

CONTRACT DOCUMENTS  
FOR THE CONSTRUCTION OF THE  
**BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN PROJECT**



PREPARED FOR  
CITY OF CRESTVIEW  
FLORIDA  
VOLUME 1 OF 2  
SPECIFICATIONS

For information regarding  
this project, contact:

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Project No. D3553000

**JACOBS®**

DECEMBER 2021

**BID DOCUMENTS**



**CITY OF CRESTVIEW PUBLIC SERVICES**

**CRESTVIEW, FLORIDA**

**BIDDING REQUIREMENTS  
AND  
CONTRACT DOCUMENTS**

for the construction of the

**BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN**

Contract No. \_\_\_\_\_

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JACOBS

Pensacola, FL

December 2021

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Project No. D3553000

Copy No. \_\_\_\_\_





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**END OF SECTION**



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**LEGAL**

**FRONT ENDS**

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SECTION 00020

ADVERTISEMENT FOR BIDS

FOR

CITY OF CRESTVIEW

FY-2021 Blackwater Golf Club Lift Station and Force Main Project

BID NO. 22-01-27

NOTICE IS HEREBY GIVEN: That sealed bids will be received by the City of Crestview, at the City Clerk's Office 198 N. Wilson Street, Crestview, Florida 32536; until **January 27, 2022 at 2:00 p.m. local time.**

Any bids received after the above time will not be accepted under any circumstances. Any uncertainty regarding the time a bid is received will be resolved against the bidder.

Bid opening will be promptly at **2:00 p.m. local time on January 27, 2022** at the City Hall Council Chambers, 198 N. Wilson Street, Crestview, Florida 32536, at which time all bids received will be publicly opened and read aloud.

A pre-bid meeting will be held on **January 12, 2022**, at **10:00 a.m.** local time at the City of Crestview City Hall, 198 North Wilson Street, Crestview, FL 32536. The pre-bid meeting shall be mandatory.

DESCRIPTION OF WORK: All work for the Project shall be done in accordance with the Drawings and Specifications and shall be awarded and constructed, if award is made, under one Contract. Bids shall be submitted for furnishing, delivering, and installing all materials, equipment, and services, including labor for the Work described:

This project is to provide the City with a new wastewater lift station and force main at Blackwater Golf Club along with the required utility improvements associated with the revitalization of the Golf Club. The project generally includes miscellaneous site work, installation of a fiberglass wetwell and pumps furnished by the owner, installation of sanitary sewer force main and connection to an existing force main within the system, electrical work, and site restoration. The contractor shall provide and install the new lift station, force main, and utility improvements in accordance with the plans and specifications and shall include all materials and labor to provide a fully functioning and reliable wastewater conveyance system.

Bidders are urged to visit the site prior to submitting a bid. If you have any questions, **contact Jacobs Engineering Group, 25 West Cedar Street, Suite 350, Pensacola, FL 32502. The project engineer is Scott Jernigan, PE, and can be reached at 850-941-7282 or [scott.jernigan@jacobs.com](mailto:scott.jernigan@jacobs.com).**

Questions regarding the Contract Documents must be submitted electronically to JACOBS through Scott Jernigan no later than **4:00 p.m. local time, January 14, 2022** in order for responses to be provided via addendum prior to the bid date.

BIDDING DOCUMENTS can be obtained on the city website: [www.cityofcrestview.org](http://www.cityofcrestview.org) and reviewed at:

Department of Public Services  
715 N. Ferdon Blvd.  
Crestview, FL 32536  
(850) 682-6132

The City of Crestview reserves the right to accept or reject, in part or total, any or all bids and to waive any informalities as deemed in the best interest of the City. All bids must be marked on the outside of the envelope with the bid name, the time and date of opening. It shall be the Bidder's responsibility to ensure that bids are delivered to the above address by the appointed time.

Bids shall be prepared from complete Bidding Documents.

**BID SUBMITTAL:** A single bid shall be submitted for the work. The contract will be awarded pursuant to the requirements of applicable state and federal laws and regulations.

Award will be made to the lowest responsible and responsive bidder. The City of Crestview will in no way be liable for any costs incurred by any bidder in the preparation of its Bid in response to this Invitation to Bid.

The City reserves the right to waive technicalities or irregularities, to reject any or all bids, and to accept that Bid which is in the best interest of the City.

The CITY OF CRESTVIEW, FLORIDA does not discriminate on the basis of race, color, national origin, sex, religion, age, and handicapped status in employment or provision of service.

**CITY OF CRESTVIEW, FLORIDA**  
**Office of the City Clerk**  
198 N. Wilson Street  
Crestview, Florida 32536

END OF SECTION



## **INSTRUCTIONS TO BIDDERS**

### **General**

BIDS will be received by the City of Crestview (herein called the "OWNER") as specified in the Invitation to Bid. The BIDS will be publicly opened and read aloud at the designated time and place.

Each BID must be submitted in a sealed envelope addressed to the City of Crestview. Each sealed envelope containing a BID must be plainly marked on the outside with the name and the number of the project for which the BID is submitted; and the envelope should also show on the outside, the BIDDER's name and address.

BIDDERS must satisfy themselves as to the required quantities for the work by examination of the site and a review of the drawings and specifications including any addenda. After BIDS have been submitted the BIDDER shall not assert that there has been any misunderstanding concerning the quantities of work or of the nature of the work to be done.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required. The Bid form is the only document to be completed and signed at the bid opening.

A BIDDER may not modify its BID after BID opening. Errors in the extension of unit prices stated in a BID or in multiplication, division, addition, or subtraction in a BID may be corrected by the Director of Public Services prior to award. In such cases, unit prices shall not be changed.

Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID after the actual date of the opening thereof.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. A conditional or qualified BID may not be accepted.

BID tabulations will be posted for review on the city website: [www.cityofcrestview.org](http://www.cityofcrestview.org)

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the work, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the AGREEMENT and to complete the work contemplated herein. The low BIDDER will be required to perform at least fifty percent (50%) of the contract work with his/her own employees. The BIDDER to whom the contract is being awarded shall supply the names and addresses of major material suppliers and subcontractors when required to do so by the OWNER.

A PERFORMANCE BOND and PAYMENT BOND each in the amount of 100 percent of the contract price, with a corporate surety approved by the OWNER, will be required for the faithful performance of the contract, when the AGREEMENT is executed. Attorneys-in-fact who sign PAYMENT BONDS and PERFORMANCE BONDS must file with each BOND a current certified copy of their power of attorney.

## **INSTRUCTIONS TO BIDDERS**

Certificate of Insurance, as specified herein, shall be submitted at the time of signing the AGREEMENT.

The BIDDER to whom the contract is being awarded will be required to execute the AGREEMENT and obtain the PERFORMANCE BOND, PAYMENT BOND and Insurance on or before ten (10) calendar days following delivery of the notice of award to the BIDDER. If the BIDDER fails to properly execute the AGREEMENT or obtain the required PERFORMANCE BOND, PAYMENT BOND, or Insurance within the allotted time, the OWNER may consider the BIDDER in default.

The OWNER within ten (10) days of receipt of acceptable PERFORMANCE BOND, PAYMENT BOND, INSURANCE CERTIFICATES and the AGREEMENT signed by the CONTRACTOR to whom the contract is being awarded shall sign the AGREEMENT and return to such CONTRACTOR an executed duplicate of the AGREEMENT. Should the OWNER not execute the AGREEMENT within such period, the BIDDER may by written notice withdraw the signed AGREEMENT.

The CONTRACTOR shall thereupon record the PAYMENT and PERFORMANCE BONDS at the Okaloosa County Courthouse and return the recorded originals to the OWNER within seven (7) days.

The NOTICE TO PROCEED shall be issued within ten (10) days of the receipt of the recorded bonds by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by agreement between the OWNER and CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the AGREEMENT by written notice to the OWNER.

### **Bid Protest Procedure**

Any person whose substantial interests are directly and adversely affected by the award or intended award of a purchase order or contract or by plans or specifications contained in an invitation to bid or request for proposals may file a protest.

Notice of protest of plans, specifications or other requirements contained in an invitation to bid or in a request for proposals shall be filed not later than 5:00 P.M. of the third business day following receipt of the plans or specifications. Notice of protest of the rejection of a bid or proposal as non-responsive shall be filed not later than 5:00 P.M. of the third business day following notice to the bidder of the rejection. Notice of protest of the award or intended award of a purchase order or contract to the lowest bidder shown on a posted bid tabulation shall be filed not later than 5:00 P.M. of the third business day following the posting of the bid tabulation. Notice of protest of the award or intended award of a purchase order or contract to a bidder other than the lowest bidder shown on a posted bid tabulation shall be filed not later than 5:00 P.M. of the third business day following notice of the award of a purchase order or contract.

A notice of protest shall be in writing and shall state the subject matter of the protest.

A formal written protest shall be filed within seven (7) business days after the filing of notice of protest. A formal written protest shall state with particularity the facts and the law on which the protest is based.

Notice of protest and formal written protest of plans or specifications for or the award or intended award of a contract shall be filed with the city clerk or her designee.

Failure to file a notice of protest or failure to file a formal written protest within the times permitted shall constitute a waiver of proceedings.

END OF SECTION



## PUBLIC ACCESS

Contractor shall comply with the requirements of Florida's Public Records law. In accordance with Section 119.0701, Florida Statutes hereby certifies that shall:

- a. Keep and maintain public records that would be required by the public agency to perform the service.
- b. Upon request from the public agency's custodian of public records, provide the public agency with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided under Florida's Public Law or as otherwise provided by law.
- c. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of this contract if Contractor does not transfer the records to the public agency: and
- d. Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of Contractor or keep and maintain public records required by the public agency to perform the service. If the Contractor transfers all public records to the public agency upon completion of the contract, Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If Contractor keeps and maintains public records upon completion of this contract, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.

**e. If Contractor has questions regarding the application Chapter 119, Florida Statutes, to Contractor's duty to provide public records relating to this Agreement, Contractor shall contact the Custodian of Public Records at:**

**City Clerk, City of Crestview  
198 North Wilson Street  
P.O. Box 1209  
Crestview, Florida 32536  
(850) 682-1560 Extension 250  
[cityclerk@cityofcrestview.org](mailto:cityclerk@cityofcrestview.org)**

- f. In the event the public agency must initiate litigation against Contractor in order to enforce compliance with Chapter 119, Florida Statutes, or in the event of litigation filed against the public agency because Contractor failed to provide access to public records responsive to a public record request, the public agency shall be entitled to recover all costs, including but not limited to reasonable attorneys' fees, costs of suit, witness, fees, and expert witness fees extended as part of said litigation and any subsequent appeals.



SECTION 00300

BID FORM

SUBMITTED: \_\_\_\_\_  
Date

PROJECT IDENTIFICATION: **CITY OF CRESTVIEW**  
**Blackwater Golf Club Lift Station and Force Main**  
**Project**

NAME OF BIDDER: \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_

Phone No.: \_\_\_\_\_ Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

CONTRACTOR'S FLORIDA LICENSE NO.: \_\_\_\_\_

THIS BID IS SUBMITTED TO: City of Crestview, Florida (hereinafter called Owner) acting through its City Commission.

1. The undersigned Bidder offers and agrees to enter into an Agreement with Owner in the form included in the Bidding Documents, to complete all work for the Contract Price and within the Contract Time, all in accordance with the Contract Documents.
2. Bidder accepts all of the terms and conditions of the Bidding Documents, including without limitation those dealing with the Owner's time for accepting for Bid and the disposition of Bid Bond.
3. In submitting this Bid, Bidder makes all representations required by the Instructions to Bidders and further warrants and represents that:

(a) Bidder has examined copies of all the Bidding Documents and of the following addenda:

No. _____	Dated _____;	No. _____	Dated _____
No. _____	Dated _____;	No. _____	Dated _____
No. _____	Dated _____;	No. _____	Dated _____
No. _____	Dated _____;	No. _____	Dated _____

(Receipt of all which is hereby acknowledged) and also copies of the Advertisement for Bids and the Instructions to Bidders.

(b) Bidder has examined the site and locality where the Work is to be performed and the legal requirements (Federal, State and local laws, ordinances, rules and regulations) and conditions affecting cost, degree of difficulty, progress or performance of the Work and has made such independent investigations as Bidder deems necessary.

- (c) This Bid is genuine and not made in the interest or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over Owner.
  - (d) Bidder hereby agrees if this Bid is accepted, to commence work under this contract on or before a date to be specified in the Notice to Proceed and to fully complete all work of the Project within the Contract Time stipulated in the Agreement (Section 00500). Bidder further agrees to pay as liquidated damages the amount stated in the Agreement for each consecutive calendar day completion of the work is delayed.
- 4. Bidder submits the following unit prices to perform all the Work as required by the Drawings and Specifications for the City of Crestview. Bid shall be awarded based on Total Base Bid. Estimated quantities may exceed items listed. Payment based on installed quantities.
  - 5. All Bid Items shall include all materials, equipment, labor, permit fees, taxes, tests, miscellaneous costs of all types, overhead, and profit for the item to be complete, in place, and ready for operation in the manner contemplated by the Contract Documents.
  - 6. The following documents are attached to and made a condition of this Bid:
    - (a) **Bid Security (Section 00410 and surety bond or cashier's check).**
    - (b) **Power of Attorney (for surety bond only).**
    - (c) **Public Entities Crime Form (Section 00470).**
    - (d) **Noncollusion Affidavit (Section 00480).**
    - (e) **Trench Safety Affidavit (Section 00490).**
    - (f) **Corporate authority to execute Bid (for any corporate employee other than president or vice president).**
    - (g) **Questionnaire and Subcontractor Listing (Sections 00301 and 00301-A).**
    - (h) **Evidence of Bidder's Certification and License to perform the work.**
    - (i) **Experience and financial statement demonstrating the Bidder's ability to successfully complete the work.**
    - (j) **References (Section 00302).**
    - (k) **Similar Projects (Section 00303).**
    - (l) **Drug Free Workplace (Section 00310).**
  - 7. The terms used in this Bid, which are defined in Article 1 of the General Conditions shall have the meanings assigned to them in the General Conditions as amended by the Supplementary Conditions.
  - 8. **COMPLIANCE WITH FLORIDA TRENCH SAFETY ACT (90-96, LAWS OF FLORIDA)**

Bidder hereby acknowledges that all costs for complying with the Florida Trench Safety Act (90-96, Laws of Florida) are included in the various items of the proposal and in the Total Bid Price. For informational purposes only, the Bidder is required to further identify these costs, to be summarized below:



	Trench Safety Measure Description	Units of Measure (LF, SY)	Unit (Quantity)	Unit Cost	Extended Cost
A	_____	_____	_____	\$ _____	\$ _____
B	_____	_____	_____	\$ _____	\$ _____
C	_____	_____	_____	\$ _____	\$ _____
D	_____	_____	_____	\$ _____	\$ _____
				TOTAL:	\$ _____

**THIS IS NOT A PAY ITEM.** The purpose of this form is to disclose information on the costs associated with trench safety measures and to insure that the Bidder has considered these costs and included them in the Bid Price. Contractor will not receive additional payment if actual quantities differ from those estimated above or if the Contractor uses a safety measure different than those listed.

Failure to complete the above may result in the Bid being declared non-responsive.

**BID SUMMARY**

<b>Item No.</b>	<b>Description</b>	<b>Estimated Quantity</b>	<b>Unit</b>	<b>Unit Cost</b>	<b>Item Cost</b>
1	Mobilization/Demobilization	1	LS		
2	General Conditions	1	LS		
3	Site Clearing, Debris Removal/Disposal	1	LS		
4	Lift Station and Equipment Installation	1	LS		
5	6" Sanitary Force Main	1	LS		
6	4" Low Pressure Force Main	1	LS		
7	Electrical Work	1	LS		
8	Site work and restoration	1	LS		

**TOTAL BASE BID**

\_\_\_\_\_

\_\_\_\_\_ (In words)

\$ \_\_\_\_\_ (In numbers)

NAME OF BIDDER: \_\_\_\_\_

If Bidder is: (ALL SIGNATORIES MUST HAVE THEIR NAME PRINTED OR TYPED BELOW THEIR SIGNATURE)

SOLE PROPRIETORSHIP

\_\_\_\_\_(SEAL)

(Individual's Signature)

\_\_\_\_\_(SEAL)

(Individual's Name)

Doing Business as: \_\_\_\_\_

Business Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Florida License No.: \_\_\_\_\_

A PARTNERSHIP

\_\_\_\_\_(SEAL)

(Partnership Name)

\_\_\_\_\_(SEAL)

(General Partner's Signature)

\_\_\_\_\_(SEAL)

(General Partner's Name)

Business Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Florida License No.: \_\_\_\_\_

NAME OF BIDDER: \_\_\_\_\_

A CORPORATION

\_\_\_\_\_  
(Corporation Name)

\_\_\_\_\_  
(State of Incorporation)

By \_\_\_\_\_  
(Name of Person Authorized to Sign)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Authorized Signature)

(Corporate Seal)

Attest \_\_\_\_\_  
(Secretary)

Business Address: \_\_\_\_\_  
\_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Corporation President: \_\_\_\_\_

Florida License No.: \_\_\_\_\_

NAME OF BIDDER: \_\_\_\_\_

A JOINT VENTURE

By \_\_\_\_\_ (SEAL)  
(Name)

\_\_\_\_\_  
(Address)

By \_\_\_\_\_ (SEAL)  
(Name)

\_\_\_\_\_  
(Address)

Business Address: \_\_\_\_\_

\_\_\_\_\_  
Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Florida License No.: \_\_\_\_\_

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above).

8. List the following in connection with the Surety which is providing the Bid Bond.

Surety's Name: \_\_\_\_\_

Surety's Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Name and address of Surety's resident agent for service of process in Florida:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## SCHEDULE OF MANUFACTURERS/SUPPLIERS

The Contract Documents are based upon the equipment or products available from the manufacturers/suppliers denoted as "A", "B", etc. However, the Bidder must indicate in his Bid which Base Bid manufacturer/supplier he intends to use for each item of equipment listed by circling one (1) of the listed manufacturers/suppliers. Should the Bidder fail to circle a named supplier, he hereby agrees to provide the item listed as "A". After receipt of bids, the Bidder may not substitute for any manufacturer or supplier circled.

If the Bidder desires to propose one (1) or more substitution or "or equal" manufacturers/suppliers, he may write in the name of such substitution or "or equal" in the spaces provided on the pages following the lists, but he must, nevertheless, also circle one of the listed manufacturers/suppliers. All substitutions or "or equal" items must be identified at the time of Bid (see Paragraph 6.05 of the General Conditions as amended by the Supplementary Conditions). Substitutions or "or equal" items will **not** be considered when determining the Apparent Low Bidder. Substitutions or "or equal" items will **not** be evaluated or considered until after the "Effective Date" of the Agreement. The Bidder shall base his Bid on providing one of the listed manufacturers and shall assume for bidding purposes that all substitutions or "or equal" items will not be accepted.

If the proposed substitution or "or equal" manufacturer/supplier is determined "not equivalent" by the Engineer, the Bidder must use the circled manufacturer/supplier. If the Bidder fails to indicate which listed manufacturer/supplier he intends to use or if a substitution or "or equal" is rejected, he must use the supplier listed as "A". Also, if the Bidder circles more than one listed manufacturer/supplier, he must use the first manufacturer/supplier circled (unless a substitution or "or equal" is approved).

Each proposed substitution or "or equal" will be evaluated in accordance with Paragraph 6.05 of the General Conditions following the Effective Date of the Agreement.

In addition to the reimbursement required under Paragraph 6.05 of the General Conditions, the Contractor shall also reimburse the Owner for any engineering costs directly attributable to the change in manufacturers/suppliers, caused by the acceptance of proposed substitutions or "or equal" items, such as; additional field trips for the Engineer, additional redesign costs, and additional review costs, etc. Other costs directly attributable to the change in manufacturers/suppliers caused by the acceptance of proposed substitutions or "or equal" items such as increased electrical requirements, larger buildings, modifications to structures, additional pumps, piping or tankage, etc., shall be borne by the Contractor and not by the Owner. Bidder further agrees that the use of substitute equipment offered will not affect the completion date.

The Owner may request, and the Bidder shall supply any additional information on proposed substitutes or "or equal" items prior to Notice of Award.

SCHEDULE OF BASE BID MANUFACTURERS/SUPPLIERS

Item No.	Equipment Item or Material	Specification Section No.	Base Bid Manufacturer/Supplier
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

**SUBSTITUTIONS AND "OR EQUAL"**

The undersigned as Bidder agrees that substitutions, or "or equal" items will not be considered until after the "Effective Date of the Agreement" and will be evaluated in accordance with Paragraph 6.05, of the General Conditions as amended by the Supplementary Conditions. If Bidder intends to propose substitutions or "or equal" items after the "Effective Date of the Agreement", it is agreed that these items will be listed on the Substitution List that must be included with the Bid (form provided herein). Only the proposed substitutions or "or equal" items listed on the Substitution List and submitted at the time of Bid will be evaluated by the Engineer in accordance with the General Conditions.

**SUBSTITUTION LIST OF  
MANUFACTURERS/SUPPLIERS**

Bidder proposes the following substitutions and "or equal" items of alternate manufacturers/suppliers for the equipment of material categories so identified:

	<u>Equipment Item Material</u>	<u>Drawing No.</u>	<u>Spec. Section</u>	<u>Substitute/"or equal" Manufacturer/Supplier (List One Only)</u>	<u>Proposed Price Deduct</u>
1.	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____
6.	_____	_____	_____	_____	_____
7.	_____	_____	_____	_____	_____
9.	_____	_____	_____	_____	_____
10.	_____	_____	_____	_____	_____

END OF SECTION



SECTION 00301  
QUESTIONNAIRE

DATE: \_\_\_\_\_

PROJECT IDENTIFICATION: **CITY OF CRESTVIEW, FLORIDA**

NAME OF BIDDER: \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_

\_\_\_\_\_ Phone No. \_\_\_\_\_

CONTRACTOR'S FLORIDA LICENSE NO. \_\_\_\_\_

The undersigned warrants the truth and accuracy of all statements and answers herein contained. Include additional sheets if necessary.

1. How many years has your organization been in business as a Florida Licensed Contractor?

\_\_\_\_\_

2. Describe and give the date and owner of the last project that you have completed similar in type, size, and nature as the one proposed?

Refer to Section 00303 (Similar Projects) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Have you ever failed to complete work awarded to you? If so, where and why?

\_\_\_\_\_

\_\_\_\_\_

4. Name three (3) municipalities for which you have performed work and to which you refer:

Refer to Section 00302 (References)

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5. Have you personally inspected the sites of the proposed work? Describe any anticipated problems with the site and your proposed solutions?

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6. Will you subcontract any part of this work? If so, describe which portions:

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

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8. What equipment will you purchase for the work?

---

---

9. What equipment will you rent for the work?

---

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END OF SECTION

SECTION 00301-A  
SUBCONTRACTOR LISTING

---

List all proposed subcontractors to be used for this project regardless of racial or gender grouping.

**\*\*THE BIDDER SHALL SELF-PERFORM AT LEAST 50% OF THE PROJECT\*\***

<u>Firm Name, Address and Telephone Number</u>	<u>Trade</u>	<u>Estimated Dollar Amount</u>
* _____ _____ _____	_____	\$ _____
* _____ _____ _____	_____	\$ _____
* _____ _____ _____	_____	\$ _____
* _____ _____ _____	_____	\$ _____
* _____ _____ _____	_____	\$ _____
* _____ _____ _____	_____	\$ _____

---

Use additional sheets if necessary.

END OF SECTION



SECTION 00302

REFERENCES

**Project Name:** Blackwater Golf Club Lift Station and Force Main Project

OWNER

CONTACT PERSON

TELEPHONE NUMBER




SECTION 00303  
SIMILAR PROJECTS

**Project Name:** \_\_\_\_\_

List at least five (5) similar projects completed in the last three years that indicate the experience and qualifications of the Bidder (relative to this project). Information should include Owner's name with contact person; description of work including Bidder's responsibilities; original contract price; final contract price; original contract time; actual time to complete the project; and any relevant circumstances or conditions about the project.

**PROJECT NAME:** \_\_\_\_\_

OWNER'S NAME: \_\_\_\_\_

CONTACT: \_\_\_\_\_ PHONE: \_\_\_\_\_

PROJECT DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ORIGINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

FINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

NUMBER AND DOLLAR AMOUNT OF CHANGE ORDERS: \_\_\_\_\_

ORIGINAL CONTRACT TIME (Substantial Completion): \_\_\_\_\_

ACTUAL TIME TO COMPLETE (Substantial Completion): \_\_\_\_\_

OTHER RELEVANT INFORMATION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**PROJECT NAME:** \_\_\_\_\_

OWNER'S NAME: \_\_\_\_\_

CONTACT: \_\_\_\_\_ PHONE: \_\_\_\_\_

PROJECT DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ORIGINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

FINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

NUMBER AND DOLLAR AMOUNT OF CHANGE ORDERS: \_\_\_\_\_

ORIGINAL CONTRACT TIME (Substantial Completion): \_\_\_\_\_

ACTUAL TIME TO COMPLETE (Substantial Completion): \_\_\_\_\_

OTHER RELEVANT INFORMATION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**PROJECT NAME:** \_\_\_\_\_

OWNER'S NAME: \_\_\_\_\_

CONTACT: \_\_\_\_\_ PHONE: \_\_\_\_\_

PROJECT DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ORIGINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

FINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

NUMBER AND DOLLAR AMOUNT OF CHANGE ORDERS: \_\_\_\_\_

ORIGINAL CONTRACT TIME (Substantial Completion): \_\_\_\_\_

ACTUAL TIME TO COMPLETE (Substantial Completion): \_\_\_\_\_

OTHER RELEVANT INFORMATION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**PROJECT NAME:** \_\_\_\_\_

OWNER'S NAME: \_\_\_\_\_

CONTACT: \_\_\_\_\_ PHONE: \_\_\_\_\_

PROJECT DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ORIGINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

FINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

NUMBER AND DOLLAR AMOUNT OF CHANGE ORDERS: \_\_\_\_\_

ORIGINAL CONTRACT TIME (Substantial Completion): \_\_\_\_\_

ACTUAL TIME TO COMPLETE (Substantial Completion): \_\_\_\_\_

OTHER RELEVANT INFORMATION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**PROJECT NAME:** \_\_\_\_\_

OWNER'S NAME: \_\_\_\_\_

CONTACT: \_\_\_\_\_ PHONE: \_\_\_\_\_

PROJECT DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ORIGINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

FINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

NUMBER AND DOLLAR AMOUNT OF CHANGE ORDERS: \_\_\_\_\_

ORIGINAL CONTRACT TIME (Substantial Completion): \_\_\_\_\_

ACTUAL TIME TO COMPLETE (Substantial Completion): \_\_\_\_\_

OTHER RELEVANT INFORMATION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**PROJECT NAME:** \_\_\_\_\_

OWNER'S NAME: \_\_\_\_\_

CONTACT: \_\_\_\_\_ PHONE: \_\_\_\_\_

PROJECT DESCRIPTION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ORIGINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

FINAL CONTRACT AMOUNT: \$ \_\_\_\_\_

NUMBER AND DOLLAR AMOUNT OF CHANGE ORDERS: \_\_\_\_\_

ORIGINAL CONTRACT TIME (Substantial Completion): \_\_\_\_\_

ACTUAL TIME TO COMPLETE (Substantial Completion): \_\_\_\_\_

OTHER RELEVANT INFORMATION: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Section 00310

**DRUG-FREE WORK PLACE**

The undersigned vendor, in accordance with Florida Statute 287.087, hereby certifies that

\_\_\_\_\_ does:  
*(Name of Business)*

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

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

X  
\_\_\_\_\_  
Proposer's Signature

\_\_\_\_\_  
Date

(THIS FORM MUST BE COMPLETED IF APPLICABLE AND RETURNED WITH YOUR PROPOSAL)



SECTION 00410

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, \_\_\_\_\_ as Principal, and \_\_\_\_\_ as Surety, are hereby held and firmly bound unto the City of Crestview, Florida as Owner in the penal sum of, (five percent (5%) of the Contract Bid) \_\_\_\_\_ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns to pay Owner upon default of Bidder the penal sum set forth on the face of this Bond. Signed, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

The condition of the above obligation is such that whereas the Principal has submitted to City of Crestview, Florida, a certain Bid, attached hereto and hereby made a part hereof, to enter into a contract in writing, for the Blackwater Golf Club Lift Station and Force Main Project.

NOW THEREFORE,

1. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents.
2. This obligation shall be null and void if:
  - 2.1 Owner accepts Bidder's bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents and Contract Documents, or
  - 2.2 All bids are rejected by Owner, or
  - 2.3 Owner fails to issue a notice of award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof).
3. Payment under this Bond will be due and payable upon default of Bidder and within thirty (30) calendar days after receipt of Bidder and Surety of written notice of default from Owner which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

4. Surety waives notice of any and all defenses based on or arising out of any time extension to issue notice of award agreed to in writing by Owner and Bidder, provided that the time for issuing notice of award including extensions shall not in the aggregate exceed ninety (90) days from Bid Due without Surety's written consent.
5. No suit or action shall be commenced under this Bond prior to thirty (30) calendar days after the notice of default required in paragraph 3 above is received by Bidder and Surety, and in no case later than one year after Bid Due Date.
6. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
7. Notice required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the part concerned.
8. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent or representative who executed this Bond on behalf of Surety to execute, seal and deliver such Bond and bind the Surety thereby.
9. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of the Bond conflicts with any applicable provision of any applicable statute, then the provision of said statute shall govern and the remainder of the Bond that is not in conflict therewith shall continue in full force and effect.
10. The term "bid" as used herein includes a bid, offer or proposal as applicable.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal (Print Full Name):

\_\_\_\_\_

Surety (Print Full Name):

\_\_\_\_\_ (Seal)  
Surety's Name and Corporate Seal

By: \_\_\_\_\_ (L.S.)

By: \_\_\_\_\_  
Signature (attach power of attorney)

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Attest: \_\_\_\_\_  
Signature and Title

Attest: \_\_\_\_\_  
Signature and Title

IMPORTANT - Surety companies executing bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of Florida. See Article 5 of the General Conditions as amended by Supplementary Conditions.

END OF SECTION





SECTION 00470

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

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

1. This sworn statement is submitted to \_\_\_\_\_  
(print name of the public entity)
- by \_\_\_\_\_  
(print individual's name and title)
- for \_\_\_\_\_  
(print name of entity submitting sworn statement)

whose business address is

\_\_\_\_\_  
\_\_\_\_\_

and (if applicable) its Federal Employer Identification Number (FEIN) is \_\_\_\_\_

(If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: \_\_\_\_\_.)

2. I understand that a “public entity crime” as defined in Paragraph 287.133(1)(g), **Florida Statutes**, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.
3. I understand that “convicted” or “conviction” as defined in Paragraph 287.133(1)(b), **Florida Statutes** means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that an “affiliate” as defined in Paragraph 287.133(1)(a), **Florida Statutes**, means:

1. A predecessor or successor of a person convicted of a public entity crime; or
2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term “affiliate” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a “person” as defined in Paragraph 287.133(1)(e), **Florida Statutes**, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term “person” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

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

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

\_\_\_\_\_ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

\_\_\_\_\_ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. (attach a copy of the final order.)

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

\_\_\_\_\_  
(signature)

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Personally known \_\_\_\_\_

OR Produced identification \_\_\_\_\_

\_\_\_\_\_  
(type of identification)

Notary Public - State of Florida

My commission expires \_\_\_\_\_

\_\_\_\_\_  
(printed, typed or stamped commissioned name of notary public.)

END OF SECTION



SECTION 00480  
NONCOLLUSION AFFIDAVIT

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

\_\_\_\_\_, being first duly sworn deposes and says that:

1. He (it) is the \_\_\_\_\_, of \_\_\_\_\_, the Bidder that has submitted the attached Bid;
2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
3. Such Bid is genuine and is not a collusive or sham Bid;
4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affidavit, have in any way, colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted; or to refrain from bidding in connection with such Contract; or have in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference with any Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit, or cost elements of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against (Recipient), or any person interested in the proposed Contract;
5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any other of its agents, representatives, owners, employees or parties in interest, including this affidavit.

By \_\_\_\_\_

Sworn and subscribed to before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, in the  
State of \_\_\_\_\_, County of \_\_\_\_\_.

\_\_\_\_\_ Notary Public

My Commission Expires: \_\_\_\_\_

END OF SECTION

**SECTION 00490**

**TRENCH SAFETY COMPLIANCE**

Trench excavations on this Project are expected to be in excess of 5 feet deep. The Occupational Safety and Health Administration excavation safety standards, 29 CFR 1926.650 Subpart P trench safety standards, will be in effect during the period of construction of the Project.

Bidder acknowledges that included in the Bid Price are costs for complying with the Florida Trench Safety Act (90-096, Laws of Florida) effective October 1, 1990, and hereby gives assurance that, if awarded the Contract, the Contractor or Subcontractor performing trench excavation work on the Project will comply with the applicable trench safety standards. The Bidder further identifies the costs as follows:

Trench Safety Item (Description) and Estimated Cost

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(Cost in Words)

TOTAL \$ \_\_\_\_\_

FAILURE TO COMPLETE THE ABOVE MAY RESULT IN THE BID BEING DECLARED NON-RESPONSIVE.

Company Name: \_\_\_\_\_

Date: \_\_\_\_\_

By: \_\_\_\_\_





SECTION 00500

AGREEMENT

THIS AGREEMENT made and entered into this \_\_\_\_\_ day of \_\_\_\_\_ 2021, by and between the CITY OF CRESTVIEW, FLORIDA, a municipality organized and existing under the laws of the State of Florida, hereinafter called the OWNER, and \_\_\_\_\_ hereinafter called CONTRACTOR;

WITNESSETH:

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE I - SCOPE OF WORK

CONTRACTOR shall complete all work as specified or indicated in the Contract Documents. The Work is generally described as follows:

**Blackwater Golf Club Lift Station and Force Main Project**

**BID # 21-10-00**

All work for the Project shall be constructed in accordance with the Drawings and Specifications prepared by Tetra Tech and the proposed improvements will be awarded and constructed, if award is made, under one Contract. Bids shall be submitted for furnishing, delivering, and installing all materials, equipment and services, including labor, for the Work described.

This project is to provide the City with a new wastewater lift station and force main at Blackwater Golf Club along with the required utility improvements associated with the revitalization of the Golf Club. The project generally includes miscellaneous site work, installation of a fiberglass wetwell and pumps furnished by the owner, installation of sanitary sewer force main and connection to an existing force main within the system, installation of a sanitary sewer gravity collection system, electrical work including site lighting and controls, and site restoration. The contractor shall provide and install the new lift station, force main, and utility improvements in accordance with the plans and specifications and shall include all materials and labor to provide a fully functioning and reliable wastewater conveyance system.

ARTICLE II - ENGINEER

The Engineer, Scott L Jernigan, P.E. (Jacobs), whose address is 25 West Cedar Street, Suite 350, Pensacola FL 32502, hereinafter referred to as ENGINEER and who will assume all duties and responsibilities and will have the rights and authority assigned to the Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE III - CONTRACT TIME

3.1 The Work will be substantially completed within **180** days after the date when the Contract Time commences to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within **210** days after the date when the Contract Time commences to run.

3.2 Damages for Delay. OWNER and CONTRACTOR recognize that **TIME IS OF THE ESSENCE** in this Agreement and that the OWNER will suffer financial loss if the Work is not completed within the time specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions.

3.2.1 Uniqueness of the Work. The OWNER and the CONTRACTOR expressly acknowledge the unique characteristics of the Work, which cause time to be of the essence in this contract.

3.2.2 Liquidated Damages. OWNER and CONTRACTOR recognize that **TIME IS OF THE ESSENCE** in this Agreement and that Owner will suffer financial loss if the work is not substantially complete in the time specified in Paragraph 3.1 above. The parties also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by the OWNER if the Work is not substantially complete on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER \$1,000.00 (One Thousand Dollars) for each day that expires after the time specified in Paragraph 3.1 for Substantial Completion until the Work is substantially complete, and that the liquidated damages set forth herein bear a reasonable relationship to the estimated actual damages that the OWNER would suffer.

ARTICLE IV - CONTRACT PRICE

4.1 OWNER shall pay CONTRACTOR for performance of the Work in accordance with the Contract Documents in current funds at the lump sum or unit prices as presented in the Bid Form, which is incorporated herein and made a part hereof by this reference.

4.2 OWNER shall pay CONTRACTOR for completion of the work in accordance with the Contract Documents an amount in correct funds equal to the amount below:

Bid Total: \_\_\_\_\_  
(use words)

Bid Total: \$ \_\_\_\_\_  
(use figures)

4.3 The parties expressly agree that the Contract Price is a stipulated sum, except with regard to those items in the Bid which are subject to unit prices.

ARTICLE V - PAYMENT PROCEDURES

5.1 CONTRACTOR shall submit Applications for Payment in accordance with the Contract Documents. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

5.2 OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S monthly Applications for Payment, as approved by the ENGINEER, which shall be submitted by the CONTRACTOR on or before the 10th day after the end of each calendar month for which payment is requested.

