX

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required and install, complete, ready for operation and field-tested one Return Activated Sludge/Waste Activated Sludge (RAS/WAS) Flow Splitter Box as depicted in the Drawings and specified herein.

B. The RAS/WAS Flow Splitter Box shall be designed to meet the operational functionality and capacity of the existing Unit #1 Model R Oxigest BNR (Biological Nutrient Removal) Treatment system as manufactured by Smith and Loveless.

C. The existing Unit #1 has an average daily treatment capacity of 1.5 million gallons per day and a peak flow capacity of 3.0 million gallons per day.

D. The RAS/WAS Flow Splitter Box shall be furnished with a plug valve and electric actuator, a V-notch weir and flow sensor.

1.02 RELATED WORK

A. Section 13300 – Instrumentation and Controls

B. Section 15100 – Valves and Appurtenances

C. Section 15010 – RAS/WAS Actuator

D. Section 16001 – General Electrical Requirements

1.03 DESCRIPTION OF SYSTEM

A. The RAS/WAS Flow Splitter Box shall be designed to be robust and reliable, capable of withstanding the demands of continuous operation and the potential for variations in sludge volume and consistency and able to handle large capacities and high-strength domestic waste.

B. The RAS/WAS Flow Splitter Box shall be Model R Oxigest by Smith and Loveless. No exceptions permitted.

1.04 QUALIFICATIONS

A. The equipment shall be manufactured of new materials designed, constructed, and installed in accordance with the best practices and methods and shall comply with all of these specifications.

B. The manufacturer shall have a minimum of ten (10) years experience and have an installation list of a minimum of ten (10) similar wastewater applications.

C. Submit to the Engineer for review, a copy of the credentials for the firm that will be removing, installing the RAS/WAS Flow Splitter Box. Key personnel who will be installing the RAS/WAS Flow Splitter Box shall have installed a minimum of five (5) similar units.

PART 2 - MATERIALS

2.01 RAS/WAS FLOW SPLITTER BOX

A. The RAS/WAS Flow Splitter Box shall be provided and installed atop the existing tankage construction.

B. The RAS/WAS Flow Splitter Box shall be built to adhere to AWWA standards.

C. The RAS/WAS Flow Splitter Box shall be provided with a single flanged connection to and accept flow from the existing RAS/WAS airlift.

D. The fabricated portions of the flow splitter box shall be constructed of ¼" 316 Stainless Steel

E. Flow to the splitter box shall be split into two (2) directions to opposite ends of the splitter box and pass through a single v-notch weir on either side.

F. Flow to either side of the splitter box shall be manually controlled by a swing gate internal to the splitter box with hinges integral to the box construction.

G. The slitter box shall be sized to accept a flow appropriate to the WWTU #1 design capacities to the inlet such that turbulence in flows to both or either outlet is minimized.

H. Overall outside dimensions of the RAS/WAS Flow Splitter Box shall not exceed 12' x 4' x 4' (L x W x H).

I. The RAS/WAS Flow Splitter Box shall be fully enclosed with top and sidewalls. Access to the splitter box inside shall be available through a hinged lid in the box top at either end of the box.

J. The box shall come equipment with One (1) 2" threaded coupling connection on the top and one open 4" through hole on the top for mounting optical water level measuring device.

2.02 FLOW MEARUREMENT

A. The RAS/WAS Flow Splitter Box shall have a 90 degree v-notch weir for flow measurement.

B. The Contractor shall install the flow measurement device in accordance with the Manufactures instruction, Drawings and Section 13300 of these Specifications.

2.03 RAS/WAS VALVE REPLACEMENT

A. The RAS/WAS Flow Splitter Box shall be fitted with a new RAS/WAS valve and MOV Actuator. Refer to Section 15011.

PART 3 - EXECUTION

3.01 MANUFACTURER SERVICES

A. The Manufacturer shall provide the services of a factory-trained representative for a maximum period of one (1) day on-site to verify all dimensions, capacities, tie-ins, structural support. etc. prior to fabrication to ensure a complete working system.

B. The Manufacture shall provide the services of a factory-trained representative for a maximum period of 2-days on-site to assist with the initial startup, and to instruct the Owner's operating personnel in the operation and maintenance of the equipment.

C. Failure caused by the design, manufacture or installation which necessitates additional time of the factory-trained representative shall be provided at no cost to the Owner.

D. Prior to Owner Acceptance, the Manufacture shall provide a letter of certification to the Owner stating that the installation is correct, complete and ready for operation.

3.02 INSTALLATION

A. The contractor shall reinstall the RAS/WAS Flow Splitter Box to the specifications of the Manufacturer to ensure a complete and properly working system.

B. Any structural modifications to the existing steel support structure shall be included.

3.03 TESTING

A. The contractor shall coordinate with the factory-trained representative to ensure a complete and properly working system to the Owners satisfaction.

3.04 WARRANTY

A. The clarifier drive and gear shall be warrantied for materials, manufacture defects and installation one year from the date of Owner Acceptance.

END OF SECTION

Attachment E

SECTION 11439

FINE BUBBLE DIFFUSED AERATION EQUIPMENT

PART 1 - GENERAL

1.01 THE REQUIREMENT

A. The Contractor shall furnish all labor, materials, tools and equipment necessary for demolition and removal of the existing fine bubble membrane diffused aeration equipment including diffusers, manifolds, diffuser header pipes, supports, purge systems, and related items in the existing Package Plant No. 1 as specified herein. Unless anchoring devices are noted to remain following demolition, the Contractor shall remove and/or burn back anchors to ½-inch minimum below the surface and plug all anchor bolt holes with epoxy resin binder. If anchoring devices are stainless steel, then the anchors may be cut and removed to the top of concrete surface without applying epoxy resin binder.

B. The Contractor shall furnish all labor, materials, tools and equipment necessary for supply, installation, testing, and placing into satisfactory operation new fine bubble membrane diffused aeration equipment including stainless steel to PVC transition coupling, PVC manifold and distributor pipes, diffuser holders, diffusers, stainless steel supports, purge systems, and related items in the Contact zone and Secondary Aeration zone within the existing Package Plant No. 1 as specified herein.

C. The diffused aeration equipment shall be provided complete with all accessories, special tools, spare parts, mountings, anchor bolts, and other appurtenances as specified and as may be required for a complete and operational installation. All diffusers shall be installed to within 1/8-inch of the same elevation in all tanks. All air piping, tees, expansion fittings, manifolds, diffuser header pipes, purge systems, supports, diffusers, diffuser elements, orifice plugs, and all other necessary equipment shall be supplied new by the Manufacturer. All diffuser membranes shall be manufactured by the same supplier and at the same location to ensure similar properties for all membrane diffusers to be installed.

D. The membrane diffused aeration equipment shall be supplied by Sanitaire (Xylem) or Aquarius Technologies LLC. Being named in this specification does not exempt the Manufacturer from meeting the performance requirements specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Division 01 – General Requirements

1.03 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Shall be as specified in Section 01030 – References.

1.04 SUBMITTALS

A. The Contractor shall submit Shop Drawings, Operation and Maintenance Manuals and other information as specified in accordance with Section 01320 – Submittals. Shop Drawings shall include complete erection, installation, and adjustment instructions and recommendations. Detailed layout drawings for the diffused aeration system in the Contact zone and Secondary Aeration zone shall be based on existing tank dimensions, floor slab elevations, and obstructions as field verified by the Contractor.

After the tank is emptied, The Contractor shall measure floor slab elevations at a minimum of eight (8) locations in each tank to confirm the floor slab elevations shown in the Contract Drawings. The Contractor shall field verify existing tank dimensions and locations of all obstructions, including but not limited to: columns, walls, piping, supports, and drain sumps. The Contractor shall provide field verified information to the Manufacturer before Shop Drawings are prepared and submitted.

B. The Manufacturer shall guarantee the oxygen transfer efficiency of the equipment. Certified oxygen transfer efficiency and headloss curves shall be submitted for identical diffusers based on previous testing conducted in accordance with the latest revision of ASCE Standards for the design submergence and range of operating airflows specified herein.

C. The Manufacturer shall submit Quality Assurance / Quality Control documentation for the manufacturing process of the diffused aeration system including the membrane diffusers themselves. Protocols detailing primer and solvent storage and application, including torque and impact testing to ensure proper pod to pipe attachment shall be included. Details of the method of attachment of the holder to the distributor piping shall be included.

D. The Manufacturer shall submit a performance guarantee and one (1) year warranty as specified herein.

E. The Manufacturer's installation instructions shall be submitted prior to shipment of the diffuser equipment. Installation and storage instructions shall be complete and shall include anchoring, leveling, fastening, inspection, provisions for expansion/contraction, and additional instructions as required.

1.05 SERVICES OF MANUFACTURER'S REPRESENTATIVE

A. The Contractor shall arrange for the Manufacturer to furnish the services of a qualified technical representative with at least three years of experience, who is regularly involved in the inspection, installation, startup, testing, operation, and maintenance of fine bubble aeration systems. The Manufacturer's technical representative(s) shall:

1. Witness installation procedures and check installation. The Contractor shall conduct all field tests described in Paragraph 3.02 including a pull test for each anchor bolt.

2. Witness and check operation at startup.

3. Assist the Contractor in performing field testing and preparing a written report as specified below.

4. Troubleshoot, document, and correct any equipment problems that are noted during initial operation.

5. Submit written certification signed by the Manufacturer's technical representative(s) and a Manufacturer's corporate officer, Vice President or higher, that the system has been properly installed, tested, and adjusted and that the system operates as required, including dates of field tests and a listing of all persons present during the tests.

6. Investigate and correct any equipment problems that may arise during the warranty period of the equipment.

7. Instruct the Owner's personnel in proper operation and maintenance of the equipment.

B. Such services shall be furnished at no additional cost to the Owner and shall entail a period of not less than two days and a minimum of two site visits.

C. The times specified 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. Any additional time required to achieve successful installation and operation shall be at the expense of the Contractor.

E. The Manufacturer's representative shall sign in and out at the Engineer's Field Office on each day and shall comply with Owner requirements for visiting the site.

F. A written report covering the representative's findings and installation approval shall be submitted to the Engineer covering all inspections and outlining in detail any deficiencies noted.

1.06 QUALITY ASSURANCE

A. The materials covered by these Specifications are intended to be standard equipment of proven reliability and as manufactured by reputable manufacturers having experience in the production of such equipment.

B. The equipment furnished shall be designed, constructed, and installed in accordance with the best practices and methods and shall operate satisfactorily when installed as operated per the Manufacturer's recommendations.

C. All material shall be new and both workmanship and materials shall be of the very best quality, totally suitable for use with compressed air for the service conditions indicated in the Contract Documents.

D. All components of the fine bubble diffuser system shall have been used successfully by the Manufacturer in previous installations. The Manufacturer shall note any new or changed components on the submittal documents for Engineer approval.

E. Design of support systems, system for expansion and contraction, and diffuser assemblies shall be the full undivided responsibility of the equipment manufacturer. Layout of the equipment in the reactor shall be the responsibility of the equipment Manufacturer and shall meet the equipment requirements specified herein.

F. The diffuser system including but not limited to manifolds, distributors, and supports shall be designed to resist all forces imparted by mixing equipment, pumps, internal flows (including but not limited to influent, and return activated sludge (RAS)) and other forces that may be present during basin operation. Design of supports for forces including those generated by operating blowers and pumps shall be the responsibility of the diffused aeration system Manufacturer. Additional cross bracing and/or struts shall be furnished by the diffused aeration system Manufacturer and installed by the Contractor where necessary. The Contractor shall coordinate between the mixer, pump and diffused aeration equipment manufacturers to ensure that the diffuser supports are fully compatible with and adequate clearances are provided for the selected mixing or pumping equipment. Clearances between diffused aeration equipment and mixers, pumps, and/or piping shall be included in the shop drawings submitted by the diffused aeration equipment Manufacturer.

G. The system for expansion and contraction and all diffuser system components shall be designed for a temperature range of a minimum of 10°F (diffuser distributor out of service and exposed) to a maximum of 140°F (diffuser in operation with limited submergence of the diffusers).

H. All materials shall be compatible with a continuous maximum air temperature condition of 220°F at the top of the aeration drop pipe over the full range of diffuser flow rates at design submergence and a maximum wastewater temperature of 92°F. Additionally, all materials shall be compatible with a continuous maximum air temperature condition of 220°F at the top of the aeration drop pipe assuming a minimum water level of 36 inches above the transition from stainless steel to PVC and an airflow rate of 0.5 scfm per diffuser. The Manufacturer shall provide stainless steel cooling loops if necessary to reduce air temperature to prevent damage to the diffused aeration system specified herein.

I. The membrane fine bubble aeration system shall be supplied as a complete system from a single manufacturer.

1.07 HANDLING AND STORAGE

A. Special care shall be exercised during delivery, handling, and storage of equipment and material to prevent damage, degradation of materials, and fouling. Delivery shall be scheduled by the Contractor to minimize time materials are stored on site. Materials shall not be stored on site for more than 90 days. In the event the storage time exceeds 90 days, the Owner can require storage in a bonded, climate-controlled facility at no expense to the Owner.

B. Delivery, handling, and storage of the piping and equipment shall be in accordance with Manufacturer's recommendations and as specified in Division 01 – General Requirements.

C. All PVC piping, diffuser holders and membrane diffusers shall be completely protected from exposure to sunlight by storage indoors or under a canopy. Storage under tarps or plastic is not permitted to avoid exposing equipment to high temperatures.

D. All parts of the air diffusion equipment shall be shipped to the job site adequately palletized and protected from breakage and dirt.

E. All PVC and stainless steel piping shall be crated and supported in a wood framework. All loose fittings, pipe supports, etc., shall be adequately boxed and palletized. All equipment shall remain palletized and boxed until the time of installation.

1.08 WARRANTY AND GUARANTEE

A. The membrane material shall be proven to be effective in fine bubble aeration applications with at least five installations with not less than three years' experience each of satisfactory performance. The Manufacturer shall provide a list of successful applications with contact information in the equipment submittal. Materials/diffusers that do not comply with performance history requirements will not be accepted.

B. If any materials are found to be defective within one year of the date when the diffused aeration equipment is placed into service, the Manufacturer shall pay all labor and materials costs for removal of the defective materials and replacement with satisfactory materials. Defective materials shall include improperly assembled

diffuser distributor. The Manufacturer shall provide all labor and material to replace the header pipes where there is separation or leaks between the diffuser holder and header piping. If within one year after the date diffused aeration equipment is placed in service, installation is found to be unsatisfactory, installation shall be redone by the Contractor at no additional cost to the Owner. Unsatisfactory installation shall include improperly installed anchor bolts that cause piping to become unattached and to separate resulting in leaks. The warranty period of one year will extend from the date that equipment is placed into service or after correction of defective installation.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Aeration Tanks

1. The membrane fine bubble diffuser system shall be used in the activated sludge process to transfer oxygen into mixed liquor. Methanol, ethanol, acetic acid, sodium acetate, corn syrup, glycerol, Micro-C™, anionic polymer, cationic polymer, solids recycle streams, sodium hypochlorite, alum, ferric chloride, polyaluminate chlorides, sodium aluminate, and fats, oils and grease may also be present in any stage of the aeration zones. The list of possible constituents in the wastewater is not limited to this list. The system manufacturer shall ensure that all materials are compatible with these and other potential constituents found in wastewater.

2. The system Manufacturer shall guarantee diffuser system performance for specified transfer efficiency and headloss.

3. The diffusers and diffuser system shall operate efficiently and effectively over the range of 0.5 to 3.0 scfm per diffuser.

4. Membrane diffuser transfer efficiency and top of drop leg pressure requirements at 14.25 feet of diffuser submergence at various diffuser airflow rates and the specified diffuser densities, expressed as tank surface area / total diffuser area (AT/AD), shall be as follows:

Airflow/Diffuser (scfm)	Maximum Pressure Drop from the Top of Drop Pipe including Diffuser and Orifice (psig)	Minimum Standard Oxygen Transfer Efficiency (%) for Contact Zone AT/AD = 8.84	Minimum Standard Oxygen Transfer Efficiency (%) for Secondary Aeration Zone AT/AD =12.15
0.50	6.98	30.6	30.2
1.25	7.26	27.6	27.2
2.25	7.68	25.9	25.5
3.0	8.02	25.1	24.6

5. Standard oxygen transfer efficiency shall be based on a liquid temperature of 20°C, oxygen saturation value and transfer characteristic (KLa) equal to that of clean tap water at 20°C, and initial dissolved oxygen concentration of zero mg/l, an alpha factor of 1.0, a beta factor of 1.0, and a temperature correction factor (theta) of 1.024.

6. No tolerance shall be allowed for required minimum oxygen transfer efficiency. Tolerance for measured headloss shall be -15 percent and +10 percent.

7. The Manufacturer shall provide control orifices sized for the required headloss.

8. The Contractor shall field verify the elevation of the tank floors and the dimensions in each tank prior to installation of the diffusers and notify the Engineer if the tank floor elevations or tank dimensions deviate from what is shown on the Contract Drawings. The Contractor shall schedule submittal of Shop Drawings for diffused aeration equipment after field verification of tank dimensions such that diffusers are laid out based on actual tank dimensions.

2.02 EQUIPMENT REQUIREMENTS

A. Layout of blank diffusers in the diffuser grid shall be submitted for Engineer review and shall provide as uniform a pattern of active diffusers as possible.

B. The Contractor shall furnish a complete membrane fine bubble aeration system in each of the Aeration Tanks. The Contractor shall furnish manifolds, diffuser distributor, diffuser saddles and diffusers in the tanks as follows:

Parameter	**Plant No. 1**	
	Contact Zone	**Secondary Aeration Zone**
Number of Grids of this Type	2	2
Approximate Zone Area (ft^2t)	1,753	3,080
Existing Drop Pipe[1] Diameter (inch)	6	6
Manifold Diameter (inch)	6	6
Distributor Diameter (inch)	4	4
Number of Rows (Minimum)	15	10
Total Diffuser Saddles per Basin	460	588

1. Existing stainless steel drop pipes to be reused.

2.03 MATERIALS OF CONSTRUCTION

A. All PVC pipe and fittings shall be manufactured from PVC compound with a tensile strength of 7,000 psi.

B. PVC resins shall be blended with fillers to achieve a minimum “K” value of 58 for fittings and a minimum “K” value of 64 for pipe.

C. PVC material for air manifold and distribution piping, diffuser element holders, and retainer rings shall be provided with a minimum 1.5% titanium dioxide (TiO_2) content to resist ultraviolet (UV) light degradation.

D. All PVC pipe shall perform satisfactorily when subjected to 130°F mean wall temperatures on a long-term continuous basis.

E. All solvent welding shall be completed prior to shipment to the site; no field solvent welding shall be allowed except for moisture blow-off piping, the connection of the PVC portion of the drop leg to the manifold, and minor repair of leaking joints.

1. Components that require minor solvent welding to repair leaking joints shall be removed from the wet environment, solvent welded, and be allowed to fully cure before reinstallation and testing. Components requiring extensive repair, as determined at the discretion of the Engineer/Owner, shall be replaced in their entirety. If the number of solvent weld leaks is found to be extensive, as determined at the discretion of the Engineer/Owner, all affected components shall be replaced in their entirety.

F. Layout of piping around any obstructions shall be submitted for Engineer review.

G. Solvent welds shall be factory assembled in accordance with ASTM 2855 and tested prior to shipment. Diffuser holders shall be factory solvent welded and ultrasonically staked to the pipe to maximize adhesion. Solvent welds shall be accomplished with solvent cements specifically formulated for use with PVC.

H. All nuts, except for the lower nuts on the piping supports, shall be 316 stainless steel Nylok-type locknuts to prevent movement due to vibration. 316 stainless steel lock washers and nuts shall be used as the lower support nuts with Nylock-type lock nuts installed on the top to prevent loosening.

2.04 DOWNCOMERS (DROP PIPES) TRANSITION

A. The diffuser manufacturer shall supply a transition coupling from each existing stainless steel downcomer to the PVC manifold. Transition couplings shall be a fabricated lug all-stainless steel universal clamp, JCM 168 or equal, or a bolted split-sleeve stainless steel sleeve coupling, Victaulic 231S or equal.

2.05 SUBMERGED MANIFOLDS

A. Air manifold piping and fittings shall be Schedule 40 PVC conforming to ASTM D 1784, D 1785, and D 2466 with minimum 1.5% TiO_2 for UV protection.

B. Manifolds shall be fabricated in nominal lengths up to 30 feet. Ends of the manifolds shall be factory solvent welded end caps or plates.

C. Stainless steel supports shall be provided for air manifold piping at a spacing of not more than 8 feet.

1. Material for supports shall be 304L stainless steel.

2. Manifold pipe supports shall be made of minimum 5/8-inch diameter threaded anchor rods, washers, hex nuts, and 12 gauge by 2-inch pipe clamps.

3. Anchor bolts shall be 316 stainless steel, minimum size 5/8-inch diameter with a minimum 3.5-inch embedment.

4. Fabricate manifolds with one 4-inch diameter fixed joint connection to each air distribution header. Each air distribution header shall be anchored to the floor within 7.5 feet of the manifold.

5. Furnish manifolds with minimum Schedule 40 dimensions when stub to manifold connection is reinforced with a solvent welded saddle tee. Furnish manifolds with Schedule 80 dimensions when stub connection is unreinforced.

6. Manifold supports with a pipe centerline of 22 inches or higher above the tank floor shall require a diagonal stainless steel support strut for added support rigidity.

7. Manifold supports shall provide for plus or minus two inches vertical adjustment.

8. Design manifold, connections and supports to resist thrust generated by expansion or contraction of the air distributors.

9. Manifold supports shall be provided directly under or as close as possible to the downcomer.

D. The invert elevation of the submerged air manifolds and elevation of the top of the diffuser shall be the same in all tanks.

E. The equipment Manufacturer shall supply all manifold flange bolts, nuts, washers, and gaskets. Flanges shall be PVC. Connection hardware shall be minimum 316 stainless steel.

F. Provide PVC manifolds perpendicular to and at the same centerline elevation as the air distributor.

2.06 DIFFUSER HEADER SYSTEM

A. The diffuser header system shall include the header piping (distributors), support stands and provisions for expansion/contraction of piping, factory installed diffuser element holders, anchor bolts, and all necessary connectors.

B. Distributors piping and fittings shall be equivalent to Schedule 40 PVC wall thickness and shall be perpendicular to the air manifold.

C. Diffuser distributor, diffuser holders, and retainer rings shall be manufactured of PVC with minimum 2% TiO2 added for UV protection. Alternatively, glass fiber reinforced polypropylene holders may be used.

D. Diffuser holders and retainer rings shall have a minimum wall thickness of 0.12 inches.

E. The diffuser distributor shall connect to the side centerline of the manifolds.

F. The distributor shall be fabricated in sections not exceeding 23 feet in length with sections joined by fixed joints and anchored by guide (sliding) supports.

G. The pipe and piping grid design and installation shall withstand the normal system operating pressures and temperatures as well as all surges during startup periods.

H. Corners and ends of the grid shall be equipped with easily removable caps or plugs for cleanout of the grid piping interior.

I. The header system shall consist of fixed joints between header pipes and guide supports which allow movement of the pipe with changes in temperature. Support spacing shall not exceed 7.5 feet.

1. The fixed joint shall consist of a spigot section with grooves solvent welded to one end of a header, a threaded socket section with splines solvent welded to the mating header, an O-ring gasket, and a threaded screw-on retaining ring or shall consist of an O-ring gasket compressed on all four sides plus anti-rotational protrusions on the socket and spigot ends to prevent rotation.
2. The fixed joint shall provide a rigid connection between distributor and shall prevent rotation of either of the pipes. In lieu of the fixed joint described above, flanges shall be used to connect header pipes in accordance with ASTM standards for the specified header pipe.
3. Intermediate guide supports shall consist of a hold-down and sliding mechanism which shall provide a minimum 1.5 in. wide contoured bearing surface with chamfered leading edges to minimize binding of the air header piping. The sliding mechanism shall provide minimum resistance to movement of the header pipe.
4. Supports shall be fabricated of Type 304L stainless steel. Distributor pipe supports shall be made of minimum ½-inch diameter threaded anchor rods, washers, hex nuts, and 14 gauge by 1-1/2- inch pipe clamps. The supports shall be designed to provide plus or minus 2 inches vertical adjustment of the header. Adjustment shall be continuous and possible without removing the air piping from the support. The Contractor shall furnish all materials to compensate for any variations in floor slab elevations where fine bubble diffusers are installed.
    a. The Contractor and Manufacturer shall be fully responsible for designing, furnishing, and installing supports to withstand all potential forces.
    b. Anchor bolts shall be 316 stainless steel, minimum size 1/2-inch diameter with a minimum 3.5-inch embedment.
    c. Each support shall be secured to the tank floor with 316 stainless steel adhesive type anchors.
    d. The support system shall be designed to withstand a force at least equal to 4 times the buoyant force.
    e. The Contractor and Manufacturer shall be fully responsible for adhesive-type anchors used to provide zero pull-out of header support of anchor bolts.
    f. The entire system shall be designed, manufactured, and installed in such a manner that all the diffuser elements in all tanks are within ± 1/8 inch of a common diffuser elevation.
    g. Air distribution shall be uniform throughout the entire system and shall be uniform over the entire horizontal projected surface of each diffuser element.
    h. All air manifolds, diffuser distributor, and diffusers shall be capable of being installed precisely at level and of remaining level under all conditions of operation whether the aeration tanks are full, partially full, or empty.

2.07 DIFFUSER ASSEMBLY

A. Each air diffuser assembly shall incorporate a nominal 9-inch diameter membrane diffuser element with insert and flow control orifice, a diffuser holder and a factory solvent-welded airtight connection to the diffuser header system.

B. The membrane diffuser element shall be made from EPDM material with precision die formed slits. Thermoplastic materials such as plasticized PVC or polyurethane will not be accepted.

C. Diffuser shall be a one-piece compression molded part with a minimum thickness of 0.080 inch for nominal 9-inch diameter unit. This part thickness shall limit the maximum tensile stress of the rubber membrane to 10 psi when operating at 2.4 scfm per square foot of membrane media.

The EPDM rubber compound shall have the following minimum characteristics:

Parameter	Design Criteria	ASTM
Base Polymer:	EPDM	
UV Resistance:	Carbon Black	
Specific Gravity:	1.25 or Less	
Ozone Resistance	Pass	D1171
Durometer, Shore A:	58 Point ±5	D2240
Tensile Strength:	1,200 psi minimum	D412
Elongation at Break:	350% minimum	D412
Accelerated Aging Max. Compression Set		
@ 23°C, 22 Hrs.	20%	D573
@ 70°C, 22 Hrs.	40%	D573

D. The membrane shall collapse and seal when aeration system air is turned off. Membrane shall be able to collapse onto the support base when air is not being diffused. Diffusers that require a center bolt to limit membrane deflection will not be allowed.

E. A PVC retaining ring shall be furnished to securely hold and seal the diffuser to the disc holder to prevent air escape at the diffuser disc-sealing gasket interface.

F. The sealing method shall allow the applied sealing force between the sealing gasket and membrane to be varied, with a minimum force of 50 pounds per inch of circumference of the sealing gasket to provide a long-term positive seal and prevent air escape except through the active area of the diffuser.

G. Retainer ring and diffuser element holder shall be provided with a minimum of one complete thread with a minimum cross-section of 1/8 inch for engagement.

H. Diffusers shall be substantially free from any material soluble in sewage containing household industrial wastes of any character and from any loose, unbonded material which may affect their normal and proper operation.

I. All diffusers shall be free of cracks, soft spots, or other defects which may cause unequal air distribution. The diffuser elements shall provide a constant and uniform distribution of the emergent diffused air bubbles across their entire exposed area.

J. Each diffuser assembly shall incorporate a control orifice. The air release of the orifice shall be distributed evenly under the horizontal surface of the diffuser element to meet the operating requirements including pressure, temperature, wastewater characteristics, airflow per diffuser, etc. for the system specified.

K. Orifices shall be of the same diameter and length for all diffusers. Orifices shall be provided free of any shavings, obstructions, or residual solvent weld material.

L. All orifices shall be factory drilled. Orifices shall be examined in the field prior to installation. If any improperly fabricated orifices are found, field testing shall continue until 95 percent of the tested orifices conform to the Specifications. Improperly fabricated orifices and all associated diffuser assemblies or piping shall be replaced by the Manufacturer at no cost to the Owner.

M. Orifices shall be 13/64-inch diameter control orifices unless otherwise required to provide the required headloss across the orifice plus diffuser specified in Paragraph 2.01. of this Section.

N. The diffuser holder shall be suitably solvent welded to the diffuser header at the factory to strict tolerances. Following curing, a sample test piece with at least 4 diffuser holders from each day's production shall be tested for torque and impact resistance. The holder and pipe shall be clamped in a test fixture and tested at a rotational torque and at an impact energy to confirm proper connection of the diffuser holder to the header pipe.

1. The diffuser element holders shall be attached to the header to resist applied torques of 150 foot pounds about the polar axis of the holder and 100 foot pounds about the longitudinal axis of the holder.

2. The diffuser holder shall be PVC and shall provide for horizontal mounting of the membrane diffuser.

3. The bottom rim and top surface of the diffuser and diffuser holder shall be horizontal. The diffuser holder shall be attached to the pipe with no more than 1 degree angular variation from top dead center. Diffuser tilt shall be field verified by the Contractor as required by the Engineer by use of a level and scale, and witnessed by the Engineer.

4. All diffuser holders and associated piping with tilt in excess of ± 1/8 inch shall be removed by the Contractor and replaced by the Manufacturer without additional cost to the Owner.

5. The diffuser hold-down arrangement shall provide for an airtight seal between the diffuser and diffuser holder such that even after 20 years of operation all air passes through the diffuser.

O. The Contractor shall replace any diffusers which are damaged in shipment or during installation at no additional cost to the Owner.

P. Membrane diffuser holders shall provide complete peripheral edge support for the membrane diffuser element. The diffuser assembly and retaining device shall prevent air escape at the diffuser element-sealing gasket interface. The gasket shall be integral with the diffuser membrane.

Q. Alternatives utilizing a threaded nipple design for attaching diffuser to header will not be allowed.

2.08 PURGE ASSEMBLIES

A. Two mechanisms for purging moisture from the air piping shall be provided.

1. One continuous purge assembly per independent grid shall be provided.

2. One moisture blow-off assembly per independent grid shall be provided.

B. The continuous purge assembly shall consist of an EPDM membrane tube or snap cap diffuser, hose, and 316L stainless steel supports and clamps.

C. Moisture Blow-off Assemblies

1. The moisture blow-off piping shall include all required pipe, fittings, valves and supports.

2. The moisture blow-off assembly shall operate on the airlift principle and shall be designed to remove any liquid that has entered the air piping system.

3. The moisture blow-off assembly shall be located at the extreme corners of each grid, and at a location accessible from existing walkways by plant personnel.

4. Vertical moisture blow-off piping and fittings shall be Schedule 40, minimum 1/2-inch diameter 316 stainless steel.

5. Vertical piping shall be secured to the tank wall with 316 stainless steel anchors and fasteners. Support spacing shall not exceed 3 feet. Vertical piping shall extend to 18-inches above the adjacent walkway for each access to the purge valve. Provide a tee-fitting at the top of the assembly for clean out and for installing a minimum ½-inch 316 stainless steel threaded ball valve on the branch of the tee. Final location of the ball valve shall be as approved by the Engineer.

6. The bottom of the vertical purge piping shall connect to a moisture-blowoff tee integral with the aeration grid piping and shall be provided with a factory-welded minimum ½-inch PVC dip tube, which shall remove moisture from the invert of the grid piping.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Unless otherwise shown or specified, all equipment shall be installed in strict accordance with Manufacturers' instructions and recommendations.

B. The Contractor shall replace any diffusers which are broken or damaged in shipment, in relocation, or during installation at no additional cost to the Owner.

C. The Contractor shall be responsible for providing proper storage at no additional cost to the Owner.

D. Diffusers to be stored by the Owner at the end of construction shall be inspected for integrity prior to acceptance for storage.

E. Each tank shall be cleaned by the Contractor to remove all debris from the tank to provide for proper installation of the fine bubble diffused aeration equipment.

F. The Contractor shall comply with manufacturer's recommendations after diffusers are installed and before and during placement into operation to ensure that diffusers are maintained in "new" condition and to prevent any sliming or bio-fouling of the diffuser elements.

G. The Contractor shall minimize the time that diffuser membranes, PVC components, and grid piping are exposed to sunlight by completing installation of piping and diffusers in a tank within three weeks from the installation of the first piping in the tank and shall cover the system with plant effluent water until the system is placed in service. The Owner will provide plant effluent water at no charge to the Contractor. Contractor shall provide all equipment and pay all costs to pump or transport plant effluent water to the tank. If the Contractor's activities preclude the usage of plant effluent water, the Contractor shall be responsible for all costs associated with providing potable water. The Owner cannot guarantee the quality or solids content of the plant effluent water.

H. Concrete anchors shall not be installed within 6 inches of any concrete expansion joint.

I. Contractor shall clean air header pipe, mains, submains, laterals, blowers, filters and drop legs prior to installing diffuser elements.

J. Contractor shall protect diffuser elements from unpressurized submergence in wastewater.

3.02 FIELD TESTS

A. The Contractor shall conduct the installation and performance tests for the diffuser system as specified herein. Detailed procedures for all field testing shall be submitted with the Shop Drawings. The Owner shall provide plant effluent water at no charge to the Contractor. Contractor shall provide all equipment and shall pay all costs to pump or transport plant effluent water to the Contact zone and Secondary Aeration zone for field tests of the fine bubble diffusers. In the event that the Contractor's activities preclude the usage of plant effluent water, the Contractor shall be responsible for all costs associated with providing potable water. The Owner cannot guarantee the quality or solids content of the plant effluent water.

B. The Contractor shall conduct pull tests for all diffuser system piping supports and tie-downs to ensure that all supports and tie-downs have a margin of safety of 4 against calculated buoyant forces. The Contractor shall submit details of proposed pull test apparatus and procedures to Engineer for approval.

1. Each support shall be attached to a lever which shall be placed on a fulcrum.

2. A static load shall be applied to the opposite end producing a vertical (or horizontal for wall-mounted supports) extracting force on the support/tie-

down equal to 4 times the calculated maximum buoyant forces to which the support/tie-downs will be subjected in normal operation.