5.3 Progress payments prior to Substantial Completion will be made in the following manner:

5.3.1 Prior to Substantial Completion and prior to fifty percent (50%) of the Work being completed, progress payments shall be ninety percent (90%) of the value of Work complete and ninety percent (90%) of the value of materials and equipment not incorporated into the Work, but delivered and suitably stored, less in each case the aggregate of payments previously made.

5.3.2 After fifty percent (50%) of the Work has been completed as determined by the ENGINEER, and if the character and progress has been satisfactory to the OWNER and ENGINEER, OWNER, on the recommendation of ENGINEER, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no retainage on account of subsequent Work and materials and equipment not incorporated into the Work, but delivered and suitably stored, which results in the Owner withholding a retainage equal to five percent (5%) of the Contract Price until Substantial Completion. However, OWNER shall reserve the right to reinstate withholding a retainage of ten percent (10%) if OWNER, on the recommendation of ENGINEER, determines that the progress or character of the Work is not satisfactory.

5.3.3 Upon Substantial Completion of the Work, OWNER shall pay an amount sufficient to increase total payments to the CONTRACTOR to ninety-five percent (95%) of the Contract Price, less such amounts as ENGINEER shall determine in accordance with Article 14 of the General Conditions.”

5.4 Final Payment. Upon final completion of the Work in accordance with the Contract Documents, OWNER shall pay CONTRACTOR an amount sufficient to increase total payments to ninety-eight percent (98%) of the Contract Price. However, not less than two percent (2%) of the Contract Price shall be retained until Record Drawings, specifications, addenda, modifications and shop drawings, including all manufacturers instructional and parts manuals are delivered to and accepted by the ENGINEER.

## ARTICLE VI - CONTRACTOR'S REPRESENTATIONS

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

6.1 CONTRACTOR has visited the work site and familiarized himself with the nature and extent of the Contract Documents, Work, locality, and all local conditions and federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

6.2 CONTRACTOR has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which were relied upon by the ENGINEER in the preparation of the Drawings and Specifications, and which have been identified in the General and Supplementary Conditions of the Contract Documents.

6.3 CONTRACTOR has made or caused to be made examinations, investigations, tests and studies of such reports and related data in addition to those referred to in Paragraph 6.2 above as he deems necessary for the performance of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by CONTRACTOR for such purposes.

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

6.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to the CONTRACTOR.

#### ARTICLE VII - CONTRACT DOCUMENTS

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

- 7.1 This Agreement (Section 00500) (pages 1 to 6, inclusive).
- 7.2 Exhibits to this Agreement (sheets \_\_\_ to \_\_\_, inclusive). N/A
- 7.3 Performance Bond, Payment Bond and Certificates of Insurance.
- 7.4 Notice of Award and Notice to Proceed.
- 7.5 General Conditions (Section 00700) as amended by the Supplementary Conditions.
- 7.6 Supplementary Conditions (Section 00800).
- 7.8 Project Manual bearing the general title: "BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN PROJECT" and consisting of Divisions 0 through 16 as listed in the table of contents.
- 7.9 Drawings bearing the following general title: "BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN PROJECT" and consisting of the sheets as listed in the Drawings Index.
- 7.10 Addenda Numbers \_\_\_ through \_\_\_, inclusive.
- 7.11 Bid Form (Section 00300) (Pages 1 to 11, inclusive).
- 7.12 All applicable provisions of State and Federal Law and any modification, including Change Orders or written amendments duly delivered after execution of Agreement.
- 7.13 Advertisement for Bids, Instructions to Bidders, Bid Bond, Noncollusion Affidavit, General Requirements, Field Orders and State of Florida Contract Provisions.

There are no Contract Documents other than those listed above in this Article VII. The Contract Documents may only be altered, amended, or repealed in accordance with Article 3 of the General Conditions as modified in the Supplementary Conditions.

## ARTICLE VIII - MISCELLANEOUS

8.1 No assignment by the parties hereto of any rights under, or interest in, the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically, but without limitation, monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent of an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

8.2 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto, his partners, successors, assigns or legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

8.3 Terms used in this Agreement, which are defined in Article 1 of the General Conditions, shall have the meanings indicated in the General Conditions, as modified in the Supplementary Conditions.

## ARTICLE IX - GOVERNING LAW

This Agreement shall be governed by the laws of the State of Florida. Both parties agree that the courts of the State of Florida shall have jurisdiction of any claim arising in connection with this Agreement. In the event of litigation arising out of this Agreement, the prevailing party shall be entitled to the award of attorney's fees and costs at both the trial and appellate level. Venue for any litigation arising out of this agreement shall be in Orange County, Florida.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement in triplicate. One (1) counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on \_\_\_\_\_, 2021.

OWNER: CITY OF CRESTVIEW, FLORIDA

By: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ATTEST: \_\_\_\_\_

CITY CLERK

APPROVED AS TO FORM AND CORRECTNESS: \_\_\_\_\_

CITY ATTORNEY

CONTRACTOR:

By: \_\_\_\_\_  
\_\_\_\_\_

Title: \_\_\_\_\_

(CORPORATE SEAL)

ATTEST: \_\_\_\_\_

SECRETARY

\_\_\_\_\_

END OF SECTION

# Performance Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

---

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place  
of Business):

OWNER (Name and Address):

## CONTRACT

Date:

Amount:

Description (Name and Location):

## BOND

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form:

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

## CONTRACTOR AS PRINCIPAL

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

## SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

## CONTRACTOR AS PRINCIPAL

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

## SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

## EJCDC No. 1910-28-A (1996 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Contract, which is incorporated herein by reference.

2. If the CONTRACTOR performs the Contract, the Surety and the CONTRACTOR have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.

3. If there is no OWNER Default, the Surety's obligation under this Bond shall arise after:

3.1. The OWNER has notified the CONTRACTOR and the Surety at the addresses described in paragraph 10 below, that the OWNER is considering declaring a CONTRACTOR Default and has requested and attempted to arrange a conference with the CONTRACTOR and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Contract. If the OWNER, the CONTRACTOR and the Surety agree, the CONTRACTOR shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the OWNER's right, if any, subsequently to declare a CONTRACTOR Default; and

3.2. The OWNER has declared a CONTRACTOR Default and formally terminated the CONTRACTOR's right to complete the Contract. Such CONTRACTOR Default shall not be declared earlier than twenty days after the CONTRACTOR and the Surety have received notice as provided in paragraph 3.1; and

3.3. The OWNER has agreed to pay the Balance of the Contract Price to:

3.3.1. The Surety in accordance with the terms of the Contract;

3.3.2 Another contractor selected pursuant to paragraph 4.3 to perform the Contract.

4. When the OWNER has satisfied the conditions of paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1. Arrange for the CONTRACTOR, with consent of the OWNER, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the OWNER and the contractor selected with the OWNER's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the Bonds issued on the Contract, and pay to the OWNER the amount of damages as described in paragraph 6 in excess of the Balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances;

4.4.1 After investigation, determine the amount for which it may be liable to the OWNER and, as soon as practicable after the amount is determined, tender payment therefor to the OWNER; or

4.4.2 Deny liability in whole or in part and notify the OWNER citing reasons therefor.

5. If the Surety does not proceed as provided in paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the OWNER to the Surety demanding that the Surety perform its obligations under this Bond, and the OWNER shall be entitled to enforce any remedy available to the OWNER. If the Surety proceeds as provided in paragraph 4.4, and the OWNER refuses the payment tendered or the Surety has denied

liability, in whole or in part, without further notice the OWNER shall be entitled to enforce any remedy available to the OWNER.

6. After the OWNER has terminated the CONTRACTOR's right to complete the Contract, and if the Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Contract. To a limit of the amount of this Bond, but subject to commitment by the OWNER of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:

6.1. The responsibilities of the CONTRACTOR for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional and delay costs resulting from the CONTRACTOR's Default, and resulting from the actions or failure to act of the Surety under paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the CONTRACTOR.

7. The Surety shall not be liable to the OWNER or others for obligations of the CONTRACTOR that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the OWNER or its heirs, executors, administrators, or successors.

8. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after CONTRACTOR Default or within two years after the CONTRACTOR ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by the OWNER to the CONTRACTOR under the Contract after all proper adjustments have been made, including allowance to the CONTRACTOR of any amounts received or to be received by the OWNER in settlement of insurance or other Claims for damages to which the CONTRACTOR is entitled, reduced by all valid and proper payments made to or on behalf of the CONTRACTOR under the Contract.

12.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

12.3. CONTRACTOR Default: Failure of the CONTRACTOR, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.



(FOR INFORMATION ONLY--Name, Address and Telephone)  
AGENT or BROKER: OWNER'S REPRESENTATIVE (Engineer or other party):



# Payment Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

---

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place  
of Business):

OWNER (Name and Address):

## CONTRACT

Date:

Amount:

Description (Name and Location):

## BOND

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form:

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

### CONTRACTOR AS PRINCIPAL

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

### SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

### CONTRACTOR AS PRINCIPAL

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

### SURETY

Company: \_\_\_\_\_ (Corp. Seal)

Signature: \_\_\_\_\_

Name and Title:

## EJCDC No. 1910-28-B (1996 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

1. The CONTRACTOR and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER to pay for labor, materials and equipment furnished for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to the OWNER, this obligation shall be null and void if the CONTRACTOR:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies and holds harmless the OWNER from all claims, demands, liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided the OWNER has promptly notified the CONTRACTOR and the Surety (at the addresses described in paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the CONTRACTOR and the Surety, and provided there is no OWNER Default.

3. With respect to Claimants, this obligation shall be null and void if the CONTRACTOR promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with the CONTRACTOR have given notice to the Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with the CONTRACTOR:

1. Have furnished written notice to the CONTRACTOR and sent a copy, or notice thereof, to the OWNER, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from the CONTRACTOR, or not received within 30 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to the Surety and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

5. If a notice required by paragraph 4 is given by the OWNER to the CONTRACTOR or to the Surety, that is sufficient compliance.

6. When the Claimant has satisfied the conditions of paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8. Amounts owed by the OWNER to the CONTRACTOR under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any Performance Bond. By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the

performance of the Contract are dedicated to satisfy obligations of the CONTRACTOR and the Surety under this Bond, subject to the OWNER's priority to use the funds for the completion of the Work.

9. The Surety shall not be liable to the OWNER, Claimants or others for obligations of the CONTRACTOR that are unrelated to the Contract. The OWNER shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by paragraph 4.1 or paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the OWNER or the CONTRACTOR shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, the OWNER or the CONTRACTOR, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is, that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, the CONTRACTOR shall promptly furnish a copy of this Bond or shall permit a copy to be made.

## 15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with the CONTRACTOR or with a Subcontractor of the CONTRACTOR to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of the CONTRACTOR and the CONTRACTOR's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2. Contract: The agreement between the OWNER and the CONTRACTOR identified on the signature page, including all Contract Documents and changes thereto.

15.3. OWNER Default: Failure of the OWNER, which has neither been remedied nor waived, to pay the CONTRACTOR as required by the Contract or to perform and complete or comply with the other terms thereof.

(FOR INFORMATION ONLY--Name, Address and Telephone)

AGENCY or BROKER:            OWNER'S REPRESENTATIVE (Engineer or other party):



SECTION 00650

CERTIFICATE OF INSURANCE

A. INSURANCE REQUIREMENTS

1. Contractor shall purchase and maintain such comprehensive general liability and other insurance as required by this document. Should any of the required insurance policies be canceled before the expiration date thereof, the insuring company shall provide written notice to each insured 30 days prior to cancellation.

B. CERTIFICATE OF INSURANCE FORM

1. The Certificate of Insurance submitted to the Owner and Engineer shall be on the Insurance Company's form with a format similar to the popular ACORD Corporation form.
2. The Owner's project name and project number shall be shown on the Certificate.
3. Three (3) Certificates shall be submitted along with the executed Contract Agreement.

A. Minimum Scope of Insurance:

Coverage shall be at least as broad as:

1. Insurance Services Office Form No. CG 0001 (11/85) or CG 0002 (2/86) Commercial General Liability; and Insurance Services Office Form No. GL 0404 (5181) Broad Form Comprehensive General Liability; endorsement, and
2. Insurance Services Office form No. CA 0001 (Ed. 1/87) covering Automobile Liability, code 1 "any auto", and CA 0002 (1/87), and
3. Workers' Compensation as required by the State of Florida and Employers' Liability insurance:

B. Minimum Limits of Insurance:

Contractor shall maintain coverage's and limits as follows:

1. General Liability:

Aggregate Limit: \$1,000,000.

Products and completed operation aggregate limit: \$500,000.

Personal and advertising injury limit: N/A.

Each occurrence limit: \$500,000.

Fire damage limit: \$50,000 any one fire.

Medical expense limit: \$5,000 per person.  
Blanket: no.

(1) Designated contractors (specify): City of Crestview

2. Automobile Liability:

- (a) Business auto with symbol(s): one (1)
- (b) Limit per accident: \$1,000,000.

3. Workers' Compensation as required by Florida laws, and Employer's Liability with the following minimum limits:

- (a) Each accident: \$100,000.
- (b) Per employee disease: \$100,000.
- (c) All claims disease: \$500,000.

C. Deductibles and Self-Insured Retentions:

Any deductible or self-insured retention must be declared to and approved by the City. At the option of the City, either the insurer shall reduce or eliminate such deductibles or self insured retentions as respects the City, its officials and employees, or the contractor shall procure a bond guaranteeing payment of losses and related investigation, claim administration and defense expenses.

D. Acceptability of Insurers: Insurance should be placed with insurers having a Bests' rating of A-Excellent and Xiii Financial Size.

E. Verification of Coverage: Successful Contractor shall furnish the City with certificates of insurance and with original endorsements affecting coverage's required by this appendix. The certificates and endorsement for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificate and endorsement are to be on forms provided or approved by the City and are to be received and approved in final form by the

City

F. Subcontractors: Contractor shall include all subcontractors as insured's under its policies or shall furnish separate certivicates and endorsements for each subcontractor. All coverage's for subcontractors shall be subject to all of the requirements stated herein.



This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

**ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE**

and

Issued and Published Jointly by

**ACEC**

AMERICAN COUNCIL OF ENGINEERING COMPANIES



**ASCE** American Society  
of Civil Engineers

**P/E** National Society of  
Professional Engineers  
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

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*A Practice Division of the*  
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
  3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
  5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
  7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
  8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
  9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
  10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
  11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.



27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *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.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

## 1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

### B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

### C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

### D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
  - a. does not conform to the Contract Documents; or
  - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
  - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

### E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
  2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
  3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
  4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## **ARTICLE 2 – PRELIMINARY MATTERS**

### *2.01 Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

### *2.02 Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

### *2.03 Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

## 2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

## 2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
  - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
  - 2. a preliminary Schedule of Submittals; and
  - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

## 2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

## 2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
  - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of

the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

### **ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE**

#### **3.01 *Intent***

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

#### **3.02 *Reference Standards***

- A. Standards, Specifications, Codes, Laws, and Regulations
  1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
  2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

#### **3.03 *Reporting and Resolving Discrepancies***

- A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
  - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
  - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
  1. A Field Order;
  2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

### 3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
  1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
  2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

### 3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

## **ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS**

### 4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the



Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

#### 4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

- 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
- 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

- 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

#### 4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

- 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; or
- 3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
  - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
  - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
  - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
  - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
  - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

#### 4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
  - a. reviewing and checking all such information and data;
  - b. locating all Underground Facilities shown or indicated in the Contract Documents;
  - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
  - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### 4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

#### 4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
  - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
  - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
  - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to

permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 5 – BONDS AND INSURANCE

### 5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

### 5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

### 5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

#### 5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
  - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
  - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
  - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
    - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
    - b. by any other person for any other reason;
  - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
  - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
  - 1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners,

employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
  - a. Such insurance shall remain in effect for two years after final payment.
  - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

#### 5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

#### 5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
  1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of



them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
  3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
  4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
  5. allow for partial utilization of the Work by Owner;
  6. include testing and startup; and
  7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
  2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

## ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

### 6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

### 6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

### 6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

#### 6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
  2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

#### 6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
1. "*Or-Equal*" Items: If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that:
      - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
      - 3) it has a proven record of performance and availability of responsive service.
    - b. Contractor certifies that, if approved and incorporated into the Work:
      - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
      - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

## 2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
  - 1) shall certify that the proposed substitute item will:
    - a) perform adequately the functions and achieve the results called for by the general design,
    - b) be similar in substance to that specified, and
    - c) be suited to the same use as that specified;
  - 2) will state:
    - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
    - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
    - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
  - 3) will identify:
    - a) all variations of the proposed substitute item from that specified, and
    - b) available engineering, sales, maintenance, repair, and replacement services; and
  - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

#### 6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or

entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
  2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

#### 6.07 *Patent Fees and Royalties*

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



use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

#### 6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

#### 6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner

and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

#### 6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

#### 6.11 *Use of Site and Other Areas*

##### A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

## 6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

## 6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
  - 1. all persons on the Site or who may be affected by the Work;
  - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts

any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

#### 6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

#### 6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

#### 6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

#### 6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

##### 1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

##### 2. *Samples:*

- a. Submit number of Samples specified in the Specifications.

- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:
  - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
  - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
  - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
  - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the

Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
  1. observations by Engineer;
  2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
6. any inspection, test, or approval by others; or
7. any correction of defective Work by Owner.

#### 6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
  1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
  2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

## 6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

## **ARTICLE 7 – OTHER WORK AT THE SITE**

### 7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
  - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
  - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe



access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

#### 7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
  - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
  - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
  - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

#### 7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

## ARTICLE 8 – OWNER’S RESPONSIBILITIES

### 8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

### 8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

### 8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

### 8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

### 8.05 *Lands and Easements; Reports and Tests*

- A. Owner’s duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

### 8.06 *Insurance*

- A. Owner’s responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

### 8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

### 8.08 *Inspections, Tests, and Approvals*

- A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

### 8.09 *Limitations on Owner’s Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws

and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

**ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION**

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations

on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of,

and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

#### 9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

### **ARTICLE 10 – CHANGES IN THE WORK; CLAIMS**

#### 10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

#### 10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

#### 10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
  - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
  - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
  - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of

executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

#### 10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

#### 10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
  - 1. deny the Claim in whole or in part;
  - 2. approve the Claim; or
  - 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

## **ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### *11.01 Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
  - 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
  - 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
  - 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.



4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
  - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
  - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
  - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
  - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
  - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
  - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
  - g. The cost of utilities, fuel, and sanitary facilities at the Site.
  - h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
  - i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
  2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
  3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
  4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
  5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

## 11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
1. Contractor agrees that:
    - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
    - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in

the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
2. there is no corresponding adjustment with respect to any other item of Work; and
3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

**ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES**

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee*: The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
    - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
    - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
    - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

## 12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

## 12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

## **ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

### *13.01 Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

### *13.02 Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

### *13.03 Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
  - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
  - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
  - 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

#### 13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### 13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

#### 13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers,

architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

### 13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. repair such defective land or areas; or
  - 2. correct such defective Work; or
  - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
  - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.



### 13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

### 13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

## **ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION**

### 14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

### 14.02 *Progress Payments*

#### A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

#### B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's

review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
- a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
  - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
- a. to supervise, direct, or control the Work, or
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
  - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
  - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
  - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
  - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  - c. there are other items entitling Owner to a set-off against the amount recommended; or
  - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

#### 14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

#### 14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

#### 14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 14.07 *Final Payment*

##### A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
  - b. consent of the surety, if any, to final payment;
  - c. a list of all Claims against Owner that Contractor believes are unsettled; and

- d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

*B. Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

*C. Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

**14.08** *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

#### 14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
  2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

### **ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION**

#### 15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

#### 15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
  2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
  3. Contractor's repeated disregard of the authority of Engineer; or
  4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);



2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
  3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

### 15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
  3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other

dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

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

#### 15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

### **ARTICLE 16 – DISPUTE RESOLUTION**

#### 16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or
3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

## **ARTICLE 17 – MISCELLANEOUS**

### *17.01 Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
  1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
  2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

### *17.02 Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

### *17.03 Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

### *17.04 Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

### *17.05 Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

### *17.06 Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.



## SECTION 00800

### SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (ACEC/NSPE/ASCE) Document No. C-700, 2007 edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect. Where conflicts exist between these Supplementary Conditions and the FDEP Supplementary Conditions, the FDEP Supplementary Conditions shall govern.

SC-1.01 The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract (No. C-700, 2007 Edition) have the meanings assigned to them in the Standard General Conditions.

SC-1.01.12 Delete the definition of "Contract Documents" in Article 1 of the General Conditions. "Contract Documents" are the documents enumerated in Article 8 of the Agreement.

SC-1.01.44 Delete the definition of Substantial Completion and insert the following in its place:

Substantial Completion - The Work (or a specified part thereof) has progressed to the point where, in the opinion of the ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents and that all conditions precedent to Substantial Completion have been met in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to any Work refer to Substantial Completion thereof.

Add the following definitions:

SC-1.01.52 Compensable Delay - Any delay beyond the control and without the fault or negligence of the CONTRACTOR resulting from OWNER-caused changes in the Work, differing site conditions, suspensions of the Work, or termination for convenience by the OWNER.

SC-1.01.53 Correction Period - The time during which the CONTRACTOR must correct defective Work or remove defective Work from the site and replace it with non-defective Work, all at no cost to the OWNER, pursuant to paragraph 13.07 of the General Conditions, as supplemented.

- SC-1.01.54      Final Completion - The date upon which the final payment is due to be paid by OWNER to CONTRACTOR.
- SC-1.01.55      Excusable Delay - Any delay beyond the control and without the fault or negligence of the CONTRACTOR, the OWNER, or any other contractor caused by events or circumstances such as, but not limited to, acts of God or of the public enemy, acts of interveners, acts of the government, fires, floods, epidemics, quarantine restrictions, freight embargoes, and hurricanes, tornadoes, or new sink holes. Labor disputes and above average rainfall shall give rise only to Inexcusable Delays.
- SC-1.01.56      Float or Slack Time - The time available in the progress schedule during which an unexpected activity can be completed without delaying the Substantial Completion of the Work.
- SC-1.01.57      Inexcusable Delay - Any delay caused either (i) by events or circumstances within the control of the CONTRACTOR, such as inadequate crewing, slow submittals, etc., which might have been avoided by the exercise of care, prudence, foresight, or diligence on the part of the CONTRACTOR, (ii) by weather conditions (other than hurricanes and tornadoes) or (iii) labor disputes.
- SC-1.01.58      Nonprejudicial Delay - Any delay impacting a portion of the Work within the available total Float or Slack Time, as that term is used in Section 01310: Progress Schedules and not necessarily preventing completion of the Work within the Contract Time.
- SC-1.01.59      Prejudicial Delay - Any Excusable or Compensable Delay impacting the Work and exceeding the total Float Time available in the progress schedule, thus preventing completion of the Work within the Contract Time unless the Work is accelerated.
- SC-1.01.60      Preoperational Testing (Check-Out-Testing) - All field inspections, installation checks, water tests, performance tests, and necessary corrections required of the CONTRACTOR as a condition or conditions to achieving Substantial Completion to demonstrate to the OWNER and ENGINEER that individual components of the Work have been properly constructed and operate in accordance with the Contract Documents for their intended purposes.

- SC-1.01.61      Start-Up Testing (Demonstration Testing) - A predefined trial period required as a condition to Substantial Completion during which CONTRACTOR is to operate the entire Work (or any part thereof agreed to by the OWNER) under actual and simulated operating conditions for the purpose (i) of making such minor adjustments and changes to the Work as may be necessary for the Work to comply with the Contract Documents and (ii) of complying with the final test requirements in the Contract Documents.
- SC-2.02      Delete paragraph 2.02 of the General Conditions in its entirety and insert the following in its place:
- 2.2.1      After the Agreement has been executed, the CONTRACTOR will be furnished one (1) complete set of reproducible Drawings (24 x 36) and one (1) reproducible copy of the Project Manual (Contract Requirements and Specifications) and all addenda.
- 2.2.2      The CONTRACTOR shall furnish each of the Subcontractors, Suppliers, Permitting Agencies, and others such copies of the Contract Documents as may be required for their Work. All copies of the Contract Documents shall be printed from the reproducible.
- SC-2.03      Delete paragraph 2.03 of the General Conditions in its entirety and insert the following in its place.
- 2.03      The Contract Time will commence to run on the day indicated in the Notice to Proceed. The Notice to Proceed may be given at any time after the Effective Date of the Agreement. In no event will the Contract Time commence to run later than the sixtieth (60th) day after the Effective Date of the Agreement.
- SC-2.05      Add the following immediately after subparagraph 2.05.3 of the General Conditions:
- 2.05.4      The submittals required in subparagraphs 2.05.1, 2.05.2 and 2.05.3 shall be as specified in Section 01310, 01340, and 01370, respectively.
- SC-2.07      Delete paragraph 2.07A.2 of the General Conditions in its entirety and insert the following in its place:
- 2.07.A.2      CONTRACTOR'S schedule of shop drawings and sample submittals will be acceptable to ENGINEER only if it provides a minimum of thirty (30) days for reviewing and processing the submittals. Shop Drawings requiring resubmission and review shall not rise to an excusable or compensable delay.

SC-3.03 Add the following immediately after paragraph 3.03 A of the General Conditions:

3.03 B Measurements

1. When measurements are affected by conditions already established or where items have to be fitted into construction conditions, it shall be the CONTRACTOR's responsibility to verify all such dimensions at the site and the actual job dimensions shall take precedence over scale and figure dimensions on the Drawings.

2. The CONTRACTOR shall carefully study and compare all Drawings, Specifications and other instructions; shall test all figures on the Drawings before laying out the Work; shall notify the ENGINEER of all errors, inconsistencies, or omissions which he may discover; and obtain specific instructions before proceeding with the Work. The CONTRACTOR shall not take advantage of any apparent error or omissions which may be found in the Contract Documents, and the ENGINEER shall be entitled to make such corrections therein and interpretations thereof as may be deemed necessary for the fulfillment of their intent. The CONTRACTOR shall be responsible for all errors in construction which could have been avoided by such examination and notification and shall correct, at CONTRACTORS own expense, all Work improperly constructed through failure to notify the ENGINEER and request specific instructions.

3.03 B Amend paragraph 3.03 B to read 3.03 C.

SC-3.06 Add the following immediately after paragraph 3.06.C:

3.06.D The CONTRACTOR shall submit hard copies of all information required by Sections 01027, 01340 and 01730 and all forms that require the CONTRACTOR signature. Other CONTRACTOR submittals may be electronic data if approved by the ENGINEER.

SC-4.03.A.4 In the last paragraph of 4.03.A after "then CONTRACTOR shall" amend "promptly" to read "within three (3) days".

SC-4.04.B.1 In the first sentence of 4.04.B.1 amend "promptly" to read "within three (3) days".



SC-4.06.E Add the following immediately after paragraph 4.06.E of the General Conditions:

The provisions of paragraphs 4.06.A, 4.06.B, 4.06.C, 4.06.D and 4.06.E shall not apply where the Work is performed upon public lands, rights-of-way, easements or other properties of which the OWNER does not own. In such case, Contractor's sole remedy shall be an extension of contract time.

SC-4.07 Add a new paragraph immediately after paragraph 4.06 of the General Conditions which is to read as follows:

4.07 No claim of the CONTRACTOR under paragraphs 4.03, 4.04 and 4.06 shall be allowed unless, (1) the CONTRACTOR has given the notice required in the respective sub-paragraph above, and (2) within thirty (30) days (but before final payment) after the CONTRACTOR has given written notice, the CONTRACTOR submits to the OWNER a detailed claim setting forth the CONTRACTOR's right to an increase in the Contract Price or extension of the Contract Time as provided in Articles 11 and 12 of the General Conditions.

SC-5.01 Add the following immediately after paragraph 5.01 C of the General Conditions:

D. The Surety shall be rated as "A" or better as to General Policyholders Rating and Class X or better as to Financial Category by Best's Key Rating Guide, published by Alfred M. Best Company, Inc., of 75 Fulton Street, New York, New York, 10038.

E. All Surety Companies are subject to approval and may be rejected by the OWNER without cause.

F. The bonding limit of the Surety shall not exceed ten percent (10%) of the policyholder surplus (capital and surplus) as listed by the aforementioned Best's Key Rating Guide, on any one risk (penalty or amount of any one bond).

G. The Agent countersigning the bond shall be resident in the County where the Project is located and/or other counties that are acceptable to the OWNER.

SC-5.04.A The limits of liability for the insurance required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or where required by Law and Regulations.

Worker's Compensation, Employer's Liability etc., (under paragraphs 5.04.A.1 and 5.04.A.2 of the General Conditions):

- (1) State: Coverage A: Statutory
- (2) Applicable Federal: Statutory
- (3) Employer's Liability:
  - Each Accident \$ 500,000
  - Each Employee \$ 500,000
  - Disease \$ 100,000

5.04.A.3 thru 5.04.A.6 of the General Conditions which shall also include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

- (1) Commercial General Liability (Bodily Injury and Property Damage single limit each occurrence): \$ 1,000,000
- (2) Umbrella Liability \$ 2,000,000
- (3) Business Automobile Liability:
  - Combined Single Limit - (Bodily Injury and Property Damage)
  - \$ 1,000,000 Each Occurrence

SC-5.04.B.1 Additional Insureds:

Owner:  
City of Crestview

Engineer:  
(To Be Named At A Later Date)

\_\_\_\_\_  
Crestview, FL \_\_\_\_\_

The Contractual Liability coverage required by paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts:

- (1) Each Aggregate \$ 1,000,000
- (2) Each Occurrence (Bodily Injury and Property Damage) \$ 1,000,000

SC-5.06.A Revise paragraph 5.06.A. of the General Conditions as follows: Replace the word "Owner" with the word "CONTRACTOR" such that CONTRACTOR is required to purchase property insurance.

5.06.A.1 Name Additional Property Insureds (as previously listed).

5.06.A.2 Include coverage for hurricanes, floods, wind, and sinkholes.

5.06.A.7 Delete paragraph 5.06.A.7 in its entirety and replace with the following:

Be maintained in effect until Final Completion, unless otherwise agreed to in writing by OWNER, CONTRACTOR and ENGINEER with thirty (30) days written notice to each other additional insured to whom a certificate of insurance has been issued.

The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with this paragraph 5.06 shall comply with the requirements of GC-5.08.

SC-5.06.B Delete paragraph 5.06.B in its entirety.

SC-5.10 Delete paragraph 5.10 of the General Conditions in its entirety and insert the following in its place:

5.10 The CONTRACTOR shall maintain all insurance as required in Paragraph 5.06 for the Work and allow OWNER to occupy or use a portion or portions of the Work prior to Substantial Completion. CONTRACTOR shall make appropriate provisions with insurers providing the proper endorsements, if required. The property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

SC-6.01.B Add to the end of 6.01.B "Resident superintendent shall be fluent in English."

SC-6.02

Add the following sub-paragraphs immediately after paragraph 6.02.B of the General Conditions which are to read as follow:

- 6.02.B.1 Maintenance work may be performed during hours other than regular working hours. Regular working hours are defined as daylight hours between one-half hour after sunrise to one-half hour before sunset but not more than eight (8) hours per day forty (40) hours per week during weekdays. Requests to Work during other than regular working hours must be submitted to the OWNER at least seventy-two (72) hours in advance of the period proposed for such irregular working hours and shall set forth the proposed schedule for such hours to give the OWNER ample time to arrange for its personnel to be at the site of the Work.
- 6.02.B.2 The OWNER will pay for charges of ENGINEER and construction observation performed during regular working hours. The CONTRACTOR shall pay for additional engineering and construction observation charges required during irregular hours which may be authorized under the provisions of paragraph SC-6.02.B.1.
- 6.02.B.3 The CONTRACTOR shall also pay for the costs of additional engineering charges and construction observation required during the correction of defective Work. Such additional costs incurred during irregular working hours and during the correction of defective Work, shall be subsidiary obligation of the CONTRACTOR and no extra payment shall be made by the OWNER on account of such Work.

SC-6.05

Delete the first paragraph in 6.05.A of the General Conditions in its entirety and insert the following in its place:

6.05.A ENGINEER and OWNER have no obligation to consider "or equal" items or substitutions unless such items are specifically identified in Section 00300 by CONTRACTOR at the time of bid. All "or equal" items and substitute items must be identified at the time of bid. It is the OWNER's sole prerogative to have ENGINEER review proposals, other than those identified in Section 00300, proposed by CONTRACTOR during the course of the Work. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains or is followed by words "or equal" or "or approved equal" no substitution is permitted. Other items of material or equipment of other Suppliers will be reviewed by ENGINEER, with OWNER's approval, if the material or equipment is not named in Section 00300.

- SC-6.08 Add the following to the end of paragraph 6.08.A in the General Conditions:
- "The OWNER, prior to the advertisement of the Project, has applied for or has secured permits and/or licenses for the Project as referenced in Section 01065: Permits and Fees. The CONTRACTOR shall obtain and pay for all other construction permits required."
- SC-6.11.B Add the following the end of 6.11.B:
- "Contractor shall remove and dispose of waste materials, rubbish, and other debris on a weekly basis or when directed by the OWNER or ENGINEER."
- SC-6.11.C Add to the end of 6.11.C:
- "Contractor shall clean the site and the Work to the satisfaction of the OWNER."
- SC-6.11 Add a new sub-paragraph immediately after paragraph 6.11.D of the General Conditions which are to read as follows:
- 6.11.E Use of the OWNER's existing washrooms, lavatories, sanitary facilities or plumbing fixtures by the CONTRACTOR or any of its employees or Subcontractors will not be permitted.
- SC-6.13.C The Owner does not have safety programs that are specifically applicable to the Work. All safety programs associated with the Work shall be the responsibility of the Contractor.
- SC-6.13.D Replace paragraph 6.13.D with the following:
- "Contractor's duties and responsibilities for safety and protection of the Work shall continue until Final Completion and at all times during the correction period that Contractor, subcontractor, supplier, or any other individual directly or indirectly employed by any of them are on site to perform work."

SC-6.13 Add the following paragraph 6.13.G:

"The CONTRACTOR shall be completely responsible for any tanks, wet wells or similar structures that may become buoyant during the construction and modification operations due to the ground water or floods and before the structure is put into operation. Should there be any possibility of buoyancy of a structure, the CONTRACTOR shall take the necessary steps to prevent its buoyancy either by increasing the structures weight, by filling it with approved material or other acceptable methods. The proposed final structures have been designed against buoyancy; however, during various construction stages, methods employed by the CONTRACTOR and other conditions which may affect the buoyancy, the CONTRACTOR shall take the necessary precautions against buoyancy. Damage to any structures due to floating or flooding shall be repaired or the structures replaced at the CONTRACTOR's expense."

SC-6.17 E.1 Add the following at the end of paragraph 6.17.E.1 in the General Conditions:

"Shop Drawings and other submittal data shall be reviewed by the ENGINEER for each original submittal and first re-submittal; thereafter, the CONTRACTOR shall reimburse OWNER for services rendered by ENGINEER for review time and other associated costs of subsequent re-submittals."

SC-6.22 Add the following new paragraphs after paragraph 6.21 of the General Conditions to read as follows:

6.22 Additional Costs: The CONTRACTOR shall reimburse the OWNER for services rendered by the ENGINEER when made necessary by the following:

6.22.1. Work damaged by fire, flood, lightning, or any other cause during construction.

6.22.2. Default by CONTRACTOR or any Subcontractor.

SC-7.01.C In the first sentence of paragraph 7.01.C, amend "promptly" to read "within three (3) days."

Amend the last sentence to read, "Contractor's failure to so report within three (3) days will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work."

SC-7.02 Delete paragraph 7.02 of the General conditions in its entirety and insert the following in its place:

7.02 The parties expressly acknowledge that the Work to be done by the CONTRACTOR under this contract may interface with the Work of other contractors. Thus, in addition to the foregoing paragraphs in this Article 7, the following provisions apply.

7.02.A The CONTRACTOR shall cooperate with all other contractors who may be performing Work on behalf of the OWNER in the vicinity of the Work to be done under this contract, and CONTRACTOR shall conduct his operation as to interfere to the least possible extent with the Work of such contractor.

7.02.B The CONTRACTOR shall promptly make good, at its own expense, any injury or damage that may be caused by it to other contractors, employees or subcontractors or suppliers thereof.

7.02.C Any difference or conflict which may arise between the CONTRACTOR and other contractors in regard to their respective Work shall be adjusted and determined by the OWNER.

7.02.D If the Work is delayed because of any acts or omissions of any other contractor, the CONTRACTOR shall have no claim against the OWNER on that account.

SC-8.06 Delete paragraph 8.06 of the General Conditions in its entirety.

SC-9.08.D Add the following sentences to the end of paragraph 9.08.D of the General Conditions:

"No action, either at law or at equity, shall be brought in connection with any such claim, dispute or other matter later than thirty (30) days after the date on which the ENGINEER has rendered such written decision in respect thereof. Failure to bring an action within said thirty (30) day period shall result in ENGINEER's decision being final and binding upon the OWNER and the CONTRACTOR. In no event may any such action be brought after the time at which instituting such proceedings would be otherwise barred by the applicable statute of limitations."