3. 25 percent of all supports shall be tested; no exceptions or substitutions shall be allowed.

C. The Contractor shall conduct field leakage tests for all submerged air piping.

1. The procedure shall consist of operating the system under plant effluent water for visual identification of all leaks.

2. All field leakage tests shall be witnessed by the Owner and/or Engineer.

3. All submerged piping shall be installed free of any leaks.

D. The Contractor shall conduct air distribution tests in each tank.

1. Each aeration tank shall be filled with plant effluent water to a depth above the diffusers as directed by the Engineer.

2. The system shall be operated over the full range of operating conditions (0.5 to 3.0 scfm/diffuser). Uniform air distribution to all individual diffusers within the tank shall be verified by visual inspection.

3. If in the opinion of the Engineer there are areas of consistent low or high airflows, then the Contractor shall make all necessary adjustments to correct these deficiencies.

E. The Contractor shall take level measurements for each diffuser during installation to ensure that all membrane diffusers are installed to within 1/8 inch of a common horizontal plane. Field surveying equipment used shall be as approved by the Engineer.

1. A final level check shall be made during air distribution tests.

2. During filling, visual inspection shall be made when the water level is at the top of the diffuser elements to confirm that all diffusers are installed to within 1/8-inch of a common horizontal plane.

3. Prior to startup of each zone with fine bubble diffusers, and as a condition of acceptance, the Contractor shall provide the services of an independent surveyor, licensed as a Professional Surveyor in the State of Florida, to verify the elevations of the installed diffusers in each Tank. The Contractor shall adjust elevations based on survey to provide all diffusers at the same elevation to within the specified plus or minus 1/8-inch. Survey shall be completed and elevations shall be per specifications before wastewater may be reintroduced into the zone.

F. The Contractor shall measure operating pressure at the top of the drop pipe through the diffuser to ensure compliance with the maximum pressure requirements in Paragraph 2.01.

END OF SECTION

SECTION 15011

RETURN ACTIVATED SLUDGE (RAS)/WASTE ACTIVATED SLUDGE (WAS)

MOTORIZED VALVE (MOV) ACTUATOR

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required to remove the existing RAS/WAS MOV Actuator and install, complete, ready for operation and field tested a new RAS/WAS MOV Actuator as shown on the Drawings and specified herein.

B. Contractor shall replace all electrical and controls conduit and wiring for the new RAS/WAS MOV Actuator.

1.02 RELATED WORK

A. Section 01340 - Shop Drawings, Working Drawings, and Samples

B. Section 11300 - RAS/WAS Splitter Box

C. Section 13300 - Instrumentation and Controls

D. Section 16001 - General Electrical Requirements

E. Other Sections as applicable.

1.03 DESCRIPTION OF SYSTEM

A. The RAS/WAS MOV is intended to be used to modulate the flow in the RAS/WAS Splitter Box in treatment unit 1 as shown on the Drawings and specified herein.

B. The Actuator shall be modulating type operation from a 4-20 mA signal.

C. The Actuator shall operate on 480v, 3-phase power.

D. The Actuator shall be direct coupled to the proposed new plug valve.

1. The Manufacture shall coordinate with the plug valve selection for the proper operation of the MOV Actuator.

1.04 QUALIFICATIONS

A. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with all of these specifications.

B. The Manufacturer shall have extensive experience in the application of MOV actuators to wastewater RAS/WAS processing.

C. The Manufacturer shall a minimum of fifty (50) similar installation in the US.

D. A contractor or subcontractor shall have the knowledge & skills to remove the existing and install, calibrate and test the new MOV Actuator.

E. Submit to the Engineer for review, shop drawings, laying schedules and material certifications including dimensioning and technical specifications for the new MOV Actuator.

PART 2 - MATERIALS

2.01 MANUFACTURER

A. The MOV Actuator shall be manufactured by Beck Electric Actuators Series 11.

B. No substitutions permitted.

C. Bernard Electric Actuator Model SQ15MG-021-96023D or approved equal.

D. The new Bernard Electric Actuator Model SQ15MG-021-96023D or approved equal shall be 480 Volts – 3 Phase – 60 Hertz.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The contractor shall remove and return the existing RAS Valve and Actuator to the Chief Wastewater Plant Operator.

B. Contractor shall provide all required cables or electrical wire, conduits, piping, controls or other modifications needed to install the new Actuator at the location shown on the fabrication drawings of the RAS/WAS Splitter Box.

C. The contractor shall test the new Bernard Electric Actuator Model SQ15MG-021-96023D or approved equal to insure that the new RAS Valve perform as described by the manufacturer and to insure the system connects to and properly communicates with the control systems for the wastewater plant.

3.02 WARRANTY

A. The MOV Actuator shall be warranted for a period of one year from the date of Owner Acceptance.

END OF SECTION

SECTION 15050

CLARIFIER DRIVE

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required and install, complete, ready for operation and field-tested clarifier drive as shown on the Drawings and specified herein.

B. The clarifier drive shall be designed to meet the operational functionality of the existing Unit #1 Model R Oxigest BNR (Biological Nutrient Removal) Treatment system as manufactured by Smith and Loveless.

C. The existing Unit #1 has an average daily treatment capacity of 1.5 million gallons per day and a peak flow capacity of 3.0 million gallons per day.

D. The clarifier drive shall be designed to accommodate the existing treatment capacity and shall have, at a minimum, the same shaft size, speed and torque capacity as the existing clarifier drive and gear.

1.02 RELATED WORK

A. Valves and appurtenances are included in Section 15100

B. Pipe and fittings are included in Division 2 and Division 15.

C. Basic Electrical Materials and Methods in Section 16050

1.03 DESCRIPTION OF SYSTEM

A. The clarifier drive shall be designed to be robust and reliable, capable of withstanding the demands of continuous operation and the potential for variations in sludge volume and consistency and able to handle large capacities and high-strength domestic waste.

B. The clarifier drive shall be Model R Oxigest by Smith and Loveless or Approved Equal.

1.04 QUALIFICATIONS

A. The equipment shall be manufactured of new materials and fully lubricated by a manufacturing facility that has experience with this type of clarifier drive. designed, constructed, and installed in accordance with the best practices and methods and shall comply with all of these specifications.

B. The manufacturer shall have a minimum of ten (10) years experience and have an installation list of a minimum of ten (10) similar clarifier drive and gear in wastewater applications.

C. Submit to the Engineer for review, a copy of the credentials for the firm that will be removing, installing and servicing the clarifier drive and gear. Key personnel who will be installing the clarifier drive and gear shall have installed a minimum of five (5) similar units.

PART 2 - MATERIALS

2.01 CLARIFIER DRIVE UNIT

A. The clarifier drive mechanism shall consist of a primary gear motor, a secondary speed reducer, mounting plate and hardware.

B. Power shall be transmitted from the primary to the secondary unit by means of a roller chain drive, which shall be enclosed for protection from the weather and for operator safety.

C. The primary and secondary units shall be of the heavy-duty type running in oil. Anti friction bearings shall be used throughout.

D. An overload protection system shall be provided to protect the motor should the drive become overloaded.

1. The protection system shall consist of a sprocket on the input shaft of the secondary reducer mounted between two friction facings, which are spring loaded.

2. When an overload occurs, the driven sprocket shall “slip” between the two facings limiting the torque placed on the drive.

2.02 DRIVE FAILURE ALARM CONTACTS

A. A drive failure alarm contact shall be furnished to actuate a suitable alarm device if the drive should become overloaded or stop turning for any reason, i.e., over torque condition, chain breakage, motor failure, or power faimountinglure.

B. A contact shall also be provided to shut off the drive motor when a fault condition occurs.

2.03 MOTOR

A. The clarifier drive motor shall have the following characteristics:

1. ½ horsepower minimum

2. 208-230/460 volt, 60 Hz.

3. NEMA type C premium efficiency rated and inverter ready.

4. TEFC 56C Steel Frame

5. Continuous duty rated.

6. Class F insulation motor windings.

7. Motor bearings shall require Polyrex EM Type grease lubrication.

8. Contractor to verify existing power prior to ordering shop drawing.

PART 3 - EXECUTION

3.01 MANUFACTURER SERVICES

A. The Manufacturer shall provide the services of a factory-trained representative for a maximum period of one (1) day on-site to verify all dimensions, capacities, tie-ins, etc. prior to fabrication to ensure a complete working system.

B. The Manufacture shall provide the services of a factory-trained representative for a maximum period of 2-days on-site to assist with the initial startup, and to instruct the Owner's operating personnel in the operation and maintenance of the equipment.

C. Failure caused by the design, manufacture, installation or delays which necessitates additional time of the factory-trained representative shall be provided at no cost to the Owner.

D. Prior to Owner Acceptance, the Manufacture shall provide a letter of certification to the Owner stating that the installation is correct, complete and ready for operation.

3.02 INSTALLATION

A. The contractor shall reinstall the clarifier drive, gear and skimmer. The contractor shall run any needed cables or electrical wire, conduits or other modifications needed to the treatment unit to ensure that the clarifier drive, gear, and skimmer work properly.

B. The clarifier drive and gear shall be designed as not to require structural modifications to the existing steel support structure.

3.03 SPARE PARTS

A. The clarifier drive and gear shall be furnished with one set of spare parts, lubrication and touch-up paint as specified by the Manufacturer.

3.04 TESTING

A. The contractor shall fully test the clarifier drive, gear and skimmer. The Contractor shall correct any alignment or mechanical problems for a minimum of 10 days, 24 hours a day to ensure the units are operating correctly.

B. All alignment and vibrations shall be within manufacturer's tolerances.

3.05 WARRANTY

A. The clarifier drive and gear shall be warrantied for materials, manufacture defects and installation one year from the date of Owner Acceptance.

END OF SECTION

SECTION 15100

VALVES AND APPURTENANCES

PART 1 - GENERAL

PART 2 - PRODUCTS

2.01 AIR RELEASE VALVES

A. Sewer Force Main Air Release Valves – System shall be a combination of one sewage air release valve and one sewage air/vacuum valve with dual isolation plug valves. Valve bodies and covers shall be of cast iron construction in accordance with ASTM A126-B. All internal parts shall be of stainless steel, ASTM A240 - Type 304 and ASTM A276 - Type 303. The venting orifice shall be 5/16" in diameter with stainless steel seat. The inlet openings shall be a minimum of 2" NPT screwed connection for both valves. The valves shall be fully capable of operation in sewage force main. Both valves shall include a back-flushing feature for periodic cleaning of the internal mechanism. The overall height shall not exceed 22 inches. Valves shall be manufactured by Val-Matic Corporation, or approved equal.

B. Water Main Air Release Valves – Valve body and cover shall be of cast iron construction, per ASTM A126-B. All internal parts shall be of stainless steel, ASTM A240 – Type 304 for the float, and ASTM A296 – Type 316 for the linkage. The venting orifice shall be 3/16" diameter with brass seat. The inlet opening shall be a 2" NPT screwed connection. The overall height shall not exceed 13 inches. Valves shall be manufactured by Valve and Primer Corporation, model number APCO 200A, or approved equal.

2.02 BACKFLOW PREVENTION ASSEMBLY

A. The assembly shall conform to the latest revision of ANSI/AWWA C510 and shall be capable of withstanding a working pressure of at least 150 psi without damage to working parts or impairment of function. It shall consist of two internally loaded, independently operating check valves, located between two tightly closing resilient-seated shut off valves, with four properly placed resilient-seated test cocks.

2.03 BUTTERFLY VALVES

A. Butterfly valves and operators shall conform to the latest revision of ANSI/AWWA C504 standard for rubber-seated butterfly valves. Valves shall be Class 150 A or B, and shall be Mueller, Pratt, Clow, DeZurik, or approved equal.

2.04 DETECTOR TAPE

A. Detector tape shall be 3" wide, blue tape for water mains, green tape for force mains, with a metallized foil core laminated between 2 layers of plastic film. The words "CAUTION WATER LINE BURIED BELOW" or "CAUTION FORCE MAIN BURIED BELOW" shall be printed at 30" intervals along the tape. Tape shall be placed 18" below grade above all PVC mains and services, or as recommended by manufacturer. Non-metallic tape shall be used above ductile iron pipe.

2.05 FLANGED COUPLING ADAPTERS

A. Coupling adapters shall be Smith-Blair Model No. 912. Body and follower flange shall be iron. Bolt circle sizes and spacing shall conform to ASA 125 flange. Gasket shall be Smith-Blair Grade 30 or 60. O-Rings shall be Grade 60. Cross and tee bolts shall conform to ANSI A21.11.

2.06 FLEXIBLE CONNECTOR

A. Flexible connectors or rubber expansion joints shall be spool type containing elastomers woven with nylon fabric and nylon tire core cord reinforced with wire.

B. Elastomers shall be nitrile (BUNA-N) unless otherwise depicted on the Drawings.

C. All elastomers design for exterior applications shall have a factory applied UV coating.

D. Backing plates and hardware shall be 316L stainless steel.

E. Flexible connectors shall be manufactured by Proco series 230 or Approved Equal.

2.07 GATE VALVES

A. Gate valves shall be iron body, fully resilient seat, bronze mounted non-rising stem, double disc, rated at 200 psi and conforming to the latest revision of ANSI/AWWA C509. Exposed valves shall be outside screw and yoke type. Gate valves shall be Mueller, Clow, American Darling, or approved equal.

2.08 GATE VALVES (WHEEL STYLE)

A. Exposed wheel gate valves, unless otherwise specified or approved, shall be iron-body, bronze-mounted, double disc type, with flanged ends, and shall conform to the AWWA Standard Specification for Gate Valves for Ordinary Water Works Service, Designation C500. Exposed valves shall be outside screw and yoke type.

B. Face-to-face dimension shall conform to ANSI Standard Face-to-Face and End-to-End Dimensions of Ferrous Valves, (ANSI B16.10) for 125 pound cast-iron valves.

C. Bronze gate rings shall be fitted into grooves of dovetail or similar shape in the gates. For grooves or other shapes, the rings shall be firmly attached to the gates with bronze rivets.

D. Gate valves shall have a resilient rubber-seated ring or wedge, permanently bonded to the wedge disc, and complying with AWWA C509.

E. Stuffing box follower bolts shall be of steel, and the nuts shall be of bronze.

F. The design of the valves shall be such as to permit packing the valves without undue leakage while they are wide open and in service. O-ring stuffing boxes may be used.

G. Chain wheel operators shall be furnished with the valves. Such operators shall be designed with adequate strength for the valves with which they are supplied and shall provide for easy operation of the valve. Chains for valve operators shall be stainless steel. Gate valves shall be as manufactured by the Mueller Company, Clow Valve Company, or equal.

H. Where required, gate valves shall be provided with a box, cast in the slab, and a box cover. The depth of the valve box shall not be less than the slab thickness. Box cover

opening shall be for valve wheel. The floor box and cover shall be equal to those manufactured by Rodney Hunt Machine Company or Clow Corporation.

I. Gate valves for diesel fuel service shall have API approval. Bodies shall be cast iron or bronze.

2.09 LINK SEALS & WALL SLEEVES

A. The pipe-to-wall penetration closures shall be "Link-Seal" as manufactured by Thunderline Corp., Belleville, MI 48111. Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to fill continuously the annular space between the pipe and wall opening. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. Seals shall be installed such that bolt heads are facing the inside of the structure and shall be accessible from grade without the need for excavation. After the seal assembly is positioned in the wall sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide an absolutely water-tight seal between the pipe and wall opening. The seal shall be constructed so as to provide electrical insulation between the pipe and wall, thus reducing chances of cathodic reaction between these two members.

B. Contractor shall determine the required inside diameter of each individual wall sleeve before ordering, fabricating or installing. The inside diameter of each wall sleeve shall be sized as recommended by the manufacturer to fit the pipe and Link-Seal to assure a water-tight joint.

C. Wall sleeve shall be specially designed to mate with the Link-Seal. The wall sleeve shall be heavy wall welded or seamless steel pipe. The sleeve shall have a full-circle continuously-welded water stop plate on the sleeve O.D. which acts as the sleeve anchor and water stop. Wall sleeve shall be model WS by Thunderline Corp.

2.10 PLUG VALVES

A. Plug valves shall be non-lubricated eccentric type with resilient faced plugs, and shall be furnished with end connections as shown on the plans. Flanged valves shall be faced and drilled in conformance with ANSI B16.1 Class 125 standard. Mechanical joint ends shall be in conformance with AWWA C111. Bell ends shall be in conformance with AWWA C100 Class B.

B. Unless otherwise specified on the plans, port areas for all valves shall be min. 80% of full pipe area.

C. Valve bodies shall be of ASTM A126 Class B cast iron in compliance with AWWA Standard C507 Section 5.1 and AWWA Standard C504. All exposed nuts, bolts, springs, washers, etc. shall be zinc plated. Resilient plug facings shall be Neoprene or Buna-N, on a single piece plug. The plug shall be of sufficient construction so that no strengthening member is required opposite the face.

D. Valves shall be furnished with corrosion resistant seats which comply with AWWA Standard C507 Section 7 paragraph 7.2 and with AWWA Standard C504 Section 3.5. The seat shall be in the body only. Seat ring shall be adjustable and replaceable.

E. Valves shall be furnished with replaceable, sleeve-type bearings in the upper and lower journals. These bearings shall comply with AWWA Standard C507 Section 8

paragraphs 8.1, 8.3 and 8.5 and with AWWA Standard C504 Section 3.6.

F. Valve shaft seals or packing shall be adjustable and replaceable without removing the valve from service or interrupting service with flow in either direction. Shaft seals shall comply with AWWA Standard C507 Section 10 and with AWWA C507 Section 111.

G. Valve pressure ratings shall be as follows and shall be established by hydrostatic tests as specified by ANSI Standard B16.1. Pressure ratings shall be 175 psi for valves through 12", 150 psi for valves in sizes 14" through 36" and 125 psi for valves in sizes 42" through 54". Valves shall be capable of providing drip-tight shutoff up to the full valve rating with pressure in either direction.

H. All valves 8 inches and larger shall be equipped with gear actuators. All gearing shall be enclosed and suitable for running in oil, with seals provided on all shafts to prevent entry of dirt and water into the actuator. All shaft bearings shall be furnished with permanently lubricated bronze bearing bushings. Actuator shall clearly indicate valve position. An adjustable stop shall be provided. Construction of actuator housing shall be cast iron or steel.

I. Plug valves installed such that actuators are 6 feet or more above the floor shall have chain-wheels and chains provided.

J. For plug valves with extended shafts and actuators, the actuators shall be mounted on floor stands where indicated on the Drawings or shall have removable hand-wheels where floor stands are not called for. Six inch sleeves shall be provided for extended shafts in all floors. Where necessary, covers shall be provided. Shafts shall be of adequate strength to operate the valve. Floor stands and covers, where called for, shall be cast iron. Floor stands shall be equipped with valve position indicators and a lock for the hand-wheel.

K. All plug valves shall be installed so that the direction of flow through the valve is in accordance with the manufacturer's recommendations.

L. Valves and actuators shall be as manufactured by DeZurik.

2.11 PRESSURE GAUGE ASSEMBLY

A. Pressure gauge shall be direct-mounted with a minimum 4-1/2 inch diameter dial with a clear glass crystal window constructed to the following standards:

1. Accuracy – 1% full scale grade A ASME B40, 100
2. Weather Protection – Dry Case International Protection Rating (IP) IP54
3. Fill - Glycerin filled, hermetically sealed IP65
4. Case type – Open front 304 stainless steel case
5. Dial – Aluminum dial, brushed aluminum background, black figures and graduations.
6. Bourdon Tube and Socket – 316L/316L Stainless steel
7. Scale and range – As depicted on Drawings.
8. Manufacture – ISO 9001 registered.
9. Pressure gauge shall be manufactured by Ashcroft Type 1009 or Approved Equal

B. All pressure gauges for wastewater applications shall be mounted to a Pressure

Sensor.

1. Pressure Sensors shall be of the wafer type, designed to fit between standard ANSI B16.1 Class125/ANSI B16.5 Class 150 pipeline flanges. The face-to-face of the entire sensor shall be no longer than specifications for butterfly valves - MSS-SP67.
2. Pressure Sensors shall be flow through design with a nitrile (BUNA-N) elastomer sensing ring around the full circumference. There shall be no dead ends or crevices, and flow passage shall make the sensor self-cleaning.
3. The sensing ring shall have a cavity behind the ring filled with ethylene glycol fluid to transfer pressure to the gauge.
4. Pressure Sensor shall be manufactured by Red Valve Series 48 or Approved Equal

C. Pressure gauge assembly shall include ½" brass fittings, ball valves, snubbers or gauge guards as depicted on the Drawings.

2.12 RESILIENT SEAT BALL VALVE

A. Ball valve shall be tight closing, shaft-mounted complying with Fed. Spec. WW-V-35, Type II, Class C, Style 3. Valve design shall eliminate metal-to-metal contact or wedging in the sealing action. Design pressure rating shall be greater than 150 psi.

B. Valve body shall be one- or two-piece stainless steel ASTM A351. Ball shall be stainless steel ASTM A276. Seat ring shall be reinforced TFE.

C. Valve shall have a stainless steel 1/4 turn lever arm. Ends shall be threaded. Ball valve shall be Figure No. T-580-S6-R-66 as manufactured by Nibco, Inc. or equal.

2.13 RETAINER GLANDS

A. Retainer glands shall conform to the latest revision of ANSI/AWWA C111/A21.11. All glands shall be manufactured from ductile iron as listed by Underwriters Laboratories for 250 psi minimum water pressure rating, manufactured by Clow Corporation, EBAA Iron, or approved equal.

2.14 STRAINERS

A. Strainers shall be of the "Y" type, shall have bronze bodies with a removable bronze screen, and shall be as manufactured by Watts Regulator Company, Lawrence, MA.

2.15 SERVICE CONNECTIONS

A. Service saddles shall be Ductile Iron, epoxy or nylon coated, with double stainless steel straps, or a single wide strap. Saddles shall conform to the latest revisions of ANSI/AWWA C111/21.11 and ASTM A588.

B. Service lines shall be polyethylene (PE) tubing as described in ANSI/AWWA C901, latest revision, with a working pressure of 200 psi (DR 9). Pipe joints shall be of the compression type, with totally confined grip seal and coupling nut. Polyethylene shall be extruded from PE 3408 high molecular weight materials and must conform to ASTM D2737.

C. Corporation stops shall be manufactured of brass alloy in accordance with ASTM B62 with threaded ends and shall be Ford or approved equal.

D. Meter stops shall be the 90 degree lockwing type and shall be of bronze construction in accordance with ASTM B62. Meter stops shall be closed button design, with a resilient "O" ring, sealed against external leakage at the top. Stops shall be equipped with a meter coupling nut on the outlet side, as manufactured by Mueller, Ford or approved equal.

E. All meters (2 1/2" and smaller) and meter boxes will be supplied and installed by the City at the owner's expense. Meters larger than 2 ½ inches will have special installation requirements.

2.16 TAPPING SLEEVES

A. Tapping sleeves shall be ductile iron or stainless steel, mechanical or joint, as stated on the Drawings, manufactured by Clow, or approved equal.

2.17 UNIONS

A. Unions on ferrous pipe, 2 inch diameter and smaller, shall be 150 lb malleable iron, and zinc-coated. Unions on water piping, 2 1/2 inch diameter and larger, shall be 125 lb pound flange pattern, and zinc-coated. Gaskets for flanged unions shall be of the best quality fiber or plastic. Unions shall not be concealed in walls, ceilings, or partitions.

2.18 VALVE BOXES

A. Valve boxes for water mains and sewer force mains shall be U.S. Foundry Model 7500, marked "Water" or "Sewer", or approved equal.

B. Valve boxes for blow-off assembly shall be U.S. Foundry Model 7630 (No. 3) or approved equal.

2.19 PIPE COUPLINGS

A. Pipe couplings shall be style 38 all 316L stainless steel by Piping Specialties Dresser, Inc..

PART 3 - EXECUTION

3.01 INSTALLATION

A. Valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Engineer before they are installed.

B. Install floor boxes, brackets, extension rods, guides, and the various types of operators and appurtenances that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures having direct bearing on the locations of the valves and appurtenances, and he shall be responsible for the proper location of these items during the construction of the structures.

C. Flanged joints shall be made with hot-dipped galvanized bolts, nuts and washers. Mechanical joints shall be made with mild corrosion-resistant alloy steel bolts and nuts. All exposed bolts shall be painted the same color as the pipe. All buried bolts

and nuts shall be heavily coated with two (2) coats of bituminous paint.

D. Prior to assembly of split couplings, the grooves and other parts shall be thoroughly cleaned. The ends of the pipes and the outsides of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections shall then be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.

E. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6 inches from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up fingertight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.

3.02 SHOP PAINTING

A. Ferrous surfaces of valves and appurtenances shall receive an exterior coating of rust-inhibitive primer. Interior coatings shall be the manufacturer's standard except that valves for potable water lines shall be coated with paints approved by EPA, FDA and AWWA for potable water service. All pipe connection openings shall be capped after shop painting to prevent the entry of foreign matter prior to installation.

3.03 FIELD PAINTING

A. All above ground valves and appurtenances shall be painted in accordance with Section 09900 – Painting.

3.04 INSPECTION AND TESTING

A. Completed pipe shall be subjected to hydrostatic pressure test for 2 hours at 150% full working pressure. All leaks shall be repaired and lines retested until approved by the Engineer.

END OF SECTION

SECTION 13300

INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall furnish, install and place into service operating process instrumentation, control systems and panels including accessories related to the City of Pembroke Pines Wastewater Treatment Plant, Treatment Unit 1 Rehabilitation project as shown on plans and specified herein. Refer to appropriate electrical and Instrumentation drawings for I&C scope of work.

1. Contractor shall provide and install Treatment Unit 1 control panel as shown on drawings and as per specifications. Coordinate with packaged system supplier of the Treatment Unit drive and associated equipment and approved shop drawings and adjust control panel as needed.

2. Contractor shall provide new instruments such as ultrasonic level transmitters, flow meters, and flow transmitters, etc. as shown drawings and as per specifications.

3. The contractor shall furnish all shop drawings to the instrumentation contractor for systems that interface with Treatment Unit control system. The instrumentation contractor shall inform the general contractor in writing of the shop drawings necessary for instrumentation and control system coordination.

4. The contractor is responsible for providing a complete working instrumentation and control system in place.

5. Power supplies, surge suppressors, terminal strips, etc. for all I/O that are to be connected to the new control system must be provided new. The instrument contractor is responsible to provide completed panels that are clean, functional and present a professional workman-like appearance.

6. All wires in control panels must be permanently tagged and shown on the as-built drawings. This includes all spare and abandoned wires and cables. Spare and abandoned cables are to be taped and left coiled in the panels for future use. Cable and wire numbers are to be assigned by the contractor, documented and controlled to prevent duplicate numbers. The contractor shall turn over to the owner, at the project conclusion, a cable and wire list showing assigned numbers and their physical location in the plant.

7. See electrical drawings and specifications for additional work required of the instrument contractor as part of this project.

8. Furnish updated PLC loop diagram after modification of existing PLC system as required by this project.

9. Modify existing PLC panel to add new signals as shown on drawings. Provide PLC programming and SCADA programming for new signals added and removed as part of this project. The cost of PLC panel modification, termination, adding terminal blocks (if needed), PLC and SCADA programming shall be included in the bid price.

B. Work Includes: Engineering, furnishing, installing, calibrating, adjusting, testing, documenting, starting up, and Owner training for a complete Instrumentation and Control System in place.

1. Major elements are:

a. New instruments.

b. New control panel.

c. Loop check.

d. Start-up and testing.

e. Modification of the existing PLC, RIO panels.

f. PLC and SCADA programming.

g. Update I/O loop diagrams.

C. Instrument and Control (I&C) Supplier work scope:

1. For I&C equipment and ancillaries provide the following:

a. Completion of detailed design.

b. Required Submittals.

c. Equipment and ancillaries.

d. Instructions, details, and recommendations to, and coordination with, Contractor for proper installation.

e. Coordination with package system shop drawings and other disciplines.

f. Loop checks.

g. Verify readiness for operation.

h. Verify the correctness of final power and signal connections.

i. Adjusting and calibrating.

j. Starting up.

k. Testing and coordination of testing.

l. Training.

m. As-built documentation.

2. Verify following work not by I&C Supplier is provided:

   a. Correct type, size, and number of signal wires with their raceways.

   b. Correct electrical power circuits and raceways.

   c. Correct size, type, and number of I&C related pipes, valves, fittings, and tubes.

   d. Correct size, type, materials, and connection of process mechanical piping for in-line primary elements.

3. For equipment not provided under I&C Supplier, but directly connected to equipment required by I&C Supplier:

   a. Obtain from Contractor, manufacturer's information on installation, interface, function, and adjustment.

   b. Coordinate with Contractor to allow required interface and operation with I&C System.

   c. For operation and control, verify that installations, interfacing signal terminations, and adjustments have been completed with manufacturer's recommendations.

   d. Test to demonstrate required interface and operation with I&C System. Examples of items in this category, but not limited to the following:
      1) Valve operators, position switches, and controls.
      2) Chemical feed pump and feeder speed/stroke controls.
      3) Automatic samplers.
      4) Motor control centers.
      5) Variable speed drive systems.

   e. Examples of items not in this category:
      1) Internal portions of equipment provided under Division 16, Electrical, that are not directly connected to equipment under I&C System.
      2) Internal portions of I&C Systems provided as part of package systems and that are not directly connected to equipment provided under I&C System.

4. Wiring external to equipment provided by I&C Supplier:

   a. Special control and communications cable: Provided by I&C Supplier.

D. Software Engineering work scope:

1. Software engineering work shall be performed by the instrumentation and control contractor, unless otherwise noted. The instrumentation and control contractor shall have be responsible to coordinate loop-checks, start-up etc. for a complete working system in place. The following are part of the software engineering scope:

   a. Correct I/O mapping and scaling.

b. Ladder logic implementation defined in control strategies.

c. HMI interface graphic screens and mapping.

d. Start-up support, including system testing and trouble shooting.

e. System training.

f. Specifications/documents including: System External Specification, System Internal Specification, I/O Checklist, Site Acceptance Test Plan.

1.02 SINGLE INSTRUMENT SUPPLIER

A. The Contractor shall assign to the Single Instrument and Control (I&C) supplier full responsibility for the functional operation of all new instrumentation and control systems. The Contractor shall have said supplier perform all engineering necessary in order to select, furnish, program, supervise the installation of, connection, calibrate, and place into operation of all sensors, instruments, alarm equipment, control panels, accessories, and all other equipment as specified herein. The I&C supplier shall have a maintenance office within a 150 mile radius of the project.

B. The single instrument and controls supplier shall demonstrate his/her ability to successfully complete projects of similar sizes and nature. Provide references (including phone number and contact name) for at least three projects successfully completed in which the following tasks were performed: system engineering, programming, panel assembly, instrumentation installation, documentation (including panel assembly), schematics and wiring diagrams, field testing, calibration and start-up, operator instruction and maintenance training. Provide references (including phone number and contact name) for at least three project s where software engineering (programming) tasks such as ladder logic programming, computer based SCADA system configuration, documentation, field testing, start-up, and operator instruction were performed.

C. The foregoing shall enable the Contractor and the Owner to be assured that the full responsibility for the requirements of this Section shall reside in an organization which is qualified and experienced in the water treatment and distribution field and its associated process technology on a functional systems basis.

D. The single I&C supplier shall have a UL approved shop and shall build all panels according to UL 508A. All control panels shall bear a UL 508A label. All control panels shall also meet the requirements of national electrical code article 419 for industrial control panels.

E. Instrumentation and Controls supplier shall be:

1. C.C. Control Corp.

2. Champion Controls.

3. Or Owner approved equal.

1.03 INSTALLATION WORK

A. The I&C contractor is not required to employ the services of the instrument or manufacturer's organization, or any division thereof, to accomplish the physical installation of any elements, instruments, accessories or assemblies specified herein. However, the Contractor shall employ installers who are skilled and experienced in the installation and connection of all elements, instruments, accessories and assemblies; portions of their work shall be supervised or checked as specified in Part 3, herein.

1.04 PREPARATION OF SUBMITTAL OF DRAWINGS AND DATA

A. It is incumbent upon the Contractor to coordinate the work specified in these Sections so that a complete well I&C system shall be provided and shall be supported by accurate Shop and record Drawings. As a part of the responsibility as assigned by the Contractor, the Single I&C supplier shall prepare and submit through the Contractor, complete organized Shop Drawings, as specified in Part 2.02, herein. Interface between instruments, motor starters, etc. shall be included in his Shop Drawing submittal.

B. During the period of preparation of this submittal, the Contractor shall authorize direct, informal liaison between his Single I&C supplier and the Engineer for exchange of technical information. As a result of this liaison, the Engineer may authorize certain minor refinements and revisions in the systems as specified informally, but these shall not alter the scope of work or cause increase or decrease in the Contract Price. During this informal exchange, no oral statement by the Engineer shall be construed to give formal approval of any component or method, nor shall any statement be construed to grant formal exception to or variation from these Specifications.

1.05 ADDITIONAL TECHNICAL SERVICES

A. At no separate additional cost to the Owner, the Contractor shall provide the following services of qualified technical representatives of the Single I&C supplier (See Part 3, herein).

1. To supervise installation and connection of all instruments, elements, and components of every system, including connection of instrument signals to primary measurement elements and to final control elements such as pumps, valves, and chemical feeders.

2. To make all necessary adjustments, calibrations and tests; and

3. To instruct plant operating and maintenance personnel on instrumentation. This time shall be in addition to whatever time is required for other facets of work at the site, and shall be during the Owner's normal working days and hours.

4. To terminate and test all fiber optic cable and effected devices (if applicable).

1.06 GUARANTEE

A. The Contractor shall guarantee all equipment and installation, as specified herein, for a period of one year following the date of completion of the work. To fulfill this obligation, the Contractor shall utilize technical service personnel designated by the Single I&C supplier to which the Contractor originally assigned project responsibility for instrumentation. Services shall be performed within two calendar days after notification by the Owner.

1.07 ADDITIONAL PROVISIONS

A. The applicable provisions of the following Sections under Electrical Work shall apply to work and equipment specified herein, the same as if stated in full, herein:

1. Codes and Standards
2. Equipment, Materials and Workmanship
3. Testing
4. Grounding
5. Equipment Anchoring
6. Conductor and Equipment Identification
7. Terminal Cabinets and Control Compartments
8. Process Control Devices

1.08 NEWEST MODEL COMPONENTS

A. All meters, instruments, and other components shall be the most recent field proven models marketed by their manufacturers at the time of submittal of Shop Drawings unless otherwise specified to match existing equipment. All technical data publications included with submittals shall be the most recent issue.