SC-10.01.C  
&  
SC-10.01.D

Add the following new paragraphs after paragraph 10.01.B of the General Conditions:

10.01.C At anytime, ENGINEER may request a quotation from CONTRACTOR for a proposed change in the Work. Within seven (7) calendar days after receipt of a request for a quotation for a proposed change, the CONTRACTOR shall submit a written and detailed proposal for an increase or decrease in the Contract Price or Contract Time for the proposed change. ENGINEER shall have twenty-one (21) calendar days after receipt of the detailed proposal to respond in writing. The proposal shall include an itemized estimate of all costs and time for performance that will result directly or indirectly from the proposed change. Unless otherwise directed, itemized estimates shall be in accordance with Articles 11 and 12 of the General Conditions and in sufficient detail to permit an analysis by ENGINEER of all material, labor, equipment, subcontract, and overhead costs and fees and shall cover all Work involved in the change, whether such Work was deleted, added, changed, or impacted. Any amount claimed for subcontracts shall be similarly supported. Itemized schedule adjustments shall be in sufficient detail to permit an analysis of impact as required in Section 01310: Progress Schedules. Notwithstanding the request for quotation, the CONTRACTOR shall carry on the Work and maintain the progress schedule. Delays in the submittal of the written and detailed quotation will be considered a non-prejudicial delay as defined in the Supplementary Conditions.

10.01.D The adjustment in Contract Price and/or Contract Time stated in a Change Order shall comprise the total price and/or time adjustment due or owed the CONTRACTOR for the Work or changes defined in the Change Order. By executing the Change Order, the CONTRACTOR acknowledges and agrees that the stipulated price and/or time adjustments include the costs and delays for all Work contained in the Change Order, including costs and delays associated with the interruption of schedules, extended overheads, delay, acceleration and cumulative impacts or ripple effect on all other non-affected Work under this contract. Signing of the Change Order constitutes full and mutual accord and satisfaction for the adjustment in the Contract Price or Contract Time as a result of increases or decreases in costs and time of performance caused directly and indirectly from the change, subject to the current scope of the entire Work as set forth in the Contract Documents. Acceptance of the Change Order constitutes an

agreement between OWNER and CONTRACTOR that the Change Order represents an equitable adjustment to the Contract Documents, and that the CONTRACTOR will waive all rights to file a claim on this Change Order after it is properly executed.

SC-10.05 Add the following new paragraphs after paragraph 10.05.F of the General Conditions:

10.05.G. This Project is a "Public Work" under Chapter 255, Florida Statutes. No liens may be filed against OWNER. Any Claimant may apply to the OWNER for a copy of this Contract and the Public Construction Bond. The Claimant shall have a right of action against the CONTRACTOR and surety for the amount due him. Such action shall not involve the OWNER in any expense claims against the CONTRACTOR or the surety are subject to timely prior notice to both the CONTRACTOR and the Surety as specified in Section 255.05 Florida Statutes. The CONTRACTOR shall insert the following in all subcontracts hereunder.

"NOTICE: Claims for labor, materials, and supplies are not assertable against the OWNER and are subject to proper prior notice to the CONTRACTOR and the Surety pursuant to Chapter 255 of the Florida Statutes. This paragraph shall be insert in every subcontract hereunder."

SC-12.02 Delete paragraph 12.02 of the General Conditions in its entirety and insert the following in its place:

12.02.A The Contract Time may be changed only by a Change Order. Any claim for an extension or shortening in the Contract Time shall be based on written notice delivered to the OWNER and ENGINEER within fifteen (15) days from detection or the beginning of any event or circumstance giving rise to an Excusable or Compensable Delay and setting forth the general nature of the cause of delay. Within thirty (30) days of any such detection or beginning of event, the CONTRACTOR shall provide the analysis and documentation required to ascertain the facts, as specified in Section 01310: Progress Schedules and shall provide a written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. No claim by the CONTRACTOR under this provision shall be allowed unless the CONTRACTOR has

given the notice and the analysis and documentation required in this paragraph, or if asserted after final payment.

12.02.B No forfeiture due to delay shall be made because of any Excusable and Prejudicial Delays in the completion of the entire Work or a specified part thereof. Any such delays shall not entitle the CONTRACTOR to any change in Contract Price. The sole remedy of the CONTRACTOR shall be an extension of the Contract Time pursuant to this Article and the provisions of Section 01310: Progress Schedules.

12.02.C No forfeiture due to delay shall be made because of any Compensable and Prejudicial Delays in the completion of the Work or a specified part thereof. Any such delays will entitle the CONTRACTOR solely to an extension of the Contract Time pursuant to this Article and the provisions of Section 01310: Progress Schedules, of the General Requirements.

12.02.D No extensions of Contract Time or increases in Contract Price shall be granted for Nonprejudicial Delays of any type or for Inexcusable Delays, unless otherwise agreed to by the OWNER at his sole discretion.

SC-13.03 B Delete Paragraph 13.03.B and sub-paragraphs 13.03.B.1, 13.03.B.2 and 13.03.B.3 in their entirety and insert the following:

13.03.B Payment of testing and laboratory services is specified in Section 01410; Testing and Laboratory Services for inspections and tests required by the Contract Documents. In addition to the requirements specified in Section 01410, CONTRACTOR shall pay for all inspections, tests or approvals covered by paragraph 13.03.C.

SC-13.06 Add a new paragraph 13.06.C as follows:

"The CONTRACTOR shall not be entitled to an extension of Contract Time or increase in Contract Cost for removing or correcting defective work."

SC-13.07.A Add a new paragraph 13.07.A.5:

"When deemed necessary by OWNER, CONTRACTOR shall furnish and install at no cost to OWNER, such temporary equipment and material necessary to maintain functionality of the Work while defective Work is being corrected or replaced."

- SC-13.07.B Revise the first (1<sup>st</sup>) sentence of paragraph 13.07.B as follows:
- "..., or in an emergency where delay would cause risk of loss, damage, present a threat to OWNER or the public, the environmental or cause or present a threat of violation of any Laws and Regulations, OWNER may..."
- SC-14.02 Add a new paragraph 14.02.A.4 as follows:
- "Applications for payment shall be in accordance with Section 01027."
- SC-14.02 Delete subparagraph 14.02.C of the General Conditions and replace it with the following sentence:
- "Thirty (30) days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.02.B) become due and payable by OWNER to CONTRACTOR."
- SC-14.04.A Delete the first sentence of paragraph 14.04.A of the General Conditions and replace it with the following sentences:
- "After all requirements of Section 01700: Contract Closeout have been met with respect to Substantial Completion, then when CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion."
- SC-14.06.A Amend 14.06.A to read as follows:
- "After all requirements of Section 01700: Contract Closeout have been met with respect to Final Inspection Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies. Contractor shall not request a Final Inspection until CONTRACTOR has achieved Substantial Completion."

SC-14.07.A Add the following subparagraphs after Paragraph 14.07.A.3 of the General Conditions:

14.07.A.4 Notwithstanding any provision of the Contract Documents to the contrary, the OWNER shall not be deemed to have accepted the Work or waived claims against the CONTRACTOR until (i) payment of all remaining amounts of the Contract Price as provided under Paragraph 5.3. of the Agreement, (ii) all Record Drawings, specifications, addenda, modifications and shop drawings are delivered to and accepted by the ENGINEER, and (iii) the CONTRACTOR has met all conditions of General Condition 13.07 - Correction Period.

SC-15.01 Add a new subparagraph immediately after paragraph 15.01.A of the General Conditions to read as follows:

15.01.B Notwithstanding this paragraph 15.01, if the OWNER stops Work under paragraph 13.05 or suspends the CONTRACTOR's services under paragraph 13.06 of the General Conditions, or suspends the Work or any portion thereof because of the CONTRACTOR's failure to prosecute the Work without endangering persons and property, the CONTRACTOR shall not be entitled to an extension of Contract Time or increase in Contract Price.

SC-16.01 Add a new paragraph 16.01.D as follows:

"The CONTRACTOR shall carry on the Work and maintain the progress schedule during any dispute, regardless of how resolved, unless otherwise mutually agreed in writing. Venue for any litigation, at law or equity or arbitration, shall lie exclusively in the place of the OWNER's choosing. This Contract, or any provision hereof, shall be construed and interpreted, and any litigation arising therefrom, shall be governed by the laws of the State of Florida."

SC-17.01 Add the following after paragraph 17.01.A.2:

"3. Delivered by an independent carrier than can substantiate delivery with a tracking number and name of an individual or member of the firm accepting receipt."

SC-17.07  
&  
SC-17.08

Add the two paragraphs immediately after paragraph 17.06 of the General Conditions which are to read as follows:

17.07           The form of all submittals, notices, change orders and other documents permitted or required to be used or transmitted under the Contract Documents shall be determined by the ENGINEER.

17.08           All representations, warranties and guarantees made in the Contract Documents shall survive final payment and termination or completion of the Agreement. Also, the obligation of the CONTRACTOR to maintain the Work until Substantial Completion shall survive final payment and termination or completion of the Agreement.

END OF SECTION

SECTION 00843

CHANGE ORDER FORM

Project: Blackwater Golf Club  
Lift Station and Force Main Project

CHANGE ORDER NO. \_\_\_\_\_

DATE OF ISSUANCE: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

EFFECTIVE DATE: \_\_\_\_\_

ENGINEER: \_\_\_\_\_

OWNER'S CONTRACT NO.: \_\_\_\_\_

The following changes are hereby made to the Contract Documents:

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price  \$ _____	Original Contract Times  Substantial Completion: _____ Ready for final payment: _____ days or dates
Net changes from previous Change Orders No. ___ to No. ___  \$ _____	Net change from previous Change Orders No. ___ to No. ___  _____ days
Contract Price prior to this Change Order  \$ _____	Contract Times prior to this Change Order  Substantial Completion: _____ Ready for final payment: _____ days or dates
Net Increase (decrease) of this Change Order  \$ _____	Net Increase (decrease) of this Change Order  _____ days
Contract Price with all approved Change Orders  \$ _____	Contract Times with all approved Change Orders  Substantial Completion: _____ Ready for final payment: _____ days or dates

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CHANGES ORDERED:

I. GENERAL This change order is necessary to cover changes in the work to be performed under this Contract. The General Conditions, Supplementary Conditions, Specifications and all parts of the Project Manual listed in Article 1, Definitions, of the General Conditions apply to and govern all work under this change order.

Change Order No. \_\_\_\_\_

II. REQUIRED CHANGES: \_\_\_\_\_

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III. JUSTIFICATION: \_\_\_\_\_

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IV. PAYMENT: \_\_\_\_\_

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V. APPROVAL AND CHANGE AUTHORIZATION: \_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Acknowledgments:

The aforementioned change, and work affected thereby, is subject to all provisions of the original contract not specifically changed by this Change Order; and,

It is expressly understood and agreed that the approval of the Change Order shall have no effect on the original contract other than matters expressly provided herein.

Change Order Request by: \_\_\_\_\_

Change(s) Ordered by: \_\_\_\_\_

RECOMMENDED BY:

ACCEPTED BY:

\_\_\_\_\_  
(Engineer)

\_\_\_\_\_  
(Contractor)

By: \_\_\_\_\_  
(Authorized Signature) (Date)

\_\_\_\_\_  
(Authorized Signature) (Date)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Title)

APPROVED BY:

City of Crestview, Florida  
(Owner)

By: \_\_\_\_\_  
(Authorized Signature) (Date)

END OF SECTION



SECTION 00844

APPLICATION AND CERTIFICATE FOR PAYMENT FORM

Application No. \_\_\_\_\_ Progress \_\_\_\_\_ Final \_\_\_\_\_

Engineer's Project No.: \_\_\_\_\_

Project: Blackwater Golf Club  
Lift Station and Force Main Project

Contractor: \_\_\_\_\_ Contract Date: \_\_\_\_\_

Contract for: \_\_\_\_\_

Application Date: \_\_\_\_\_ For Period Ending \_\_\_\_\_

Change Order Summary		ADDITIONS	DEDUCTIONS
Change Orders approved in previous months by OWNER TOTAL			
Approved this month			
Number	Date Approved		
TOTALS			
Net Change by Change Orders			

1. ORIGINAL CONTRACT SUM \$ \_\_\_\_\_
2. Net Change by Change Order \$ \_\_\_\_\_
3. CONTRACT SUM TO DATE (Line 1 and 2) \$ \_\_\_\_\_
4. TOTAL COMPLETED AND STORED TO DATE \$ \_\_\_\_\_
5. RETAINAGE: (Column I & N, Forms 00845 and 00846)
  - a. \_\_\_\_% of Completed Work \$ \_\_\_\_\_
  - b. \_\_\_\_% of Stored Material \$ \_\_\_\_\_
  - Total Retainage (Line 5a and 5b) \$ \_\_\_\_\_
6. TOTAL EARNED LESS RETAINAGE  
(Line 4 less Line 5 Total) \$ \_\_\_\_\_
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT  
(Line 6 from prior Certificate) \$ \_\_\_\_\_
8. AMOUNT DUE THIS APPLICATION \$ \_\_\_\_\_
9. BALANCE TO FINISH, PLUS RETAINAGE  
(Line 3 less Line 6) \$ \_\_\_\_\_

Contractor's Certification

The undersigned Contractor hereby swears under penalty of perjury that (1) all previous progress payments received from the Owner on account of Work performed under the contract referred to above have been applied by the undersigned to discharge in full all obligations of the undersigned incurred in connection with Work covered by prior Applications for Payment numbered 1 through \_\_\_\_\_ inclusive; and (2) all materials and equipment incorporated in said Project or otherwise listed in or covered by this Application for Payment are free and clear of all liens, claims, security interest and encumbrances; (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and not defective as that term is defined in the Contract Documents.

Dated \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
(Contractor)

By: \_\_\_\_\_  
(Name)

\_\_\_\_\_  
(Title)

COUNTY OF \_\_\_\_\_

STATE OF \_\_\_\_\_

Before me on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, personally appeared \_\_\_\_\_, known to me, who being duly sworn, deposes and says that (s)he is the \_\_\_\_\_ of the Contractor above mentioned; that(s) he executed the above Application for Payment and statement on behalf of said Contractor; and that all of the statements contained therein are true, correct and complete.

\_\_\_\_\_  
Notary Public  
My Commission Expires \_\_\_\_\_

Engineer's Recommendation

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

By: \_\_\_\_\_  
(Authorized Signature)

Date: \_\_\_\_\_

Owner's Approval

By: \_\_\_\_\_

\_\_\_\_\_  
(Title)

Acct. No. \_\_\_\_\_

Date: \_\_\_\_\_

END OF SECTION



SECTION 00845  
SCHEDULE OF VALUES

Pay Estimate No. \_\_\_\_\_ Project \_\_\_\_\_  
 For Period Ending \_\_\_\_\_ Prepared by \_\_\_\_\_ Page \_\_\_\_ of \_\_\_\_

A	B	C	D	E	F	G		H		I
Item	Description	Bid Quantity	Units	Unit Price	Bid Amount	Complete Through Last Period		Complete Through This Period		Value of Items Completed
						Qty.	%	Qty.	%	
						Subtotals				





SECTION 00849

CONTRACTOR'S FINAL RELEASE OF LIEN

Before me the undersigned authority in said County and State, appeared \_\_\_\_\_ who, being first duly sworn, deposes and says that he is \_\_\_\_\_ of \_\_\_\_\_, a company and/or corporation authorized to do business under the laws of Florida, which is the Contractor on the Contract described as: Blackwater Golf Club Lift Station and Force Main Project dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, that the said deponent is duly authorized to make this affidavit by resolution of the Board of Directors of said company and/or corporation; that deponent knows of his own knowledge that said Contract has been complied with in every particular by said Contractor and that all parts of the work have been approved by the Owner's Engineers; that there are no bills remaining unpaid for labor, material, or otherwise, in connection with said Contract and work, and that there are no suits pending against the undersigned as Contractor or anyone in connection with the work done and materials furnished or otherwise under said Contract. Deponent further says that the final estimate which has been submitted to the owner simultaneously with the making of the affidavit constitutes all claims and demands against the Owner on account of said Contract or otherwise, and the acceptance of the sum specified in said final estimate will operate as a full and final release and discharge of the Owner from any further claims, demands or compensation by Contractor under the above Contract. Deponent further agrees that all guarantees under this Contract shall be in full force from the date of this release as spelled out in the Contract Documents.

Sworn to and subscribed to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Notary Public

My Commission Expires \_\_\_\_\_

We, the \_\_\_\_\_ having heretofore executed a Performance Bond for the above-mentioned Contractor covered Project and Section as described above in the sum of \_\_\_\_\_ dollars (\$ \_\_\_\_\_), hereby agree that the Owner may make full payment of the final estimate, including the retained percentage, to said Contractor.

It is fully understood that the granting of the right to the Owner to make payment of the final estimate to said Contractor and/or his assigns, shall in no way relieve the surety company of its obligations under its bond, as set forth in the Specifications, Contract and Bond pertaining to the above Project.

IN WITNESS WHEREOF, the \_\_\_\_\_ has caused this instrument to be executed on its behalf by its \_\_\_\_\_ and/or its duly authorized attorney in fact, and its corporate seal to be hereunto affixed, all of this \_\_\_\_\_ day of \_\_\_\_\_, A.D., 20\_\_\_\_\_.

\_\_\_\_\_  
Surety Company

\_\_\_\_\_  
Attorney in Fact

(Power of Attorney must be attached if executed by Attorney in Fact)

STATE OF FLORIDA

COUNTY OF \_\_\_\_\_

Before me the undersigned authority, personally appeared to me well known as the person described in and who executed the foregoing instrument in the name of \_\_\_\_\_ and/or \_\_\_\_\_ purpose therein expressed and that he had due and legal authority to execute the same on behalf of said \_\_\_\_\_, a corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Notary Public

END OF SECTION

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**TECHNICAL**  
**SPECIFICATIONS**

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**SECTION 01 11 00  
SUMMARY OF WORK**

**PART 1 GENERAL**

**1.01 WORK COVERED BY CONTRACT DOCUMENTS**

- A. The completed Work will provide Owner with a new sanitary sewer lift station and force main conveyance system as follows:
1. A new fully functional duplex lift station.
  2. Sanitary Sewer force main as shown to connect the new lift station to the existing sewer force main along Antioch Road.
  3. Low pressure sanitary sewer force main as shown to connect to the future low pressure sewer from the Foxwood subdivision.
  4. Miscellaneous site work.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**



**SECTION 01 26 00  
CONTRACT MODIFICATION PROCEDURES**

**PART 1 GENERAL**

**1.01 PROPOSAL REQUESTS**

- A. Owner may, in anticipation of ordering an addition, deletion, or revision to the Work, request Contractor to prepare a detailed proposal of cost and times to perform contemplated change.
- B. Proposal request will include reference number for tracking purposes and detailed description of and reason for proposed change, and such additional information as appropriate and as may be required for Contractor to accurately estimate cost and time impact on Project.
- C. Proposal request is for information only; Contractor is neither authorized to execute proposed change nor to stop Work in progress as result of such request.
- D. Contractor's written proposal shall be transmitted to Engineer promptly, but not later than 14 days after Contractor's receipt of Owner's written request. Proposal shall remain firm for a maximum period of 45 days after receipt by Engineer.
- E. Owner's request for proposal or Contractor's failure to submit such proposal within the required time period will not justify a Claim for an adjustment in Contract Price or Contract Times (or Milestones).

**1.02 CLAIMS**

- A. Include, at a minimum:
  - 1. Specific references including (i) Drawing numbers, (ii) Specification section and article/paragraph number, and (iii) Submittal type, Submittal number, date reviewed, Engineer's comment, as applicable, with appropriate attachments.
  - 2. Stipulated facts and pertinent documents, including photographs and statements.
  - 3. Interpretations relied upon.
  - 4. Description of (i) nature and extent of Claim, (ii) who or what caused the situation, (iii) impact to the Work and work of others, and (iv) discussion of claimant's justification for requesting a change to price or times or both.

5. Estimated adjustment in price claimant believes it is entitled to with full documentation and justification.
6. Requested Change in Contract Times: Include at least (i) Progress Schedule documentation showing logic diagram for request, (ii) documentation that float times available for Work have been used, and (iii) revised activity logic with durations including sub-network logic revisions, duration changes, and other interrelated schedule impacts, as appropriate.
7. Documentation as may be necessary as set forth below for Work Change Directive, and as Engineer may otherwise require.

### 1.03 WORK CHANGE DIRECTIVES

#### A. Procedures:

1. Engineer will:
  - a. Initiate, including a description of the Work involved and any attachments.
  - b. Affix signature, demonstrating Engineer's recommendation.
  - c. Transmit five copies to Owner for authorization.
2. Owner will:
  - a. Affix signature, demonstrating approval of the changes involved.
  - b. Return four copies to Engineer, who will retain one copy, send one copy to the Resident Project Representative or other field representative, and forward two copies to Contractor.
3. Upon completion of Work covered by the Work Change Directive or when final Contract Times and Contract Price are determined, Contractor shall submit documentation for inclusion in a Change Order.
4. Contractor's documentation shall include but not be limited to:
  - a. Appropriately detailed records of Work performed to enable determination of value of the Work.
  - b. Full information required to substantiate resulting change in Contract Times and Contract Price for Work. On request of Engineer, provide additional data necessary to support documentation.
  - c. Support data for Work performed on a unit price or Cost of the Work basis with additional information such as:
    - 1) Dates Work was performed, and by whom.
    - 2) Time records, wage rates paid, and equipment rental rates.
    - 3) Invoices and receipts for materials, equipment, and subcontracts, all similarly documented.

- B. Effective Date of Work Change Directive: Date of signature by Owner, unless otherwise indicated thereon.



1.04 CHANGE ORDERS

A. Procedure:

1. Engineer will prepare six copies of proposed Change Order and transmit such with Engineer's written recommendation and request to Contractor for signature.
2. Contractor shall, upon receipt, either: (i) promptly sign copies, retaining one for its file, and return remaining five copies to Engineer for Owner's signature, or (ii) return unsigned five copies with written justification for not executing Change Order.
3. Engineer will, upon receipt of Contractor signed copies, promptly forward Engineer's written recommendation and partially executed five copies for Owner's signature, or if Contractor fails to execute the Change Order, Engineer will promptly so notify Owner and transmit Contractor's justification to Owner.
4. Upon receipt of Contractor-executed Change Order, Owner will promptly either:
  - a. Execute Change Order, retaining one copy for its file and returning four copies to Engineer; or
  - b. Return to Engineer unsigned copies with written justification for not executing Change Order.
5. Upon receipt of Owner-executed Change Order, Engineer will transmit two copies to Contractor, one copy to Resident Project Representative or other field representative, and retain one copy, or if Owner fails to execute the Change Order, Engineer will promptly so notify Contractor and transmit Owner's justification to Contractor.
6. Upon receipt of Owner-executed Change Order, Contractor shall:
  - a. Perform Work covered by Change Order.
  - b. Revise Schedule of Values to adjust Contract Price and submit with next Application for Payment.
  - c. Revise Progress Schedule to reflect changes in Contract Times, if any, and to adjust times for other items of Work affected by change.
  - d. Enter changes in Project record documents after completion of change related Work.

- B. In signing a Change Order, Owner and Contractor acknowledge and agree that:
1. Stipulated compensation (Contract Price or Contract Times, or both) set forth includes payment for (i) the Cost of the Work covered by the Change Order, (ii) Contractor's fee for overhead and profit, (iii) interruption of Progress Schedule, (iv) delay and impact, including cumulative impact, on other Work under the Contract Documents, and (v) extended overheads.
  2. Change Order constitutes full mutual accord and satisfaction for the change to the Work.
  3. Unless otherwise stated in the Change Order, all requirements of the original Contract Documents apply to the Work covered by the Change Order.

#### 1.05 COST OF THE WORK

- A. In determining the supplemental costs allowed in paragraph 13.01.B.5 of the General Conditions for rental equipment and machinery, the following will apply.
- B. Rental of construction equipment and machinery and the parts thereof having a replacement value in excess of \$1,000, whether owned by Contractor or rented or leased from others, shall meet the following requirements:
1. Full rental costs for leased equipment shall not exceed rates listed in the Rental Rate Blue Book published by Equipment Watch, as adjusted to the regional area of the Project. Owned equipment costs shall not exceed the single shift rates established in the Cost Reference Guide (CRG) published by Equipment Watch. The most recent published edition in effect at commencement of actual equipment use shall be used.
  2. Rates shall apply to equipment in good working condition. Equipment not in good condition, or larger than required, may be rejected by Engineer or accepted at reduced rates.
  3. Leased Equipment: For equipment leased or rented in arm's length transactions from outside vendors, maximum rates shall be determined by the following actual usage/Payment Category:
    - a. Less than 8 hours: Hourly rate.
    - b. 8 or more hours but less than 7 days: Daily rate.
    - c. 7 or more days but less than 30 days: Weekly rate.
    - d. 30 days or more: Monthly rate.

4. Arm's length rental and lease transactions are those in which the firm involved in the rental or lease of equipment is not associated with, owned by, have common management, directorship, facilities and/or stockholders with the firm renting the equipment.
5. Financial arrangements associated with rental and lease transactions that provide Contractor remuneration or discounts not visible to the Owner must be disclosed and integrated with charged rates.
6. Leased Equipment in Use: Actual equipment use time documented by Engineer shall be the basis that equipment was on and utilized at the Project Site. In addition to the leasing rate above, equipment operational costs shall be paid at the estimated hourly operating cost rate set forth in the Rental Rate Blue Book if not already included in the lease rate. Hours of operation shall be based upon actual equipment usage to the nearest quarter hour, as recorded by Engineer.
7. Leased Equipment, When Idle (Standby): Idle or standby equipment is equipment onsite or in transit to and from the Work Site and necessary to perform the Work under the modification, but not in actual use. Idle equipment time, as documented by Engineer, shall be paid at the leasing rate determined above, excluding operational costs.
8. Owned and Other Equipment in Use: Equipment rates for owned equipment or equipment provided in other than arm's length transaction shall not exceed the single shift total hourly costs rate developed in accordance with the CRG and as modified herein for multiple shifts. This total hourly rate will be paid for each hour the equipment actually performs work. Hours of operation shall be based upon actual equipment usage as recorded by Engineer. This rate shall represent payment in full for Contractor's direct costs.
9. Owned and Other Equipment, When Idle (Standby): Equipment necessary to be onsite to perform the Work on single shift operations, but not utilized, shall be paid for at the ownership hourly expense rate developed in accordance with the CRG, provided its presence and necessity onsite has been documented by Engineer. Payment for idle time of portions of a normal workday, in conjunction with original contract Work, will not be allowed. In no event shall idle time claimed in a day for a particular piece of equipment exceed the normal Work or shift schedule established for the Project. It is agreed that this rate shall represent payment in full for Contractor's direct costs. When Engineer determines that the equipment is not needed to continuously remain at the Work Site, payment will be limited to actual hours in use.

10. Owned and Other Equipment, Multiple Shifts: For multiple shift operations, the CRG single shift total hourly costs rate shall apply to the operating equipment during the first shift. For subsequent shifts, up to two in a 24-hour day, operating rate shall be the sum of the total hourly CRG operating cost and 60 percent of the CRG ownership and overhaul expense. Payment for idle or standby time for second and third shifts shall be 20 percent of the CRG ownership and overhaul expense.
11. When necessary to obtain owned equipment from sources beyond the Project limits, the actual cost to transfer equipment to the Site and return it to its original location will be allowed as an additional item of expense. Move-in and move-out allowances will not be made for equipment brought to the Project if the equipment is also used on original Contract or related Work.
12. If the move-out destination is not to the original location, payment for move-out will not exceed payment for move-in.
13. If move is made by common carrier, the allowance will be the amount paid for the freight. If equipment is hauled with Contractor's own forces, rental will be allowed for the hauling unit plus the hauling unit operator's wage. If equipment is transferred under its own power, the rental will be 75 percent of the appropriate total hourly costs for the equipment, without attachments, plus the equipment operator's wage.
14. Charges for time utilized in servicing equipment to ready it for use prior to moving and similar charges will not be allowed.
15. When a breakdown occurs on any piece of owned equipment, payment shall cease for that equipment and any other owned equipment idled by the breakdown.
16. If any part of the Work is shut down by Owner, standby time will be paid during nonoperating hours if diversion of equipment to other Work is not practicable. Engineer reserves the right to cease standby time payment when an extended shutdown is anticipated.
17. If a rate has not been established in the CRG for owned equipment, Contractor may:
  - a. If approved by Engineer, use the rate of the most similar model found, considering such characteristics as manufacturer, capacity, horsepower, age, and fuel type, or
  - b. Request Equipment Watch to furnish a written response for a rate on the equipment, which shall be presented to Engineer for approval; or
  - c. Request Engineer to establish a rate.

#### 1.06 FIELD ORDER

- A. Engineer will issue Field Orders, with three copies to Contractor.

Blackwater Golf Club Lift Station and Force Main

- B. Effective date of the Field Order shall be the date of signature by Engineer, unless otherwise indicated thereon.
- C. Contractor shall acknowledge receipt by signing and returning one copy to Engineer.
- D. Field Orders will be incorporated into subsequent Change Orders, as a no-cost change to the Contract.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**



**SECTION 01 29 00  
PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

- A. Informational Submittals:
  - 1. Schedule of Values: Submit on Contractor's standard form.
  - 2. Schedule of Estimated Progress Payments:
    - a. Submit with initially acceptable Schedule of Values.
    - b. Submit adjustments thereto with Application for Payment.
  - 3. Application for Payment.
  - 4. Final Application for Payment.

**1.02 SCHEDULE OF VALUES**

- A. Prepare a separate Schedule of Values for each schedule of the Work under the Agreement.
- B. Upon request of Engineer, provide documentation to support the accuracy of the Schedule of Values.
- C. Unit Price Work: Reflect unit price quantity and price breakdown from conformed Bid Form.
- D. Lump Sum Work:
  - 1. List bonds and insurance premiums, mobilization, demobilization, preliminary and detailed progress schedule preparation, equipment testing, facility startup, and contract closeout separately.
    - a. Mobilization includes, at minimum, items identified in Section 01 50 00, Temporary Facilities and Controls.
    - b. Include item(s) for monthly progress schedule update
  - 2. Break down by Division 02 through 49 with appropriate subdivision of each specification for each Project facility.
- E. An unbalanced or front-end loaded schedule will not be acceptable.
- F. Summation of the complete Schedule of Values representing all the Work shall equal the Contract Price.
- G. Submit Schedule of Values on a CD in a spreadsheet format compatible with latest version of MSExcel.

1.03 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

- A. Show estimated payment requests throughout Contract Times aggregating initial Contract Price.
- B. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule and Contract Price as reflected by modifications to the Contract Documents.

1.04 APPLICATION FOR PAYMENT

- A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.
- B. Use detailed Application for Payment Form suitable to Owner.
- C. Provide separate form for each schedule as applicable.
- D. Include accepted Schedule of Values for each schedule or portion of lump sum Work and the unit price breakdown for the Work to be paid on a unit priced basis.
- E. Include separate line item for each Change Order and Work Change Directive executed prior to date of submission. Provide further breakdown of such as requested by Engineer.
- F. Preparation:
  - 1. Round values to nearest dollar.
  - 2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Engineer.

1.05 PAYMENT

- A. Payment for all Lump Sum Work shown or specified in Contract Documents is included in the Contract Price. Payment will be based on a percentage complete basis for each line item of the accepted Schedule of Values.



- B. Payment for unit price items covers all the labor, materials, and services necessary to furnish and install the following items:

<b>Item</b>	<b>Description</b>
Mobilization/Demobilization	Includes all associated costs for Contractor to facilitate the beginning of the Project and obtain all required equipment at Project Site and in addition includes associated costs to remove equipment at Project Site. Extended bid unit cost of mobilization and demobilization shall not exceed 5 percent of the Total Extended Bid Unit Price.
General Conditions	Includes all associated costs for the Contractor to facilitate the Project included all necessary bonds, insurances, and administrative costs as outlined in the Contract Documents.
Site Clearing, Debris Removal/Disposal	Includes all materials, labor, equipment and incidental costs for tree clearing and grubbing the project area within the limits shown on the drawings as well as any necessary clearing and grubbing required to facilitate construction of the lift station. This line item also includes all costs necessary to construct the new gravel utility access drive.
Lift Station and Equipment Installation	Includes all materials, labor, equipment and incidentals necessary to receive, handle, install, test, etc. the lift station wet well, pumps, control panel, piping, and all other equipment necessary to supply the Owner with a fully functioning lift station.
6" Sanitary Force Main	Includes all materials, labor, equipment and incidentals necessary to construct the 6" sanitary sewer force main from the lift station to the connection with the existing force main. Includes all work necessary to field locate existing utilities; excavate, install, and backfill the 6-inch force main; construct the aerial force main and supports; as well as all associated valves, fittings, and appurtenances.

4" Low Pressure Sewer	Includes all materials, labor, equipment and incidentals necessary to construct the 4" low pressure sewer force main from the manhole outside the new lift station to the station 4+00. Includes all work necessary to install the 4-inch force main; as well as all associated valves, fittings, and appurtenances.
Electrical Work	Includes all materials, labor, equipment and incidentals necessary to provide electrical power to the new lift station as shown on the drawings.
Site Work and Restoration	Includes all materials, labor, equipment and incidentals necessary to restore all disturbed areas to pre-construction original conditions or better.

1.06 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.
2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by Owner.
6. Material remaining on hand after completion of Work.

1.07 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored unless Shop Drawings and preliminary operation and maintenance data is acceptable to Engineer.
- B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**



**SECTION 01 31 13  
PROJECT COORDINATION**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

**A. Informational:**

1. Statement of Qualification (SOQ) for land surveyor or civil engineer.
2. Photographs:
  - a. Digital Images: Submit two copies of DVD disc containing images within 5 days of being taken. Each image is to have a minimum file size of 1.4 Mb (1,400 Kb) so viewed resolution is high quality. The production of larger file sizes with higher resolution is encouraged.
3. Video Recordings: Submit two copies within 5 days of being taken.

**1.02 RELATED WORK AT SITE**

**A. General:**

1. Other work that is either directly or indirectly related to scheduled performance of the Work under these Contract Documents, listed henceforth, is anticipated to be performed at Site by others.
2. Coordinate the Work of these Contract Documents with work of others as specified in General Conditions.
3. Include sequencing constraints specified herein as a part of Progress Schedule.

**1.03 OWNER-FURNISHED PRODUCTS**

- A. Refer to Section 01 64 00, Owner-Furnished Products.**

**1.04 UTILITY NOTIFICATION AND COORDINATION**

- A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during the Work.**

**1.05 PROJECT MILESTONES**

- A. General: Include the Milestones specified herein as a part of the Progress Schedule required under Section 01 32 00, Construction Progress Documentation.**

1.06 WORK SEQUENCING/CONSTRAINTS

- A. Include the following work sequences in the Progress Schedule:
  - 1. Continuous unobstructed operation of the sanitary sewer facilities at the golf course.
  - 2. Provide temporary plugs or caps on interconnecting piping as needed to maintain the indicated existing facilities in service and to preclude the entry of wastewater or process flow into the new facilities prior to their acceptance.

1.07 FACILITY OPERATIONS

- A. Continuous operation of Owner's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.
- B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner's operations.
- C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner's facility.
- D. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and Engineer. Such authorization will be considered within 48 hours after receipt of Contractor's written request.
- E. Process or Facility Shutdown:
  - 1. The existing and/or proposed facilities may only be shut down after completion of the new lift station and force main and following successful Performance Testing. Coordinate shut down time with City and golf course to connect new gravity sewer to the existing sewer service laterals.
  - 2. Provide 7 days advance written request for approval of need to shut down a process or facility to Owner and Engineer.
  - 3. Power outages will be considered upon 48 hours written request to Owner and Engineer. Describe the reason, anticipated length of time, and areas affected by the outage. Provide temporary provisions for continuous power supply to critical facility components.

- F. Install and maintain bypass facilities and temporary connections required to keep Owner's operations on line. Sequences other than those specified will be considered upon written request to Owner and Engineer, provided they afford equivalent continuity of operations.
- G. Do not proceed with Work affecting a facility's operation without obtaining Owner's and Engineer's advance approval of the need for and duration of such Work.
- H. Relocation of Existing Facilities:
  - 1. During construction, it is expected that minor relocations of Work will be necessary.
  - 2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
  - 3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
  - 4. Perform relocations to minimize downtime of existing facilities.
  - 5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Engineer.

#### 1.08 ADJACENT FACILITIES AND PROPERTIES

- A. Examination:
  - 1. After Effective Date of the Agreement and before Work at Site is started, Contractor, Engineer, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
  - 2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.
- B. Documentation:
  - 1. Record and submit documentation of observations made on examination inspections in accordance with Article Construction Photographs and Article Audio Video Recordings.
  - 2. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and Owner.

1.09 CONSTRUCTION PHOTOGRAPHS

A. General:

1. Photographically document all phases of the Project including preconstruction, construction progress, and post-construction.
2. Engineer shall have right to select subject matter and vantage point from which photographs are to be taken.
3. Digital Images: No post-session electronic editing of images is allowed. Stored image shall be actual image as captured without cropping or other edits.