1.09 INSPECTION OF THE SITE AND EXISTING CONDITIONS

A. The instrumentation drawings were developed from past record drawings and information supplied by the Owner.

B. Before submitting a bid, visit the site and determine conditions at the site and at all existing structures in order to become familiar with all existing conditions and instrumentation and control systems that will, in any way or manner, affect the work required under this Contract. No subsequent increase in Contract cost will be allowed for additional work required because of the Contractor's failure to fulfill this requirement.

1.10 RELATED WORK

A. Division 16 – Electrical

B. Division 11 – Equipment

PART 2 - PRODUCTS

2.01 INSTRUMENTATION CRITERIA

A. Designation of Components

1. In these Specifications and on the Drawings, all systems, meters, instruments, and other elements are represented schematically, and are designated by numbers, as derived from criteria in Instrument Signal and Automation Society of America Standard ANSI/ISA S5.1-1973. The nomenclature and numbers designated herein and on the Drawings shall be employed exclusively throughout Shop Drawings, data sheets, and similar materials. Any other symbols, designations, and nomenclature unique to the manufacturers standard methods shall not replace these prescribed above, used, herein and on the Drawings.

B. Signal Characteristics

1. Signals shall be electrical, as indicated herein, and shall vary in direct linear proportion to the measured variable, except as noted. Electrical signals outside control panel(s) shall be 4 to 20 milliamperes DC, except as noted. Signals within enclosures may be 1-5 volts DC.

C. Matching Style Appearance and Type

1. All instruments to be panel mounted at the control panels shall have matching style and general appearance. Instruments performing similar functions shall be of the same type, model, or class, and shall be of one manufacturer, where applicable.

D. Accuracy and Repeatability

1. The overall accuracy of each instrumentation system or loop shall be as described in the Specifications for that system or loop. Each system's accuracy shall be determined as a probable maximum error; this shall be the square-root of the sum of the squares of certified "accuracies" of certain designated components in each system, expressed as a percentage of the actual span or value of the measured variable. Each individual electronic instrument shall have a minimum accuracy of +0.7 percent of full scale and a minimum repeatability of +0.4 percent of full scale unless otherwise specified. Instruments that do not conform to or improve upon these criteria are not acceptable.

E. Signal Isolators, Converters, and Power Supplies

1. Signal isolators shall be furnished and installed in each measurement and

control loop, wherever required, to insure adjacent component impedance match or where feedback paths may be generated. Signal converters shall be included where required to resolve any signal level incompatibilities. Signal power supplies shall be included, as required by the manufacturer's instrument load characteristics, to insure sufficient power to each loop component.

F. Alternative Equipment or Methods

1. Equipment or methods requiring redesign of any project details are not acceptable without prior approval of the Engineer. Any changes inherent to a proposal alternative shall be at no additional cost to the Owner. The required approval shall be obtained in writing by the I&C Subcontractor through the Contractor prior to submittal of Shop Drawings and data. Any proposal for approval of alternative equipment or methods shall include evidence of improved performance, operational advantage and maintenance enhancement over the equipment or method specified, or shall include evidence that a specified component is not available. Otherwise, alternative equipment (other than direct, equivalent substitutions) and alternative methods shall not be proposed.

2.02 DETAILED SYSTEMS DRAWINGS AND DATA

A. Content

1. The Contractor shall submit detailed Shop Drawings and data prepared and organized by the Single I&C supplier designated at the time of bidding. Six submittal sets shall be required. These Drawings and data shall be submitted as a complete, bound package at one time, within 80 calendar days after date of Notice to Proceed and shall include:

a. Drawings showing definite diagrams for every instrument loop system. These diagrams shall show and identify each component of each loop or system using legend and symbols from ISA Standard S5.4, each having the format of ISA Standard S5.1 as used on the Project Drawing. (Each system or loop diagram shall be drawn on a separate Drawing sheet.)

b. Data sheets for each component, together with a technical product brochure or bulletin. The data sheets shall show:
   1) Component function description used herein and on the Drawings;
   2) Manufacturer’s model number or other product designation;
   3) Project tag number used herein and on the Drawings;
   4) Project system loop of which the component is a part;
   5) Project location or assembly at which the component is to be installed;
   6) Input and output characteristics;
   7) Scale range and units (if any) and multiplier (if any);
   8) Requirements for electric supply (if any);
   9) Requirements for air supply (if any);

10) Materials of component parts to be in contact with, or otherwise exposed to, process media;
11) Calibration curves as required.
12) Special requirements or features.

c. A complete index shall appear in the front of each bound submittal volume. A separate technical brochure or bulletin shall be included with each instrument data sheet. The data sheets shall be indexed in the submittal by systems or loops, as a separate group for each system or loop. If, within a single system or loop, a single instrument is employed more than once, one data sheet with one brochure or bulletin may cover all identical uses of that instrument in that system. Each brochure or bulletin shall include a list of tag numbers for which it applies. System groups shall be separated by labeled tags.

d. Drawings showing both schematic and wiring diagrams for control circuits. Complete details on the circuit interrelationship of all devices within and outside each control panel shall be submitted first, using schematic control diagrams. Subsequent to return of this first submittal by the Engineer, piping and wiring diagrams shall be prepared and submitted for review by the Engineer; the diagrams shall consist of component layout Drawings to scale, showing numbered terminals on components together with the unique number of the wire to be connected to each terminal. Piping and wiring diagrams shall show terminal assignments from all primary measurement devices, such as flow meters, and to all final control devices, such as samplers, pumps, valves, and chemical feeders. The Contractor shall furnish all necessary equipment supplier's Shop Drawings to facilitate inclusion of this information by the I&C system supplier.

e. Schematic and wiring diagram criteria shall be followed as established in NEMA Standards Publication ANSI/NEMA 1CS-1-1978, "Industrial Control and Systems."

f. Assembly and construction Drawings for each control panel and for other special enclosed assemblies for field installation. These Drawings shall include dimensions, identification of all components, surface preparation and finish data, nameplates, and the like. These Drawings also shall include enough other details, including prototype photographs, to define exactly the style and overall appearance of the assembly; a finish treatment sample shall be included.

g. Installation, mounting and anchoring details for all components and assemblies to be field-mounted, including conduit connection or entry details.

h. Complete and detailed bills of materials. A master Bill of Materials listing all field mounted devices, control panels and other equipment that shall be shipped to the job site. A Bill of Materials for each control panel listing all devices within the panel.

i. Modifications to existing equipment. A complete description of all proposed modifications to existing instrumentation equipment, control panels, control devices, cabinets, etc., shall be submitted with the Shop Drawings complete with detailed Drawings of the proposed modifications.

B. Organization and Binding

1. The organization of initial Shop Drawing submittal required above shall be compatible to eventual inclusion with the Technical Manuals submittal and shall include final alterations reflecting “as built” conditions. Accordingly, the initial multiple copy Shop Drawing submittal shall be separately bound in 3-ring binders of the type specified under Part 2.03, herein, for the Technical Manuals.

2.03 TECHNICAL MANUALS

A. Five final sets of technical manuals shall be supplied for the Owner, and one final set shall be supplied to the Engineer, as a condition of acceptance of the project. Each set shall consist of one or more volumes, each of which shall be bound in a standard size, three-ring, loose-leaf, vinyl plastic hard cover binder, suitable for bookshelf storage. Binder ring size shall not exceed 3.0 inches. If Owner allows electronic submittal in lieu of hard copies, it is acceptable to submit pdf file submittal.

B. Initially, two (2) sets of these manuals shall be submitted to the Engineer, and two sets submitted to the Owner, for review. Coordinate with front end documents for quantity of submittal requirements and adjust accordingly. Following the Engineer’s, and Owner’s review, one (1) set shall be returned to the Contractor with comments. The sets shall be revised and/or amended as required and the requisite final sets shall be submitted to the Engineer fifteen (15) days prior to start-up of systems. The Engineer shall distribute the copies to the Owner.

C. In addition to updated Shop Drawing information to reflect actual existing conditions, each set of technical manuals shall include installation, connection, operating, trouble-shooting, maintenance, and overhaul instructions in complete detail. This shall provide the Owner with comprehensive information on all systems and components to enable operation, service, maintenance, and repair. Exploded or other detailed views of all instruments, assemblies, and accessory components shall be included together with complete parts lists and ordering instructions.

2.04 MODIFICATION OF EXISTING PLC CONTROL PANELS

A. General:

1. Contractor shall modify the existing PLC control panel as shown on drawings and as described in this specification. Modify existing panel to add new signals as shown on drawings, including relays, surge arrestors,

terminal block, wiring, etc. as necessary for a complete and function PLC system.

2.05 NEW CONTROL PANELS

A. General:

1. New control panels shall be furnished and installed under this Contract as shown on drawings. They shall house the breakers, motor starters, overloads, control devices, indicating lights, control transformer, relays, timers, switches, run timer meters, surge protective devices and all necessary accessories, wiring and terminal blocks as necessary and as shown on the Drawings and as described herein. Control panel doors shall be equipped with a door latch kit or a fast operating clamp assembly as applicable. Each control panel shall be properly grounded and as such be provided with a ground terminal block. Control panels shall be properly sized for installation through new and existing entry ways and custom fit for locations as shown on the drawings

2. Construction:

   a. Outdoor: All outdoor control panels shall be NEMA 4X with drip shield kit, 3 point latch mechanism and 316 stainless steel 14 gauge construction, unless otherwise noted on drawings.
   b. Painting: Control panels shall be thoroughly cleaned and sandblasted per SSPC-SP-6 (Commercial Blast) after which surfaces shall receive a prime coat (Amercoat 185, Koppers 622HB, or equal) 3-mils dry, followed by two (2) or more finish coats (Amercoat 5401, Koppers 501, or equal) 3-mils dry, for a total thickness of the complete system of 6 mils. The finished color of the outside surfaces shall be white, unless otherwise noted or requested by Owner. The inside surfaces shall have a white finish coat.

3. Cooling: Control panels shall have sufficient cooling and/or ventilation not to exceed the maximum operating temperature of any of the internal components. Ambient temperature limits shall be 90 degrees F for indoor and 100 degrees F for outdoor control panels. Outdoor control panels with electronic equipment shall be furnished with sun shields around and on top of the control panels.

B. Signal and Control Circuit Wiring

1. Wire Type and Sizes: Conductors shall be flexible stranded copper wire; these shall be U.L. listed Type THHN and shall be rated 600 volts. Wire for control signal circuits and alarm input circuits shall be 16 AWG. All instrumentation cables shall be shielded No. 20 AWG minimum with a copper drain wire. All special instrumentation cable such as between sensor and transmitter shall be supplied by the I&C supplier.

2. Wire Insulation Colors: Conductors supplying 120 volt AC power on the line side of a disconnecting switch shall have a black insulation for the ungrounded conductor. Grounded circuit conductors shall have white insulation. Insulation for ungrounded 120 volt AC control circuit conductors shall be red. All wires energized by a voltage source external to the control board(s) shall have yellow insulation. Insulation for all DC conductors shall be blue.

3. Wiring Installation:

   a. All wires shall be run in plastic wireways except (1) field wiring, (2) wiring run between mating blocks in adjacent sections, (3) wiring run from components on a swing-out panel to components on a part of the fixed structure, and (4) wiring run to panel mounted components. Wiring run from components on a swing-out panels to other components on a fixed panel shall be made up in tied bundles. These shall be tied with nylon wire ties, and shall be secured to panels at both sides of the "hinge loop" so that conductors are not strained at terminals.

   b. Wiring run to control devices on the front panels shall be tied together at short intervals with nylon wire ties and secured to the inside face of the panel using adhesive mounts.

   c. Wiring to rear terminals on panel mount instruments shall be run in plastic wireways secured to horizontal brackets run above or below the instruments in about the same plane as the rear of the instruments.

   d. Shields of shielded instrument cable shall only be grounded on one side of each cable run. The side to be grounded shall always be in the field as applicable.

   e. Care shall be exercised to properly insulate the ungrounded side, to prevent ground loops from occurring.

   f. Conformance to the above wiring installation requirements shall be reflected by details shown on the Shop Drawings for the Engineer's review.

   g. Wires shall be terminated using pin connectors or spade lugs.

4. Wire Marking:

   a. Each signal, control, alarm, and indicating circuit conductor connected to a given electrical point shall be designated by a single unique number which shall be shown on all Shop Drawings. These numbers shall be marked on all conductors at every terminal using permanently marked heat-shrink plastic. Instrument signal circuit conductors shall be tagged with unique multiple digit numbers.

Black and white wires from the circuit breaker panelboard shall be tagged including the one (1) or two (2) digit number of the branch circuit breaker.

5. Terminal Blocks:

a. Terminal blocks shall be molded plastic with barriers and box lug terminals, and shall be rated 15 amperes at 600 volts. White marking strips, fastened securely to the molded sections, shall be provided and wire numbers or circuit identifications shall be marked thereon with permanent marking fluid. Terminal blocks shall be General Electric Type CR 151A1 with mounting rack, equivalent by Cinch-Jones or equal.

2.06 PLC REQUIREMENTS

A. Add new PLC I/O modules to the existing PLC as shown on the instrumentation drawings and as per specifications.

2.07 PROGRAMMABLE LOGIC CONTROLLER SOFTWARE

A. No new PLC software is needed. Contractor shall use his/her own PLC software to program the existing PLC components.

2.08 ACCESSORIES

A. General purpose relays in the control panels shall be plug in type with contacts rated 10 amperes at 120 volts AC. The quantity and type of contacts shall be as shown on the Drawings. Each relay shall be enclosed in a clear plastic heat and shock resistant dust cover with LED indication. Sockets for relays shall have screw type terminals. Relays shall be Potter and Brumfield, Square-D, or equal.

B. Time delay relays shall be solid-state on-delay or off-delay type with contacts rated for 10 amperes at 120VAC. Units shall include adjustable dial with graduated scale covering the time range in each case. Time delay relays shall be Agastat Series 7000, Omron Series H3, SSAC Type TDM, or approved equal.

C. Additional slave relays shall be installed when the number or type of contacts shown exceeds the contact capacity of the specified relays and timers.

D. Switches and indicating lights shall be round, 30.5 mm configuration, heavy duty and corrosion resistant. Legend plate shall be standard size square style laminate with white field and black markings as shown.

E. Indicating lights shall have LED type, unless otherwise noted. Lens color shall be as noted. All indicating lights shall be push-to-test type. Pushbuttons shall include full guard with flush button and selector switches shall include a black non-illuminated knob on switch, unless otherwise noted. Contact arrangement and configuration shall be as shown.

F. Devices shall be Eaton Electrical Type E-30, General Electric Type CR104, Square D class 9001 Type SK, Allen-Bradley Bulletin 800 or equal.

G. Selector switches shall be of the rotary type with the number of positions as shown on the Drawings. Color, escutcheon engravings, contact configurations and the like shall be as shown. Devices shall be Eaton Electrical Type E-24, General Electric Type CR104, or equal.

H. Circuit breakers shall be single pole, 120 volt, 15 ampere rating or as required to protect wires and equipment and mounted inside the panels as shown.

I. Nameplates shall be supplied for identification of all field-mounted elements, including flow meters and their transmitters. These nameplates shall identify the instrument, or meter, descriptively, as to function and system. These nameplates shall be fabricated from black-face, white-center, laminated engraving plastic. A nameplate shall be provided for each signal transducer, signal converter, signal isolator, each electronic trip, and the like, mounted inside the control panels. These shall be descriptive, to define the function and system of such element. Adhesives shall be acceptable for attaching nameplates. Painted surfaces must be prepared to allow permanent bonding of adhesives. Nameplates shall be provided for instruments, function titles for each group of instruments and other components mounted on the front of the control panels as shown. These nameplates and/or individual letters shall be fabricated from VI-LAM, Catalog No. 200, manufactured by N/P Company, or equivalent by Formica, or equal. Colors, lettering, style and sizes shall be as shown or as selected by the Engineer.

J. Solenoid Valves, if not otherwise noted, shall be globe valve, directly actuated by solenoid and not requiring minimum pressure differential for operation. Materials shall be brass globe valve bodies and Buna-N valve seats. The size shall be 1/4" normally closed. The coil shall be 115 VAC coil, NEMA 4 solenoid enclosure. Manufacturer shall be ASCO Red Hat, or equal.

2.09 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) PROTECTION

A. General

1. TVSS protection shall be provided to protect the electronic instrumentation system from induced surges propagating along the signal and power supply lines. The protection systems shall be such that the protective level shall not interfere with normal operation, but shall be lower than the instrument surge withstand level, and be maintenance free and self-restoring.

2. Instruments shall be housed in a suitable case, properly grounded. Ground wires for all TVSS shall be connected to a good earth ground and where practical, each ground wire run individually and insulated from each other. These protectors shall be mounted within the instrument enclosure or a separate NEMA-4X junction box coupled to the enclosure.

B. Power Supply

1. Protection of all 120 VAC instrument power supply lines shall be provided. Control panels shall be protected by line noise suppressing isolation transformers and TVSS. Field instruments shall be protected by TVSS. For control panels, the line noise suppressing isolation transformer shall be Topaz Series 30 Ultra isolators or approved equal. The suppressor shall be Edco HSP-121 and U.L. 1449 compliant.

C. Analog Signals

1. Protection of analog signal lines originating and terminating not in the same building shall be provided by TVSS. For analog signal lines, the TVSS shall be EDCO PC-642. For field mounted two-wire instruments, the TVSS shall be encapsulated in stainless steel pipe nipples and shall be EDCO SS64 series, and U.L. 497B compliant.

2. For field mounted four-wire 120VAC instruments, the TVSS shall be in a NEMA 4X polycarbonate enclosure, EDCO SLAC series.

2.10 INSTRUMENTATION AND CONTROL EQUIPMENT SPECIFICATIONS

L1. ULTRASONIC FLOW TRANSDUCER AND CONTROLLER (FLOW APPLICATION)

1. The multi purpose sonic level system shall operate on the principle of ultrasonic sonar reflection in which acoustic impulses emitted from an ultrasonic transducer are reflected back from the material surface and are received by the transducer. The transit time of pulse travel from generation to echo is measured. The elapsed time is proportional to the distance between the transducer face and material surface. Systems shall be designed for automatic self-compensation of signal speed due to temperature, humidity and other atmospheric variations. The system shall be supplied with interconnecting cable between sensor and transmitter.

2. Transmitter Design:

a. Microprocessor-based echo-time measuring transmitter with output signal proportional to distance between sensor and surface of media. The controller shall have an EEPROM memory and shall not require a battery to ensure protection of stored data.
b. Modular component assembly construction with plug-in electronics for convenient service.
c. Power: 120 VAC. 60 Hz, 17-Watt maximum power requirements (36-VA).
d. Isolated 4-20 mA DC output signal into 750 ohms.
e. Operation range and engineering unit selections with local digital display of measured distance shall be able to enter new data via infrared keypad.
f. Accuracy: +/- 0.25 percent of full scale.
g. Resolution: +/- 0.1 percent of full scale.
h. Distance: Maximum allowable distance between sensor and transmitter is 1200 feet.
i. Total Beam Angle: 6 degrees or less.

j. Maximum Range: 0 to 50 standard feet.
k. Process: Level of finished water in storage tank.
l. Sensor Location Temperature: -40 to 203 degree F.
m. Transmitter Ambient Temperature: -5 to 122 degree F.
n. Communication: 4-20mA hard wired signal.

3. The multipurpose sonic level system shall have internal self-diagnostics function and 6 alarm relays for lost echo or temperature, rate of change of level, differential level, time sampling, volume sampling, and pump control. Systems shall be furnished complete with flanged transducer, interconnection cable and indicating transmitter.

4. The transmitter shall include an integral LCD type indicator calibrated in engineering units for local indication. LCD display shall be minimum 100 x 40 mm (4 x 1.5") multi-field back lit LCD display with individual alarm status lights on LCD display.

5. Provide a hand held keypad programmer or calibrator for startup.

6. Unless shown otherwise on the instrument schedule, provide NEMA 4X corrosion resistant, oil tight, dust tight, and weatherproof housing for indoor or outdoor locations.

7. Provide all 316 stainless steel mounting hardware for surface, panel or handrail mounting as required by location.

8. Provide front mounted visible data display behind clear, shatterproof viewing cover.

9. Systems shall be manufactured by Siemens-Milltronics Model Hydroranger 200 with an Echomax XPS-15 transducer or approved equal. The ultrasonic level transmitter shall be programmed to convert level to flow using the V-notch as shown on drawings. Coordinate with the mechanical engineer for any data requirements of the V-notch flow channel for flow calculation and program accordingly.

M1. Magnetic Flow Meter

Furnish all labor, material, equipment, and incidentals required to install new magnetic flow meters and associated piping and auxiliary equipment as shown on the Drawings.

Meter:

All equipment included in the construction of the magnetic flow meters shall be of proven ability for use in measuring total flow and flow rates for continuously metering raw well water.

The meter shall contain a remote microprocessor based signal converter which will display both rate of flow and total flow using a 4-20 mA DC output signal and dry contact pulsed output.

1. General:
   a. Function: Measure, indicate, and transmit the flow of a process liquid in a

full pipe.

b. Type: Electromagnetic flowmeter, with operation based on Faraday's Law, utilizing the pulsed dc type coil excitation principle with high impedance electrodes.

c. Parts: Flow element, transmitter, interconnecting cables, mounting hardware, and calibrator.

2. Service: Wastewater and up to 10 mg/l suspended solids.

The meter shall be of the low frequency electromagnetic induction type and shall produce a pulsed DC signal directly proportional and linear to the liquid signal directly proportional and linear to the liquid flow rate. The output signal from the separately mounted meter electronics shall be 4-20mA DC and dry contact pulsed output. The meter shall be designed for operation of a 120 VAC, 60 Hz power consumption of less than 15 watts for sizes through 12-inch, and 5 watts per inch of diameter larger than 12 inches.

The meter shall include a magnetic driver to power the magnetic coils and a signal converter. The metering velocity span shall be continuously adjustable from 0 to 1 and 0 to 33 feet per second, and the meter shall feature complete zero stability. The meter shall be hydraulically calibrated in the United States and the calibration shall be traceable to the NIST.

3. Performance:
   a. Flow Range: 0 – 2000 gpm
   b. Accuracy: Plus or minus 1 percent of rate for all flows resulting from pipe velocities of 0 to 100% flow range.
   c. Turndown Ratio: Minimum of 10 to 1 when flow velocity at minimum flow is at least 1 foot per second.
   d. Repeatability: +/- 0.1% of full scale.
   e. Ambient Temperature - 20 to 120 deg F.
   f. Range full scale from 0 to 33 ft/sec.

4. Features:
   a. Zero stability feature to eliminate the need to stop flow to check zero alignment.
   b. No obstructions to flow.
   c. Very low pressure loss.

5. Process Connection:
   a. Meter Size: 10 inches. Coordinate with Mechanical.
   b. Connection Type: 150-pound ANSI raised-face flanges or wafer style depending on meter size, unless otherwise noted.
   c. Flange Material: Carbon steel, unless otherwise noted.

6. Signal Interface:
   a. 4 to 20 mA dc for load impedance 0 to 800 ohms minimum for 24V dc supply.
   b. Dry contact pulsed output programmable for pulse units.

7. Power: 120V ac, 60-Hz, unless otherwise noted.

8. Element:
   a. Meter Tube Material: Carbon Steel, unless otherwise noted.
   b. Liner Material: Teflon, unless otherwise noted.
   c. Liner Protectors: Covers on each end to protect liner during shipment.
   d. Electrode Type: Flush or bullet nose as recommended by the manufacturer for the noted stream fluid.
   e. Electrode Material: 316 stainless steel, unless otherwise noted.
   f. Enclosure: NEMA 4, unless otherwise noted.
   g. Grounding Ring/Electrode Material: 316 stainless steel, unless otherwise noted.

9. Transmitter:
   a. Display: Blind or indicating and/or totalizing as noted.
   b. Mounting: Pipe stand, wall, panel, or integral as noted.
   c. Enclosure: NEMA 4X.
   d. Zero and Span: Field adjustable.
   e. Indicator: Digital 16-character display, with scale range as noted.
   f. Totalizer: Digital 16-character display, with totalizer unit digit value as noted.
   g. Terminal Box: NEMA 4X construction mounted on main body of water. Provide splash and dust proof terminal boxes with water cable entrance seals.

10. Cables:
   a. Types: As recommended by manufacturer.
   b. Lengths: As required to accommodate device locations.

11. Calibration System:
   a. Features:
      1) Field programmable electronics.
      2) Self-diagnostics with troubleshooting codes.
      3) Ability to program electronics with full scale flow, engineering units, meter size, zero flow cutoff, desired signal damping, totalizer unit digit value, etc.
      4) Initial flow tube calibration and subsequent calibration checks.
   b. Equipment:
      1) Built-in electronics with each unit provided.
      2) Alternatively, one portable calibrator of each type required for the various electromagnetic flowmeters provided on the project.

Provide special tools and spare parts to completely operate and maintain the unit.

Calibration check shall be verified by a simple built in signal injection. The meter shall provide for a constant zero output signal during no flow and other conditions of potential false signals.

Electrical connections shall be 1/2 inch NPT water tight and flush. Manufacturer shall certify the meter is capable of operating under submergence for up to 48

hours in 30 feet of water.

Meter rangeability shall be 100:1 The output signal scale shall be capable of field adjustment. The unit shall be accurate to +1% of rate. The unit shall have standard radio frequency protection.

The manufacturer shall be:
1. ABB
2. Or Owner Approved Equal

Converter:
Microprocessor based signal converter shall accept any linear or squared 4-20 mA DC signal. The unit shall simultaneously display rate of flow and total flow on a half inch (1/2") high liquid crystal display (LCD). The totalizer shall be field programmable for totalization and indicator. The unit shall contain an 8-digit total flow display and be provided with a battery backup for total flow display, in the event of signal interruption or loss of signal. The total flow display, prior to signal interruption, shall not be lost or zeroed out. Power requirements shall be 120 VAC. The Indication Flow display shall be 3-digit, 1/2 inch high LCD. Converter shall be supplied with empty pipe detection feature.
The accuracy of the Total Display shall be+/-0.5 percent of rate over the full scale.
The accuracy of the rate display shall be+/-0.5 percent of rate over the full scale.

The housing shall be a fire retardant glass-reinforced polyester plastic with provisions for surface mounting. The case shall be NEMA 4X rated suitable for outdoor installations. The window shall be tempered glass. Provide internal illumination for night reading.

Provide two output signals linear and directly proportional to flow as follows: 4-20mAdc isolated into 0-600 ohms. 0-10 kHz scaled pulse.

Low Flow Cutoff Limit: Drive the output to zero when the measured flow rate is 1-10 percent (adjustable) of full scale and when fully developed flow no longer exists.

High Impedance Sensing: Provide sensing amplifiers with high impedance to minimize effects of deposit build-up on the electrodes.

Interchangeable Electronics: Provide converter/transmitter that is interchangeable with all flow meter sizes of manufacturer's same model.

The signal converter shall be provided by the manufacturer of the flow element as a matched package. Signal converters shall be manufacturer supplied model that meets the specification of this section. Different manufacturers of flow element and signal converter submitted as a package will not be acceptable.

Installation:

1. Mount the flow meter in the process pipe at a location to ensure a full pipe under both normal flow and no-flow conditions, locate the flow meter in a straight run of pipe where the following obstructions (valves, gates, elbows, tees, pumps, severe

reducers and for plant expanders) are not nearer than ten pipe diameters from the meter inlet and five pipe diameters from the meter outlet. Where there is insufficient space to follow these guidelines, notify the Engineer before installing any flow meter.

2. Locate the transmitter within the distance from the flow meter sensor recommended by the manufacturer. Mount the transmitter on the sludge loading panel as noted on the drawings.

3. On horizontal pipes, mount the transducer electrodes on the side of the pipe rather than on the top or bottom.

4. Ground flow meters using grounding probes or 0. 125 inch thick stainless steel grounding rings placed between the meter and mating flanges at both ends of the meter, or as recommended by the manufacturer of the meter. Provide an earth ground using a ground rod. Do not use process piping for grounding.

5. Supply the power for the magmeter and the transmitter from the same power source and electrical phase. Provide separate conduits for signal and power wiring.

2.11 CONTROL STRATEGY AND LOOP DESCRIPTIONS

A. No control strategy modification is needed. Only I/O mapping and removable of I/O points from one PLC and adding in another PLC panel as shown on drawings. Modify SCADA screens to match the modified treatment unit No.1 system.

B. The I&C supplier and software programmer shall perform the loop check after the new signals and existing signals are reconnected to the existing PLC panel. New signals will need I/O mapping in the PLC program. The I&C supplier and software programmer shall also perform the startup service after all signals are connected. Refer to I-drawings for additional requirements.

2.12 INSTRUMENT LIST

TAG NO.	COMPONENT CODE	COMPONENT TITLE	COMPONENT OPTIONS/RANGE	REMARKS
As shown on P&ID Drawing				

PART 3 - EXECUTION

2.13 INSTALLATION, CALIBRATION, TESTING, START-UP AND INSTRUCTION

A. General:

1. Under the supervision of the Single I&C supplier, all systems specified in

this Section shall be installed, connected, calibrated and tested, and in coordination with the Engineer and the Owner, shall be started to place the processes in operation. This shall include final calibration in concert with equipment specified elsewhere in these Specifications, including pumps, valves, as well as certain existing equipment.

B. Testing

1. All systems shall be exercised through operational tests in the presence of the Engineer in order to demonstrate achievement of the specified performance. Operational tests depend upon completion of work specified elsewhere in these Specifications. The scheduling of tests shall be coordinated by the Contractor among all parties involved so that the tests may proceed without delays or disruption by incomplete work.

2. Check the function of each loop, including set points, alarms, displays, and operator interface. Check all loops before performing the startup or strategy testing. Check data logging, alarm logging, and event logging.

3. See section 3.02 supplements for sample "Loop Status Report" and "Functional Acceptance Test Sheet".

C. Installation and Connection:

1. The Contractor shall install and connect all field-mounted components and assemblies under the criteria imposed in Part 1, 1.03, herein. The installation personnel shall be provided with a final reviewed copy of the Shop Drawings and data.

2. The instrument process sensing lines and air signal tubing shall, in general, be installed in a similar manner to the installation of conduit specified under Division 16. Individual tubes shall be run parallel and near the surfaces from which they are supported.

3. Supports shall be used at intervals of not more than 3 feet of rigid tubing.

4. Bends shall be formed with the proper tool and to uniform radii and shall be made without deforming or thinning the walls of the tubing. Plastic clips shall be used to hold individual plastic tubes parallel. Ends of tubing shall be square cut and cleaned before being inserted in the fittings. Bulkhead fittings shall be provided at all panels.

5. The Contractor shall have a technical field representative of the I&C supplier to instruct these installation personnel on any and all installation requirements; thereafter, the technical field representative shall be readily available by telephone to answer questions and supply clarification when needed by the installation personnel.

6. Where primary elements (supplied by I&C supplier) shall be part of a mechanical system, the I&C supplier shall coordinate the installation of the

primary elements with the mechanical system manufacturer.

7. Finally, after all installation and connection work has been completed, the technical field representative shall check it all for correctness, verifying polarity of electric power and signal connections, making sure all process connections are free of leaks, and all such similar details. If the initial inspection finds no deficiencies, the technical field representative shall proceed to the certification to the Contractor. Any completed work that is found to have deficiencies shall have those deficiencies corrected by installation personnel at no additional cost to the Owner. The technical field representative shall then recheck the work after the identified deficiencies are corrected. If the technical field representative finds deficiencies in the follow-up inspection, then remedial action shall be taken by the Contractor at no cost to the Owner. This pattern shall be repeated until the installation is free from defect. The technical field representative shall then certify in writing to the Contractor that for each loop or system that he has inspected is complete and without discrepancies.

8. The field representative of the Single I&C supplier shall coordinate all work required to interface the new equipment and control devices with the existing equipment, including all required modifications to existing equipment and related devices.

D. Calibration

1. All instruments and systems shall be calibrated after installation, in conformance with the component manufacturer's written instructions. This shall provide that those components having adjustable features are set carefully for the specific conditions and applications of this installation, and that the components and/or systems are within the specified limits of accuracy. Defective elements that cannot achieve proper calibration or accuracy, either individually or within a system, shall be replaced. This calibration work shall be accomplished by the technical field representatives of the I&C system supplier who shall certify in writing to the Contractor that for each loop or system all calibrations have been made and that all instruments are ready to operate. See section 3.02 supplements for sample "Instrumentation Calibration Sheet".

2. Proof of Conformance - The burden of proof of conformance to specified accuracy and performance is on the Contractor using its designated Single I&C supplier. The Contractor's designer shall supply necessary test equipment and technical personnel if called upon to prove accuracy and/or performance, at no separate additional cost to the Owner, wherever reasonable doubt or evidence of malfunction or poor performance may appear within the guarantee period.

E. Pre-Commissioning:

1. The I&C Supplier shall test each loop (discrete and analog) to determine if it is functioning correctly. The I&C Supplier shall furnish a loop sheet for

each loop to be tested. The loop sheet shall represent the actual "as-built" condition of the loop. The I&C Supplier shall perform a field functional loop test which shall be witnessed by the Engineer and Owner. If the loop fails the functional test, the I&C Supplier shall coordinate repairs for the Contractor to correct whatever is wrong with the loop. The I&C Supplier shall retest the loop until it is approved.

2. Each loop shall be tested and approved by Engineer and Owner until all loops have been approved.

F. Start-up and Instruction

1. When all systems are assessed by the Contractor to have been successfully carried out complete operational tests with a minimum of simulation, and the Engineer concurs in this assessment, plant start-up by the Owner's operating personnel can follow. When the owner has accepted the system, instruction shall be given by qualified persons who have been made familiar in advance with the systems in accordance with item 3.01.I. All equipment shall be checked during the first year of operation at intervals of three months for a period of not less than one day or as may be required to correct any defects to the satisfaction of the Owner.

G. Modifications to Existing Facilities

1. The Contractor shall make all modifications to existing equipment and control devices that are required to successfully install and integrate all new instrumentation equipment. All costs for any required modification and rehabilitation effort shall be included in the Contractor's original bid amount and no additional payment shall be allowed.