B. Preconstruction and Post-Construction:

1. After Effective Date of the Agreement and before Work at Site is started, and again upon issuance of Substantial Completion, take a minimum of 48 photographs of Site and property adjacent to perimeter of Site.
2. Particular emphasis shall be directed to structures both inside and outside the Site.
3. Format: Digital, minimum resolution of 1680 by 2240 pixels and 24-bit, millions of color.

C. Construction Progress Photos:

1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.
2. Weekly: Take 48 photographs using digital, minimum resolution of 1680 by 2240 pixels and 24-bit, millions of color.
3. Monthly: Take 50 photographs using digital, minimum resolution of 1680 by 2240 pixels and 24-bit, millions of color.

D. Documentation:

1. Digital Images:
  - a. Electronic image shall have date taken embedded into image.
  - b. Archive using a commercially available photo management system that provides listing of photographs including date, keyword description, and direction of photograph.
  - c. Label each disk with Project and Owner's name, and month and year images were produced.



1.10 AUDIO-VIDEO RECORDINGS

- A. Prior to beginning the Work on Site or of a particular area of the Work, and again within 10 days following date of Substantial Completion, videograph Site and property adjacent to Site.
- B. In the case of preconstruction recording, no work shall begin in the area prior to Engineer's review and approval of content and quality of video for that area.
- C. Particular emphasis shall be directed to physical condition of existing vegetation, structures, and pavements within and areas adjacent to and within the right-of-way or easement, and on Contractor storage and staging areas.
- D. Engineer shall have right to select subject matter and vantage point from which videos are to be taken.
- E. Video Format and Quality:
  - 1. DVD format, with sound.
  - 2. Video:
    - a. Produce bright, sharp, and clear images with accurate colors, free of distortion and other forms of picture imperfections.
    - b. Electronically, and accurately display the month, day, year, and time of day of the recording.
  - 3. Audio:
    - a. Audio documentation shall be done clearly, precisely, and at a moderate pace.
    - b. Indicate date, project name, and a brief description of the location of recording, including:
      - 1) Facility name.
      - 2) Street names or easements.
      - 3) Addresses of private property.
      - 4) Direction of coverage, including engineering stationing, if applicable.
- F. Documentation:
  - 1. DVD Label:
    - a. DVD number (numbered sequentially, beginning with 001).
    - b. Project name.
    - c. Date and time of coverage.
  - 2. Project Video Log: Maintain an ongoing log that incorporates above noted label information for DVDs on Project.

1.11 REFERENCE POINTS AND SURVEYS

- A. Location and elevation of bench marks are shown on the Drawings.
- B. Contractor's Responsibilities:
  - 1. Provide additional survey and layout required to layout the Work.
  - 2. Notify Engineer at least 3 working days in advance of time when grade and line to be provided by Owner will be needed.
  - 3. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
  - 4. In event of discrepancy in data or staking provided by Owner, request clarification before proceeding with Work.
  - 5. Retain professional land surveyor or civil engineer registered in state of Florida who shall perform or supervise engineering surveying necessary for additional construction staking and layout.
  - 6. Maintain complete accurate log of survey work as it progresses as a Record Document.
  - 7. On request of Engineer, submit documentation.
  - 8. Provide competent employee(s), tools, stakes, and other equipment and materials as Engineer may require to check layout, survey, and measurement work performed by others.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 CUTTING, FITTING, AND PATCHING

- A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.
- B. Obtain prior written authorization of Engineer and Owner before commencing Work to cut or otherwise alter:
  - 1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
  - 2. Weather-resistant or moisture-resistant elements.
  - 3. Efficiency, maintenance, or safety of element.
  - 4. Work of others.
- C. Refinish surfaces to provide an even finish.
  - 1. Refinish continuous surfaces to nearest intersection.
  - 2. Refinish entire assemblies.

3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and the Work is evident in finished surfaces.
- D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown on the Drawings.
- E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.
- F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.
- G. Remove specimens of installed Work for testing when requested by Engineer.

**END OF SECTION**



**SECTION 01 31 19  
PROJECT MEETINGS**

**PART 1 GENERAL**

1.01 GENERAL

- A. Engineer will schedule physical arrangements for meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 days after each meeting to participants and parties affected by meeting decisions.

1.02 PRECONSTRUCTION CONFERENCE

- A. Contractor shall be prepared to discuss the following subjects, as a minimum:
1. Required schedules.
  2. Status of Bonds and insurance.
  3. Sequencing of critical path work items.
  4. Progress payment procedures.
  5. Project changes and clarification procedures.
  6. Use of Site, access, office and storage areas, security and temporary facilities.
  7. Major product delivery and priorities.
  8. Contractor's safety plan and representative.
- B. Attendees will include:
1. Owner's representatives.
  2. Contractor's office representative.
  3. Contractor's resident superintendent.
  4. Contractor's quality control representative.
  5. Subcontractors' representatives whom Contractor may desire or Engineer may request to attend.
  6. Engineer's representatives.
  7. Others as appropriate.

1.03 PRELIMINARY SCHEDULES REVIEW MEETING

- A. As set forth in General Conditions and Section 01 32 00, Construction Progress Documentation.

1.04 PROGRESS MEETINGS

- A. Engineer will schedule regular progress meetings at Site, conducted monthly to review the Work progress, Progress Schedule, Schedule of Submittals, Application for Payment, contract modifications, and other matters needing discussion and resolution.
- B. Attendees will include:
  - 1. Owner's representative(s), as appropriate.
  - 2. Contractor, Subcontractors, and Suppliers, as appropriate.
  - 3. Engineer's representative(s).
  - 4. Others as appropriate.

1.05 QUALITY CONTROL MEETINGS

- A. In accordance with Section 01 45 16.13, Contractor Quality Control.
- B. Scheduled by Engineer on regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of the Work and work of other Contractors.
- C. Attendees will include:
  - 1. Contractor.
  - 2. Contractor's designated quality control representative.
  - 3. Subcontractors and Suppliers, as necessary.
  - 4. Engineer's representatives.

1.06 PROCESS INSTRUMENTATION AND CONTROL SYSTEMS (PICS)  
COORDINATION MEETINGS

- A. Engineer will schedule up to four meetings at Site, conducted to review specific requirements of PICS work.
- B. Attendees will include:
  - 1. Contractor.
  - 2. Owner.
  - 3. PICS Subcontractor/Installer.
  - 4. Engineer's representatives.

1.07 PREINSTALLATION MEETINGS

- A. When required in individual Specification sections, convene at Site prior to commencing the Work of that section.

- B. Require attendance of entities directly affecting, or affected by, the Work of that section.
- C. Notify Engineer 4 days in advance of meeting date.
- D. Provide suggested agenda to Engineer to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

1.08 FACILITY STARTUP MEETINGS

- A. Schedule and attend a minimum of three facility startup meetings. The first of such meetings shall be held prior to submitting Facility Startup Plan, as specified in Section 01 91 14, Equipment Testing and Facility Startup, and shall include preliminary discussions regarding such plan.
- B. Agenda items shall include, but not be limited to, content of Facility Startup Plan, coordination needed between various parties in attendance, and potential problems associated with startup.
- C. Attendees will include:
  - 1. Contractor.
  - 2. Contractor's designated quality control representative.
  - 3. Subcontractors and equipment manufacturer's representatives whom Contractor deems to be directly involved in facility startup.
  - 4. Engineer's representatives.
  - 5. Owner's operations personnel.
  - 6. Others as required by Contract Documents or as deemed necessary by Contractor.

1.09 OTHER MEETINGS

- A. In accordance with Contract Documents and as may be required by Owner and Engineer.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**





**SECTION 01 32 00  
CONSTRUCTION PROGRESS DOCUMENTATION**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

**A. Informational Submittals:**

1. Preliminary Progress Schedule: Submit at least 7 days prior to preconstruction conference.
2. Detailed Progress Schedule:
  - a. Submit initial Detailed Progress Schedule within 90 days after Effective Date of the Agreement.
  - b. Submit an Updated Progress Schedule at each update, in accordance with Article Detailed Progress Schedule.
3. Submit with Each Progress Schedule Submission:
  - a. Contractor's certification that Progress Schedule submission is actual schedule being used for execution of the Work.
  - b. Electronic file compatible with latest version of Microsoft Project, unless otherwise approved by Engineer.
  - c. Progress Schedule: Four legible copies.
  - d. Narrative Progress Report: Same number of copies as specified for Progress Schedule.

**1.02 PRELIMINARY PROGRESS SCHEDULE**

- A. In addition to basic requirements outlined in General Conditions, show a detailed schedule, beginning with Notice to Proceed, for minimum duration of 90 days, and a summary of balance of Project through Final Completion.
- B. Show activities including, but not limited to the following:
  1. Notice to Proceed.
  2. Permits.
  3. Submittals, with review time. Contractor may use Schedule of Submittals specified in Section 01 33 00, Submittal Procedures.
  4. Early procurement activities for long lead equipment and materials.
  5. Initial Site work.
  6. Earthwork.
  7. Specified Work sequences and construction constraints.
  8. Contract Milestone and Completion Dates.
  9. Owner-furnished products delivery dates or ranges of dates.
  10. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.

11. System startup summary.
  12. Project close-out summary.
  13. Demobilization summary.
- C. Update Preliminary Progress Schedule monthly as part of progress payment process. Failure to do so may result in the Owner withholding all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to Engineer.
- D. Format: In accordance with Article Progress Schedule—Bar Chart.

#### 1.03 DETAILED PROGRESS SCHEDULE

- A. In addition to requirements of General Conditions, submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.
- B. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.
- C. When accepted by Engineer, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Updated Progress Schedules.
- D. Format: In accordance with Article Progress Schedule—Bar Chart.

#### 1.04 PROGRESS SCHEDULE—BAR CHART

- A. General: Comprehensive bar chart schedule, generally as outlined in Associated General Contractors of America (AGC) 580, “Construction Project Planning and Scheduling Guidelines.” If a conflict occurs between the AGC publication and this specification, this specification shall govern.
- B. Format:
1. Unless otherwise approved, white paper, 11-inch by 17-inch sheet size.
  2. Title Block: Show name of Project and Owner, date submitted, revision or update number, and name of scheduler.
  3. Identify horizontally, across the top of the schedule, the time frame by year, month, and day.
  4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
  5. Legend: Describe standard and special symbols used.

- C. Contents: Identify, in chronological order, those activities reasonably required to complete the Work, including as applicable, but not limited to:
1. Obtaining permits, submittals for early product procurement, and long lead time items.
  2. Mobilization and other preliminary activities.
  3. Initial Site work.
  4. Specified Work sequences, constraints, and Milestones, including Substantial Completion date(s).
  5. Subcontract Work.
  6. Major equipment design, fabrication, factory testing, and delivery dates.
  7. Delivery dates for Owner-furnished products, as specified in Section 01 11 00, Summary of Work.
  8. Sitework.
  9. Concrete Work.
  10. Structural steel Work.
  11. Architectural features Work.
  12. Conveying systems Work.
  13. Equipment Work.
  14. Mechanical Work.
  15. Electrical Work.
  16. Instrumentation and control Work.
  17. Interfaces with Owner-furnished equipment.
  18. Other important Work for each major facility.
  19. Equipment and system startup and test activities.
  20. Project closeout and cleanup.
  21. Demobilization.

#### 1.05 PROGRESS OF THE WORK

- A. Updated Progress Schedule shall reflect:
1. Progress of Work to within 5 working days prior to submission.
  2. Approved changes in Work scope and activities modified since submission.
  3. Delays in Submittals or resubmittals, deliveries, or Work.
  4. Adjusted or modified sequences of Work.
  5. Other identifiable changes.
  6. Revised projections of progress and completion.
  7. Report of changed logic.
- B. Produce detailed sub-schedules during Project, upon request of Owner or Engineer, to further define critical portions of the Work such as facility shutdowns.

- C. If an activity is not completed by its latest scheduled completion date and this failure is anticipated to extend Contract Times (or Milestones), submit, within 7 days of such failure, a written statement as to how nonperformance will be corrected to return Project to acceptable current Progress Schedule. Actions by Contractor to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.
- D. Owner may order Contractor to increase plant, equipment, labor force, or working hours if Contractor fails to:
  - 1. Complete a Milestone activity by its completion date.
  - 2. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

#### 1.06 SCHEDULE ACCEPTANCE

- A. Engineer's acceptance will demonstrate agreement that:
  - 1. Proposed schedule is accepted with respect to:
    - a. Contract Times, including Final Completion and all intermediate Milestones, are within the specified times.
    - b. Specified Work sequences and constraints are shown as specified.
    - c. Specified Owner-furnished Equipment or Material arrival dates, or range of dates, are included.
    - d. Access restrictions are accurately reflected.
    - e. Startup and testing times are as specified.
    - f. Submittal review times are as specified.
    - g. Startup testing duration is as specified and timing is acceptable.
  - 2. In all other respects, Engineer's acceptance of Contractor's schedule indicates that, in Engineer's judgment, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. Engineer's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to Engineer's attention in submittal. Schedule remains Contractor's responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.

- B. Unacceptable Preliminary Progress Schedule:
  - 1. Make requested corrections; resubmit within 10 days.
  - 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process, including updating schedule on a monthly basis to reflect actual progress and occurrences to date.
- C. Unacceptable Detailed Progress Schedule:
  - 1. Make requested corrections; resubmit within 10 days.
  - 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process.
- D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to Engineer's acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

#### 1.07 ADJUSTMENT OF CONTRACT TIMES

- A. Reference General Conditions and Section 01 26 00, Contract Modification Procedures.
- B. Evaluation and reconciliation of Adjustments of Contract Times shall be based on the Updated Progress Schedule at the time of proposed adjustment or claimed delay.
- C. Schedule Contingency:
  - 1. Contingency, when used in the context of the Progress Schedule, is time between Contractor's proposed Completion Time and Contract Completion Time.
  - 2. Contingency included in Progress Schedule is a Project resource available to both Contractor and Owner to meet Contract Milestones and Contract Times. Use of Schedule contingency shall be shared to the proportionate benefit of both parties.
  - 3. Use of schedule contingency suppression techniques such as preferential sequencing and extended activity times is prohibited.
  - 4. Pursuant to Contingency sharing provisions of this specification, no time extensions will be granted, nor will delay damages be paid until a delay occurs which (i) consumes all available contingency time, and (ii) extends Work beyond the Contract Completion date.

D. Claims Based on Contract Times:

1. Where Engineer has not yet rendered formal decision on Contractor's Claim for adjustment of Contract Times, and parties are unable to agree as to amount of adjustment to be reflected in Progress Schedule, reflect an interim adjustment in the Progress Schedule as acceptable to Engineer.
2. It is understood and agreed that such interim acceptance will not be binding on either Contractor or Owner, and will be made only for the purpose of continuing to schedule Work until such time as formal decision has been rendered as to an adjustment, if any, of the Contract Times.
3. Revise Progress Schedule prepared thereafter in accordance with Engineer's formal decision.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 01 33 00  
SUBMITTAL PROCEDURES**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Action Submittal: Written and graphic information submitted by Contractor that requires Engineer's approval.
- B. Deferred Submittal: Information submitted by Contractor for portions of design that are to be submitted to permitting agency for approval prior to installation of that portion of the Work, along with Engineer's review documentation that submittal has been found to be in general conformance with Project's design.
- C. Informational Submittal: Information submitted by Contractor that requires Engineer's review and determination that submitted information is in accordance with the Conditions of the Contract.

1.02 PROCEDURES

- A. Direct submittals to Engineer at the following, unless specified otherwise: To be determined at the preconstruction conference.
- B. Electronic Submittals: Submittals shall, unless specifically accepted, be made in electronic format.
  - 1. Each submittal shall be an electronic file in Adobe Acrobat Portable Document Format (PDF). Use the latest version available at time of execution of the Agreement.
  - 2. Electronic files that contain more than ten pages in PDF format shall contain internal bookmarking from an index page to major sections of the document.
  - 3. PDF files shall be set to open "Bookmarks and Page" view.
  - 4. Add general information to each PDF file, including title, subject, author, and keywords.
  - 5. PDF files shall be set up to print legibly at 8.5-inch by 11-inch, 11-inch by 17-inch, or 22-inch by 34-inch. No other paper sizes will be accepted.
  - 6. Submit new electronic files for each resubmittal.
  - 7. Include a copy of the Transmittal of Contractor's Submittal form, located at end of section, with each electronic file.
  - 8. Engineer will reject submittal that is not electronically submitted, unless specifically accepted.

9. Provide Engineer with authorization to reproduce and distribute each file as many times as necessary for Project documentation.
10. Detailed procedures for handling electronic submittals will be discussed at the preconstruction conference.

C. Transmittal of Submittal:

1. Contractor shall:
  - a. Review each submittal and check for compliance with Contract Documents.
  - b. Stamp each submittal with uniform approval stamp before submitting to Engineer.
    - 1) Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval, and statement certifying submittal has been reviewed, checked, and approved for compliance with Contract Documents.
    - 2) Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form attached at end of this section.
3. Identify each submittal with the following:
  - a. Numbering and Tracking System:
    - 1) Sequentially number each submittal.
    - 2) Resubmission of submittal shall have original number with sequential alphabetic suffix.
  - b. Specification section and paragraph to which submittal applies.
  - c. Project title and Engineer's project number.
  - d. Date of transmittal.
  - e. Names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.
4. Identify and describe each deviation or variation from Contract Documents.

D. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.
2. Package submittal information by individual Specification section. Do not combine different specification sections together in submittal package, unless otherwise directed in Specification.
3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.



4. Index with labeled tab dividers in orderly manner.
- E. Timeliness: Schedule and submit in accordance Schedule of Submittals and requirements of individual Specification sections.
- F. Processing Time:
  1. Time for review shall commence on Engineer's receipt of submittal.
  2. Engineer will act upon Contractor's submittal and transmit response to Contractor not later than 30 days after receipt, unless otherwise specified. For submittals in excess of 50 pages, Engineer's response will be within 45 days after receipt.
  3. Resubmittals will be subject to same review time.
  4. No adjustment of Contract Times or Price will be allowed as a result of delays in progress of Work caused by rejection and subsequent resubmittals.
- G. Resubmittals: Clearly identify each correction or change made.
- H. Incomplete Submittals:
  1. Engineer will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
  2. When any of the following are missing, submittal will be deemed incomplete:
    - a. Contractor's review stamp; completed and signed.
    - b. Transmittal of Contractor's Submittal; completed and signed.
    - c. Clear evidence that the Contractor has performed the required review.
    - d. Substantive components of a submittal.
- I. Submittals not required by Contract Documents:
  1. Will not be reviewed and will be returned stamped "Not Subject to Review".
  2. Engineer will keep one copy and return submittal to Contractor.

#### 1.03 ACTION SUBMITTALS

- A. Prepare and submit Action Submittals required by individual Specification sections.

B. Shop Drawings:

1. Identify and Indicate:
  - a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
  - b. Equipment and Component Title: Identical to title shown on the Drawings.
  - c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
  - d. Project-specific information drawn accurately to scale.
2. Manufacturer's standard schematic drawings and diagrams as follows:
  - a. Modify to delete information that is not applicable to the Work.
  - b. Supplement standard information to provide information specifically applicable to the Work.
3. Product Data: Provide as specified in individual Specifications.
4. Foreign Manufacturers: When proposed, include names and addresses of at least two companies that maintain technical service representatives close to Project.

C. Samples:

1. Copies: Two, unless otherwise specified in individual Specifications.
2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
  - a. Manufacturer name.
  - b. Model number.
  - c. Material.
  - d. Sample source.
3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
4. Full-size Samples:
  - a. Size as indicated in individual Specification section.
  - b. Prepared from same materials to be used for the Work.
  - c. Cured and finished in manner specified.
  - d. Physically identical with product proposed for use.

D. Action Submittal Dispositions: Engineer will review, comment, stamp, and distribute as noted:

1. Approved:
  - a. Contractor may incorporate product(s) or implement Work covered by submittal.

- b. Distribution: Electronic.
  - 2. Approved as Noted:
    - a. Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
    - b. Distribution: Electronic.
  - 3. Partial Approval, Resubmit as Noted:
    - a. Make corrections or obtain missing portions, and resubmit.
    - b. Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
    - c. Distribution: Electronic.
  - 4. Revise and Resubmit:
    - a. Contractor may not incorporate product(s) or implement Work covered by submittal.
    - b. Distribution: Electronic.
- E. Back charges for Review of Resubmittals: Where a resubmittal is returned as "Partially Approved, Resubmit as Noted" or "Revise and Resubmit", Contractor shall be subject to charges from the Owner for reimbursement of Engineer's charges associated with review of the 2<sup>nd</sup> and subsequent resubmittals at a cost of \$250 each for submittal of less than 30 pages or 10 Drawings, and \$500 for any larger submittals.

#### 1.04 INFORMATIONAL SUBMITTALS

##### A. General:

- 1. Copies: Submit three copies, unless otherwise indicated in individual Specification section.
- 2. Refer to individual Specification sections for specific submittal requirements.
- 3. Engineer will review each submittal. If submittal meets conditions of the Contract, Engineer will forward copy to appropriate parties. If Engineer determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Engineer will retain one copy and return remaining copy with review comments to Contractor, and require that submittal be corrected and resubmitted.

##### B. Certificates:

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

## Blackwater Golf Club Lift Station and Force Main

2. Welding: In accordance with individual Specification sections.
  3. Installer: Prepare written statements on manufacturer's letterhead certifying installer complies with requirements as specified in individual Specification section.
  4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
  5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual Specification sections.
  6. Manufacturer's Certificate of Compliance: In accordance with Section 01 61 00, Common Product Requirements.
  7. Manufacturer's Certificate of Proper Installation: In accordance with Section 01 43 33, Manufacturers' Field Services.
- C. Construction Photographs Video: In accordance with Section 01 31 13, Project Coordination, and as may otherwise be required in Contract Documents.
- D. Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.
- E. Contractor-design Data (related to temporary construction):
1. Written and graphic information.
  2. List of assumptions.
  3. List of performance and design criteria.
  4. Summary of loads or load diagram, if applicable.
  5. Calculations.
  6. List of applicable codes and regulations.
  7. Name and version of software.
  8. Information requested in individual Specification section.
- F. Deferred Submittals: See Drawings for list of deferred submittals.
1. Contractor-design data related to permanent construction:
    - a. List of assumptions.
    - b. List of performance and design criteria.
    - c. Summary of loads or load diagram, if applicable.
    - d. Calculations.
    - e. List of applicable codes and regulations.
    - f. Name and version of design software.
    - g. Factory test results.
    - h. Informational submittals requested in individual Specification section.

2. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit calculations and test results of Contractor-designed components for review by Engineer.
- G. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification section.
- H. Operation and Maintenance Data: As required in Section 01 78 23, Operation and Maintenance Data.
- I. Payment:
1. Application for Payment: In accordance with Section 01 29 00, Payment Procedures.
  2. Schedule of Values: In accordance with Section 01 29 00, Payment Procedures.
  3. Schedule of Estimated Progress Payments: In accordance with Section 01 29 00, Payment Procedures.
- J. Quality Control Documentation: As required in Section 01 45 16.13, Contractor Quality Control.
- K. Schedules:
1. Schedule of Submittals: Prepare separately or in combination with Progress Schedule as specified in Section 01 32 00, Construction Progress Documentation.
    - a. Show for each, at a minimum, the following:
      - 1) Specification section number.
      - 2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.
      - 3) Estimated date of submission to Engineer, including reviewing and processing time.
    - b. On a monthly basis, submit updated Schedule of Submittals to Engineer if changes have occurred or resubmittals are required.
  2. Progress Schedules: In accordance with Section 01 32 00, Construction Progress Documentation.
- L. Special Guarantee: Supplier's written guarantee as required in individual Specification sections.

- M. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Subcontractor, trade, Specialist, consultant, installer, and other professionals.
- N. Submittals Required by Laws, Regulations, and Governing Agencies:
  - 1. Promptly submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
  - 2. Transmit to Engineer for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
- O. Test, Evaluation, and Inspection Reports:
  - 1. General: Shall contain signature of person responsible for test or report.
  - 2. Factory:
    - a. Identification of product and Specification section, type of inspection or test with referenced standard or code.
    - b. Date of test, Project title and number, and name and signature of authorized person.
    - c. Test results.
    - d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
    - e. Provide interpretation of test results, when requested by Engineer.
    - f. Other items as identified in individual Specification sections.
  - 3. Field:
    - a. As a minimum, include the following:
      - 1) Project title and number.
      - 2) Date and time.
      - 3) Record of temperature and weather conditions.
      - 4) Identification of product and Specification section.
      - 5) Type and location of test, Sample, or inspection, including referenced standard or code.
      - 6) Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
      - 7) If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
      - 8) Provide interpretation of test results, when requested by Engineer.
      - 9) Other items as identified in individual Specification sections.

- P. Testing and Startup Data: In accordance with Section 01 91 14, Equipment Testing and Facility Startup.
- Q. Training Data: In accordance with Section 01 43 33, Manufacturers' Field Services.

1.05 SUPPLEMENT

- A. The supplement listed below, following "End of Section", is part of this Specification.

- 1. Form: Transmittal of Contractor's Submittal.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**





<h2 style="margin: 0;">Jacobs</h2> <p style="margin: 0;">(ATTACH TO EACH SUBMITTAL)</p>		<h3 style="margin: 0;">TRANSMITTAL OF CONTRACTOR'S SUBMITTAL</h3>	
		DATE: _____	
<p><b>TO:</b> _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p><b>FROM:</b> _____</p> <p style="text-align: center;">Contractor</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Submittal No.: _____</p> <p><input type="checkbox"/> New Submittal    <input type="checkbox"/> Resubmittal</p> <p>Project: _____</p> <p>Project No.: _____</p> <p>Specification Section No.: _____</p> <p style="text-align: center;"><b>(Cover only one section with each transmittal)</b></p> <p>Schedule Date of Submittal:</p> <p>_____</p>		
<p><b>SUBMITTAL TYPE:</b></p> <p><input type="checkbox"/> Shop Drawing</p> <p><input type="checkbox"/> Deferred</p>		<p><input type="checkbox"/> Sample</p>	<p><input type="checkbox"/> Informational</p>

**The following items are hereby submitted:**

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: \_\_\_\_\_  
Contractor (Authorized Signature)



**SECTION 01 42 13**  
**ABBREVIATIONS AND ACRONYMS**

**PART 1 GENERAL**

1.01 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES

- A. Reference to standards and specifications of technical societies and reporting and resolving discrepancies associated therewith shall be as provided in Article 3 of the General Conditions, and as may otherwise be required herein and in the individual Specification sections.
- B. Work specified by reference to published standard or specification of government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall meet requirements or surpass minimum standards of quality for materials and workmanship established by designated standard or specification.
- C. Where so specified, products or workmanship shall also meet or exceed additional prescriptive or performance requirements included within Contract Documents to establish a higher or more stringent standard of quality than required by referenced standard.
- D. Where two or more standards are specified to establish quality, product and workmanship shall meet or exceed requirements of most stringent.
- E. Where both a standard and a brand name are specified for a product in Contract Documents, proprietary product named shall meet or exceed requirements of specified reference standard.
- F. Copies of standards and specifications of technical societies:
  - 1. Copies of applicable referenced standards have not been bound in these Contract Documents.
  - 2. Where copies of standards are needed by Contractor, obtain a copy or copies directly from publication source and maintain in an orderly manner at the Site as Work Site records, available to Contractor's personnel, Subcontractors, Owner, and Engineer.

1.02 ABBREVIATIONS

A. Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.

1. AA Aluminum Association
2. AABC Associated Air Balance Council
3. AAMA American Architectural Manufacturers Association
4. AASHTO American Association of State Highway and Transportation Officials
5. ABMA American Bearing Manufacturers' Association
6. ACI American Concrete Institute
7. AEIC Association of Edison Illuminating Companies
8. AGA American Gas Association
9. AGMA American Gear Manufacturers' Association
10. AI Asphalt Institute
11. AISC American Institute of Steel Construction
12. AISI American Iron and Steel Institute
13. AITC American Institute of Timber Construction
14. ALS American Lumber Standards
15. AMCA Air Movement and Control Association
16. ANSI American National Standards Institute
17. APA APA – The Engineered Wood Association
18. API American Petroleum Institute
19. APWA American Public Works Association
20. AHRI Air-Conditioning, Heating, and Refrigeration Institute
21. ASA Acoustical Society of America
22. ASABE American Society of Agricultural and Biological Engineers
23. ASCE American Society of Civil Engineers
24. ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
25. ASME American Society of Mechanical Engineers
26. ASNT American Society for Nondestructive Testing
27. ASSE American Society of Sanitary Engineering
28. ASTM ASTM International
29. AWI Architectural Woodwork Institute
30. AWPA American Wood Preservers' Association
31. AWPI American Wood Preservers' Institute
32. AWS American Welding Society
33. AWWA American Water Works Association
34. BHMA Builders Hardware Manufacturers' Association

35.	CBM	Certified Ballast Manufacturer
36.	CDA	Copper Development Association
37.	CGA	Compressed Gas Association
38.	CISPI	Cast Iron Soil Pipe Institute
39.	CMAA	Crane Manufacturers' Association of America
40.	CRSI	Concrete Reinforcing Steel Institute
41.	CS	Commercial Standard
42.	CSA	Canadian Standards Association
43.	CSI	Construction Specifications Institute
44.	DIN	Deutsches Institut für Normung e.V.
45.	DIPRA	Ductile Iron Pipe Research Association
46.	EIA	Electronic Industries Alliance
47.	EJCDC	Engineers Joint Contract Documents' Committee
48.	ETL	Electrical Test Laboratories
49.	FAA	Federal Aviation Administration
50.	FCC	Federal Communications Commission
51.	FDA	Food and Drug Administration
52.	FEMA	Federal Emergency Management Agency
53.	FIPS	Federal Information Processing Standards
54.	FM	FM Global
55.	Fed. Spec.	Federal Specifications (FAA Specifications)
56.	FS	Federal Specifications and Standards (Technical Specifications)
57.	GA	Gypsum Association
58.	GANA	Glass Association of North America
59.	HI	Hydraulic Institute
60.	HMI	Hoist Manufacturers' Institute
61.	IBC	International Building Code
62.	ICBO	International Conference of Building Officials
63.	ICC	International Code Council
64.	ICEA	Insulated Cable Engineers' Association
65.	IFC	International Fire Code
66.	IEEE	Institute of Electrical and Electronics Engineers, Inc.
67.	IESNA	Illuminating Engineering Society of North America
68.	IFI	Industrial Fasteners Institute
69.	IGMA	Insulating Glass Manufacturer's Alliance
70.	IMC	International Mechanical Code
71.	INDA	Association of the Nonwoven Fabrics Industry
72.	IPC	International Plumbing Code
73.	ISA	International Society of Automation
74.	ISO	International Organization for Standardization
75.	ITL	Independent Testing Laboratory

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76.	JIC	Joint Industry Conferences of Hydraulic Manufacturers
77.	MIA	Marble Institute of America
78.	MIL	Military Specifications
79.	MMA	Monorail Manufacturers' Association
80.	MSS	Manufacturer's Standardization Society
81.	NAAMM	National Association of Architectural Metal Manufacturers
82.	NACE	NACE International
83.	NBGQA	National Building Granite Quarries Association
84.	NEBB	National Environmental Balancing Bureau
85.	NEC	National Electrical Code
86.	NECA	National Electrical Contractor's Association
87.	NEMA	National Electrical Manufacturers' Association
88.	NESC	National Electrical Safety Code
89.	NETA	InterNational Electrical Testing Association
90.	NFPA	National Fire Protection Association
91.	NHLA	National Hardwood Lumber Association
92.	NICET	National Institute for Certification in Engineering Technologies
93.	NIST	National Institute of Standards and Technology
94.	NRCA	National Roofing Contractors Association
95.	NRTL	Nationally Recognized Testing Laboratories
96.	NSF	NSF International
97.	NSPE	National Society of Professional Engineers
98.	NTMA	National Terrazzo and Mosaic Association
99.	NWWDA	National Wood Window and Door Association
100.	OSHA	Occupational Safety and Health Act (both Federal and State)
101.	PCI	Precast/Prestressed Concrete Institute
102.	PEI	Porcelain Enamel Institute
103.	PPI	Plastic Pipe Institute
104.	PS	Product Standards Section-U.S. Department of Commerce
105.	RMA	Rubber Manufacturers' Association
106.	RUS	Rural Utilities Service
107.	SAE	SAE International
108.	SDI	Steel Deck Institute
109.	SDI	Steel Door Institute
110.	SJI	Steel Joist Institute
111.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
112.	SPI	Society of the Plastics Industry
113.	SSPC	The Society for Protective Coatings

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114. STI/SPFA	Steel Tank Institute/Steel Plate Fabricators Association
115. SWI	Steel Window Institute
116. TEMA	Tubular Exchanger Manufacturers' Association
117. TCA	Tile Council of North America
118. TIA	Telecommunications Industry Association
119. UBC	Uniform Building Code
120. UFC	Uniform Fire Code
121. UL	formerly Underwriters Laboratories Inc.
122. UMC	Uniform Mechanical Code
123. USBR	U.S. Bureau of Reclamation
124. WCLIB	West Coast Lumber Inspection Bureau
125. WI	Wood Institute
126. WWPA	Western Wood Products Association

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**





**SECTION 01 43 33  
MANUFACTURERS' FIELD SERVICES**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Person-Day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS

- A. Informational Submittals:

- 1. Training Schedule: Submit, in accordance with requirements of this Specification, not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

- A. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified in the individual Specification section.
- B. Representative subject to acceptance by Owner and Engineer. No substitute representatives will be allowed unless prior written approval by such has been given.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

- A. Furnish manufacturers' services, when required by an individual Specification section, to meet the requirements of this section.
- B. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, time required to perform specified services shall be considered incidental.
- C. Schedule manufacturer' services to avoid conflict with other onsite testing or other manufacturers' onsite services.

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- D. Determine, before scheduling services, that conditions necessary to allow successful testing have been met.
- E. Only those days of service approved by Engineer will be credited to fulfill specified minimum services.
- F. When specified in individual Specification sections, manufacturer's onsite services shall include:
  - 1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
  - 2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
  - 3. Providing, on a daily basis, copies of manufacturers' representatives field notes and data to Engineer.
  - 4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Engineer.
  - 5. Resolution of assembly or installation problems attributable to or associated with respective manufacturer's products and systems.
  - 6. Assistance during functional and performance testing, and facility startup and evaluation.
  - 7. Training of Owner's personnel in the operation and maintenance of respective product as required.

### 3.02 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

- A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by equipment manufacturer's representative.
- B. Such form shall certify signing party is a duly authorized representative of manufacturer, is empowered by manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to ensure equipment is complete and operational.

### 3.03 TRAINING

- A. General:
  - 1. Furnish manufacturers' representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.

2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information specified in Section 01 78 23, Operation and Maintenance Data.
3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule:

1. List specified equipment and systems that require training services and show:
  - a. Respective manufacturer.
  - b. Estimated dates for installation completion.
  - c. Estimated training dates.
2. Allow for multiple sessions when several shifts are involved.
3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by manufacturers' representatives. Adjust schedule for interruptions in operability of equipment.
4. Coordinate with Section 01 32 00, Construction Progress Documentation, and Section 01 91 14, Equipment Testing and Facility Startup.

C. Prestartup Training:

1. Coordinate training sessions with Owner's operating personnel and manufacturers' representatives, and with submission of operation and maintenance manuals in accordance with Section 01 78 23, Operation and Maintenance Data.
2. Complete at least 14 days prior to beginning of facility startup.

D. Post-startup Training: If required in Specifications, furnish and coordinate training of Owner's operating personnel by respective manufacturer's representatives.

3.04 SUPPLEMENTS

A. The supplement listed below, following "End of Section," is part of this Specification.

1. Manufacturer's Certificate of Proper Installation.

**END OF SECTION**



**MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION**

OWNER \_\_\_\_\_ EQPT SERIAL NO: \_\_\_\_\_  
EQPT TAG NO: \_\_\_\_\_ EQPT/SYSTEM: \_\_\_\_\_  
PROJECT NO: \_\_\_\_\_ SPEC. SECTION: \_\_\_\_\_

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- Installed in accordance with Manufacturer’s recommendations.
- Inspected, checked, and adjusted.
- Serviced with proper initial lubricants.
- Electrical and mechanical connections meet quality and safety standards.
- All applicable safety equipment has been properly installed.
- Functional tests.
- System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: \_\_\_\_\_, 20\_\_\_\_

Manufacturer: \_\_\_\_\_

By Manufacturer’s Authorized Representative: \_\_\_\_\_  
(Authorized Signature)



**SECTION 01 45 16.13**  
**CONTRACTOR QUALITY CONTROL**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
  - 1. ASTM International (ASTM):
    - a. D3740, Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
    - b. E329, Use in the Evaluation of Testing and Inspection Agencies as Used in Construction.

1.02 DEFINITIONS

- A. Contractor Quality Control (CQC): The means by which Contractor ensures that the construction, to include that performed by subcontractors and suppliers, complies with the requirements of the Contract.

1.03 SUBMITTALS

- A. Informational Submittals:
  - 1. CQC Plan: Submit, not later than 30 days after receipt of Notice to Proceed.
  - 2. CQC Report: Submit, weekly, an original and one copy in report form.

1.04 OWNER'S QUALITY ASSURANCE

- A. All Work is subject to Owner's quality assurance inspection and testing at all locations and at all reasonable times before acceptance to ensure strict compliance with the terms of the Contract Documents.
- B. Owner's quality assurance inspections and tests are for the sole benefit of Owner and do not:
  - 1. Relieve Contractor of responsibility for providing adequate quality control measures;
  - 2. Relieve Contractor of responsibility for damage to or loss of the material before acceptance;
  - 3. Constitute or imply acceptance; or
  - 4. Affect the continuing rights of Owner after acceptance of the completed Work.

- C. The presence or absence of a quality assurance inspector does not relieve Contractor from any Contract requirement.
- D. Promptly furnish all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by Engineer.
- E. Owner may charge Contractor for any additional cost of inspection or test when Work is not ready at the time specified by Contractor for inspection or test, or when prior rejection makes re-inspection or retest necessary. Quality assurance inspections and tests will be performed in a manner that will not unnecessarily delay the Work.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Maintain an adequate inspection system and perform such inspections as will ensure that the Work conforms to the Contract Documents.
- B. Maintain complete inspection records and make them available at all times to Owner and Engineer.
- C. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product that complies with the Contract Documents. The system shall cover all construction and demolition operations, both onsite and offsite, including Work by subcontractors, fabricators, suppliers and purchasing agents, and shall be keyed to the proposed construction sequence.

3.02 COORDINATION MEETING

- A. After the Preconstruction Conference, but before start of construction, and prior to acceptance of the CQC Plan, schedule a meeting with Engineer and Owner to discuss the quality control system.
- B. Develop a mutual understanding of the system details, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite Work, and the interrelationship of Contractor's management and control with the Owner's Quality Assurance.
- C. There may be occasions when subsequent conferences may be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by Contractor.



### 3.03 QUALITY CONTROL ORGANIZATION

#### A. CQC System Manager:

1. Designate an individual within Contractor's organization who will be responsible for overall management of CQC and have the authority to act in CQC matters for the Contractor.
2. CQC System Manager may perform other duties on the Project.
3. CQC System Manager shall be an experienced construction person, with a minimum of 3 years construction experience on similar type Work.
4. CQC System Manager shall report to the Contractor's project manager or someone higher in the organization. Project manager in this context shall mean the individual with responsibility for the overall quality and production management of the Project.
5. CQC System Manager shall be onsite during construction; periods of absence may not exceed 2 weeks at any one time.
6. Identify an alternate for CQC System Manager to serve with full authority during the System Manager's absence. The requirements for the alternate will be the same as for designated CQC System Manager.

- #### B. Organizational Changes: Obtain Engineer's acceptance before replacing any member of the CQC staff. Requests for changes shall include name, qualifications, duties, and responsibilities of the proposed replacement.

### 3.04 QUALITY CONTROL PHASING

- #### A. CQC shall include at least three phases of control to be conducted by CQC System Manager for all definable features of Work, as follows:

1. Preparatory Phase:
  - a. Notify Owner at least 48 hours in advance of beginning any of the required action of the preparatory phase.
  - b. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The CQC System Manager shall instruct applicable CQC staff as to the acceptable level of workmanship required in order to meet Contract requirements.
  - c. Document the results of the preparatory phase meeting by separate minutes prepared by the CQC System Manager and attached to the QC report.

- d. Perform prior to beginning Work on each definable feature of Work:
  - 1) Review applicable Contract Specifications.
  - 2) Review applicable Contract Drawings.
  - 3) Verify that all materials and/or equipment have been tested, submitted, and approved.
  - 4) Verify that provisions have been made to provide required control inspection and testing.
  - 5) Examine the Work area to verify that all required preliminary Work has been completed and is in compliance with the Contract.
  - 6) Perform a physical examination of required materials, equipment, and sample Work to verify that they are on hand, conform to approved Shop Drawing or submitted data, and are properly stored.
  - 7) Review the appropriate activity hazard analysis to verify safety requirements are met.
  - 8) Review procedures for constructing the Work, including repetitive deficiencies.
  - 9) Document construction tolerances and workmanship standards for that phase of the Work.
  - 10) Check to verify that the plan for the Work to be performed, if so required, has been accepted by Engineer.
- 2. Initial Phase:
  - a. Accomplish at the beginning of a definable feature of Work:
    - 1) Notify Owner at least 48 hours in advance of beginning the initial phase.
    - 2) Perform prior to beginning Work on each definable feature of Work:
      - a) Review minutes of the preparatory meeting.
      - b) Check preliminary Work to verify compliance with Contract requirements.
      - c) Verify required control inspection and testing.
      - d) Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Comparison with sample panels is appropriate.
      - e) Resolve all differences.
      - f) Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

- 3) Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
  - 4) The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.
3. Follow-up Phase:
- a. Perform daily checks to verify continuing compliance with Contract requirements, including control testing, until completion of the particular feature of Work.
  - b. Daily checks shall be made a matter of record in the CQC documentation and shall document specific results of inspections for all features of Work for the day or shift.
  - c. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of Work that will be affected by the deficient Work. Constructing upon or concealing nonconforming Work will not be allowed.
4. Additional Preparatory and Initial Phases: Additional preparatory and initial phases may be conducted on the same definable features of Work as determined by Owner if the quality of ongoing Work is unacceptable; or if there are changes in the applicable QC staff or in the onsite production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

### 3.05 CONTRACTOR QUALITY CONTROL PLAN

#### A. General:

1. Plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used.
2. An interim plan for the first 30 days of operation will be considered.
3. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of Work to be started.
4. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of Work to be started.

B. Content:

1. Plan shall cover the intended CQC organization for the entire Contract and shall include the following, as a minimum:
  - a. Letters of Authority: A copy of a letter to the CQC System Manager signed by an authorized official of the firm, describing the responsibilities and delegating sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop Work which is not in compliance with the Contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to Owner.
  - b. Submittals: Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers and purchasing agents.
  - c. Testing: Control, verification and acceptance testing procedures for each specific test to include the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required.
  - d. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests, including documentation.
  - e. Procedures for tracking deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
  - f. Reporting procedures, including proposed reporting formats; include a copy of the CQC report form.
- C. Acceptance of Plans: Acceptance of the Contractor's basic and addendum CQC plans is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. Owner reserves the right to require Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.
- D. Notification of Changes: After acceptance of the CQC plan, Contractor shall notify Engineer, in writing, a minimum of 7 calendar days prior to any proposed change. Proposed changes are subject to acceptance by Engineer.

3.06 CONTRACTOR QUALITY CONTROL REPORT

- A. As a minimum, prepare a CQC report for every 7 calendar days. Account for all days throughout the life of the Contract. Reports shall be signed and dated by CQC System Manager. Include copies of test reports and copies of reports prepared by QC staff.
- B. Maintain current records of quality control operations, activities, and tests performed, including the Work of subcontractors and suppliers.
- C. Records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:
  - 1. Contractor/subcontractor and their areas of responsibility.
  - 2. Operating plant/equipment with hours worked, idle, or down for repair.
  - 3. Work performed today, giving location, description, and by whom. When a network schedule is used, identify each phase of Work performed each day by activity number.
  - 4. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
  - 5. Material received with statement as to its acceptability and storage.
  - 6. Identify submittals reviewed, with Contract reference, by whom, and action taken.
  - 7. Offsite surveillance activities, including actions taken.
  - 8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
  - 9. List instructions given/received and conflicts in Drawings and/or Specifications.
  - 10. Contractor's verification statement.
  - 11. Indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered.
  - 12. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in file work and workmanship comply with the Contract.

3.07 SUBMITTAL QUALITY CONTROL

- A. Submittals shall be as specified in Section 01 33 00, Submittal Procedures. The CQC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements. Owner will furnish copies of test report forms upon request by Contractor. Contractor may use other forms as approved.

3.08 TESTING QUALITY CONTROL

- A. Testing Procedure:
  - 1. Perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements. Perform the following activities and record the following data:
    - a. Verify testing procedures comply with contract requirements.
    - b. Verify facilities and testing equipment are available and comply with testing standards.
    - c. Check test instrument calibration data against certified standards.
    - d. Verify recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
    - e. Documentation:
      - 1) Record results of all tests taken, both passing and failing, on the CQC report for the date taken.
      - 2) Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test.
      - 3) Actual test reports may be submitted later, if approved by Engineer, with a reference to the test number and date taken.
      - 4) Provide directly to Engineer an information copy of tests performed by an offsite or commercial test facility. Test results shall be signed by an engineer registered in the state where the tests are performed.
      - 5) Failure to submit timely test reports, as stated, may result in nonpayment for related Work performed and disapproval of the test facility for this Contract.

- B. Testing Laboratories: Laboratory facilities, including personnel and equipment, utilized for testing soils, concrete, asphalt and steel shall meet criteria detailed in ASTM D3740 and ASTM E329, and be accredited by the American Association of Laboratory Accreditation (AALA), National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO), or other approved national accreditation authority. Personnel performing concrete testing shall be certified by the American Concrete Institute (ACI).

3.09 COMPLETION INSPECTION

- A. CQC System Manager shall conduct an inspection of the Work at the completion of all Work or any milestone established by a completion time stated in the Contract.
- B. Punchlist:
  - 1. CQC System Manager shall develop a punchlist of items which do not conform to the Contract requirements.
  - 2. Include punchlist in the CQC report, indicating the estimated date by which the deficiencies will be corrected.
  - 3. CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Owner.
  - 4. These inspections and any deficiency corrections required will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

**END OF SECTION**





**SECTION 01 50 00**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of Nurserymen (AAN): American Standards for Nursery Stock.
  2. Federal Emergency Management Agency (FEMA).
  3. National Fire Prevention Association (NFPA): 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.
  4. Telecommunications Industry Association (TIA); Electronic Industries Alliance (EIA): 568B, Commercial Building Telecommunications Cabling Standard.
  5. U.S. Department of Agriculture (USDA): Urban Hydrology for Small Watersheds.
  6. U.S. Weather Bureau: Rainfall-Frequency Atlas of the U.S. for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years.

1.02 SUBMITTALS

- A. Informational Submittals:
1. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
  2. Temporary Construction Submittals:
    - a. Parking area plans.
    - b. Contractor's field office, storage yard, and storage building plans, including gravel surfaced area.
    - c. Fencing and protective barrier locations and details.
    - d. Staging area location plan.
    - e. Plan for maintenance of existing plant operations.

1.03 MOBILIZATION

- A. Mobilization includes, but is not limited to, these principal items:
1. Obtaining required permits.
  2. Moving Contractor's field office and equipment required for first month operations onto Site.
  3. Installing temporary construction power, wiring, and lighting facilities.

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4. Providing onsite Internet service to Contractor's field offices.
  5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
  6. Arranging for and erection of Contractor's work and storage yard.
  7. Posting OSHA required notices and establishing safety programs and procedures.
  8. Having Contractor's superintendent at Site full time.
- B. Use area designated for Contractor's temporary facilities as shown on the Drawings.

### 1.04 PROTECTION OF WORK AND PROPERTY

- A. Comply with Owner's safety rules while on Owner's property.
- B. Keep Owner informed of serious onsite accidents and related claims.
- C. Use of Explosives: No blasting or use of explosives will be allowed onsite.

## **PART 2 PRODUCTS**

### 2.01 PROJECT SIGN

- A. Provide and maintain one, 8-foot wide by 4-foot high sign constructed of 3/4-inch exterior high-density overlaid plywood. Sign shall bear name of Project, Owner, Contractor, Engineer, and other participating agencies. Lettering shall be blue applied on white background by an experienced sign painter. Include Owner's and agency's logos in full color. Provide exterior type enamel paint. Information to be included and logo graphic will be provided by Engineer.

### 2.02 CONTRACTORS FIELD OFFICE

- A. Prefabricated or mobile units with serviceable finishes temperature controls, and foundations adequate for normal loading.
- B. Provide on-site facilities for Contractor and subcontractors as appropriate to the stage and demands of the work.

**PART 3 EXECUTION**

**3.01 TEMPORARY UTILITIES**

**A. Power:**

1. Determine type and amount available and make arrangements for obtaining temporary electric power service, metering equipment, and pay all costs for electric power used during contract period, except portions of the Work designated in writing by Engineer as substantially complete. as needed.
2. Cost of electric power will be borne by Contractor.

**B. Lighting:** Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.

**C. Water:**

1. Contractor shall make temporary connections for construction water at Site at locations as coordinated with the Owner. Provide temporary facilities and piping required to bring water to point of use and remove when no longer needed notify fire department before obtaining water from fire hydrants.
2. Water as reasonably necessary for prosecution of the work shall be provided at no cost to Contractor. If, in the opinion of the Engineer the Contractor's water use is excessive or wasteful, Engineer may require the Contractor to install an acceptable metering device and pay for water used at Owner's current rate.

**D. Sanitary and Personnel Facilities:**

1. Provide and maintain facilities for Contractor's employees, Subcontractors, and other onsite employers' employees. Service, clean, and maintain facilities and enclosures.
2. Use of Owner's existing sanitary facilities by construction personnel will not be allowed.

**E. Fire Protection:** Furnish and maintain on Site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

3.02 PROTECTION OF WORK AND PROPERTY

A. General:

1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
2. No residence or business shall be cut off from vehicular traffic unless special arrangements have been made.
3. Maintain in continuous service existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and other utilities encountered along line of the Work, unless other arrangements satisfactory to owners of said utilities have been made. See Section 01 31 13, Project Coordination for additional coordination requirements.
4. Where completion of the Work requires temporary or permanent removal or relocation of existing utility, coordinate activities with owner of said utility and perform work to their satisfaction.
5. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
6. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
7. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.
8. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance: Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
9. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
10. Maintain original Site drainage wherever possible.

- B. Site Security: Provide and maintain additional temporary security fences as necessary to protect the Work and Contractor-furnished products not yet installed.

C. Trees and Plantings:

1. Protect from damage and preserve trees, shrubs, and other plants outside limits of the Work and within limits of the Work, which are designated on the Drawings to remain undisturbed.
  - a. Where practical, tunnel beneath trees when on or near line of trench.
  - b. Employ hand excavation as necessary to prevent tree injury.
  - c. Do not stockpile materials within drip lines of trees.
  - d. Provide and maintain temporary barricades around trees.
  - e. Water vegetation as necessary to maintain health.
  - f. Cover temporarily exposed roots with wet burlap, and keep burlap moist until soil is replaced around roots.
  - g. No trees, except those specifically shown on the Drawings to be removed, shall be removed without written approval of Engineer.
  - h. Dispose of removed trees in a legal manner off the Site.
2. Balling and burlapping of trees indicated for replacement shall conform to recommended specifications set forth in the American Standards for Nursery Stock, published by American Association of Nurserymen. Balls shall be firm and intact and made-balls will not be accepted. Handle ball and burlap trees by ball and not by top.
3. In event of damage to bark, trunks, limbs, or roots of plants that are not designated for removal, treat damage by corrective pruning, bark tracing, application of a heavy coating of tree paint, and other accepted horticultural and tree surgery practices.
4. Replace each plant that dies as a result of construction activities.

D. Existing Structures:

1. Where Contractor contemplates removal of small structures such as mailboxes, signposts, and culverts that interfere with Contractor's operations, obtain approval of property owner and Engineer.
2. Replace items removed in their original location and a condition equal to or better than original.

E. Finished Construction: Protect finished floors and concrete floors exposed as well as those covered with composition tile or other applied surfacing.

F. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.

- G. Archaeological Finds: Should finds of an archaeological or paleontological nature be made within Site limits, immediately notify Owner and Engineer and proceed in accordance with General Conditions. Continue the Work in other areas without interruption.
- H. Endangered and Threatened Species:
  - 1. Take precautions necessary and prudent to protect native endangered and threatened flora and fauna.
  - 2. Notify Engineer of construction activities that might threaten endangered and threatened species or their habitats.
  - 3. Engineer will mark areas known as habitats of endangered and threatened species prior to commencement of onsite activities.
  - 4. Additional areas will be marked by Engineer as other habitats of endangered and threatened species become known during construction.

### 3.03 TEMPORARY CONTROLS

- A. Air Pollution Control:
  - 1. Minimize air pollution from construction operations.
  - 2. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
  - 3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.
  - 4. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as need no longer exists.
- B. Noise Control:
  - 1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.
  - 2. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments.

C. Water Pollution Control:

1. Divert sanitary sewage and nonstorm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to existing waterway.
2. Prior to commencing excavation and construction, obtain Engineer's agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and dewatering pump discharges.
3. Comply with Section 01 57 13, Temporary Erosion and Sediment Control, for stormwater flow and surface runoff.
4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

D. Erosion, Sediment, and Flood Control: Provide, maintain, and operate temporary facilities as specified in Section 01 57 13, Temporary Erosion and Sediment Control, to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period.

3.04 STORAGE YARDS AND BUILDINGS

- A. Coordinate requirements with Section 01 61 00, Common Product Requirements, Owner, and Engineer to establish Temporary Storage Area.
- B. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.
- C. Temporary Storage Buildings:
  1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.
  2. Arrange or partition to provide security of contents and ready access for inspection and inventory.
  3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

3.05 ACCESS ROADS

- A. Construct access roads as shown and within easements, rights-of-way, or Project limits. Use existing roads where shown.
- B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.

## Blackwater Golf Club Lift Station and Force Main

- C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.
- D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.
- E. Upon completion of construction, restore ground surface disturbed by access road construction to original grade.

### 3.06 PARKING AREAS

- A. Contractor may park up to two vehicles at the construction trailer. All other vehicle parking shall be restricted to designated areas as coordinated with the Owner and Engineer.
- B. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.

### 3.07 VEHICULAR TRAFFIC

- A. Comply with Laws and Regulations regarding closing or restricting use of public streets or highways. No public or private road shall be closed, except by written permission of proper authority. Ensure the least possible obstruction to traffic and normal commercial pursuits.
- B. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.
- C. Whenever it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.
- D. Notify fire department and police department before closing street or portion thereof. Notify said departments when streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without written permission from fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. Furnish Contractor's night emergency telephone numbers to police department.



3.08 CLEANING DURING CONSTRUCTION

- A. In accordance with General Conditions, as may be specified in other Specification sections, and as required herein.
- B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up and dispose of debris.
- C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least weekly, dispose of such waste materials, debris, and rubbish offsite.
- D. At least weekly, brush sweep entry drive, roadways, and other streets and walkways affected by the Work and where adjacent to the Work.

**END OF SECTION**



**SECTION 01 57 13**  
**TEMPORARY EROSION AND SEDIMENT CONTROL**

**PART 1 GENERAL**

1.01 WORK OF THIS SECTION

- A. This section covers work necessary for stabilization of soil to prevent erosion during and after construction and land disturbing activities. The work shall include the furnishing of all labor, materials, tools, and equipment to perform the work and services necessary as herein specified and as indicated on the Drawings. This shall include installation, maintenance, and final removal of all temporary soil erosion and sediment control measures.
- B. The minimum areas requiring soil erosion and sediment control measures are indicated on the Drawings. The right is reserved to modify the use, location, and quantities of soil erosion and sediment control measures based on activities of the Contractor and as the Engineer considers to be to the best interest of the Owner.
- C. See additional information noted on the Drawings.

1.02 GENERAL

- A. See Conditions of the Contract and Division 1, General Requirements, which contain information and requirements that apply to the Work specified herein and are mandatory for this project.
- B. All activities shall conform to the National Pollutant Discharge Elimination System per Part IV, Chapter 373, Florida Statute, as administered by the Florida Department of Environmental Protection (FDEP). Best practices and erosion control measures shall conform to the Drawings and the Florida Stormwater Erosion and Sedimentation Control Inspector's Manual, latest edition. In the event of a conflict, the more stringent requirement shall apply.
- C. Contractor shall prepare and obtain approval for a Generic Permit for Stormwater Discharge from Large and Small Construction Activities (FDEP Document 62-621.300[4][a]). The Contractor shall prepare and submit the supporting Generic Permit documentation including a site specific Stormwater Pollution Prevent Plan, Notice of Intent (FDEP Form 62-621.300[4][b]), and processing fee.

- D. Soil erosion stabilization and sedimentation control consist of the following elements:
1. Maintenance of existing permanent or temporary storm drainage piping and channel systems, as necessary.
  2. Construction of new permanent and temporary storm drainage piping and channel systems, as necessary.
  3. Construction of temporary erosion control facilities such as silt fences, check dams, etc.
  4. Topsoil and Seeding:
    - a. Placement and maintenance of Temporary Seeding on all areas disturbed by construction.
    - b. Placement of permanent topsoil, fertilizer, and seed, etc., in all areas not occupied by structures or pavement, unless shown otherwise.
  5. Soil Stabilization Seeding: Placement of fertilizer and seed, etc., in areas as specified hereinafter.
- E. The Contractor shall be responsible for phasing Work in areas allocated for his exclusive use during this Project, including any proposed stockpile areas, to restrict sediment transport. This will include installation of any temporary erosion control devices, ditches, or other facilities.
- F. The areas set aside for the Contractor's use during the Project may be temporarily developed to provide satisfactory working, staging, and administrative areas for his exclusive use. Preparation of these areas shall be in accordance with other requirements contained within these Specifications and shall be done in a manner to both control all sediment transport away from the area.
- G. All permanent stockpiles shall be seeded with soil stabilization seed and protected by construction of silt fences.
- H. Sediment transport and erosion from working stockpiles shall be controlled and restricted from moving beyond the immediate stockpile area by construction of temporary toe-of-slope ditches and accompanying silt fences, as necessary. The Contractor shall keep these temporary facilities in operational condition by regular cleaning, regrading, and maintenance. Stockpiles remaining in place longer than 14 calendar days shall be considered permanent stockpiles for purposes of erosion and sediment control.
- I. The Contractor shall maintain all elements of the Soil Erosion Stabilization and Sedimentation Control systems and facilities to be constructed during this Project for the duration of his activities on this Project. Formal inspections made jointly by the Contractor and the Field Engineer shall be conducted every 2 weeks to evaluate the Contractor's conformance to the requirements of both these Specifications and FDEP Regulations.

- J. All silt traps shall be cleaned of collected sediment after every storm or as determined from the biweekly inspections. Cleaning shall be done in a manner that will not direct the sediment into the storm drain piping system. Removed sediment shall be taken to an area selected by the Owner.
- K. Replacement or repair of failed or overloaded silt fences, check dams, or other temporary erosion control devices shall be accomplished by the Contractor immediately upon discovery.
- L. Unpaved earth drainage ditches shall be regraded as needed to maintain original grade and remove sediment buildup. If a ditch becomes difficult to maintain, the Contractor shall cooperate with the Engineer and install additional erosion control devices such as check dams, temporary paving, or silt fences as directed by the Engineer.

1.03 SUBMITTALS

- A. Submittals shall be made in accordance with Section 01 33 00, Submittal Procedures.
- B. In addition, the Contractor shall provide the following specific information:
  - 1. Certificates of inspection of seed by state or federal authorities and copies of delivery invoices or other proof of quantities of fertilizer.
  - 2. Manufacturer's certificate of compliance attesting that the geotextile meets the requirements of these Specifications.

**PART 2 PRODUCTS**

2.01 PERMANENT SEED

- A. All permanent grass seed shall be in accordance with Section 32 92 00, Turf and Grasses. Permanent seeds shall be Bahia grass seed and have a minimum pure seed content of 95 percent with a minimum germination of 80 percent.

2.02 SOIL STABILIZATION AND TEMPORARY SEED

- A. All temporary grass seed shall be in accordance with Section 32 92 00, Turf and Grasses. Temporary seed for erosion control shall be annual type ryegrass seed with a minimum pure seed content of 95 percent with a minimum germination of 95 percent.

2.03 FERTILIZER

- A. Fertilizer shall be commercial, chemical type, uniform in composition, free-flowing, conforming to state and federal laws, and suitable for application with equipment designed for that purpose.
- B. Fertilizer shall be as specified under Section 32 92 00, Turf and Grasses.

2.04 STRAW MULCH

- A. Threshed straw of oats, wheat, barley, or rye, free from seed of noxious weeds, or clean salt hay.
- B. Straw mulch shall be as specified under Section 32 92 00, Turf and Grasses.

**PART 3 EXECUTION**

3.01 GENERAL

- A. The Contractor shall install erosion and sediment control measures and maintain in accordance with the Drawings and in accordance with the Florida Stormwater Erosion and Sedimentation Control Inspector's Manual, latest edition.
- B. The Contractor shall provide and maintain temporary seeding at all times.

3.02 SEEDING

- A. General:
  - 1. The Contractor shall give at least 3 days notice to the Engineer prior to seeding to allow the Owner to inspect the prepared areas. The Contractor shall rework any areas not approved for seeding to the Owner's satisfaction.
  - 2. The Contractor shall keep the Engineer advised of schedule of operations.
  - 3. Seeding application shall be as specified under Section 32 92 00, Turf and Grasses.
- B. Soil Stabilization and Temporary Seeding:
  - 1. Hydroseeding will be permitted as an alternative method of applying seed and associated soil conditioning agents described above. Should the Contractor elect to apply soil stabilization seeding by hydroseeding methods, he shall submit his operational plan and methods to the Engineer.

2. Temporary Seeding is to be placed and maintained over all disturbed areas prior to Permanent Seeding. Maintain Temporary Seeding until such time as areas are approved for Permanent Seeding. As a minimum, maintenance shall include the following:
  - a. Fix-up and reseedling of bare areas or redisturbed areas.
  - b. Mowing for stands of grass or weeds exceeding 6 inches in height.

C. Topsoil and Permanent Seeding:

1. Topsoil is to be placed over all disturbed areas that are not surfaced with concrete, asphalt, or pavers.
2. Preparation:
  - a. After rough grading is completed and reviewed by the Engineer, Contractor shall spread topsoil as hereinbefore specified over all areas to receive Permanent Seeding to a minimum compacted depth of 4 inches with surface elevations as shown. Loosen the finished surface to a depth of 2 inches and leave in smooth condition, free from depressions or humps, ready for seeding.
  - b. Finish Grading:
    - 1) Contractor shall rake the topsoiled area to a uniform grade, so that all areas drain as indicated on the grading plan.
    - 2) Contractor shall remove all trash and stones exceeding 1 inch in diameter from area to a depth of 2 inches.
3. Maintenance:
  - a. Maintenance Period: Contractor shall begin maintenance immediately after each portion of permanent grass is planted and continue for 8 weeks after all planting is completed.
  - b. Maintenance Operations: Contractor shall water to keep surface soil moist. Repair washed out areas by filling with topsoil, liming, fertilizing, and seeding. Replace mulch on banks when washed or blown away. Mow to 2 inches after grass reaches 3 inches in height, and mow frequently enough to keep grass from exceeding 3-1/2 inches. Weed by local spot application of selective herbicide only after first planting season when grass is established.
4. Guarantee:
  - a. If, at the end of the 8-week maintenance period, a satisfactory stand of grass has not been produced, the Contractor shall renovate and reseed the grass or unsatisfactory portions thereof immediately.
  - b. A satisfactory stand is defined as grass or section of grass that has a substantial establishment of new grass, strongly rooted, and uniformly green in appearance from a distance of 50 feet. No noticeable thin or bare areas as determined by the Engineer.

**END OF SECTION**





**SECTION 01 61 00  
COMMON PRODUCT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 DEFINITIONS**

**A. Products:**

1. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock, and may also include existing materials or components required for reuse.
2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

**1.02 DESIGN REQUIREMENTS**

**A.** Where Contractor design is specified, design of installation, systems, equipment, and components, including supports and anchorage, shall be in accordance with provisions as indicated on the Drawings, with the Occupational Safety and Health Administration, and with all other applicable state and local agency requirements.

1. Refer to Design Criteria on Structural General Notes Drawings.
2. Refer to individual Specification sections and to Drawings for additional design criteria.

**B.** Where Contractor design is specified; installation, systems, equipment, and components shall be designed by a qualified professional Engineer registered in the State of Florida.

**1.03 ENVIRONMENTAL REQUIREMENTS**

**A.** Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at 230 feet above sea level.

- B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 10 degrees F to 105 degrees F.

1.04 PREPARATION FOR SHIPMENT

- A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.
- B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.
- C. Extra Materials, Special Tools, Test Equipment, and Expendables:
  - 1. Furnish as required by individual Specifications.
  - 2. Schedule:
    - a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
    - b. Transfer to Owner shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
  - 3. Packaging and Shipment:
    - a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
    - b. Prominently displayed on each package, the following:
      - 1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
      - 2) Applicable equipment description.
      - 3) Quantity of parts in package.
      - 4) Equipment manufacturer.
  - 4. Deliver materials to site or other area as designated by the Contractor.
  - 5. Notify Engineer, Owner, and Construction Manager upon arrival for transfer of materials.
  - 6. Replace extra materials and special tools found to be damaged or otherwise inoperable at the time of transfer to Owner.

- D. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify Engineer of anticipated date and place of delivery.
- E. Factory Test Results: Reviewed and accepted by Engineer before product shipment as required in individual Specification sections.

1.05 DELIVERY AND INSPECTION

- A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.
- B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.
- C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.
- D. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.06 HANDLING, STORAGE, AND PROTECTION

- A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, Temporary Facilities and Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.
- B. Manufacturer's instructions for material requiring special handling, storage, or protection shall be provided prior to delivery of material.
- C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to ensure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.

- D. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulate against moisture, water, and dust damage. Connect and operate continuously space heaters furnished in electrical equipment.
- E. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
- F. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.
- G. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.
- H. Hazardous Materials: Prevent contamination of personnel, storage area, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.
- B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.
- C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.
- D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

- E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.
- F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.
- G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.
- H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.
- I. Authority Having Jurisdiction (AHJ):
  - 1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
  - 2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.
- J. Equipment Finish:
  - 1. Provide manufacturer's standard finish and color, except where specific color is indicated.
  - 2. If manufacturer has no standard color, provide equipment with finish as approved by Owner.
- K. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.

## Blackwater Golf Club Lift Station and Force Main

- L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Owner.
- M. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
  - 1. Use or reuse of components and materials without a traceable certification is prohibited.

### 2.02 FABRICATION AND MANUFACTURE

#### A. General:

- 1. Manufacture parts to U.S.A. standard sizes and gauges.
- 2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
- 3. Design structural members for anticipated shock and vibratory loads.
- 4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
- 5. Modify standard products as necessary to meet performance Specifications.

#### B. Lubrication System:

- 1. Require no more than weekly attention during continuous operation.
- 2. Convenient and accessible; oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
- 3. Provide constant-level oilers or oil level indicators for oil lubrication systems.
- 4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

### 2.03 SOURCE QUALITY CONTROL

- A. Where Specifications call for factory testing to be witnessed by Engineer, notify Engineer not less than 14 days prior to scheduled test date, unless otherwise specified.

- B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).
- C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

### **PART 3 EXECUTION**

#### **3.01 INSPECTION**

- A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor's control.

#### **3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE**

- A. When so specified, a Manufacturer's Certificate of Compliance, a copy of which is attached to this section, shall be completed in full, signed by entity supplying the product, material, or service, and submitted prior to shipment of product or material or execution of the services.
- B. Engineer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.
- C. Such form shall certify proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.
- D. May reflect recent or previous test results on material or product, if acceptable to Engineer.

#### **3.03 INSTALLATION**

- A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.
- B. No shimming between machined surfaces is allowed.
- C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Repaint painted surfaces that are damaged prior to equipment acceptance.

- E. Do not cut or notch any structural member or building surface without specific approval of Engineer.
- F. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at Site, available for review at all times.
- G. For material and equipment specifically indicated or specified to be reused in the Work:
  - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
  - 2. Arrange for transportation, storage, and handling of products that require offsite storage, restoration, or renovation. Include costs for such Work in the Contract Price.

3.04 FIELD FINISHING

- A. In accordance with individual Specification sections.

3.05 ADJUSTMENT AND CLEANING

- A. Perform required adjustments, tests, operation checks, and other startup activities.

3.06 LUBRICANTS

- A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Owner.

3.07 SUPPLEMENTS

- A. The supplement listed below, following "End of Section", is part of this specification.
  - 1. Form: Manufacturer's Certificate of Compliance.

**END OF SECTION**



**MANUFACTURER’S CERTIFICATE OF COMPLIANCE**

OWNER: \_\_\_\_\_ PRODUCT, MATERIAL, OR SERVICE  
PROJECT NAME: \_\_\_\_\_ SUBMITTED: \_\_\_\_\_  
PROJECT NO: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I hereby certify that the above-referenced product, material, or service called for by the Contract for the named Project will be furnished in accordance with all applicable requirements. I further certify that the product, material, or service are of the quality specified and conform in all respects with the Contract requirements, and are in the quantity shown.

Date of Execution: \_\_\_\_\_, 20\_\_\_\_

Manufacturer: \_\_\_\_\_

Manufacturer’s Authorized Representative (*print*): \_\_\_\_\_

\_\_\_\_\_  
(Authorized Signature)



**SECTION 01 64 00**  
**OWNER-FURNISHED PRODUCTS**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Seller: The party under separate contract with Owner to furnish the products or special services specified herein.

1.02 OWNER-FURNISHED PRODUCTS

A. Products:

1. Products as shown on the Drawings.
2. Pumps and Controls: Includes two submersible pumps, control panel, manufacturer supplied cables, pump base elbow, level floats and guide rails.
3. Fiberglass Wet Well: Includes a fiberglass wet well with associated hatches, pipe penetrations, etc.
4. Piping and Appurtenances: Includes all discharge piping and pipe supports located inside the wet well and the discharge pipe through the wet well to a flanged connection.

B. Receipt and Handling:

1. Point of receipt: Coordinate with Owner and Seller.
2. Estimated date of arrival: Coordinate with Owner and Seller.
3. Equipment or facility necessary for receipt and unloading of product: As needed to facilitate unloading and installing equipment.
4. Estimated weight of product: Coordinate with Seller.
5. Special handling or storage instructions: As required by equipment manufacturer.
6. Associated special services to be provided by Owner:
  - a. Installation assistance.
  - b. Certification of proper installation.
  - c. Functional testing assistance.
  - d. Performance testing assistance.
  - e. Training of Owner's personnel.

1.03 INFORMATION FURNISHED BY OWNER

- A. Shop drawings related to Owner-furnished products will be made available for Contractor's use in performing the work under this section.

- B. Manufacturer's installation, operation, and maintenance instructions for Owner-furnished products will be made available.

#### 1.04 TRANSFER OF PRODUCTS

- A. Unless indicated otherwise, items will be furnished f.o.b. the Project Site.
- B. Upon delivery, conduct with Owner or Engineer a joint inspection for the purpose of identifying product, general verification of quantities, and observation of apparent condition. Such inspection will not be construed as final or as receipt of any product that, as a result of subsequent inspections and tests, are determined to be nonconforming.
- C. Damaged or incomplete products to be returned for replacement will not be unloaded, except as necessary to expedite return shipment. Owner will submit claims for transportation damage and expedite replacement of damaged, defective, or deficient items.
- D. Indicate signed acceptance of delivery on a copy of the invoice.
- E. If Contractor is not prepared to accept delivery of Owner-furnished products by either the specified Estimated Date of Arrival or such Owner-confirmed delivery date, as specified herein, associated costs incurred by Owner shall be borne by Contractor. Such costs may include, but not be limited to, demurrage, interest, insurance costs, additional administrative and engineering costs, additional factory and field technical support, additional storage and reshipping costs, cost escalation, and extended warranty costs due.

#### 1.05 UNLOADING, STORAGE AND MAINTENANCE

- A. Subsequent to transfer, Contractor shall have complete responsibility for unloading Owner-furnished products. Unload product in accordance with manufacturers' instructions, or as specified.
- B. Store, protect, and maintain product to prevent damage until final acceptance of completed work. Damage to or loss of products after date of transfer to Contractor shall be repaired to original condition, or replaced with new identical products, at the discretion of Engineer.
- C. Maintain complete inventory of all Owner-furnished products after their transfer to Contractor.

#### 1.06 SCHEDULING AND SEQUENCING

- A. Include sequencing constraints specified herein as part of Progress Schedule.

- B. Owner will keep Contractor informed of probable delivery date changes.
- C. Owner will confirm delivery date with Contractor 10 days prior to scheduled delivery, and within 24 hours of expected delivery time.
- D. Provide a minimum of 10 days notice to Owner that Owner-furnished product is ready for all special services listed herein to be furnished by Owner through its contract with seller. Contractor shall bear the cost of all damages assessed to Owner by seller resulting from delays caused by Contractor.

1.07 EXTRA MATERIALS

- A. Unless otherwise specified, Owner will take acceptance of, and be responsible for storing associated extra materials and special tools upon delivery.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. Install products in conformance with Owner-furnished product shop drawings and installation instructions.
- B. Provide all interconnecting structures, equipment, piping, electrical and instrumentation work, finish painting, and appurtenances to achieve a complete and functional system.
- C. Provide foundation pads for Owner-furnished products as shown. Verify exact dimensions and configuration of all pads, including penetrations, with Owner-furnished product shop drawings.
- D. Anchor Bolts:
  - 1. Where required, provide anchor bolts, fasteners, washers, and templates needed for installation of Owner-furnished equipment.
  - 2. Size and locate anchor bolts in accordance with Owner-furnished product shop drawings and installation instructions.
- E. Mechanical and electrical equipment shall be properly aligned, plumb and level, with no stresses on connecting piping or conduit.
- F. Verify direction of motor rotation before starting equipment drives.
- G. Verify operability and safety of electrical system needed to operate equipment. Check electrical system for continuity, phasing, grounding, and proper functions.