H. Plant Shutdowns

1. The Single I&C supplier shall carefully examine all work to be performed relative to existing I&C equipment and the installation of new equipment and control devices. Work shall be scheduled to minimize required plant shutdown times.

I. Training

1. The cost of training programs to be conducted with City's personnel shall be included in the Contract price. The training and instruction, insofar as practicable, shall be directly related to the systems being supplied.

2. The supplier shall provide detailed manuals to supplement the training courses. The manuals shall include specific details of equipment supplied and operations specific to the project.

3. The supplier shall make use of teaching aids, manuals, slide/video presentations, etc. as necessary to provide a complete and valuable training experience. After the training services, such materials shall be

delivered to City.

4. The training program shall represent a comprehensive program covering all aspects of the operation, maintenance, calibration and cleaning procedures for the system.

5. All training schedules shall be coordinated with, and at the convenience of the City. Shift training may be required to correspond to the City's working schedule.

6. Training shall be performed by qualified representatives of the Instrumentation Control and Monitoring System Integrator. Training shall be specifically tailored to this project and reflect the control system installation and configuration. All training shall be conducted at the job site, unless an alternate location is approved by the City. Training shall be for a minimum of 1 full day and may require multiple classes to accommodate different shifts of operations personnel. Submit training materials and resumes of the training personnel to the City a minimum of two weeks prior to the training session(s) for City approval.

2.14 SUPPLEMENTS

A. Supplements listed below; following "END OF SECTION" is part of this Specification.

1. Instrumentation Calibration Sheet

2. Loop Status Report

END OF SECTION

Attachment E

LOOP STATUS REPORT

PROJECT NAME:_____

PROJECT NO.:_____

FUNCTIONAL REQUIREMENTS

			COMPONENT	**STATUS**		
TAG NO.	DELIVERED*	TAG/IDENTIFI-CATION CHECK*	INSTALLATION CHECK	TERMINATION WIRING*	TERMINATION TUBING*	CALIBRATED*

REMARKS	LOOP READY FOR START-UP
	BY
	DATE

* INITIAL AND DATE WHEN COMPLETE

COMPONENT CODE: NAME:	MANUFACTURER: MODEL: SERIAL:	PROJECT NUMBER: NAME:
RANGE VALUE UNITS □INDIATE/CHART _____ _____ RECORD SCALE _____ _____ □TRANS/INPUT _____ _____ CONVERT OUTPUT _____ _____	□ COMPUTE FUNCTIONS	□ CONTROL ACTION (DIRECT/REVERSE) MODES (P/I/D) □ SWITCH UNIT RANGE (VALUE/UNITS) DIFFERENTIAL (FIXED/ADJUSTABLE) RESET (AUTOMATIC/MANUAL)

ANALOG							DISCRETE					
REQUIRED			AS CALIBRATED				REQUIRED			AS CALIBRATED		REMARKS CODE
IN	SCALE	OUT	SCALE	OUT	SCALE	OUT	NUMBER	TRIP PT	RESET PT	TRIP PT	RESET PT	
C. MODE SETTINGS: P				I		D						

	COMPONENT CALIBRATED AND READY FOR START-UP BY DATE
	TAG NO.

SECTION 16001

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section covers the work necessary for the construction of the electrical system shown on the accompanying Drawings. The work included under this section includes providing all materials, furnishing all labor and except as provided under other sections of these Specifications, by others or by the Owner, to install a complete functioning electrical system. This installation shall include all incidental items whether shown on the drawing, call for in these Specifications or not. It is not the intent for the Drawings or these Specifications to show or specify each and every required device, conduit, conductor, control device or other incidental items.

1.02 REFERENCES

A. American National Standards Institute (ANSI):

1. C80.5, Rigid Aluminum Conduit.

2. C80.6, Intermediate Metal Conduit (MC)-Zinc Coated**.**

3. Nema RN1, PVC Coated Rigid Steel.

4. Z55.1, Gray Finishes for Industrial Apparatus and Equipment.

B. Federal Specifications (FS):

1. W-C-596, Connector, Receptacle, Electrical.

2. W-S-896E, Switches, Toggle, Flush Mounted.

C. National Electrical Contractor’s Association, Inc. (NECA): 5055, Standard of Installation.

D. National Electrical Manufacturers Association (NEMA):

1. AB1, Molded Case Circuit Breakers and Molded Case Switches.

2. ICS2, Standard for Industrial Control Devices, Controllers, and Assemblies.

3. PB1, Panelboards.

4. ST20, Dry-Type Transformers for General Applications.

5. TC2, Electrical Plastic Tubing (EB) and Conduit (EPC-40 and EPC-80).

6. TC3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.

7. WD1, General Requirements for Wiring Devices.

8. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).

E. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).

F. Underwriters Laboratories, Inc. (UL):

1. 1, Standard for Safety Flexible Metal Conduit.

2. 651, Standard for Safety Schedule 40 and 80 PVC Conduit.

3. 845, Standard for Safety Motor Control Centers.

4. Standard for Dry-Type General Purpose and Power Transformers.

G. American Society for Testing and Materials (ASTM):

1. A123 El, Standard Specification for Zinc-Coated (Galvanized) Coatings on Iron and Steel Products.

2. C857, Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.

1.03 ELECTRICAL SUBCONTRACTOR QUALIFICATIONS

A. The electrical subcontractor shall meet or exceed the criteria described below:

1. The electrical subcontractor shall be licensed in the State of Florida.

2. The electrical subcontractor shall have successfully completed electrical construction on three water treatment plant, or wastewater treatment plant related projects within the past six years.

3. The electrical subcontractor shall have, in their employ, the following full time employees that will be assigned to perform the electrical work of this contract:

a. A minimum of (1) Licensed Master Electrician who is overall responsible for the supervision of personnel performing the construction, installation startup and testing of all electrical related facilities and systems.

b. A minimum of (1) Licensed Journeyman Electrician responsible for the daily construction activities and guidance of the electrical contractor’s on site employees. The Licensed Journeyman’s primary assignment will be the construction of the electrical facilities of this project until project

completion. The Licensed Journeyman shall be certified in local County of this project or shall meet the reciprocity standards of Florida State Statue 489 Part II.

4. The electrical subcontractor shall not be involved in any current or pending litigation which may have a material negative impact on the ability to complete the project. The electrical subcontractor shall provide a statement advising all current or pending litigations.

1.04 CODES AND PERMITS

A. All work shall be performed in strict accordance with the current addition of National Fire Protection Association NFPA 70 (National Electrical Code), IEEE Standards, NECA Standards, NEMA Standards, local codes, Local County codes, Florida Building codes with amendments and shall comply with the Authority Having Jurisdiction (AHJ) over the project. Conflicts will be resolved at the discretion of the Engineer.

B. Wherever the Specifications or Drawings exceed those of the applicable codes or authorities the requirements contained herein shall govern. Code compliance is mandatory. Nothing contained in these Contract Documents shall be construed as permitting work to be performed outside the requirements of the applicable codes or governing authorities.

C. Obtain all required permits and pay all fees required by any agency having jurisdiction over this project. Upon completion of the work, obtain from regulatory authorities signed permits indicating the work is acceptable to the authority having jurisdiction.

1.05 COMPLIANCE

A. All the work executed under this section shall meet the General and Special Conditions sections of this Specification as if fully stated herein.

1.06 SUBMITTALS

A. Furnish submittal and shop drawing information for minimum of the following:

1. Conduit and wire

2. Junction boxes

3. Supports

4. Electrical equipment, such as panelboard, breakers, disconnect, etc., as applicable.

5. Precast Manholes and Handholes

6. Instrument

1.07 INTENT OF DRAWINGS

A. The electrical drawings show only general locations of equipment devices, and raceways, unless specifically dimensioned. The Contractor shall be responsible for the proper routing of raceways, final sizing of conductors, and location of equipment and connections. The control diagrams for the equipment are diagrammatic and intended to show the desired operation. The Contractor shall install the controls exactly as shown unless this operation will cause failure of the equipment due to unique operating characteristics of the supplied equipment not known to the Engineer. The Contractor shall notify the Engineer of such conflicts within 30 days of the Contract award and receive written resolution before proceeding with the Contract work. Any damage to Contractor-supplied equipment arising due to improper control shall be the responsibility of the Contractor.

1.08 PRE-BID SITE VISIT

A. The Contractor shall familiarize himself with the site prior to bidding and verify that the specified new equipment can be implemented within his proposed Bid price.

1.09 PROJECT DESCRIPTION

A. Coordinate with treatment unit packaged supplier for the treatment unit components to be supplied by the supplier and notify the engineer and Owner for any deviations.

B. Coordinate with walkway structural engineer for the light pole mount requirements and install accordingly.

C. Provide and install all electrical equipment as shown on drawings and as describes in specifications complete in place.

D. Provide and install new underground conduits, pull boxes/manholes and wiring indicated on drawings complete in place.

E. Provide and install new lighting and convenience power systems, indicated on the drawings, complete in place.

F. Provide and install all conduit and wire required for power, instrumentation, and control systems complete in place.

G. Provide and install new grounding system as shown in drawings and as specified in specification complete in place.

H. Provide all miscellaneous electrical including disconnect switches, terminations, fittings, junction boxes, terminal junction boxes, mounting supports, etc. not specified but obviously necessary for complete working systems in place.

1.10 TEMPORARY POWER

A. Provide temporary power for all office trailers and for all construction areas as needed. Coordinate with local power and telephone utility for temporary construction power and telephone service, if needed, during construction. Unless otherwise agreed by the Owner, no construction power shall be from the existing plant power distribution system.

1.11 ENVIRONMENTAL CONDITIONS

A. All chemical rooms and areas shall be designated as corrosive.

B. All indoor chemical and process equipment areas shall be considered wet locations.

C. Electrical equipment in rooms designated as Classified by NFPA 70 (national electrical code) as Division 1 or Division 2 shall meet all requirements set forth for that classification as described in NEC article 500.

PART 2 - PRODUCTS

2.01 GENERAL

A. Use of new quality materials is required on this project.

B. Only materials suitable for the space provided shall be used.

C. Provide materials and equipment listed by Underwriter Laboratories (UL) wherever standards have been established by that agency.

D. Where two or more units of the same class of material or equipment are required, provide products of a single manufacturer. Component parts of materials or equipment need not be products of the same manufacturer.

2.02 STANDARD PRODUCTS

A. Unless otherwise indicated, provide materials and equipment which are the standard products of manufacturers regularly engaged in the production of such materials and equipment. Provide the manufacturer's latest standard design that conforms to these Specifications.

2.03 EQUIPMENT FINISH

A. Provide materials and equipment with manufacturer's standard finish system. Provide manufacturer's standard finish color, except where specific color or materials are indicated. If manufacturer has no standard color, finish equipment in accordance with ANSI No. 61, light gray color.

2.04 RACEWAYS

A. Rigid Aluminum Conduit: Use rigid aluminum conduit, including threaded type couplings, elbows, nipples, and other fittings, Type 6063, copper-free aluminum alloy and meeting the requirements of ANSI C80.5 and UL 6., and the NEC.

B. Flexible Metal Conduit: Use UL listed liquid-tight flexible metal conduit consisting of galvanized steel flexible conduit covered with an extruded PVC jacket and terminated with nylon bushings or bushings with steel or malleable iron body and insulated throat and sealing O-ring.

C. PVC Schedule 40 Conduit: Use UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors. Meet requirements of NEMA TC 2and UL 651.

2.05 RACEWAY FITTINGS

A. Fittings for Rigid Aluminum Conduit:

1. Use insulated throat bushings of metal with integral plastic bushings rated for 105 degrees C. For insulated throat bushings for rigid aluminum conduit, use Thomas and Betts Nylon Insulated Metallic Bushings, or O.Z. Gedney Type B.

2. Use Myers Scru-Tite hubs for rigid aluminum conduit.

3. Use conduit bodies for rigid aluminum conduit of metal and sized as required by the NEC (NFPA 70-1984). Use Appleton Form 35 threaded Unilets; Crouse-Hinds Mark 9 or Form 7 threaded condulets; Killark Series O Electrolets; or equal, for normal conduit bodies for rigid aluminum conduit. Where conduit bodies for rigid aluminum conduit are required to be approved for hazardous (classified) locations, use conduit bodies manufactured by Appleton, Crouse-Hinds, or Killark.

4. Use only couplings for rigid aluminum conduit supplied by the conduit manufacturer.

5. Use Appleton Type EYF, EYM, or ESU; Crouse-Hinds Type EYS or EZS; or Killark Type EY or EYS, sealing fittings for rigid aluminum conduit. Where condensate may collect on top of a seal, provide a drain by using Appleton Type SF or Crouse-Hinds Type EYD or EZD Drain Seal.

6. Use Appleton Type ECDB or Crouse-Hinds ECD drain fittings for rigid aluminum conduit.

7. Fittings for Liquid-Tight Flexible Metal Conduit: use insulated throat connectors for liquid-tight flexible metal conduit of metal with an integral plastic bushing rated for 105 degrees C, and of the long design type extending outside of the box or other device at least 2 inches. Use Thomas and Betts Super-Tite Nylon Insulated Connectors, or equal.

8. Fittings in Hazardous Areas: In hazardous areas, use only fittings approved for the atmosphere involved.

9. Use cable sealing fittings forming a watertight nonslip connection to pass cords and cables into conduit. Size cable sealing fitting for the conductor OD. For conductors with OD's of 1/2 inch or less, provide a neoprene bushing where the conductor enters the connector. Use Crouse-Hinds CGBS, Appleton CG Series, or equal, cable sealing fittings.

B. Fittings for PVC conduit:

1. Meet requirements of NEMA TC-3.

2. Type: PVC, slip-on.

2.06 CONDUCTORS 600 VOLTS AND BELOW

A. Cable shall be rated for 600 volts and shall meet the requirements below:

1. All conductors shall be stranded.

2. All wire shall be brought to the job in unbroken packages and shall bear the date of manufacturing; not older than 12 months.

3. Type of wire shall be THHN/THWN for aboveground and underground applications.

4. No wire smaller than No. 12 gauge shall be used for power circuits unless specifically indicated.

5. Conductor metal shall be copper. No aluminum will be allowed.

6. All conductors shall be meggered after installation and insulation must be in compliance with the Insulated Power Cable Engineers Association Minimum Values of Insulation Resistance.

7. Wire Color Identification: Neutral wire white; live wire black, red, blue on 120/208-volt system; live wire brown, purple, yellow on 277/480-volt system. Ground wire green.

8. Fixture Connection: Circuit wiring connections to fixture wire shall be made with pressure type solderless connectors. Buchanan, Scotch-lock, Wing Nut, or approved equal, complete with insulator and security ring.

9. Acceptable manufacturers:

a. Southwire

b. Rome Cable & Wire

c. Okonite Wire & Cable

B. INSTRUMENTATION CABLE TYPE "B", TWISTED SHIELDED PAIR (TSP)

1. General: The instrumentation cable shall consist of single or multiple shielded twisted pairs (tsp) with 600 volt insulation and a 105 degree C rating. The individual twisted pair of a multi-pair cable shall consist of copper conductors with an ethylene-propylene insulation, #16 AWG tinned stranded copper drain wire and an overall aluminum / mylar sheath. For the multiple pair cable assembly, a #16 AWG overall tinned copper stranded drain wire shall be provided together with an overall aluminum mylar shield and a chloro-sulfonated polyethylene compound jacket. The cable shall be flame retardant.

2. Insulation: Pair conductors shall be insulated with a heat, moisture, flame and chemically resistant mechanically rugged ethylene-propylene insulating compound. The insulation thickness shall be as follows:

AWG	Minimum Insulation Thickness
#16	45 mils

3. Conductors shall be tin coated stranded copper ASTM B-33 and B-8.

4. Jacket: Overall cable jacket shall be chloro-sulfonated polyethylene compound, exceeding the requirements of ICEA S-10-81. The cable shall be suitable for installation in cable tray, conduit in wet or dry location, and shall meet IPCEA Standards.

5. Shields: Aluminum mylar tape shields with tinned copper drain wire shall be applied over the individually twisted pairs prior to placement of the cable jacket. Another aluminum/mylar tape with tinned copper drain wire shall be applied over the assembled pairs prior to placement of the cable jacket. Grounding of shields shall be according to equipment manufacturer's recommendations.

6. The conductors shall be tested after installation and insulation must be in compliance with the manufacturer's equipment.

7. Acceptable manufacturers:

a. Southwire

b. Rome Cable & Wire

c. Belden Wire

d. Carol Wire & Cable.

e. Or Engineer Approved equal.

2.07 JUNCTION BOXES

A. Box: 14-gauge, ASTM A240, Type 316 stainless steel, unless otherwise noted. For corrosive area, use FRP junction box if not direct exposed to sunlight.

B. Cover: Hinged with screws.

C. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.

2.08 COVER PLATES

A. Provide plates fitting closely and tightly to the box on which they are to be installed. On surface-mounted boxes, provide plates which do not extend beyond the sides of the box unless the plates do not have sharp corners or edges.

B. Provide stainless steel one-piece with smooth exterior faces and with oval head stainless steel metal mounting screws of a color matching that of the plate.

C. Where weatherproof devices are indicated, provide a gasketed, weatherproof, cast metal, stainless steel or fiberglass reinforced plastic (FRP) cover plate with individual cap over each opening, and 316 stainless steel mounting screws. Plates shall have caps held by stainless steel springs.