- H. Pump Installation: in accordance with manufacturer's instructions.

3.02 FIELD FINISHING

- A. Products will be delivered with prime and finish coat(s) applied.
  - 1. Touch up or repair damage to coatings resulting from unloading, storage, installation, testing, and startup.
  - 2. If finish coats are damaged extensively after transfer, completely repaint.
  - 3. Touch up, repair, or complete repainting shall match color of original paint, and shall be fully compatible with applied primers and finish.

3.03 PRODUCT PROTECTION

- A. Immediately after installation, lubricate components in accordance with manufacturer's instructions.
- B. Follow manufacturer's instructions for protection and maintenance during storage, after installation but prior to testing and startup, and after startup but prior to acceptance.
- C. Furnish incidental supplies including lubricants, cleaning fluids, and similar products as needed for protecting and maintaining the Owner-furnished products.

3.04 TESTS AND INSPECTION

- A. Perform tests and inspections of installed products in accordance with requirements shown herein, Section 01 91 14, Equipment Testing and Facility Startup, and manufacturer's instructions.

**END OF SECTION**

**SECTION 01 77 00  
CLOSEOUT PROCEDURES**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

**A. Informational Submittals:**

1. Submit prior to application for final payment.
  - a. Record Documents: As required in General Conditions.
  - b. Special bonds, Special Guarantees, and Service Agreements.
  - c. Consent of Surety to Final Payment: As required in General Conditions.
  - d. Releases or Waivers of Liens and Claims: As required in General Conditions.
  - e. Releases from Agreements.
  - f. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01 29 00, Payment Procedures.
  - g. Extra Materials: As required by individual Specification sections.

**1.02 RECORD DOCUMENTS**

**A. Quality Assurance:**

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
  - a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
  - b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
4. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Engineer to recommend whole or any part of Contractor's Application for Payment, either partial or final.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from Engineer at no cost to Contractor, one complete set of Contract Documents in electronic format for Contractor's printing and use.
2. Print one full size set of contract drawings for "Record Drawing" markup.
3. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.
4. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by Engineer.

C. Making Entries on the Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
  - a. Color Coding:
    - 1) Green when showing information deleted from the Drawings.
    - 2) Red when showing information added to the Drawings.
    - 3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by "cloud" drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
  - a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.



- b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
  - c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
  - d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
  - e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
- a. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," and the like.
  - b. Show, by symbol or note, vertical location of item ("under slab," "in ceiling plenum," "exposed," and the like).
  - c. Make identification so descriptive that it may be related reliably to Specifications.

### 3.02 FINAL CLEANING

- A. At completion of the Work or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire Site or parts thereof, as applicable.
1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner and Engineer.
  2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
  3. Repair, patch, and touchup marred surfaces to specified finish and match adjacent surfaces.
  4. Clean all windows.
  5. Clean and wax wood, vinyl, or painted floors.
  6. Broom clean exterior paved driveways and parking areas.
  7. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
  8. Rake clean all other surfaces.
  9. Remove snow and ice from access to buildings.

## Blackwater Golf Club Lift Station and Force Main

10. Replace air-handling filters and clean ducts, blowers, and coils of ventilation units operated during construction.
  11. Leave water courses, gutters, and ditches open and clean.
- B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

**END OF SECTION**

**SECTION 01 78 23  
OPERATION AND MAINTENANCE DATA**

**PART 1 GENERAL**

1.01 SECTION INCLUDES

- A. Detailed information for the preparation, submission, and Engineer's review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.

1.02 DEFINITIONS

- A. Preliminary Data: Initial and subsequent submissions for Engineer's review.
- B. Final Data: Engineer-accepted data, submitted as specified herein.
- C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.03 SEQUENCING AND SCHEDULING

- A. Equipment and System Data:
  - 1. Preliminary Data:
    - a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by Engineer.
    - b. Submit prior to shipment date.
  - 2. Final Data: Submit Instructional Manual Formatted data not less than 30 days prior to installation of equipment or system. Submit Compilation Formatted and Electronic Media Formatted data prior to Substantial Completion of Project.
- B. Materials and Finishes Data:
  - 1. Preliminary Data: Submit at least 15 days prior to request for final inspection.
  - 2. Final Data: Submit within 10 days after final inspection.

1.04 DATA FORMAT

- A. Prepare preliminary and final data in the form of an instructional manual. Prepare final data on electronic media.

B. Instructional Manual Format:

1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
2. Size: 8-1/2 inches by 11 inches, minimum.
3. Cover: Identify manual with typed or printed title "OPERATION AND MAINTENANCE DATA" and list:
  - a. Project title.
  - b. Designate applicable system, equipment, material, or finish.
  - c. Identity of separate structure as applicable.
  - d. Identify volume number if more than one volume.
  - e. Identity of equipment number and Specification section.
4. Spine:
  - a. Project title.
  - b. Identify volume number if more than one volume.
5. Title Page:
  - a. Contractor name, address, and telephone number.
  - b. Subcontractor, Supplier, installer, or maintenance contractor's name, address, and telephone number, as appropriate.
    - 1) Identify area of responsibility of each.
    - 2) Provide name and telephone number of local source of supply for parts and replacement.
6. Table of Contents:
  - a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
  - b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
7. Paper: 20-pound minimum, white for typed pages.
8. Text: Manufacturer's printed data, or neatly typewritten.
9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
10. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.

C. Electronic Media Format:

1. Portable Document Format (PDF):
  - a. After all preliminary data has been found to be acceptable to Engineer, submit Operation and Maintenance data in PDF format on CD.
  - b. Files to be exact duplicates of Engineer-accepted preliminary data. Arrange by specification number and name.
  - c. Files to be fully functional and viewable in most recent version of Adobe Acrobat.

2. Manufacturers' standard electronic format.

## 1.05 SUBMITTALS

### A. Informational:

1. Data Outline: Submit two copies of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.
2. Preliminary Data:
  - a. Submit three copies for Engineer's review.
  - b. If data meets conditions of the Contract:
    - 1) One copy will be returned to Contractor.
    - 2) One copy will be forwarded to Resident Project Representative.
    - 3) One copy will be retained in Engineer's file.
  - c. If data does not meet conditions of the Contract:
    - 1) All copies will be returned to Contractor with Engineer's comments (on separate document) for revision.
    - 2) Engineer's comments will be retained in Engineer's file.
    - 3) Resubmit two copies revised in accordance with Engineer's comments.
3. Final Data: Submit two copies in format specified herein.

## 1.06 DATA FOR EQUIPMENT AND SYSTEMS

### A. Content For Each Unit (or Common Units) and System:

1. Product Data:
  - a. Include only those sheets that are pertinent to specific product.
  - b. Clearly annotate each sheet to:
    - 1) Identify specific product or part installed.
    - 2) Identify data applicable to installation.
    - 3) Delete references to inapplicable information.
  - c. Function, normal operating characteristics, and limiting conditions.
  - d. Performance curves, engineering data, nameplate data, and tests.
  - e. Complete nomenclature and commercial number of replaceable parts.
  - f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
  - g. Spare parts ordering instructions.

- h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).
2. As-installed, color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
  - a. Format:
    - 1) Provide reinforced, punched, binder tab; bind in with text.
    - 2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
    - 3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
    - 4) Identify Specification section and product on the Drawings and envelopes.
  - b. Relations of component parts of equipment and systems.
  - c. Control and flow diagrams.
  - d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.
5. Instructions and Procedures: Within text, as required to supplement product data.
  - a. Format:
    - 1) Organize in consistent format under separate heading for each different procedure.
    - 2) Provide logical sequence of instructions for each procedure.
    - 3) Provide information sheet for Owner's personnel, including:
      - a) Proper procedures in event of failure.
      - b) Instances that might affect validity of guarantee or Bond.
  - b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
  - c. Operating Procedures:
    - 1) Startup, break-in, routine, and normal operating instructions.
    - 2) Test procedures and results of factory tests where required.
    - 3) Regulation, control, stopping, and emergency instructions.
    - 4) Description of operation sequence by control manufacturer.
    - 5) Shutdown instructions for both short and extended duration.
    - 6) Summer and winter operating instructions, as applicable.
    - 7) Safety precautions.
    - 8) Special operating instructions.
  - d. Maintenance and Overhaul Procedures:
    - 1) Routine maintenance.
    - 2) Guide to troubleshooting.

- 3) Disassembly, removal, repair, reinstallation, and re-assembly.
  6. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, Closeout Procedures.
- B. Content for Each Electric or Electronic Item or System:
1. Description of Unit and Component Parts:
    - a. Function, normal operating characteristics, and limiting conditions.
    - b. Performance curves, engineering data, nameplate data, and tests.
    - c. Complete nomenclature and commercial number of replaceable parts.
    - d. Interconnection wiring diagrams, including control and lighting systems.
  2. Circuit Directories of Panelboards:
  3. Electrical service.
  4. Control requirements and interfaces.
  5. Communication requirements and interfaces.
  6. List of electrical relay settings, and control and alarm contact settings.
  7. Electrical interconnection wiring diagram, including as applicable, single-line, three-line, schematic and internal wiring, and external interconnection wiring.
  8. As-installed control diagrams by control manufacturer.
  9. Operating Procedures:
    - a. Routine and normal operating instructions.
    - b. Startup and shutdown sequences, normal and emergency.
    - c. Safety precautions.
    - d. Special operating instructions.
  10. Maintenance Procedures:
    - a. Routine maintenance.
    - b. Guide to troubleshooting.
    - c. Adjustment and checking.
    - d. List of relay settings, control and alarm contact settings.
  11. Manufacturer's printed operating and maintenance instructions.
  12. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
- C. Maintenance Summary:
1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.

2. Format:
  - a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
  - b. Each Maintenance Summary may take as many pages as required.
  - c. Use only 8-1/2-inch by 11-inch size paper.
  - d. Complete using typewriter or electronic printing.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
  - a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
  - b. "Unit" is the unit of measure for ordering the part.
  - c. "Quantity" is the number of units recommended.
  - d. "Unit Cost" is the current purchase price.

#### 1.07 DATA FOR MATERIALS AND FINISHES

##### A. Content for Architectural Products, Applied Materials, and Finishes:

1. Manufacturer's data, giving full information on products:
  - a. Catalog number, size, and composition.
  - b. Color and texture designations.
  - c. Information required for reordering special-manufactured products.
2. Instructions for Care and Maintenance:
  - a. Manufacturer's recommendation for types of cleaning agents and methods.
  - b. Cautions against cleaning agents and methods that are detrimental to product.
  - c. Recommended schedule for cleaning and maintenance.

##### B. Content for Moisture Protection and Weather Exposed Products:

1. Manufacturer's data, giving full information on products:
  - a. Applicable standards.
  - b. Chemical composition.
  - c. Details of installation.
2. Instructions for inspection, maintenance, and repair.



1.08 SUPPLEMENTS

A. The supplement listed below, following “End of Section”, is part of this Specification.

1. Form: Maintenance Summary Form.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**



MAINTENANCE SUMMARY FORM

PROJECT: \_\_\_\_\_ CONTRACT NO.: \_\_\_\_\_

1. EQUIPMENT ITEM \_\_\_\_\_

2. MANUFACTURER \_\_\_\_\_

3. EQUIPMENT/TAG NUMBER(S) \_\_\_\_\_

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) \_\_\_\_\_

5. NAMEPLATE DATA (hp, voltage, speed, etc.) \_\_\_\_\_

6. MANUFACTURER'S LOCAL REPRESENTATIVE \_\_\_\_\_

a. Name \_\_\_\_\_ Telephone No. \_\_\_\_\_

b. Address \_\_\_\_\_

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	“Or-equal”
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

**SECTION 01 88 15  
ANCHORAGE AND BRACING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This section covers requirements for anchorage and bracing of equipment, distribution systems, and other nonstructural components required in accordance with the Florida Building Code 7<sup>th</sup> Edition (2020), for wind, gravity, soil, and operational loads.

**1.02 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Concrete Institute 318-14 (ACI): Building Code requirements for Structural Concrete.
  2. American Institute of Steel Construction (AISC) 360, Specification for Structural Steel Buildings.
  3. American Society of Civil Engineers (ASCE): ASCE 7, Minimum Design Loads for Buildings and Other Structures.
  4. Design Criteria noted on General Structural Notes.
  5. Florida Building Code 7<sup>th</sup> Edition (2020).
  6. International Code Council (ICC): International Building Code (IBC).

**1.03 DEFINITIONS**

- A. Authority Having Jurisdiction (AHJ): Permitting building agency; may be a federal, state, local, or other regional department, or individual including building official, fire chief, fire marshal, chief of a fire prevention bureau, labor department, or health department, electrical inspector; or others having statutory authority. AHJ may be Owner when authorized to be self-permitting by governmental permitting agency or when no governmental agency has authority.

**1.04 DESIGN AND PERFORMANCE REQUIREMENTS**

- A. General:
1. Anchorage and bracing systems shall be designed by a qualified professional engineer registered in the State of Florida.

2. Design anchorage into concrete including embedment in accordance with ACI 318-14; Chapter 17 (or other industry standard approved by Engineer), and Project Specifications.
  - a. Unless otherwise noted, design for cracked concrete condition.
3. Design anchorage and bracing of architectural, mechanical, and electrical components and systems in accordance with this section, unless a design is specifically provided within Contract Documents or where exempted hereinafter.
4. Design attachments, braces, and anchors for equipment, components, and distribution systems to structure for gravity, wind, and operational loading.
5. Anchor and brace piping and ductwork, whether exempt or not exempt for this section, so that lateral or vertical displacement does not result in damage or failure to essential architectural, mechanical, or electrical equipment.
6. Architectural Components: Includes, but are not limited to, nonstructural walls and elements, partitions, cladding and veneer, access flooring, signs, cabinets, suspended ceilings, and glass in glazed curtain walls and partitions.
7. Provide supplementary framing where required to transfer anchorage and bracing loads to structure.
8. Adjust equipment pad sizes or provide additional anchorage confinement reinforcing to provide required anchorage capacities.
9. For components exempted from design requirements of this section, provide bolted, welded, or otherwise positively fastened attachments to supporting structure.

B. Design Loads:

1. Gravity: Design anchorage and bracing for self-weight and superimposed loads on components and equipment.
2. Wind: Design anchorage and bracing for wind criteria provided on General Structural Notes on the Drawings for exposed architectural components and exterior and wind-exposed mechanical and electrical equipment. Alternately, manufacturer certification may be provided for components such as roofing and flashing to verify attachments meet Project-specific design criteria.
3. Operational:
  - a. For loading supplied by equipment manufacturer for IBC required load cases.
  - b. Loads may include equipment vibration, torque, thermal effects, effects of internal contents (weight and sloshing), water hammer, and other load-inducing conditions.
  - c. Locate braces to minimize vibration to or movement of structure.

- d. For vibrating loads, use stainless steel anchors meeting code requirements for anchors with designated capacities for vibratory loading per manufacturer's ICC-ES report.

## 1.05 SUBMITTALS

### A. Action Submittals:

#### 1. Shop Drawings:

- a. List of architectural, mechanical, and electrical equipment requiring Contractor-designed anchorage and bracing, unless specifically exempted.
- b. Manufacturers' engineered hardware product data.
- c. Attachment assemblies' drawings; include connection hardware, braces, and anchors or anchor bolts for nonexempt components, equipment, and systems.
- d. Submittal will be rejected if proposed anchorage method would create excessive stress to supporting member. Revise anchorages and strengthen structural support to eliminate overstressed condition.

### B. Informational Submittals:

- 1. Anchorage and Bracing Calculations: For attachments, braces, and anchorages, include Florida Building Code and Project-specific criteria as noted on General Structural Notes on the Drawings, in addition to manufacturer's specific criteria used for design; sealed by an engineer registered in the State of Florida.
- 2. Manufacturer's hardware installation requirements.

### C. Deferred Submittals: Submit deferred Action Submittals such as Shop Drawings with supporting deferred informational submittals such as calculations no less than 4 weeks in advance of installation of component, equipment or distribution system to be anchored to structure.

## 1.06 SOURCE QUALITY CONTROL

- A. Provide all other specified, regulatory required, or required repair verification inspection and testing that is not listed in Statement of Special Inspections in accordance with Section 01 45 16.13, Contractor Quality Control.
- B. Provide Source Quality Control for welding and hot-dip galvanizing of anchors in accordance with industry standards.

## **PART 2 PRODUCTS**

### **2.01 GENERAL**

- A. Design and construct attachments and supports transferring loads to structure of materials and products suitable for application and in accordance with design criteria shown on the Drawings and nationally recognized standards.
- B. Provide anchor bolts for anchorage of equipment to concrete or masonry in accordance with manufacturer's design requirements. Provide anchor bolts of the size, minimum embedment, and spacing designated in calculations submitted by Contractor and accepted by Engineer.
- C. Provide post-installed concrete and masonry anchors for anchorage of equipment to concrete or masonry in accordance with manufacturer's design requirements. Provide post-installed anchors of the size, minimum embedment, and spacing designated in calculations submitted by Contractor and accepted by Engineer.
- D. Do not use powder-actuated fasteners or sleeve anchors for anchorage where resistance to tension loads is required. Do not use expansion anchors, other than undercut anchors, for nonvibration isolated mechanical equipment rated over 10 horsepower.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Make attachments, bracing, and anchorage in such a manner that component lateral force is transferred to lateral force resisting system of structure through a complete load path.
- B. Provide snubbers in each horizontal direction and vertical restraints for components mounted on vibration isolation systems where required to resist overturning.
- C. Provide piping anchorage that maintains design flexibility and expansion capabilities at flexible connections and expansion joints.
- D. Anchor tall and narrow equipment such as motor control centers and telemetry equipment at base and within 12 inches from top of equipment, unless approved otherwise by Engineer.
- E. Calculations shall limit anchor bolt concrete edge distance to a maximum of 4 inches or as required to provide sufficient anchor bolt capacity to resist the applied loads.



3.02 INSTALLATION

- A. Do not install components or their anchorages or restraints prior to review and acceptance by Engineer and AHJ.

3.03 FIELD QUALITY ASSURANCE AND QUALITY CONTROL

- A. Provide any other specified, regulatory required, or required repair verification inspection and testing that is not listed in Statement of Special Inspections in accordance with Section 01 45 16.13, Contractor Quality Control.

**END OF SECTION**



**SECTION 01 91 14  
EQUIPMENT TESTING AND FACILITY STARTUP**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Facility: Entire Project, or an agreed-upon portion, including all of its unit processes.
- B. Functional Test: Test or tests in presence of Engineer and Owner to demonstrate that installed equipment meets manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.
- C. Performance Test: Test or tests performed after any required functional test in presence of Engineer and Owner to demonstrate and confirm individual equipment meets performance requirements specified in individual sections.
- D. Unit Process: As used in this section, a unit process is a portion of the facility that performs a specific process function, such as a pump station.
- E. Facility Performance Demonstration:
  - 1. A demonstration, conducted by Contractor, with assistance of Owner, to demonstrate and document the performance of the entire operating facility, both manually and automatically (if required), based on criteria developed in conjunction with Owner and as accepted by Engineer.
  - 2. Such demonstration is for the purposes of (i) verifying to Owner entire facility performs as a whole, and (ii) documenting performance characteristics of completed facility for Owner's records. Neither the demonstration nor the evaluation is intended in any way to make performance of a unit process or entire facility the responsibility of Contractor, unless such performance is otherwise specified.

1.02 SUBMITTALS

- A. Informational Submittals:
  - 1. Facility Startup and Performance Demonstration Plan.
  - 2. Functional and performance test results.
  - 3. Completed Unit Process Startup Form for each unit process.
  - 4. Completed Facility Performance Demonstration/Certification Form.

1.03 FACILITY STARTUP AND PERFORMANCE DEMONSTRATION PLAN

- A. Develop a written plan, in conjunction with Owner's operations personnel; to include the following:
  - 1. Step-by-step instructions for startup of each unit process and the complete facility.
  - 2. Unit Process Startup Form (sample attached), to minimally include the following:
    - a. Description of the unit process, including equipment numbers/nomenclature of each item of equipment and all included devices.
    - b. Detailed procedure for startup of the unit process, including valves to be opened/closed, order of equipment startup, etc.
    - c. Startup requirements for each unit process, including water, power, chemicals, etc.
    - d. Space for evaluation comments.
  - 3. Facility Performance Demonstration/Certification Form (sample attached), to minimally include the following:
    - a. Description of unit processes included in the facility startup.
    - b. Sequence of unit process startup to achieve facility startup.
    - c. Description of computerized operations, if any, included in the facility.
    - d. Contractor certification facility is capable of performing its intended function(s), including fully automatic operation.
    - e. Signature spaces for Contractor and Engineer.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Facility Startup Meetings: Schedule, in accordance with requirements of Section 01 31 19, Project Meetings, to discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Owner involvement.
- B. Contractor's Testing and Startup Representative:
  - 1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
  - 2. Representative(s) shall be present during startup meetings and shall be available at all times during testing and startup.

- C. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for testing and startup.
- D. Provide Subcontractor and equipment manufacturers' staff adequate to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.
- E. Owner will:
  - 1. Provide water, power, chemicals, and other items as required for startup, unless otherwise indicated.
  - 2. Operate process units and facility with support of Contractor.

### 3.02 EQUIPMENT TESTING

- A. Preparation:
  - 1. Complete installation before testing.
  - 2. Furnish qualified manufacturers' representatives, when required by individual Specification sections.
  - 3. Obtain and submit from equipment manufacturer's representative Manufacturer's Certificate of Proper Installation Form, in accordance with Section 01 43 33, Manufacturers' Field Services, when required by individual Specification sections.
  - 4. Equipment Test Report Form: Provide written test report for each item of equipment to be tested, to include the minimum information:
    - a. Owner/Project Name.
    - b. Equipment or item tested.
    - c. Date and time of test.
    - d. Type of test performed (Functional or Performance).
    - e. Test method.
    - f. Test conditions.
    - g. Test results.
    - h. Signature spaces for Contractor and Engineer as witness.
  - 5. Cleaning and Checking: Prior to beginning functional testing:
    - a. Calibrate testing equipment in accordance with manufacturer's instructions.
    - b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
    - c. Lubricate equipment in accordance with manufacturer's instructions.
    - d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.
    - e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.

- f. Check power supply to electric-powered equipment for correct voltage.
  - g. Adjust clearances and torque.
  - h. Test piping for leaks.
6. Ready-to-test determination will be by Engineer based at least on the following:
- a. Acceptable Operation and Maintenance Data.
  - b. Notification by Contractor of equipment readiness for testing.
  - c. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.
  - d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested.
  - e. Availability and acceptability of manufacturer's representative, when specified, to assist in testing of respective equipment.
  - f. Satisfactory fulfillment of other specified manufacturer's responsibilities.
  - g. Equipment and electrical tagging complete.
  - h. Delivery of all spare parts and special tools.

B. Functional Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Owner and Engineer in writing at least 10 days prior to scheduled date of testing.
3. Prepare Equipment Test Report summarizing test method and results.
4. When, in Engineer's opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Engineer/Owner's signature as witness on Equipment Test Report.

C. Performance Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Engineer and Owner in writing at least 10 days prior to scheduled date of test.
3. Performance testing shall not commence until equipment has been accepted by Engineer as having satisfied functional test requirements specified.
4. Type of fluid, gas, or solid for testing shall be as specified.
5. Unless otherwise indicated, furnish labor, materials, and supplies for conducting the test and taking samples and performance measurements.
6. Prepare Equipment Test Report summarizing test method and results.
7. When, in Engineer's opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by Engineer's signature on Equipment Test Report.

### 3.03 STARTUP OF UNIT PROCESSES

- A. Prior to unit process startup, equipment within unit process shall be accepted by Engineer as having met functional and performance testing requirements specified.
- B. Make adjustments, repairs, and corrections necessary to complete unit process startup.
- C. Startup shall be considered complete when, in opinion of Engineer, unit process has operated in manner intended for 5 continuous days without significant interruption. This period is in addition to functional or performance test periods specified elsewhere.
- D. Significant Interruption: May include any of the following events:
  - 1. Failure of Contractor to provide and maintain qualified onsite startup personnel as scheduled.
  - 2. Failure to meet specified functional operation.
  - 3. Failure of any critical equipment or unit process that is not satisfactorily corrected within 5 hours after failure.
  - 4. Failure of any noncritical equipment or unit process that is not satisfactorily corrected within 8 hours after failure.
  - 5. As determined by Engineer.
- E. A significant interruption will require startup then in progress to be stopped. After corrections are made, startup test period to start from beginning again.

### 3.04 FACILITY PERFORMANCE DEMONSTRATION

- A. When, in the opinion of Engineer, startup of all unit processes has been achieved, sequence each unit process to the point that facility is operational.
- B. Demonstrate proper operation of required interfaces within and between individual unit processes.
- C. After facility is operating, complete performance testing of equipment and systems not previously tested.
- D. Document, as defined in Facility Startup and Performance Demonstration Plan, the performance of the facility including its computer system, until all unit processes are operable and under control of computer system.
- E. Certify, on the Facility Performance Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic and computerized operation.

3.05 SUPPLEMENTS

- A. Supplements listed below, following “End of Section,” are a part of this Specification:
1. Unit Process Startup Form.
  2. Facility Performance Demonstration/Certification Form.

**END OF SECTION**



**UNIT PROCESS STARTUP FORM**

**OWNER:** \_\_\_\_\_ **PROJECT:** \_\_\_\_\_

**Unit Process Description: (Include description and equipment number of all equipment and devices):**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Startup Procedure (Describe procedure for sequential startup and evaluation, including valves to be opened/closed, order of equipment startup, etc.):**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Startup Requirements (Water, power, chemicals, etc.):** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Evaluation Comments:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM**

**OWNER:** \_\_\_\_\_ **PROJECT:** \_\_\_\_\_

**Unit Processes Description (List unit processes involved in facility startup):**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Unit Processes Startup Sequence (Describe sequence for startup, including computerized operations, if any):**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Contractor Certification that Facility is capable of performing its intended function(s), including fully automatic operation:**

**Contractor:** \_\_\_\_\_ **Date:** \_\_\_\_\_, 20\_\_

**Engineer:** \_\_\_\_\_ **Date:** \_\_\_\_\_, 20\_\_  
(Authorized Signature)



**SECTION 26 05 02**  
**BASIC ELECTRICAL REQUIREMENTS**

**PART 1 GENERAL**

1.01 RELATED SECTIONS

- A. Requirements specified within this section apply to Division 26, Electrical. Work specified herein shall be performed as if specified in the individual sections.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
  - 1. National Electrical Contractors Association (NECA): National Electrical Installation Standards.
  - 2. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
    - b. Z535.4, Product Safety Signs and Labels.
  - 3. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
  - 4. UL.

1.03 ELECTRIC SERVICE DIVISION OF RESPONSIBILITY

- A. The facility does not currently have a metered power supply. The contractor is responsible for connecting to the existing overhead powerline and installing a new power supply connecting including but not limited to a pole mounted transformer, meter, disconnect and associated service cables.
- B. The existing overhead power is 240/480V, three phase, four wire open delta system.

1.04 SPECIAL PROJECT REQUIREMENTS

- A. The project consists of electrical work to power the new pump station. The scope of work to be performed by the Contractor includes, but is not limited to the following items:
  - 1. Installation of new pumps and control cables to new wet well.

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2. Provide new NEMA 4X TJB to be located as shown on electrical drawing. Pump manufacturer supplied cables will be terminated at the new TJB. Provide new conduits for manufacturer supplied cables from new wet well to the new TJB.
3. Provide conduits and conductors for power and control between new TJB and new control panel.
4. New pump control panel, terminal junction box, Panhandle Alarm and conduit and wire between electrical equipment on the rack.

### 1.05 QUALITY ASSURANCE

- A. Provide the Work in accordance with NFPA 70. Where required by Authority Having Jurisdiction (AHJ), material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ, in order to provide a basis for approval under the NEC.

### 1.06 ENVIRONMENTAL CONDITIONS

- A. The following areas are classified hazardous Class I, Division 1, Group D, due to the potential for occurrence of hazardous concentrations of combustible gases, and for exposure to corrosive environment. Use materials and methods required for such areas.
  1. Inside wet well containing wastewater.
  2. Three feet envelope around wet well vent.
- B. The following areas are classified hazardous, Class I, Division 2, Group D, due to the potential for accumulation of hazardous concentrations of combustible gases, and for exposure to corrosive environment. Use materials and methods required for such areas.
  1. Envelope between three feet and five feet from wet well vent pipe opening.
  2. Envelope eighteen inches above and three feet form hatch wet well hatch opening.
- C. The following areas are classified nonhazardous and wet. Use materials and methods required for such areas.
  1. Outdoor above grade areas not covered above.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. 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.
- B. Materials and equipment installed outdoors shall be capable of continuous operation at their specified rating within the ambient temperature range of 15 degrees F to 104 degrees F.

2.02 EQUIPMENT FINISH

- A. Manufacturer's standard finish color, except where specific color is indicated. If manufacturer has no standard color, finish equipment in accordance with, light gray color finish as approved by Engineer.

2.03 NAMEPLATES

- A. Material: Laminated plastic.
- B. Attachment Screws: Stainless steel.
- C. Color: White, engraved to a black core.
- D. Letter Height:
  - 1. Pushbuttons/Selector Switches: 1/8 inch.
  - 2. Other electrical equipment: 1/4 inch.

2.04 SIGNS AND LABELS

- A. Sign size, lettering, and color shall be in accordance with NEMA Z535.4.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned. Contractor shall be responsible for actual location of equipment and devices and for proper routing and support of raceways, subject to approval of Engineer.

- B. Check approximate locations of equipment and other electrical system components shown on the Drawings for conflicts with openings, structural members, and components of other systems and equipment having fixed locations. In the event of conflicts, notify Engineer in writing.
- C. Install work in accordance with NECA Standard of Installation, unless otherwise specified.
- D. Keep openings in boxes and equipment closed during construction.
- E. Lay out work carefully in advance. Do not cut or notch the wet well or equipment slabs without specific approval of Engineer. Carefully perform cutting, channeling, chasing, or drilling of floors, walls, partitions, 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 to original condition.

### 3.02 COMBINING CIRCUITS INTO COMMON RACEWAY

- A. Drawings show each homerun circuit to be provided. Do not combine power or control circuits into common raceways without authorization of Engineer.

### 3.03 NAMEPLATES, SIGNS, AND LABELS

- A. Arc Flash Protection Warning Signs:
  - 1. Field mark Service disconnect and pump control panel to warn qualified persons of potential arc-flash hazards. Locate marking so to be clearly visible to persons before working on energized equipment.
  - 2. Use arc flash hazard boundary, energy level, PPE level and description, shock hazard, bolted fault current, and equipment name from study required in Section 26 05 70, Electrical Systems Analysis as basis for warning signs.
- B. Equipment Nameplates: Provide a nameplate to label electrical equipment including motor starters panels, transformers, terminal junction boxes, disconnect switches, switches and control stations.



3.04 CLEANING AND TOUCHUP PAINTING

- A. Cleaning: Throughout the Work, clean interior and exterior of devices and equipment by removing debris and vacuuming.
- B. Touchup Paint:
  - 1. Touchup scratches, scrapes and chips on exterior and interior surfaces of devices and equipment with finish matching type, color, and consistency and type of surface of original finish.
  - 2. If extensive damage is done to equipment paint surfaces, refinish entire equipment in a manner that provides a finish equal to or better than factory finish, that meets requirements of Specification, and is acceptable to Engineer.

3.05 PROTECTION FOLLOWING INSTALLATION

- A. Protect materials and equipment from corrosion, physical damage, and effects of moisture on insulation and contact surfaces.
- B. When equipment intended for indoor installation is installed at Contractor's convenience in areas where subject to dampness, moisture, dirt or other adverse atmosphere until completion of construction, ensure adequate protection from these atmospheres is provided and acceptable to Engineer.

**END OF SECTION**



**SECTION 26 05 04**  
**BASIC ELECTRICAL MATERIALS AND METHODS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
    - a. A1011/A1011M, Standard Specification for Steel, Sheet, and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low Alloy and High-Strength Low Alloy Formability.
    - b. E814, Method of Fire Tests of Through-Penetration Fire Stops.
  2. Canadian Standards Association (CSA).
  3. Institute of Electrical and Electronics Engineers, Inc. (IEEE): 18, Standard for Shunt Power Capacitors.
  4. International Society of Automation (ISA): RP12.06.01, Wiring Practices for Hazardous (Classified) Locations Instrumentation–Part 1: Intrinsic Safety.
  5. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
    - b. C12.1, Code for Electricity Metering.
    - c. C12.6, Phase-Shifting Devices Used in Metering, Marking and Arrangement of Terminals.
    - d. ICS 2, Industrial Control and Systems: Controllers, Contactors, and Overload Relays Rated 600 Volts.
    - e. ICS 5, Industrial Control and Systems: Control Circuit and Pilot Devices.
    - f. KS 1, Enclosed and Miscellaneous Distribution Switches (600 Volts Maximum).
  6. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
  7. UL:
    - a. 98, Standard for Enclosed and Dead-Front Switches.
    - b. 248, Standard for Low Voltage Fuses.
    - c. 486E, Standard for Equipment Wiring Terminals for use with Aluminum and/or Copper Conductors.
    - d. 489, Standard for Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures.
    - e. 508, Standard for Industrial Control Equipment.
    - f. 810, Standard for Capacitors.
    - g. 943, Standard for Ground-Fault Circuit-Interrupters.
    - h. 1059, Standard for Terminal Blocks.
    - i. 1479, Fire Tests of Through-Penetration Fire Stops.

## **PART 2 PRODUCTS**

### **2.01 MOLDED CASE CIRCUIT BREAKER THERMAL MAGNETIC, LOW VOLTAGE**

#### **A. General:**

1. Type: Molded case.
2. Trip Ratings: 15 amps to 800 amps.
3. Voltage Ratings: 120, 240, 277, 480, and 600V ac.
4. Suitable for mounting and operating in any position.
5. UL 489.

#### **B. Operating Mechanism:**

1. Overcenter, trip-free, toggle type handle.
2. Quick-make, quick-break action.
3. Locking provisions for padlocking breaker in OPEN position.
4. ON/OFF and TRIPPED indicating positions of operating handle.
5. Operating handle to assume a CENTER position when tripped.

#### **C. Trip Mechanism:**

1. Individual permanent thermal and magnetic trip elements in each pole.
2. Variable magnetic trip elements with a single continuous adjustment 3X to 10X for frames greater than 100 amps.
3. Two and three pole, common trip.
4. Automatically opens all poles when overcurrent occurs on one pole.
5. Test button on cover.
6. Calibrated for 40 degrees C ambient, unless shown otherwise.
7. Do not provide single-pole circuit breakers with handle ties where multi-pole circuit breakers are shown.

#### **D. Short Circuit Interrupting Ratings:**

1. Equal to, or greater than, available fault current.
2. Not less than the following rms symmetrical currents for the indicated trip ratings: 250V ac to 600V ac; 22,000 amps.
3. Series Connected Ratings: Do not apply series connected short circuit ratings.

#### **E. Magnetic Only Type Breakers: Where shown; instantaneous trip adjustment which simultaneously sets magnetic trip level of each individual pole continuously through a 3X to 10X trip range.**

F. Connections:

1. Supply (line side) at either end.
2. Mechanical wire lugs, except crimp compression lugs where shown.
3. Lugs removable/replaceable for breaker frames greater than 100 amperes.
4. Suitable for 75 degrees C rated conductors without derating breaker or conductor ampacity.

G. Enclosures for Independent Mounting:

1. See Article Enclosures.
2. Service Entrance Use: Breakers in required enclosure and required accessories shall be UL 489 listed.
3. Interlock: Enclosure and switch shall interlock to prevent opening cover with switch in the ON position. Provide bypass feature for use by qualified personnel.

2.02 SUPPORT AND FRAMING CHANNELS

A. Stainless Steel Framing Channel: Rolled, Type 316 stainless steel, 12-gauge minimum.

B. Extruded Aluminum Framing Channel:

1. Material: Extruded from Type 6063-T6 aluminum alloy.
2. Fittings fabricated from Alloy 5052-H32.

C. Manufacturers:

1. B-Line Systems, Inc.
2. Unistrut Corp.
3. Aickinstrut.

2.03 ENCLOSURES

A. Finish: Sheet metal structural and enclosure parts shall be completely painted using an electrodeposition process so interior and exterior surfaces as well as bolted structural joints have a complete finish coat on and between them.

B. Color: Manufacturer's standard color (gray) baked-on enamel, unless otherwise shown.

C. Barriers: Provide metal barriers within enclosures to separate wiring of different systems and voltage.

D. Enclosure Selections:

1. Except as shown otherwise, provide electrical enclosures according to the following table:

<b>Enclosures</b>			
<b>Location</b>	<b>Finish</b>	<b>Environment</b>	<b>NEMA 250 Type</b>
Indoor and Outdoor	Any	Wet and Corrosive	4X 316 Stainless Steel

**PART 3 EXECUTION**

3.01 GENERAL

- A. Install equipment in accordance with manufacturer's recommendations.

3.02 SUPPORT AND FRAMING CHANNEL

- A. Install where required for mounting and supporting electrical equipment, raceway, and cable tray systems.
- B. Channel Type:
  1. Outdoor wet or Corrosive Locations:
    - a. Aluminum Raceway: Aluminum or Type 316 stainless steel.
    - b. PVC-Coated Conduit and Other Systems Not Covered: Type 316 stainless steel, or Aluminum.
  2. Aluminum Railings: Devices mounted on aluminum railing shall use aluminum framing channel.
- C. Paint cut ends prior to installation with the following:
  1. PVC-Coated Channel: PVC patch.

**END OF SECTION**

**SECTION 26 05 05  
CONDUCTORS**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. Association of Edison Illuminating Companies (AEIC): CS 8, Specification for Extruded Dielectric Shielded Power Cables Rated 5 kV through 46 kV.
  2. ASTM International (ASTM):
    - a. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
    - b. B3, Standard Specification for Soft or Annealed Copper Wire.
    - c. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.
    - d. B496, Standard Specification for Compact Round Concentric-Lay-Stranded Copper Conductors.
  3. Insulated Cable Engineer's Association, Inc. (ICEA):
    - a. S-58-679, Standard for Control Cable Conductor Identification.
    - b. S-73-532, Standard for Control Thermocouple Extensions and Instrumentation Cables.
  4. National Electrical Manufacturers' Association (NEMA):
    - a. CC 1, Electric Power Connectors for Substations.
    - b. WC 57, Standard for Control, Thermocouple Extension, and Instrumentation Cables.
    - c. WC 70, Standard for Power Cables Rated 2,000 Volts or Less for the Distribution of Electrical Energy.
  5. National Fire Protection Association (NFPA):
    - a. 70, National Electrical Code (NEC).
    - b. 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.
  6. UL:
    - a. 13, Standard for Safety for Power-Limited Circuit Cables.
    - b. 44, Standard for Safety for Thermoset-Insulated Wires and Cables.
    - c. 62, Standard for Safety for Flexible Cord and Cables.
    - d. 486A-486B, Standard for Safety for Wire Connectors.

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- e. 486C, Standard for Safety for Splicing Wire Connectors.
- f. 510, Standard for Safety for Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape.
- g. 854, Standard for Safety for Service-Entrance Cables.
- h. 1581, Standard for Safety for Reference Standard for Electrical Wires, Cables, and Flexible Cords.

### 1.02 SUBMITTALS

#### A. Action Submittals:

- 1. Product Data:
  - a. Wire and cable.
  - b. Wire and cable accessories.

#### B. Informational Submittals: Certified Factory Test Report for conductors 600 volts and below.

### 1.03 QUALITY ASSURANCE

#### A. Authority Having Jurisdiction (AHJ):

- 1. Provide the Work in accordance with NFPA 70. Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
- 2. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.

## **PART 2 PRODUCTS**

### 2.01 CONDUCTORS 600 VOLTS AND BELOW

- A. Conform to applicable requirements of NEMA WC 70.
- B. Conductor Type: Stranded copper.
- C. Insulation: Type THHN/THWN-2, except for sizes No. 6 and larger, with XHHW-2 insulation.



D. Flexible Cords and Cables:

1. Type SOW-A/50 with ethylene propylene rubber insulation in accordance with UL 62.
2. Conform to physical and minimum thickness requirements of NEMA WC 70.

2.02 600-VOLT RATED CABLE

A. General:

1. Type TC, meeting requirements of UL 1277, including Vertical Tray Flame Test at 70,000 Btu per hour, and NFPA 70, Article 340, or UL 13 meeting requirements of NFPA 70, Article 725.
2. Permanently and legibly marked with manufacturer's name, maximum working voltage for which cable was tested, type of cable, and UL listing mark.
3. Suitable for installation in open air, in cable trays, or conduit.
4. Minimum Temperature Rating: 90 degrees C dry locations, 75 degrees C wet locations.
5. Overall Outer Jacket: PVC, flame-retardant, sunlight- and oil-resistant.

B. Type 3, 16 AWG, Twisted, Shielded Pair, Instrumentation Cable: Single pair, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 57 requirements.

1. Outer Jacket: 45-mil nominal thickness.
2. Individual Pair Shield: 1.35-mil, double-faced aluminum/synthetic polymer overlapped to provide 100 percent coverage.
3. Dimension: 0.31-inch nominal OD.
4. Conductors:
  - a. Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8.
  - b. 20 AWG, seven-strand tinned copper drain wire.
  - c. Insulation: 15-mil nominal PVC.
  - d. Jacket: 4-mil nominal nylon.
  - e. Color Code: Pair conductors, black and red.
5. Manufacturers:
  - a. Okonite Co.
  - b. Alpha Wire Corp.
  - c. Belden.

2.03 GROUNDING CONDUCTORS

- A. Equipment: Stranded copper with green, Type USE/RHH/RHW-XLPE or THHN/THWN, insulation.
- B. Direct Buried: Bare stranded copper.

2.04 ACCESSORIES FOR CONDUCTORS 600 VOLTS AND BELOW

- A. Tape:
  - 1. General Purpose, Flame Retardant: 7-mil, vinyl plastic, Scotch Brand 33+, rated for 90 degrees C minimum, meeting requirements of UL 510.
  - 2. Flame Retardant, Cold and Weather Resistant: 8.5-mil, vinyl plastic, Scotch Brand 88.
  - 3. Arc and Fireproofing:
    - a. 30-mil, elastomer.
    - b. Manufacturers and Products:
      - 1) 3M; Scotch Brand 77, with Scotch Brand 69 glass cloth tapebinder.
      - 2) Plymouth; 53 Plyarc, with 77 Plyglas glass cloth tapebinder.
- B. Identification Devices:
  - 1. Sleeve:
    - a. Permanent, PVC, yellow or white, with legible machine-printed black markings.
    - b. Manufacturers and Products:
      - 1) Raychem; Type D-SCE or ZH-SCE.
      - 2) Brady, Type 3PS.
  - 2. Heat Bond Marker:
    - a. Transparent thermoplastic heat bonding film with acrylic pressure sensitive adhesive.
    - b. Self-laminating protective shield over text.
    - c. Machine printed black text.
    - d. Manufacturer and Product: 3M Co.; Type SCS-HB.
  - 3. Marker Plate: Nylon, with legible designations permanently hot stamped on plate.
  - 4. Tie-On Cable Marker Tags:
    - a. Chemical-resistant white tag.
    - b. Size: 1/2 inch by 2 inches.
    - c. Manufacturer and Product: Raychem; Type CM-SCE.
  - 5. Grounding Conductor: Permanent green heat-shrink sleeve, 2-inch minimum.

C. Connectors and Terminations:

1. Nylon, Self-Insulated Crimp Connectors:
  - a. Manufacturers and Products:
    - 1) Thomas & Betts; Sta-Kon.
    - 2) Burndy; Insulug.
    - 3) ILSCO.
2. Nylon, Self-Insulated, Crimp Locking-Fork, Torque-Type Terminator:
  - a. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
  - b. Seamless.
  - c. Manufacturers and Products:
    - 1) Thomas & Betts; Sta-Kon.
    - 2) Burndy; Insulink.
    - 3) ILSCO; ILSCONS.
3. Self-Insulated, Freespring Wire Connector (Wire Nuts):
  - a. UL 486C.
  - b. Plated steel, square wire springs.
  - c. Manufacturers and Products:
    - 1) Thomas & Betts.
    - 2) Ideal; Twister.
4. Self-Insulated, Set Screw Wire Connector:
  - a. Two piece compression type with set screw in brass barrel.
  - b. Insulated by insulator cap screwed over brass barrel.
  - c. Manufacturers:
    - 1) 3M Co.
    - 2) Thomas & Betts.
    - 3) Marrette.

D. Cable Lugs:

1. In accordance with NEMA CC 1.
2. Rated 600 volts of same material as conductor metal.
3. Uninsulated Crimp Connectors and Terminators:
  - a. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
  - b. Manufacturers and Products:
    - 1) Thomas & Betts; Color-Keyed.
    - 2) Burndy; Hydent.
    - 3) ILSCO.
4. Uninsulated, Bolted, Two-Way Connectors and Terminators:
  - a. Manufacturers and Products:
    - 1) Thomas & Betts; Locktite.
    - 2) Burndy; Quiklug.
    - 3) ILSCO.

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### E. Cable Ties:

1. Nylon, adjustable, self-locking, and reusable.
2. Manufacturer and Product: Thomas & Betts; TY-RAP.

### F. Heat Shrinkable Insulation:

1. Thermally stabilized cross-linked polyolefin.
2. Single wall for insulation and strain relief.
3. Dual Wall, adhesive sealant lined, for sealing and corrosion resistance.
4. Manufacturers and Products:
  - a. Thomas & Betts; SHRINK-KON.
  - b. Raychem; RNF-100 and ES-2000.

## 2.05 PULLING COMPOUND

- A. Nontoxic, noncorrosive, noncombustible, nonflammable, water-based lubricant; UL listed.
- B. Suitable for rubber, neoprene, PVC, polyethylene, hypalon, CPE, and lead-covered wire and cable.
- C. Approved for intended use by cable manufacturer.
- D. Suitable for zinc-coated steel, aluminum, PVC, bituminized fiber, and fiberglass raceways.
- E. Manufacturers:
  1. Ideal Co.
  2. Polywater, Inc.
  3. Cable Grip Co.

## 2.06 WARNING TAPE

- A. As specified in Section 26 05 33, Raceway and Boxes.

## 2.07 SOURCE QUALITY CONTROL

- A. Conductors 600 Volts and Below: Test in accordance with UL 44 and UL 854.

## **PART 3 EXECUTION**

### 3.01 GENERAL

- A. Conductor installation shall be in accordance with manufacturer's recommendations.

- B. Conductor and cable sizing shown is based on copper conductors, unless noted otherwise.
- C. Do not exceed cable manufacturer’s recommendations for maximum pulling tensions and minimum bending radii.
- D. Terminate conductors and cables, unless otherwise indicated.
- E. Tighten screws and terminal bolts in accordance with UL 486A-486B for copper conductors.
- F. Cable Lugs: Provide with correct number of holes, bolt size, and center-to-center spacing as required by equipment terminals.
- G. Bundling: Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not wrapped together by some other means, bundle conductors from each conduit throughout their exposed length with cable ties placed at intervals not exceeding 18 inches on center.
- H. Ream, remove burrs, and clear interior of installed conduit before pulling wires or cables.
- I. Concrete-Encased Raceway Installation: Prior to installation of conductors, pull through each raceway a mandrel approximately 1/4 inch smaller than raceway inside diameter.

3.02 POWER CONDUCTOR COLOR CODING

- A. Conductors 600 Volts and Below:
  - 1. 6 AWG and Larger: Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering area 1-1/2 inches to 2 inches wide.
  - 2. 8 AWG and Smaller: Provide colored conductors.
  - 3. Colors:

<b>System</b>	<b>Conductor</b>	<b>Color</b>
All Systems	Equipment Grounding	Green
480Y/277 Volts, Three-Phase, Four-Wire	Grounded Neutral Phase A Phase B Phase C	White Brown Orange Yellow
Note: Phase A, B, C implies direction of positive phase rotation.		

4. Tracer: Outer covering of white with identifiable colored strip, other than green, in accordance with NFPA 70.

### 3.03 CIRCUIT IDENTIFICATION

- A. Identify power, instrumentation, and control conductor circuits at each termination, and in accessible locations such as manholes, handholes, panels, pull boxes, and terminal boxes.
- B. Circuits Not Appearing in Circuit Schedules:
  1. Assign circuit name based on device or equipment at load end of circuit.
  2. Where this would result in same name being assigned to more than one circuit, add number or letter to each otherwise identical circuit name to make it unique.
- C. Method:
  1. Conductors 3 AWG and Smaller: Identify with sleeves or heat bond markers.
  2. Cables and Conductors 2 AWG and Larger:
    - a. Identify with marker plates or tie-on cable marker tags.
    - b. Attach with nylon tie cord.
  3. Taped-on markers or tags relying on adhesives not permitted.

### 3.04 CONDUCTORS 600 VOLTS AND BELOW

- A. Install 10 AWG or 12 AWG conductors for branch circuit power wiring in lighting and receptacle circuits.
- B. Do not splice incoming service conductors and branch power distribution conductors 6 AWG and larger, unless specifically indicated or approved by Engineer.
- C. Connections and Terminations:
  1. Install wire nuts only on solid conductors. Wire nuts are not allowed on stranded conductors.
  2. Install nylon self-insulated crimp connectors and terminators for instrumentation and control, circuit conductors.
  3. Install self-insulated, set screw wire connectors for two-way connection of power circuit conductors 12 AWG and smaller.
  4. Install uninsulated crimp connectors and terminators for instrumentation, control, and power circuit conductors 4 AWG through 2/0 AWG.

5. Install uninsulated, bolted, two-way connectors and terminators for power circuit conductors 3/0 AWG and larger.
  6. Install uninsulated terminators bolted together on motor circuit conductors 10 AWG and larger.
  7. Place no more than one conductor in any single-barrel pressure connection.
  8. Install crimp connectors with tools approved by connector manufacturer.
  9. Install terminals and connectors acceptable for type of material used.
  10. Compression Lugs:
    - a. Attach with a tool specifically designed for purpose. Tool shall provide complete, controlled crimp and shall not release until crimp is complete.
    - b. Do not use plier type crimpers.
- D. Do not use soldered mechanical joints.
- E. Splices and Terminations:
1. Insulate uninsulated connections.
  2. Outdoors, Dry Locations: Use flame retardant, cold- and weather-resistant tape or single wall heat shrink.
  3. Below Grade and Wet or Damp Locations: Use dual wall heat shrink.
- F. Cap spare conductors with UL listed end caps.
- G. Cabinets, Panels, and Motor Control Centers:
1. Remove surplus wire, bridle and secure.
  2. Where conductors pass through openings or over edges in sheet metal, remove burrs, chamfer edges, and install bushings and protective strips of insulating material to protect the conductors.
- H. Control and Instrumentation Wiring:
1. Where terminals provided will accept such lugs, terminate control and instrumentation wiring, except solid thermocouple leads, with insulated, locking-fork compression lugs.
  2. Terminate with methods consistent with terminals provided, and in accordance with terminal manufacturer's instructions.
  3. Locate splices in readily accessible cabinets or junction boxes using terminal strips.

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4. Cable Protection:
  - a. Under Infinite Access Floors: May install without bundling.
  - b. All Other Areas: Install individual wires, pairs, or triads in flex conduit under floor or grouped into bundles at least 1/2 inch in diameter.
  - c. Maintain integrity of shielding of instrumentation cables.
  - d. Ensure grounds do not occur because of damage to jacket over shield.
  
- I. Extra Conductor Length: For conductors to be connected by others, install minimum 6 feet of extra conductor in freestanding panels and minimum 2 feet in other assemblies.

**END OF SECTION**



**SECTION 26 05 26**  
**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
  - 1. Institute of Electrical and Electronics Engineers (IEEE): C2, National Electrical Safety Code (NESC).
  - 2. National Fire Protection Association (NFPA): 70, National Electrical Code. (NEC).

1.02 SUBMITTALS

- A. Action Submittals:
  - 1. Shop Drawings:
    - a. Product data for the following:
      - 1) Exothermic weld connectors.
      - 2) Mechanical connectors.
      - 3) Compression connectors.

1.03 QUALITY ASSURANCE

- A. Authority Having Jurisdiction (AHJ):
  - 1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
  - 2. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.

**PART 2 PRODUCTS**

2.01 GROUND ROD

- A. Material: Copper-clad.
- B. Diameter: Minimum 5/8 inch.
- C. Length: 10 feet.

2.02 GROUND CONDUCTORS

- A. As specified in Section 26 05 05, Conductors.

2.03 CONNECTORS

- A. Exothermic Weld Type:

1. Outdoor Weld: Suitable for exposure to elements or direct burial.
2. Indoor Weld: Utilize low-smoke, low-emission process.
3. Manufacturers:
  - a. Erico Products, Inc.; Cadweld and Cadweld Exolon.
  - b. Thermoweld.

- B. Compression Type:

1. Compress-deforming type; wrought copper extrusion material.
2. Single indentation for conductors 6 AWG and smaller.
3. Double indentation with extended barrel for conductors 4 AWG and larger.
4. Barrels prefilled with oxide-inhibiting and antiseizing compound and sealed.
5. Manufacturers:
  - a. Burndy Corp.; Hyground Irreversible Compression.
  - b. Thomas and Betts Co.
  - c. ILSCO.

- C. Mechanical Type: Split-bolt, saddle, or cone screw type; copper alloy material.

1. Manufacturers:
  - a. Burndy Corp.
  - b. Thomas and Betts Co.

2.04 GROUNDING WELLS

- A. Ground rod box complete with cast iron riser ring and traffic cover marked GROUND ROD.

- B. Manufacturers and Products:

1. Christy Co.; No. G5.
2. Lightning and Grounding Systems, Inc.; I-R Series.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Grounding shall be in compliance with NFPA 70 and IEEE C2.
- B. Ground electrical service neutral at service entrance equipment with grounding electrode conductor to grounding electrode system.
- C. Ground each separately derived system neutral with common grounding electrode conductor to grounding electrode system.
- D. Bond together all grounding electrodes that are present at each building or structure served to form one common grounding electrode system.
- E. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.
- F. Shielded Power Cables: Ground shields at each splice or termination in accordance with recommendations of splice or termination manufacturer.
- G. Shielded Instrumentation Cables:
  - 1. Ground shield to ground bus at power supply for analog signal.
  - 2. Expose shield minimum 1 inch at termination to field instrument and apply heat shrink tube.
  - 3. Do not ground instrumentation cable shield at more than one point.

3.02 WIRE CONNECTIONS

- A. Ground Conductors: Install in conduit containing power conductors and control circuits above 50 volts.
- B. Connect ground conductors to raceway grounding bushings.
- C. Extend and connect ground conductors to ground bus in all equipment containing a ground bus.
- D. Connect enclosure of equipment containing ground bus to that bus.
- E. Bolt connections to equipment ground bus.
- F. Bond grounding conductors to metallic enclosures at each end, and to intermediate metallic enclosures.

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- G. Junction Boxes: Furnish materials and connect to equipment grounding system with grounding clips mounted directly on box, or with 3/8-inch machine screws.
- H. Metallic Equipment Enclosures: Use furnished ground lug; if none furnished, tap equipment housing and install solderless terminal connected to box with machine screw. For circuits greater than 20 amps use minimum 5/16-inch diameter bolt.

### 3.03 GROUND RODS

- A. Install full length with conductor connection at upper end.
- B. Install with connection point below finished grade, unless otherwise shown.
- C. Space multiple ground rods by one rod length.
- D. Install to 8 feet below local frost depth.

### 3.04 GROUNDING WELLS

- A. Install for ground rods located inside buildings, asphalt and paved areas, and where shown on the Drawings.
- B. Install riser ring and cover flush with surface.
- C. Place 6 inches of crushed rock in bottom of each well.

### 3.05 CONNECTIONS

- A. General:
  - 1. Abovegrade Connections: Install exothermic weld, mechanical, or compression-type connectors; or brazing.
  - 2. Belowgrade Connections: Install exothermic weld or compression type connectors.
  - 3. Remove paint, dirt, or other surface coverings at connection points to allow good metal-to-metal contact.
  - 4. Notify Engineer prior to backfilling ground connections.
- B. Exothermic Weld Type:
  - 1. Wire brush or file contact point to bare metal surface.
  - 2. Use welding cartridges and molds in accordance with manufacturer's recommendations.

3. Avoid using badly worn molds.
4. Mold to be completely filled with metal when making welds.
5. After completed welds have cooled, brush slag from weld area and thoroughly clean joint.

C. Compression Type:

1. Install in accordance with connector manufacturer's recommendations.
2. Install connectors of proper size for grounding conductors and ground rods specified.
3. Install using connector manufacturer's compression tool having proper sized dies and operate per manufacturer's instructions.

D. Mechanical Type:

1. Apply homogeneous blend of colloidal copper and rust and corrosion inhibitor before making connection.
2. Install in accordance with connector manufacturer's recommendations.
3. Do not conceal mechanical connections.

**END OF SECTION**



**SECTION 26 05 33  
RACEWAY AND BOXES**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO): HB, Standard Specifications for Highway Bridges.
  2. ASTM International (ASTM):
    - a. A123/123M, Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
    - b. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
    - c. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
    - d. C857, Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
    - e. D149, Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies.
  3. National Electrical Contractor's Association, Inc. (NECA): Installation standards.
  4. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
    - b. C80.1, Electrical Rigid Steel Conduit (ERSC).
    - c. C80.3, Steel Electrical Metallic Tubing (EMT).
    - d. C80.5, Electrical Rigid Aluminum Conduit (ERAC).
    - e. C80.6, Electrical Intermediate Metal Conduit (EIMC).
    - f. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
    - g. TC 2, Electrical Polyvinyl Chloride (PVC) Conduit.
    - h. TC 3, Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.
    - i. TC 6, Polyvinyl Chloride (PVC) Plastic Utilities Duct for Underground Installation.
    - j. TC 14, Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.
    - k. VE 1, Metallic Cable Tray Systems.

5. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
6. UL:
  - a. 1, Standard for Safety for Flexible Metal Conduit.
  - b. 5, Standard for Safety for Surface Metal Raceways and Fittings.
  - c. 6, Standard for Safety for Electrical Rigid Metal Conduit – Steel.
  - d. 6A, Standard for Safety for Electrical Rigid Metal Conduit – Aluminum, Red Brass and Stainless.
  - e. 360, Standard for Safety for Liquid-Tight Flexible Steel Conduit.
  - f. 514B, Standard for Safety for Conduit, Tubing, and Cable Fittings.
  - g. 651, Standard for Safety for Schedule 40 and 80 Rigid PVC Conduit and Fittings.
  - h. 651A, Standard for Safety for Type EB and A Rigid PVC Conduit and HDPE Conduit.
  - i. 797, Standard for Safety for Electrical Metallic Tubing – Steel.
  - j. 870, Standard for Safety for Wireways, Auxiliary Gutters, and Associated Fittings.
  - k. 1242, Standard for Safety for Electrical Intermediate Metal Conduit – Steel.
  - l. 1660, Standard for Safety for Liquid-Tight Flexible Nonmetallic Conduit.
  - m. 1684, Standard for Safety for Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.
  - n. 2024, Standard for Safety for Optical Fiber and Communication Cable Raceway.

## 1.02 SUBMITTALS

### A. Action Submittals:

1. Manufacturer's Literature:
  - a. Rigid aluminum conduit.
  - b. PVC-coated rigid aluminum conduit, submittal to include copy of manufacturer's warranty.
  - c. Flexible metal, liquid-tight conduit.
  - d. Conduit fittings.
  - e. Wireways.
  - f. Device boxes for use in hazardous areas.
  - g. Junction and pull boxes used at or below grade.
  - h. Large junction and pull boxes.
  - i. Terminal junction boxes.
2. Equipment and machinery proposed for bending metal conduit.
3. Method for bending PVC conduit less than 30 degrees.



- B. Informational Submittals: Manufacturer's certification of training for PVC-coated rigid aluminum conduit installer.

1.03 QUALITY ASSURANCE

- A. Authority Having Jurisdiction (AHJ):
  - 1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
  - 2. Materials and equipment manufactured within scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.
- B. PVC-Coated, Rigid Aluminum Conduit Installer: Certified by conduit manufacturer as having received minimum 2 hours of training on installation procedures.

**PART 2 PRODUCTS**

2.01 CONDUIT AND TUBING

- A. Rigid Aluminum Conduit:
  - 1. Meet requirements of NEMA C80.5 and UL 6A.
  - 2. Material: Type 6063, copper-free aluminum alloy.
- B. PVC Schedule 40 Conduit:
  - 1. Meet requirements of NEMA TC 2 and UL 651.
  - 2. UL listed for concrete encasement, underground direct burial, concealed or direct sunlight exposure, and 90 degrees C insulated conductors.
  - 3. Furnish without factory-formed bell.
- C. PVC-Coated Rigid Galvanized Steel Conduit:
  - 1. Meet requirements of NEMA RN 1 and ETL.
  - 2. Material:
    - a. Meet requirements of NEMA C80.1 and UL 6A.
    - b. Exterior Finish: PVC coating, 40-mil nominal thickness; bond to metal shall have tensile strength greater than PVC.
    - c. Interior Finish: Urethane coating, 2-mil nominal thickness.
  - 3. Threads: Hot-dipped galvanized and factory coated with urethane.
  - 4. Bendable without damage to interior or exterior coating.

D. Flexible Metal, Liquid-Tight Conduit:

1. UL 360 listed for 105 degrees C insulated conductors.
2. Material: Galvanized steel with extruded PVC jacket.

2.02 FITTINGS

A. Rigid Galvanized Steel Conduit:

1. General:
  - a. Meet requirements of UL 514B.
  - b. Type: Threaded, galvanized. Set screw and threadless compression fittings not permitted.
2. Bushing:
  - a. Material: Malleable iron with integral insulated throat, rated for 150 degrees C.
  - b. Manufacturer and Product: O-Z/Gedney; Type HB.
3. Grounding Bushing:
  - a. Material: Malleable iron with integral insulated throat rated for 150 degrees, with solderless lugs.
  - b. Manufacturer and Product:
    - 1) Appleton; Series GIB.
    - 2) O-Z/Gedney; Type HBLG.
4. Conduit Hub:
  - a. Material: Malleable iron with insulated throat with bonding screw.
  - b. UL listed for use in wet locations.
  - c. Manufacturers and Products:
    - 1) Appleton, Series HUB-B.
    - 2) O-Z/Gedney; Type CH.
    - 3) Meyers; Series ST.
5. Conduit Bodies:
  - a. Sized as required for NFPA 70.
  - b. Manufacturers and Products (For Normal Conditions):
    - 1) Appleton; Form 35 threaded unilets.
    - 2) Crouse-Hinds; Form 7 or Form 8 threaded condulets.
    - 3) Killark; Series O electrolets.
    - 4) Thomas & Betts; Form 7 or Form 8.
  - c. Manufacturers (For Hazardous Locations):
    - 1) Appleton.
    - 2) Crouse-Hinds.
    - 3) Killark.
6. Couplings: As supplied by conduit manufacturer.
7. Unions:
  - a. Concrete tight, hot-dip galvanized malleable iron.

- b. Manufacturers and Products:
    - 1) Appleton; Series SCC bolt-on coupling or Series EC three-piece union.
    - 2) O-Z/Gedney, Type SSP split coupling or Type 4 Series, three-piece coupling.
  - 8. Conduit Sealing Fitting:
    - a. Manufacturers and Products:
      - 1) Appleton; Type EYF, EYM or ESU.
      - 2) Crouse-Hinds; Type EYS or EZS.
      - 3) Killark; Type EY or Type EYS.
  - 9. Drain Seal:
    - a. Manufacturers and Products:
      - 1) Appleton; Type EYD.
      - 2) Crouse-Hinds; Type EYD or Type EZD.
  - 10. Drain/Breather Fitting:
    - a. Manufacturers and Products:
      - 1) Appleton; Type ECDB.
      - 2) Crouse-Hinds; ECD.
  - 11. Expansion Fitting:
    - a. Manufacturers and Products:
      - 1) Deflection/Expansion Movement:
        - a) Appleton, Type DF.
        - b) Crouse-Hinds; Type XD.
      - 2) Expansion Movement Only:
        - a) Appleton, Type XJ.
        - b) Crouse-Hinds; Type XJ
        - c) Thomas & Betts; XJG-TP.
  - 12. Cable Sealing Fittings:
    - a. To form watertight nonslip cord or cable connection to conduit.
    - b. For Conductors with OD of ½ inch or less; Neoprene bushing at connector entry.
    - c. Manufacturer and Product:
      - 1) Appleton; CG-S.
      - 2) Crouse-Hinds; CGBS.
- B. Rigid Aluminum Conduit:
- 1. General:
    - a. Meet requirements of UL 514B.
    - b. Type: Threaded, copper-free. Set screw fittings not permitted.
  - 2. Insulated Bushing:
    - a. Material: Cast aluminum, with integral insulated throat, rated for 150 degrees C.
    - b. Manufacturer and Product: O-Z/Gedney; Type AB.

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3. Grounding Bushing:
  - a. Material: Cast aluminum with integral insulated throat, rated for 150 degrees, with solderless lugs.
  - b. Manufacturer and Product: O-Z/Gedney; Type ABLG.
4. Conduit Hub:
  - a. Material: Cast aluminum, with insulated throat.
  - b. UL listed for use in wet locations.
  - c. Manufacturers and Products:
    - 1) O-Z/Gedney; Type CHA.
    - 2) Thomas & Betts; Series 370AL.
    - 3) Meyers; Series SA.
5. Conduit Bodies:
  - a. Manufacturers and Products (For Normal Conditions):
    - 1) Appleton; Form 85 threaded unilets.
    - 2) Crouse-Hinds; Mark 9 or Form 7-SA threaded condulets.
    - 3) Killark; Series O electrolets.
  - b. Manufacturers (For Hazardous Locations):
    - 1) Appleton.
    - 2) Crouse-Hinds.
    - 3) Killark.
6. Couplings: As supplied by conduit manufacturer.
7. Conduit Sealing Fitting:
  - a. Manufacturers and Products:
    - 1) Appleton; Type EYF-AL or EYM-AL.
    - 2) Crouse-Hinds; Type EYS-SA or EZS-SA.
    - 3) Killark; Type EY or Type EYS.
8. Drain Seal:
  - a. Manufacturers and Products:
    - 1) Appleton; Type EYDM-A.
    - 2) Crouse-Hinds; Type EYD-SA or Type EZD-SA.
9. Drain/Breather Fitting:
  - a. Manufacturers and Products:
    - 1) Appleton; Type ECDB.
    - 2) Crouse-Hinds; ECD.
10. Expansion Fitting:
  - a. Manufacturers and Products:
    - 1) Deflection/Expansion Movement: Steel City; Type DF-A.
    - 2) Expansion Movement Only: Steel City; Type AF-A.
11. Cable Sealing Fittings:
  - a. To form watertight nonslip cord or cable connection to conduit.
  - b. Bushing: Neoprene at connector entry.
  - c. Manufacturer and Product: Appleton; CG-S.

C. PVC-Coated Rigid Galvanized Steel Conduit:

1. Meet requirements of UL 514B.
2. Fittings: Rigid galvanized steel type, PVC coated by conduit manufacturer.
3. Conduit Bodies: Cast metal hot-dipped galvanized or urethane finish. Cover shall be of same material as conduit body. PVC coated by conduit manufacturer.
4. Finish: 40-mil PVC exterior, 2-mil urethane interior.
5. Overlapping pressure-sealing sleeves.
6. Conduit Hangers, Attachments, and Accessories: PVC-coated.
7. Manufacturers:
  - a. Robroy Industries.
  - b. Ocal.

D. Flexible Metal, Liquid-Tight Conduit:

1. Metal insulated throat connectors with integral nylon or plastic bushing rated for 105 degrees C.
2. Insulated throat and sealing O-rings.
3. Manufacturers and Products:
  - a. Thomas & Betts; Series 5331.
  - b. O-Z/Gedney; Series 4Q.

E. Flexible Coupling, Hazardous Locations:

1. Approved for use in atmosphere involved.
2. Rating: Watertight and UL listed for use in Class I, Division 1 and 2 areas.
3. Outer bronze braid and an insulating liner.
4. Conductivity equal to a similar length of rigid metal conduit.
5. Manufacturers and Products:
  - a. Crouse-Hinds; Type ECGJH or Type ECLK.
  - b. Appleton; EXGJH or EXLK.

F. Watertight Entrance Seal Device:

1. New Construction:
  - a. Material: Oversized sleeve, malleable iron body with sealing ring, pressure ring, grommet seal, and pressure clamp.
  - b. Manufacturer and Product: O-Z/Gedney; Type FSK or Type WSK, as required.
2. Cored-Hole Application:
  - a. Material: Assembled dual pressure disks, neoprene sealing ring, and membrane clamp.
  - b. Manufacturer and Product: O-Z/Gedney; Series CSM.

## 2.03 OUTLET AND DEVICE BOXES

### A. Cast Aluminum:

1. Material:
  - a. Box: Cast, copper-free aluminum.
  - b. Cover: Gasketed, weatherproof, cast copper-free aluminum with stainless steel screws.
2. Hubs: Threaded.
3. Lugs: Cast mounting.
4. Manufacturers and Products, Nonhazardous Locations:
  - a. Crouse-Hinds; Type FS-SA or Type FD-SA.
  - b. Appleton; Type FS or Type FD.
  - c. Killark.
5. Manufacturers and Products, Hazardous Locations:
  - a. Crouse-Hinds; Type GUA-SA.
  - b. Appleton; Type GR.

### B. PVC-Coated Cast Metal:

1. Type: One-piece.
2. Material: Malleable iron, cast ferrous metal, or cast aluminum.
3. Coating:
  - a. Exterior Surfaces: 40-mil PVC.
  - b. Interior Surfaces: 2-mil urethane.
4. Manufacturers:
  - a. Robroy Industries.
  - b. Ocal.

## 2.04 JUNCTION AND PULL BOXES

- A. Outlet Box Used as Junction or Pull Box: As specified under Article Outlet and Device Boxes.
- B. Conduit Bodies Used as Junction Boxes: As specified under Article Fittings.
- C. Large Cast Aluminum Box:
  1. NEMA 250 Type 4 or 9 as required.
  2. Box: Cast copper-free aluminum, with drilled and tapped conduit entrances and exterior mounting lugs.
  3. Cover: Nonhinged.
  4. Gasket: Neoprene.
  5. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
  6. Manufacturers and Products, Surface Mounted Type:
    - a. Crouse-Hinds; Series W-SA.

- b. O-Z/Gedney; Series YS-A, YL-A.
- c. Killark.

D. Large Stainless Steel Box:

- 1. NEMA 250 Type 4X.
- 2. Box: 14-gauge, ASTM A240/A240M, Type 316 stainless steel.
- 3. Cover: Hinged with clamps.
- 4. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
- 5. Manufacturers:
  - a. Hoffman Engineering Co.
  - b. Robroy Industries.
  - c. Wiegman.

E. Concrete Box, Nontraffic Areas:

- 1. Box: Reinforced, cast concrete with extension.
- 2. Cover: Steel diamond plate with locking bolts.
- 3. Cover Marking: ELECTRICAL, TELEPHONE, or as shown.
- 4. Size: 10 inches by 17 inches, minimum.
- 5. Manufacturers and Products:
  - a. Utility Vault Co.; Series 36-1017.
  - b. Christy, Concrete Products, Inc.; N9.
  - c. Quazite; "PG" Style.

F. Concrete Box, Traffic Areas:

- 1. Box: Reinforced, cast concrete with extension and bottom slab.
- 2. Cover: Steel checked plate; H/20 loading with screw down.
- 3. Cover Marking: ELECTRICAL, TELEPHONE, or as shown.
- 4. Manufacturers and Products:
  - a. Christy, Concrete Products, Inc.; B1017BOX.
  - b. Utility Vault Co.; 3030 SB.

2.05 TERMINAL JUNCTION BOX

- A. Cover: Hinged, unless otherwise shown.
- B. Interior Finish: Paint with white enamel or lacquer.
- C. Terminal Blocks:
  - 1. Separate connection point for each conductor entering or leaving box.
  - 2. Spare Terminal Points: 25 percent, minimum.

## 2.06 ACCESSORIES

### A. Identification Devices:

1. Raceway Tags:
  - a. Material: Permanent, polyethylene.
  - b. Shape: Round.
  - c. Raceway Designation: Pressure stamped, embossed, or engraved.
  - d. Tags relying on adhesives or taped-on markers not permitted.
2. Warning Tape:
  - a. Material: Polyethylene, 4-mil gauge with detectable strip.
  - b. Color: Red.
  - c. Width: Minimum 6 inches.
  - d. Designation: Warning on tape that electric circuit is located below tape.
  - e. Identifying Letters: Minimum 1-inch-high permanent black lettering imprinted continuously over entire length.
  - f. Manufacturers and Products:
    - 1) Panduit; Type HTDU.
    - 2) Reef Industries; Terra Tape.
3. Buried Raceway Marker:
  - a. Material: Sheet bronze, consisting of double-ended arrows, straight for straight runs and bent at locations where runs change direction.
  - b. Designation: Engrave to depth of 3/32 inch; ELECTRIC CABLES, in letters 1/4-inch high.
  - c. Minimum Dimension: 1/4 inch thick, 10 inches long, and 3/4 inch high.

### B. Wraparound Duct Band:

1. Material: Heat-shrinkable, cross-linked polyolefin, precoated with hot-melt adhesive.
2. Width: 50 mm minimum.
3. Manufacturer and Product: Raychem; Type TWDB.

## PART 3 EXECUTION

### 3.01 GENERAL

- A. Conduit and tubing sizes shown are based on use of copper conductors. Reference Section 26 05 05, Conductors, concerning conduit sizing for aluminum conductors.
- B. Comply with NECA Installation Standards.