2.09 TERMINAL BLOCK (0 TO 600 VOLTS)

A. UL 486E and UL 1059.

B. Size components to allow insertion of necessary wire sizes.

C. Capable of termination of all control circuits entering or leaving equipment, panels, or boxes.

D. Screw clamp compression, dead front barrier type, with current bar providing direct contact with wire between the compression screw and yoke.

E. Yoke, current bar, and clamping screw of high strength and high conductivity metal.

F. Yoke shall guide all strands of wire into terminal.

G. Current bar shall ensure vibration-proof connection.

H. Terminals:

1. Capable of wire connections without special preparation other than stripping.

2. Capable of jumper installation with no loss of terminal or rail space.

3. Individual, rail mounted.

I. Marking system allowing use of preprinted or field-marked tags.

J. Manufacturers:

1. Weidmuller

2. Ideal

3. Electrovert

2.10 TERMINAL JUNCTION BOX.

A. Cover: Hinged, unless otherwise shown.

B. Terminal Blocks: Provide separate connection point for each conductor entering or leaving box.

1. Spare Terminal Points: 20 percent.

C. Interior Finish: Paint with white enamel or lacquer.

2.11 SUPPORT AND FRAMING CHANNELS

A. Material:

1. Dry indoors – 316 stainless steel.

2. All Other Areas: ASTM A167, Type 316 stainless steel. For corrosive area and not located outdoor, use fiber glass-reinforced polyester (FRP) channels.

B. Finish:

1. Dry indoors – 316 stainless steel.

2. All Other Areas: ASTM A167, Type 316 stainless steel. For corrosive area and not located outdoor, use fiber glass-reinforced polyester (FRP) channels.

C. Inserts: Continuous.

D. Conduit Clamps: galvanized clamps in door. 316L stainless steel clamps for corrosive area and outdoor.

E. Manufacturers:

1. B-Line.

2. Unistrut.

3. Or Engineer Approved

2.12 LIGHTING AND POWER DISTRIBUTION PANELBOARD

A. NEMA PB I, NFPA 70, and UL 67, including panelboards installed in motor control equipment.

B. Panelboards and Circuit Breakers: Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.

C. Short-Circuit Current Equipment Rating: Fully rated; series connected unacceptable.

D. Rating: If not otherwise shown in plans. Applicable to a system with available short-circuit current of 25,000 amperes rms symmetrical at 208Y/120 or 120/240 volts and 65,000 amperes rms symmetrical at 480Y/277 volts.

E. Where ground fault interrupter circuit breakers are indicated or required by code: 5 mA trip, 10,000 amps interrupting capacity circuit breakers.

F. Cabinet: As shown on plans.

G. Bus Bar:

1. Material: Copper, full sized throughout length.

2. Provide for mounting of future circuit breakers along full length of bus regardless of number of units and spaces shown. Machine, drill, and tap as required for current and future positions.

3. Neutral: Insulated, rated 150 percent of phase bus bars with at least one terminal screw for each branch circuit.

4. Ground: Copper, installed on panelboard frame, bonded to box with at least one terminal screw for each circuit.

5. Lugs and Connection Points:

   a. Suitable for either copper or aluminum conductors.

   b. Solderless main lugs for main, neutral, and ground bus bars.

   c. Subfeed or through-feed lugs as shown.

6. Bolt together and rigidly support bus bars and connection straps on molded insulators.

H. Circuit Breakers:

1. NEMA AB 1 and UL 489.

2. Thermal-magnetic, quick-make, quick-break, molded case, of the indicating type showing ON/OFF and TRIPPED positions of operating handle.

3. Noninterchangeable, in accordance with NFPA 70.

4. Locking: Provisions for handle padlocking, unless otherwise shown.

5. Type: Bolt-on circuit breakers in all panelboards.

6. Multipole circuit breakers designed to automatically open all poles when an overload occurs on one pole.

7. Do not substitute single-pole circuit breakers with handle ties for multipole breakers.

8. Do not use tandem or dual circuit breakers in normal single-pole spaces.

9. Ground Fault Interrupter:

   a. Equip with conventional thermal-magnetic trip and ground fault sensor rated to trip in 0.025 second for a 5-milliampere ground fault (UL 943, Class A sensitivity).

   b. Sensor with same rating as circuit breaker and a push-to-test button.

I. Manufacturers:

1. Square D;

2. Eaton;

3. Siemens;

4. Or Engineer approved equal.

2.13 BACKFILL MATERIAL FOR CONDUIT ZONE

A. The conduit zone shall include full trench width from a point 4 inches below the bottom of the conduit to a point 4 inches above the top of the conduit.

B. Backfill material for the conduit zone shall be natural material from the trench excavation, structural excavation, or site grading, with a maximum particle size of 1/4-inch and free from organic matter, roots, construction debris, and excessive fines. Tamp and compact the conduit zone material to 90 percent relative compaction.

2.14 GROUNDING

A. All equipment and enclosures, and the complete conduit system shall be grounded securely in accordance with pertinent sections of Article 250 of NEC. All electrically operated equipment shall be bonded to the grounding conduit system via bonding jumpers, grounding busses, and grounding bushings. Grounding shall include the grounding conductors shown on Drawings and additional grounding as required above. All enclosures shall contain a grounding buss tied to the conduit system and enclosure utilizing bonding jumpers #6 minimum.

B. Ground Rods: Copper clad steel, minimum 3/4 inch diameter and 10 foot length minimum, unless otherwise noted on drawings. If shown on drawings, use the ground rod type and length as shown on drawings.

2.15 PRECAST MANHOLES AND HANDHOLES

A. Concrete Strength: Minimum, 3,000 psi compressive, in 28 days, unless otherwise noted on drawings.

B. Loading: AASHTO Division 1, H-20 in accordance with ASTM C857.

C. Access: Provide cast concrete 6- or 12-inch risers and access hole adapters between top of manhole and finished grade at required elevations.

D. Drainage:

1. Slope floors toward drain points, leaving no pockets or other non-draining areas.

2. Provide drainage outlet or sump at low point of floor constructed with a heavy, cast iron, slotted or perforated hinged cover, and 4-inch minimum outlet and outlet pipe.

E. Raceway Entrances:

1. Provide on all four sides.

2. For raceways to be installed under this Contract, provide knockout panels or precast individual raceway openings.

3. At entrances where raceways are to be installed by others, provide minimum 12-inch high by 24-inch wide knockout panels for future raceway installation.

F. Embedded Pulling Iron:

1. Material: 3/4-inch diameter stock, fastened to overall steel reinforcement before concrete is placed.

2. Location:

a. Wall: Opposite each raceway entrance and knockout panel for future raceway entrance.

b. Floor: Centered below manhole or handhole cover.

G. Manhole Frames and Covers:

1. Material: Machined cast iron.

2. Diameter: 32 inches, unless otherwise noted on drawings.

3. Cover Type: Indented, solid top design, with two drop handles each, unless otherwise noted on drawings.

4. Cover Loading: AASHTO Division I, H-20.

5. Cover Designation: Cast, on upper side, in integral letters, minimum 2 inches in height, appropriate titles:

a. Above 600 Volts: ELECTRIC HV.

b. 600 Volts and Below: ELECTRIC LV.

c. TELEPHONE.

d. Or as shown on drawings.

H. Handhole Frames and Covers:

1. Material: Steel, hot-dipped galvanized.

2. Cover Type: Solid, bolt-on, of checkered design.

3. Cover Loading: H-20.

4. Cover Designation: Burn by welder, on upper side in integral letters, minimum 2 inches in height, appropriate titles:

a. 600 Volts and Below: ELECTRIC LV.

b. TELEPHONE.

c. Or as shown on drawings.

I. Hardware: Steel, hot-dip galvanized.

J. Furnish knockout for ground rod in each handhole and manhole.

K. Manufacturers:

1. U.S. Precast.
2. Brooks Products, Inc.
3. Penn-Cast Products, Inc.
4. Concrete Conduit Co.
5. Associated Concrete Products, Inc.
6. Utility Vault Co.
7. Pipe,Inc.
8. Or approved equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Craftsmanship is the essence of the work in this project.

B. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work that has a neat and finished appearance.

C. Coordinate electrical work with Engineer and work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the plant during construction.

D. Check the approximate locations of light fixtures, electrical outlets, equipment, and other electrical system components shown on Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, consult the Engineer. The Engineer's decision shall govern. Make modifications and changes required.

3.02 PROTECTION DURING CONSTRUCTION

A. Throughout this Contract, Provide protection for materials and equipment against loss or damage in accordance with provisions elsewhere in these Contract Documents. Protect everything from the effects of weather. Prior to installation, store items a in clean, dry, indoor locations. Store items subject to corrosion under damp conditions and items containing electrical insulation, such as transformers, conductors, motors, and controls, in a clean, dry, indoor, heated location. Energize all space heaters furnished with equipment.

B. Following installation, protect materials and equipment from corrosion, physical damage, and the effects of moisture on insulation. Cap conduit runs during construction with manufactured seals. Keep openings in boxes or equipment closed during construction. Energize all space heaters furnished with equipment.

3.03 MATERIAL AND EQUIPMENT INSTALLATION

A. Follow manufacturer's installation instructions explicitly, unless otherwise indicated. Wherever any conflict arises between manufacturer's instructions, codes and regulations, and these Contract Documents, follow Engineer's decision. Keep copy of manufacturer's installation instructions on the jobsite available for review at all times.

B. All outdoor panels shall be security fasted to meet the Florida Building Codes Wind Loading requirements, indicated or not on drawings.

3.04 CUTTING AND PATCHING

A. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval of Engineer. Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Following such work, restore surfaces neatly to original condition. Use skilled craftsmen of the trades involved.

3.05 LOAD BALANCE

A. The Drawings and Specifications indicate circuiting to electrical loads and distribution equipment; however, after installation, if necessary, balance electrical load between phases as nearly as possible on switchboards, panelboards, motor control centers, etc.

3.06 MOTOR ROTATION

A. After final service connections are made, check and correct, if necessary, the rotation of all motors.

B. Coordinate rotation checks with the Engineer and the Contractor responsible for the driven equipment. Submit a written report to the Engineer for each motor verifying that rotation has been checked and corrected.

3.07 CLEANING AND TOUCH-UP PAINTING

A. Keep the premises free from accumulation of waste material or rubbish. Upon completion of work, remove materials, scraps, and debris from premises and from interior and exterior of all devices and equipment. Touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish.

3.08 CONDUIT APPLICATION

A. Use PVC conduit for all corrosive areas and for direct buried applications. Use PVC conduit for concrete encased power applications and under slab conduits.

B. Use Rigid Aluminum conduit in all above ground areas, except for corrosive areas.

C. Conduits must be kept within the furring lines of building unless specifically noted to be exposed.

D. Provide all necessary sleeves and chases required where conduits pass through floors or walls seal all openings and finish to match adjacent surfaces. Where exposed conduits pass through walls, floors or ceilings, provide fill of same materials as the penetrated surface. Coat all Rigid Aluminum conduit with asphault coating or duct wrap to avoid direct contact with concrete.

E. Conduits entering cabinets, pull boxes or outlet boxes shall be secured with double galvanized locknuts, one on inside and outside of box, and bushings.

F. Conduit shall be sized in accordance with the NEC and shall be of such size and so installed that conductors may be drawn in without injury or excessive strain.

G. Make final connection to motors and wall or ceiling-mounted fans where flexible connection is required to minimize vibration or where required to facilitate removal or adjustment of equipment, with 18-inch minimum, 60-inch maximum length of liquid-tight, PVC jacketed, flexible steel conduit where the required conduit size is 4 inches or less. For larger sizes, use nonflexible conduit as specified.

H. Flash and counterflash all conduits penetrating membrane. All roof penetration shall be sealed unless directed otherwise by the Engineer.

I. Exposed Raceways: Exposed raceways shall be installed parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings.

J. Changes in Direction of runs: Changes in direction of runs shall be made with symmetrical bends or cast metal fittings. Field made bends and offsets shall be made with an approved hickey or conduit bending machine. Crushed or deformed raceways shall not be installed. Trapped raceways in damp and wet locations shall be avoided where possible. Care shall be taken to prevent the lodgment of plaster, dirt, or trash in raceways, boxes fittings, and equipment during the course of construction. Clogged raceways shall be entirely freed of obstructions or shall be replaced.

K. Supports: Raceways shall be securely and rigidly fastened in place at intervals of not more than 10 feet with approved pipe straps, wall brackets, conduit clamps, conduit hangers, threaded C-clamps with retainers, or ceiling trapeze. All conduit fasteners shall be 316 stainless steel for both indoor and outdoor applications.

L. Provide rigid aluminum elbows with heat shrink wrap or PVC coated rigid aluminum elbows where conduit changes from direct buried or underground application to exposed conduits, if shown on detail drawings.

3.10 INSTRUMENT GROUNDING - SURGE SUPPRESSION

A. Connect all instrument surge protection with #6 insulated copper groundwire (in PVC conduit where above grade) to closest plant ground system.

3.11 CONDUCTORS

A. No conductor shall be drawn into conduit until conduit system is complete. Lubricant shall be approved by wire manufacturer.

B. Visual and Mechanical Inspection:
   1. Inspect Each Individual Exposed Power Cable No. 6 and Larger For:
      a. Physical damage.
      b. Proper connections in accordance with single-line diagram.
      c. Cable bends not in conformance with manufacturer's minimum allowable bending radius where applicable.
      d. Color coding conformance with specifications.
      e. Proper circuit identification.
   2. Mechanical Connections For:
      a. Proper lug type for conductor material.
      b. Proper lug installation.
      c. Bolt torque level in accordance with NETA ATS, Table 10, unless otherwise specified by manufacturer.
   3. Shielded Instrumentation Cables For:
      a. Proper shield grounding.
      b. Proper terminations.
      c. Proper circuit identification.
   4. Control Cables For:
      a. Proper termination.
      b. Proper circuit identification.
   5. Cables Terminated Through Window Type CTs: Verify that neutrals and grounds are terminated for correct operation of protective devices.

C. Electrical Tests for Power Coductors:
   1. Insulation Resistance Tests:
      a. Test each conductor with respect to ground and to adjacent conductors per IEEE 118 procedures for 1 minute.
      b. Evaluate ohmic values by comparison with conductors of same length and type.
      c. Investigate values less than 50 megohms.
      d. Utilize 1,000V dc megohmmeter for 600V insulated conductors.
   2. Continuity test by ohmmeter method to ensure proper cable connections.

3.12 COLOR MARKINGS

A. Where two or more conduits run to a single outlet box, each circuit shall be color coded as a guide in making connections. Colors shall be carried continuously throughout the system if more than one multiwire branch circuit is carried through a single raceway. All circuit conductors of the same color shall be connected to the same underground feeder conductor throughout the installation.

3.13 CIRCUITS

A. Deviations from conduit runs will be permitted with the Engineer's approval. Combining circuits in single conduit is permitted with proper identification and wire size increase required by NEC and need approval of the Engieer prior to any deviations from the design documents.

3.14 CONNECTIONS TO EQUIPMENT

A. Provide all conduits, wiring, and connections for equipment furnished by the Owner or under other sections, including line and low voltage wiring for all equipment. Connections to motors shall be with flexible liquid-tight conduit in accordance with NEC. Obtain required information from the other trades and rough-in to meet requirements of said equipment. No allowance will be made for failure to comply with obtaining complete information from other trades.

3.18 TOUCH UP

A. After the equipment is installed, touch up any scratches, marks, etc., incurred during shipment or installation of equipment.

3.19 TESTS

A. General: Carry out tests specified hereinafter and as indicated under individual items of materials and equipment specified in other sections.

B. Operations: After the electrical system installation is completed and at such time as the Engineer may indicate, conduct an operating test for approval. Demonstrate that the equipment operates in accordance with the requirements of these Specifications and Drawings. Perform the test in the presence of the Engineer or his authorized representative. Furnish all instruments and personnel required for the tests. The Owner will furnish the necessary electric power. All power reading reports are required at ths demonstration time.

C. The Contractor shall assist with Instrumentation Contractor during loop check and testing.

3.20 MANHOLES AND HANDHOLES

A. Excavate, shore, brace, backfill, and final grade back to original state.

B. Do not install until final raceway grading has been determined.

C. Install such that raceways enter at nearly right angles and as near as possible to one end of wall, unless otherwise shown.

D. Grounding: As shown on the drawings.

E. Identification: Field stamp covers with manhole or handhole number as shown. Stamped numbers to be i-inch minimum height.

3.30 IDENTIFICATION

A. Raceway tags: Identify origin and destination of each conduit run.
B. For buried underground ductbank or conduit installation: provide and install an electric detectable warning tape appximately 12 inches above underground or concrete-encased raceways, indicated or not on drawings. The electric detectable warning tape shall be installed the entire underground run.
C. Wire identification sleeves: provide and install permanment, PVC, yellow or white, with legibale machine-printed black markings for all wires. All power wires shall have circuit idendification sleeves with circuit appearing in circuit schedules. For wires not appearing in circuit schedules, assign wire number to match the control panel or electrical equipment connected to.
D. Control panel, starters, disconnect, etc.: provide and install engraving stock melamine or phenolic plastic laminate for name tag with self-tapping stainless steel screws or brass bolts.

- END OF SECTION -