- C. Crushed or deformed raceways not permitted.
- D. Maintain raceway entirely free of obstructions and moisture.
- E. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.
- F. Aluminum Conduit: Do not install in direct contact with concrete. Install in PVC sleeve or cored hole through concrete walls and slabs.
- G. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.
- H. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.
- I. Group raceways installed in same area.
- J. Proximity to Heated Piping: Install raceways minimum 12 inches from parallel runs.
- K. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.
- L. Run exposed raceways parallel or perpendicular to structural members, or intersections of vertical planes.
- M. Install watertight fittings in outdoor, underground, or wet locations.
- N. Metal conduit shall be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.
- O. Do not install raceways in concrete equipment pads, foundations, or beams without Engineer approval.
- P. Horizontal raceways installed under floor slabs shall lie completely under slab, with no part embedded within slab.
- Q. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.
- R. Install conduits for fiber optic cables, telephone cables, and Category 6 data cables in strict conformance with the requirements of TIA 569B.

### 3.02 INSTALLATION IN CAST-IN-PLACE STRUCTURAL CONCRETE

- A. Minimum Cover: 2 inches, including fittings.

- B. Conduit placement shall not require changes in reinforcing steel location or configuration.
- C. Provide nonmetallic support during placement of concrete to ensure raceways remain in position.
- D. Conduit larger than 1 inch shall not be embedded in concrete slabs, walls, foundations, columns, or beams unless approved by Engineer.
- E. Slabs (Requires Engineer Approval):
  - 1. Trade size of conduit not to exceed one-fourth of slab or wall thickness.
  - 2. Install within middle two-fourths of slab or wall.
  - 3. Separate conduit less than 2-inch trade size by a minimum ten times conduit trade size, center-to-center, unless otherwise shown.
  - 4. Separate conduit 2-inch and greater trade size by a minimum eight times conduit trade size, center-to-center, unless otherwise shown.
  - 5. Cross conduit at an angle greater than 45 degrees, with minimum separation of 1 inch.
  - 6. Separate conduit by a minimum six times the outside dimension of expansion/deflection fittings at expansion joints.
  - 7. Conduit shall not be installed below the maximum water surface elevation in walls of water holding structures.

### 3.03 CONDUIT APPLICATION

- A. Diameter: Minimum 3/4 inch.
- B. Exterior, Exposed: Rigid aluminum.
- C. Direct Earth Burial: PVC-coated rigid galvanized steel.
- D. Under Slabs-On-Grade: PVC-coated rigid galvanized steel.
- E. Transition from Underground or Concrete Embedded to Exposed: PVC-coated rigid galvanized steel conduit.
- F. Under Equipment Mounting Pads: PVC-coated rigid galvanized steel conduit.
- G. Hazardous Gas Areas: PVC coated galvanized steel in wet well.

### 3.04 FLEXIBLE CONNECTIONS

- A. For motors, instrumentation, and other locations approved by Engineer where flexible connection is required to minimize vibration:
  - 1. Conduit Size 4 Inches or Less: Flexible, liquid-tight conduit.

2. Wet or Corrosive Areas: Flexible, flexible metal liquid-tight.
  3. Hazardous Areas: Flexible coupling suitable for Class I, Division 1 and 2 areas.
- B. Outdoor Areas, Process Areas Exposed to Moisture, and Areas Required to be Oiltight and Dust-Tight: Flexible metal, liquid-tight conduit.
- C. Flexible Conduit Length: 18 inches minimum, 60 inches maximum; sufficient to allow movement or adjustment of equipment.

### 3.05 PENETRATIONS

- A. Make at right angles, unless otherwise shown.
- B. Apply single layer of wraparound duct band to metallic conduit protruding through concrete floor slabs to a point 2 inches above and 2 inches below concrete surface.
- C. Entering Structures:
1. General: Seal raceway at first box or outlet with oakum or expandable plastic compound to prevent entrance of gases or liquids from one area to another.
  2. Existing or Precast Wall (Underground): Core drill wall and install watertight entrance seal device.

### 3.06 SUPPORT

- A. Support from structural members only, at intervals not exceeding NFPA 70 requirements. Do not exceed 10 feet in any application. Do not support from piping, pipe supports, or other raceways.
- B. Application/Type of Conduit Strap:
1. Aluminum Conduit: Aluminum or stainless steel.
  2. PVC-Coated Rigid Steel Conduit: PVC-coated metal.
- C. Provide and attach wall brackets, strap hangers, or ceiling trapeze as follows:
1. Location/Type of Hardware: Stainless steel.
- D. Support aluminum conduit on concrete surfaces with stainless steel or nonmetallic spacers, or aluminum or nonmetallic framing channel.

### 3.07 BENDS

- A. Install concealed raceways with a minimum of bends in the shortest practical distance.

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- B. Make bends and offsets of longest practical radius. Bends in conduits and ducts being installed for fiber optic cables shall be not less than 20 times cable diameter, 15 inches minimum.
- C. Install with symmetrical bends or cast metal fittings.
- D. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.
- E. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.
- F. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run, and raceways are same size.
- G. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

### 3.08 EXPANSION/DEFLECTION FITTINGS

- A. Provide on raceways at structural expansion joints and in long tangential runs.
- B. Provide expansion/deflection joints for 25 degrees F maximum temperature variation.
- C. Install in accordance with manufacturer's instructions.

### 3.09 PVC CONDUIT

- A. Solvent Welding:
  - 1. Apply manufacturer recommended solvent to joints.
  - 2. Install in order that joint is watertight.
- B. Adapters:
  - 1. PVC to Metallic Fittings: PVC terminal type.
  - 2. PVC to Rigid Metal Conduit or IMC: PVC female adapter.
- C. Belled-End Conduit: Bevel unbelled end of joint prior to joining.

### 3.10 PVC-COATED RIGID STEEL CONDUIT

- A. Install in accordance with manufacturer's instructions.

- B. Tools and equipment used in cutting, bending, threading and installation of PVC-coated rigid conduit shall be designed to limit damage to PVC coating.
- C. Provide PVC boot to cover exposed threading.

### 3.11 TERMINATION AT ENCLOSURES

- A. Cast Metal Enclosure: Install manufacturer's premolded insulating sleeve inside metallic conduit terminating in threaded hubs.
- B. Nonmetallic, Cabinets, and Enclosures:
  - 1. Terminate conduit in threaded conduit hubs, maintaining enclosure integrity.
  - 2. Metallic Conduit: Provide ground terminal for connection to maintain continuity of ground system.
- C. Sheet Metal Boxes, Cabinets, and Enclosures:
  - 1. General:
    - a. Install insulated bushing on ends of conduit where grounding is not required.
    - b. Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.
    - c. Utilize sealing locknuts or threaded hubs on sides and bottom of NEMA 3R and NEMA 12 enclosures.
    - d. Terminate conduits at threaded hubs at the tops of NEMA 3R and NEMA 12 boxes and enclosures.
    - e. Terminate conduits at threaded conduit hubs at NEMA 4 and NEMA 4X boxes and enclosures.
  - 2. Aluminum Conduit:
    - a. Provide one lock nut each on inside and outside of enclosure.
    - b. Install grounding bushing at source enclosure.
    - c. Provide bonding jumper from grounding bushing to equipment ground bus or ground pad.
  - 3. Flexible Metal Conduit: Provide two screw type, insulated, malleable iron connectors.
  - 4. PVC-Coated Rigid Galvanized Steel Conduit: Provide PVC-coated, liquid-tight, connector.
  - 5. PVC Schedule 40 Conduit: Provide PVC terminal adapter with lock nut, except where threaded hubs required above.

### 3.12 UNDERGROUND RACEWAYS

- A. Grade: Maintain minimum grade of 4 inches in 100 feet, either from one manhole, handhole, or pull box to the next, or from a high point between them, depending on surface contour.
- B. Cover: Maintain minimum 2-foot cover above conduit unless otherwise shown.
- C. Make routing changes as necessary to avoid obstructions or conflicts.
- D. Couplings: In multiple conduit runs, stagger so couplings in adjacent runs are not in same transverse line.
- E. Union type fittings not permitted.
- F. Spacers:
  - 1. Provide preformed, nonmetallic spacers designed for such purpose, to secure and separate parallel conduit runs in a trench or concrete encasement.
  - 2. Install at intervals not greater than that specified in NFPA 70 for support of the type conduit used, but in no case greater than 10 feet.
- G. Support conduit so as to prevent bending or displacement during backfilling or concrete placement.
- H. Transition from Underground to Exposed: PVC-coated rigid galvanized steel conduit.
- I. Installation with Other Piping Systems:
  - 1. Crossings: Maintain minimum 12-inch vertical separation.
  - 2. Parallel Runs: Maintain minimum 12-inch separation.
  - 3. Installation over valves or couplings not permitted.
- J. Provide expansion fittings that allow minimum of 4 inches of movement in vertical conduit runs from underground where exposed conduit will be fastened to or will enter building or structure.
- K. Backfill: As specified in Section 31 23 23.15, Trench Backfill.

### 3.13 UNDER SLAB RACEWAYS

- A. Make routing changes as necessary to avoid obstructions or conflicts.

- B. Support raceways so as to prevent bending or displacement during backfilling or concrete placement.
- C. Install raceways with no part embedded within slab and with no interference with slab on grade construction.
- D. Raceway spacing, in a single layer or multiple layers:
  - 1. 3 inches clear between adjacent 2-inch or larger raceway.
  - 2. 2 inches clear between adjacent 1-1/2-inch or smaller raceway.
- E. Multiple Layers of Raceways: Install under slab on grade in trench below backfill zone, as specified in Section 31 23 23.15, Trench Backfill.
- F. Individual Raceways and Single Layer Multiple Raceways: Install at lowest elevation of backfill zone with spacing as specified herein. Where conduits cross at perpendicular orientation, installation of conduits shall not interfere with placement of under slab fill that meets compaction and void limitations of earthwork specifications.
- G. Under slab raceways that emerge from below slab to top of slab as exposed, shall be located to avoid conflicts with structural slab rebar. Coordinate raceway stub ups with location of structural rebar.
- H. Fittings:
  - 1. Union type fittings are not permitted.
  - 2. Provide expansion/deflection fittings in raceway runs that exit building or structure below slab. Locate fittings 18 inches, maximum, beyond exterior wall. Raceway type between building exterior wall to fitting shall be PVC-coated rigid steel.
  - 3. Couplings: In multiple raceway runs, stagger so couplings in adjacent runs are not in same traverse line.

### 3.14 JUNCTION AND PULL BOXES

- A. General:
  - 1. Install plumb and level.
  - 2. Installed boxes shall be accessible.
  - 3. Do not install on finished surfaces.
  - 4. Use outlet boxes as junction and pull boxes wherever possible and allowed by applicable codes.
  - 5. Use conduit bodies as junction and pull boxes where no splices are required and allowed by applicable codes.

6. Install pull boxes where necessary in raceway system to facilitate conductor installation.
  7. Install where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.
  8. Install in conduit runs at least every 150 feet or after the equivalent of three right-angle bends.
- B. Mounting Hardware: Stainless steel.
- C. Supports:
1. Support boxes independently of conduit by attachment to building structure or structural member.
  2. Install bar hangers in frame construction or fasten boxes directly as follows:
    - a. Steelwork: Machine screws.
  3. Threaded studs driven in by powder charge and provided with lock washers and nuts are acceptable in lieu of expansion shields.
  4. Boxes embedded in concrete or masonry need not be additionally supported.
- D. Install Drain/breather fittings in NEMA 250 Type 4 and Type 4X.

### 3.15 IDENTIFICATION DEVICES

- A. Raceway Tags:
1. Identify origin and destination.
  2. For exposed raceways, install tags at each terminus, near midpoint, and at minimum intervals of every 50 feet, whether in ceiling space or surface mounted.
  3. Install tags at each terminus for concealed raceways.
  4. Provide nylon strap for attachment.
- B. Warning Tape: Install approximately 18 inches above underground or concrete-encased raceways. Align parallel to, and within 12 inches of, centerline of run.

### 3.16 PROTECTION OF INSTALLED WORK

- A. Protect products from effects of moisture, corrosion, and physical damage during construction.
- B. Provide and maintain manufactured watertight and dust-tight seals over conduit openings during construction.



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- C. Touch up painted conduit threads after assembly to cover nicks or scars.
- D. Touch up coating damage to PVC-coated conduit with patching compound approved by manufacturer. Compound shall be kept refrigerated according to manufacturers' instructions until time of use.

**END OF SECTION**



**SECTION 26 05 70**  
**ELECTRICAL SYSTEMS ANALYSIS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American National Standards Institute (ANSI).
  2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
    - a. C57.12.00, Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.
    - b. 242, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems.
    - c. 399, Recommended Practice for Industrial and Commercial Power System Analysis.
    - d. 1584, Guide for Performing Arc Flash Hazard Calculations.
  3. National Electrical Manufacturers Association (NEMA): Z535.4, Product Safety Signs and Labels.
  4. National Fire Protection Association (NFPA):
    - a. 70, National Electrical Code (NEC).
    - b. 70E, Standard for Electrical Safety in the Workplace.
  5. Occupational Safety and Health Standards (OSHA): 29 CFR, Part 1910 Subpart S, Electrical.

1.02 SUBMITTALS

- A. Action Submittals:
1. Short circuit study.
  2. Arc Flash Study. Submit final study prior to equipment energization.
  3. Arc flash warning labels; submit sample with initial study.

1.03 QUALITY ASSURANCE

- A. Short circuit and arc flash studies shall be prepared by a professional electrical engineer registered in the State of Florida.

1.04 SEQUENCING AND SCHEDULING

- A. Initial complete short circuit study shall be submitted and reviewed before Engineer will review Shop Drawings for equipment for incoming service.

- B. Initial complete flash study shall be submitted within 90 days after approval of initial short circuit study.
- C. Initial complete arc flash study shall be submitted and accepted prior to energization of the electrical equipment.
- D. Revised short circuit and arc flash studies, and arc flash labels shall be submitted 10 days before energizing electrical equipment.
- E. Final short circuit and arc flash studies shall be completed prior to Project Substantial Completion. Final version of study shall include as-installed equipment, materials, and parameter data or settings entered into equipment based on study.
- F. Submit final arc flash labels described herein and in compliance with NEMA Z535.4 prior to Project Substantial Completion.

#### 1.05 GENERAL STUDY REQUIREMENTS

- A. Equipment and component titles used in the studies shall be identical to equipment and component titles shown on Drawings.
- B. Perform studies using one of the following electrical engineering software packages:
  - 1. SKM Power Tools for Windows.
  - 2. ETAP.
  - 3. Paladin.
  - 4. Easy Power.
- C. Perform complete fault calculations for each proposed source combination.
  - 1. Source combination may include present and future power company supply circuits, large motors, or generators.
- D. Utilize proposed load data for study obtained from Contract Documents or obtained from field investigation of system configuration, wiring information, and equipment.

#### 1.06 SHORT CIRCUIT STUDY

- A. General:
  - 1. Prepare in accordance with IEEE 399.
  - 2. Use cable impedances based on copper conductors, except where aluminum conductors are specified or shown.

3. Use bus impedances based on copper bus bars, except where aluminum bus bars are specified or shown.
  4. Use cable and bus resistances calculated at 25 degrees C.
  5. Use medium-voltage cable reactances based on use of typical dimensions of shielded cables with 133 percent insulation levels.
  6. Use 600-volt cable reactances based on use of typical dimensions of THHN/THWN conductors.
  7. Use transformer impedances 92.5 percent of “nominal” impedance based on tolerances specified in IEEE C57.12.00.
- B. Provide:
1. Calculation methods and assumptions.
  2. Typical calculation.
  3. Tabulations of calculated quantities.
  4. Results, conclusions, and recommendations.
  5. Selected base per unit quantities.
  6. One-line diagrams.
  7. Source impedance data, including electric utility system and motor fault contribution characteristics.
  8. Impedance diagrams.
  9. Zero-sequence impedance diagrams.
- C. Calculate short circuit interrupting and momentary (when applicable) duties for an assumed three-phase bolted fault at each:
1. Electric utility’s supply termination point.
  2. 480V Pump Control Panel.
  3. Future load contributions as shown on one-line diagram.
- D. Provide bolted line-to-ground fault current study for areas as defined for three-phase bolted fault short circuit study.
- E. Provide bolted line-to-line fault current study for areas as defined for three-phase bolted fault short circuit study.
- F. Verify:
1. Equipment and protective devices are applied within their ratings.
  2. Adequacy of 480V Pump Control Panel electrical distribution hardware withstand short circuit stresses.
  3. Adequacy of transformer windings to withstand short circuit stresses.
  4. Cable and busway sizes for ability to withstand short circuit heating, in addition to normal load currents.

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### G. Tabulations:

1. General Data:
  - a. Short circuit reactances of rotating machines.
  - b. Cable and conduit material data.
  - c. Bus data.
  - d. Transformer data.
  - e. Circuit resistance and reactance values.
2. Short Circuit Data:
  - a. Fault impedances.
  - b. X to R ratios.
  - c. Asymmetry factors.
  - d. Motor contributions.
  - e. Short circuit kVA.
  - f. Symmetrical and asymmetrical fault currents.
3. Equipment Evaluation:
  - a. Equipment bus bracing, equipment short circuit rating, transformer, cable, busway.
  - b. Maximum fault current available.

### H. Written Summary:

1. Scope of studies performed.
2. Explanation of bus and branch numbering system.
3. Prevailing conditions.
4. Selected equipment deficiencies.
5. Results of short circuit study.
6. Comments or suggestions.

I. Suggest changes and additions to equipment rating and/or characteristics.

J. Notify Engineer in writing of existing circuit protective devices improperly rated for new fault conditions.

K. Revise data for “as-installed” condition.

### 1.07 ARC FLASH STUDY

- A. Perform arc flash hazard study after short circuit and protective device coordination study has been completed, reviewed and accepted.
- B. Perform arc flash study in accordance with NFPA 70E, OSHA 29 CFR, Part 1910 Subpart S, and IEEE 1584.

- C. Base Calculation: For each major part of electrical power system, determine the following:
1. Flash hazard protection boundary.
  2. Limited approach boundary.
  3. Restricted approach boundary.
  4. Incident energy level.
  5. Glove class required.
- D. Produce arc flash warning labels that list items in Paragraph Base Calculation and the following additional items.
1. Bus name.
  2. Bus voltage.
- E. Produce bus detail sheets that list items in Paragraph Base Calculation and the following additional items:
1. Bus name.
  2. Upstream protective device name, type, and settings.
  3. Bus line-to-line voltage.
- F. Produce arc flash evaluation summary sheet listing the following additional items:
1. Bus name.
  2. Upstream protective device name, type, settings.
  3. Bus line-to-line voltage.
  4. Bus bolted fault.
  5. Protective device bolted fault current.
  6. Arcing fault current.
  7. Protective device trip/delay time.
  8. Breaker opening time.
  9. Solidly grounded column.
  10. Equipment type.
  11. Gap.
  12. Arc flash boundary.
  13. Working distance.
  14. Incident energy.
- G. Analyze short circuit and arc flash calculations and highlight equipment that is determined to be underrated or causes incident energy values greater than  $8 \text{ cal/cm}^2$ . Propose approaches to reduce energy levels.

- H. Prepare report summarizing arc flash study with conclusions and recommendations which may affect integrity of electric power distribution system. As a minimum, include the following:
1. Equipment manufacturer's information used to prepare study.
  2. Assumptions made during study.
  3. Reduced copy of one-line drawing; 11 inches by 17 inches maximum.
  4. Arc flash evaluations summary spreadsheet.
  5. Bus detail sheets.
  6. Arc flash warning labels printed in color on thermally bonded adhesive backed UV and weather-resistant labels.

## **PART 2 PRODUCTS**

### **2.01 ARC FLASH WARNING LABELS**

- A. Arc flash warning labels printed in color on thermally bonded adhesive backed, UV- and weather-resistant labels. An example label is located following end of section in Figure 1.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

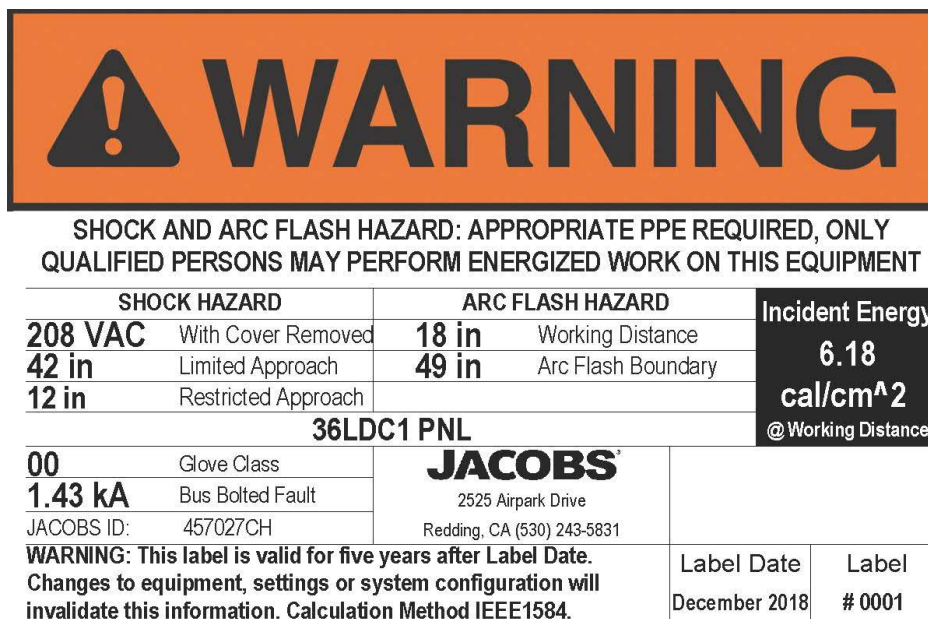
- A. Make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.
- B. Notify Engineer in writing of required major equipment modifications.
- C. Provide laminated one-line diagrams (minimum size 11 inches by 17 inches) to post on interior of electrical room doors.
- D. Provide arc flash warning labels on equipment as specified in this section.

### **3.02 SUPPLEMENTS**

- A. The supplement listed below, following "End of Section," is a part of this Specification:
1. Figure 1: Example Arc Flash Label.

**END OF SECTION**





**Figure 1**  
Example Arc Flash Label



**SECTION 26 41 00  
FACILITY LIGHTNING PROTECTION**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
  - 1. Lightning Protection Institute (LPI): 175, Standard of Practice.
  - 2. National Fire Protection Association (NFPA):
    - a. 70, National Electrical Code (NEC).
    - b. 780, Standard for the Installation of Lightning Protection Systems.
  - 3. UL:
    - a. 96, Standard for Lightning Protection Components.
    - b. 96A, Standard for Installation Requirements for Lightning Protection Systems.

**1.02 DESIGN REQUIREMENTS**

- A. Provide lightning protection system design for the following structures: Pump Control Panel equipment rack.
- B. Design lightning protection system to comply with applicable provisions of LPI 175, UL 96, UL 96A, and NFPA 780.

**1.03 SUBMITTALS**

- A. Action Submittals:
  - 1. Down conductor.
  - 2. Connecting conductor.
  - 3. Bond strap.
  - 4. Air terminals.
  - 5. Fittings.
  - 6. Connectors.
  - 7. Ground rods.
- B. Informational Submittals:
  - 1. Field test report.
  - 2. Ground Witness Certification-Form LPI-175A.
  - 3. Post-Installation Certification-Form LPI-175B.
  - 4. UL 96 Master Label "C" Certification.

1.04 QUALITY ASSURANCE

- A. Designer: Lightning protection system design shall be prepared by an LPI-certified master designer. Shop Drawings shall be stamped by the designer.
- B. System components shall be the product of a manufacturer regularly engaged in the manufacturing of lightning protection components in accordance with UL 96.
- C. Lightning protection system shall be installed under direct supervision of an LPI 175 Certified Master Installer.
- D. Inspection of final installation and grounding connection shall be performed by an LPI-certified inspector.
- E. Provide the Work in accordance with NFPA 70. Where required by Authority Having Jurisdiction (AHJ), material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
- F. Materials and equipment manufactured within the scope of standards published by UL shall conform to those standards and shall have an applied UL listing mark.

**PART 2 PRODUCTS**

2.01 MANUFACTURERS

- A. Materials, equipment, and accessories specified in this section shall be products of:
  - 1. Thompson Lightning.
  - 2. IPC Protection.
  - 3. Erico Eritech Lightning Protection Systems.
  - 4. VFC, Inc.
  - 5. "Or-equal."

2.02 GENERAL

- A. Complete system shall bear UL 96 Master Label C.
- B. System Material: Copper or high copper content, heavy-duty bronze castings, unless otherwise specified.
- C. Material shall comply in weight, size, and composition for the class of structure to be protected as established by NFPA 780.

2.03 COMPONENTS

A. Air Terminal:

1. Material: Solid copper rods with tapered or blunt points as required for application.
2. Diameter: 1/2 inch.
3. Length: Sufficient to extend minimum 10 inches above object being protected.
4. UL 96 Label B applied to each terminal.

B. Conductors:

1. Lightning System Conductors: Bare medium hard-drawn stranded copper, or stranded aluminum as required for the application.
2. Main Down Conductor: Smooth twist stranding, Class I.
3. Connecting Conductor: Concentric stranding, Class I.
4. Bonding Conductor: Flexible strap, minimum 3/4-inch wide by 1/8-inch thick.
5. Main down and connecting conductors shall bear the UL 96 Label A, applied every 10 feet.
6. Grounding Conductors: Stranded bare copper.

C. Cable Fastener and Accessories: Capable of withstanding minimum pull of 100 pounds.

D. Fittings:

1. Heavy-duty.
2. Bolts, Screws, and Related Hardware: Stainless steel.

E. Ground Rods:

1. Material: Copper.
2. Diameter: 3/4 inch.
3. Length: 20 feet.

F. Grounding Connections:

1. Welds: Exothermic process.
2. Fasteners: Bolted clamp type, corrosion-resistant copper alloy.
3. Hardware: Silicone bronze.

G. Cable Connections and Splicers:

1. Welds: Exothermic process.

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2. Fasteners: Bolted clamp type, corrosion-resistant copper alloy.
  3. Through-Roof Connectors: Straight or right angle with bronze and lead seal flashing washer.
- H. Conduit: Schedule 40 PVC, as specified in Section 26 05 33, Raceway and Boxes.

### **PART 3 EXECUTION**

#### 3.01 GENERAL

- A. Workmanship to comply with all applicable provisions of LPI 175, UL 96, UL 96A, and NFPA 780.
- B. Aluminum materials shall be used where required to meet the galvanic corrosion requirements of UL 96A.
- C. Provide pitchpockets or method compatible with roofing to waterproof roof penetrations.
- D. Install system in inconspicuous manner so components blend with building aesthetics.

#### 3.02 EXAMINATION

- A. Verify conditions prior to installation. Actual conditions may require adjustments in air terminal and ground rod locations.

#### 3.03 INSTALLATION

- A. Air Terminals:
  1. Supports: Brackets or braces.
  2. Parapet Bracket Attachment: Lag or expansion bolts.
  3. Secure base to roof surface with adhesive or pitch compatible with roofing bond.
  4. Provide terminal flashing at roof penetrations.
  5. Perimeter Terminals:
    - a. Maximum Spacing: 20 feet.
    - b. Maximum Distance From Outside Edge of Building: 2 feet.
  6. Roof Ridge Terminals: Maximum spacing 20 feet.
  7. Mid-Roof Terminals: Maximum spacing 50 feet.
  8. Provide blunt point air terminals for applications exposed to personnel.
- B. Conductors:
  1. Conceal whenever practical.

2. Provide 1-inch PVC conduit in building walls or columns for main downloads and roof risers.
3. Support: Maximum spacing for exposed conductors.
  - a. Vertical: 3 foot.
  - b. Horizontal: 4 foot.
4. Maintain horizontal and vertical conductor courses free from dips or pockets.
5. Bends: Maximum 90 degrees, with minimum 8-inch radius.
6. Install air terminal conductors on the structural roof surface before roofing composition is applied.

C. Bonding:

1. Bond to Main Conductor System:
  - a. Roof-mounted ventilators, fans, air handlers, masts, flues, cooling towers, handrails, and other sizeable metal objects.
  - b. Roof flashing, gravel stops, insulation vents, ridge vents, roof drains, soil pipe vents, and other small metal objects if located within 6 feet of main conductors or another grounded object.
2. Bond each steel column or major framing members to grounding system.
3. Bond each main down conductor to grounding system.

D. Grounding System:

1. Grounding Conductor:
  - a. Completely encircle building structure.
  - b. Bury minimum 1 foot below finished grade.
  - c. Minimum 2 feet from foundation walls.
2. Interconnect ground rods by direct-buried copper cables.
3. Maximum Resistance: 1 ohms when connected to ground rods.
4. Connections:
  - a. Install ground cables continuous between connections.
  - b. Exothermic welded connections to ground rods, cable trays, structural steel, handrails, and buried and nonaccessible connections.
  - c. Provide bolted clamp type mechanical connectors for all exposed secondary connections.
  - d. Use bolted offset parapet bases or through-roof concealed base assemblies for air terminal connections.
  - e. Provide interconnections with electrical and telephone systems and all underground metal pipes.
  - f. Provide electric service arrester ground wire to building water main.

3.04 FIELD QUALITY CONTROL

A. Field Testing:

1. Isolate lightning protection system from other ground conditions while performing tests.
2. Resistance: Test ground resistance of grounding system by the fall-of-potential method.
  - a. Test Resistance to Ground: Maximum 1 ohms.
  - b. Install additional ground rods as required to obtain maximum allowable resistance.
3. Test Report:
  - a. Description of equipment tested.
  - b. Description of test.
  - c. Test results.
  - d. Conclusions and recommendations.
  - e. Appendix, including appropriate test forms.
  - f. Identification of test equipment used.
  - g. Signature of responsible test organization authority.

**END OF SECTION**



**SECTION 31 10 00  
SITE CLEARING**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.
- B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.
- C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2-inch caliper to a depth of 6 inches below subgrade.
- D. Scalping: Removal of sod without removing more than upper 3 inches of topsoil.
- E. Stripping: Removal of topsoil remaining after applicable scalping is completed.
- F. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.02 SUBMITTALS

- A. Action Submittals: Drawings clearly showing clearing, grubbing, and stripping limits.

1.03 QUALITY ASSURANCE

- A. Obtain Engineer's approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

1.04 SCHEDULING AND SEQUENCING

- A. Prepare Site only after adequate erosion and sediment controls are in place. Limit areas exposed uncontrolled to erosion during installation of temporary erosion and sediment controls to maximum of 0.10 acres.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Clear, grub, and strip areas actually needed for waste disposal, borrow, or Site improvements within limits shown or specified.
- B. Do not injure or deface vegetation that is not designated for removal.

3.02 LIMITS

- A. As follows, but not to extend beyond Project limits.
  - 1. Excavation Excluding Trenches: 5 feet beyond top of cut slopes.
  - 2. Trench Excavation: 4 feet from trench centerline, regardless of actual trench width.
  - 3. Fill:
    - a. Clearing and Grubbing: 5 feet beyond toe of permanent fill.
    - b. Stripping and Scalping: 2 feet beyond toe of permanent fill.
  - 4. Waste Disposal:
    - a. Clearing: 5 feet beyond perimeter.
    - b. Scalping and Stripping: Not required.
    - c. Grubbing: Around perimeter as necessary for neat finished appearance.
  - 5. Structures: 15 feet outside of new structures.
  - 6. Roadways: Clearing and grubbing: 30 feet from roadway centerline.
  - 7. Overhead Utilities:
    - a. Clearing and Grubbing: Entire width of easements and rights-of-way.
    - b. Scalping and Stripping: Wherever grading is required.
  - 8. Other Areas: As shown.
- B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 CLEARING

- A. Clear areas within limits shown or specified.
- B. Fell trees so that they fall away from facilities and vegetation not designated for removal.
- C. Cut stumps not designated for grubbing flush with ground surface.
- D. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

3.04 GRUBBING

- A. Grub areas within limits shown or specified.

3.05 SCALPING

- A. Do not remove sod until after clearing and grubbing is completed and resulting debris is removed.
- B. Scalp areas within limits shown or specified.

3.06 STRIPPING

- A. Do not remove topsoil until after scalping is completed.
- B. Strip areas within limits to minimum depths shown or specified. Do not remove subsoil with topsoil.

3.07 TREE REMOVAL OUTSIDE CLEARING LIMITS

- A. Remove Within Project Limits:
  - 1. Dead, dying, leaning, or otherwise unsound trees that may strike and damage Project facilities in falling.
  - 2. Trees designated by Owner or Engineer.
- B. Cut stumps off flush with ground, remove debris, and if disturbed, restore surrounding area to its original condition.

3.08 PRUNING

- A. Remove branches below the following heights:
  - 1. 20 feet above roadways and shoulders.
  - 2. 9 feet above sidewalks.
  - 3. 6 feet above roofs.
- B. Prune in accordance with industry standards.

3.09 SALVAGE

- A. Saleable log timber may be sold to Contractor's benefit. Promptly remove from Project Site.
- B. Sod with commercial value may be sold to Contractor's benefit. Promptly remove from Project Site.

3.10 DISPOSAL

A. Clearing and Grubbing Debris:

1. Dispose of debris offsite.
2. Burning of debris onsite will not be allowed.
3. During periods when burning is prohibited by federal, state, or local authorities, debris may be stockpiled until burning ban is rescinded, provided stockpiled material does not constitute a fire hazard or interfere with or delay Work. Stockpiled material shall not remain onsite in excess of 30 days.
4. Woody debris may be chipped. Chips may be sold to Contractor's benefit or used for landscaping onsite as mulch or uniformly mixed with topsoil, provided that resulting mix will be fertile and not support combustion. Maximum dimensions of chipped material used onsite shall be 1/4 inch by 2 inches. Dispose of chips that are unsaleable or unsuitable for landscaping or other uses with unchipped debris.
5. Limit offsite disposal of clearing and grubbing debris to locations that are approved by federal, state, and local authorities, and that will not be visible from Project.

B. Scalpings: As specified for clearing and grubbing debris.

C. Strippings:

1. Dispose of strippings that are unsuitable for topsoil or that exceed quantity required for topsoil offsite.
2. Stockpile topsoil in sufficient quantity to meet Project needs. Dispose of excess strippings as specified for clearing and grubbing.

**END OF SECTION**

**SECTION 31 23 13**  
**SUBGRADE PREPARATION**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
  - 1. ASTM International (ASTM):
    - a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
    - b. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).

1.02 DEFINITIONS

- A. Optimum Moisture Content: As defined in Section 31 23 23, Fill and Backfill.
- B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.
- C. Relative Compaction: As defined in Section 31 23 23, Fill and Backfill.
- D. Relative Density: As defined in Section 31 23 23, Fill and Backfill.
- E. Subgrade: Layer of existing soil after completion of clearing, grubbing, scalping of topsoil prior to placement of fill, roadway structure or base for floor slab.
- F. Proof-Rolling: Testing of subgrade by compactive effort to identify areas that will not support the future loading without excessive settlement.

1.03 SEQUENCING AND SCHEDULING

- A. Complete applicable Work specified in Sections 31 23 16, Excavation, prior to subgrade preparation.

1.04 QUALITY ASSURANCE

- A. Notify Engineer when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.
- B. Bring subgrade to proper grade and cross-section and uniformly compact surface.
- C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.
- D. Maintain prepared ground surface in finished condition until next course is placed.

3.02 COMPACTION

- A. Granular Fill Under Structures: Compact the upper 12 inches to minimum of 95 percent relative compaction as determined in accordance with ASTM D1557.

3.03 MOISTURE CONDITIONING

- A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.
- B. Wet Subgrade: Aerate material by blading, disking, harrowing, or other methods, to hasten drying process.

3.04 TESTING

- A. Proof-roll subgrade with equipment specified in Article Compaction to detect soft or loose subgrade or unsuitable material, as determined by Engineer.

3.05 CORRECTION

- A. Soft or Loose Subgrade:
  - 1. Adjust moisture content and recompact, or
  - 2. Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23, Fill and Backfill.

- B. Unsuitable Material: Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23, Fill and Backfill.

**END OF SECTION**





**SECTION 31 23 16  
EXCAVATION**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Common Excavation: Removal of material not classified as rock excavation.

1.02 QUALITY ASSURANCE

- A. Provide adequate survey control to avoid unauthorized over excavation.

1.03 WEATHER LIMITATIONS

- A. Material excavated when frozen or when air temperature is less than 32 degrees F shall not be used as fill or backfill until material completely thaws.
- B. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.04 SEQUENCING AND SCHEDULING

- A. Dewatering: Conform to applicable requirements of Section 31 23 19.01, Dewatering, prior to initiating excavation.
- B. Excavation Support: Install and maintain as necessary to support sides of excavations and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.

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- B. Do not over excavate without written authorization of Engineer.
- C. Remove or protect obstructions as shown and as specified in Section 01 50 00, Temporary Facilities and Controls, Article Protection of Work and Property.

### 3.02 UNCLASSIFIED EXCAVATION

- A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

### 3.03 TRENCH WIDTH

- A. Minimum Width of Trenches:
  - 1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
    - a. Less than 4-inch Outside Diameter or Width: 18 inches.
    - b. Greater than 4-inch Outside Diameter or Width: 18 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
  - 2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
  - 3. Increase trench widths by thicknesses of sheeting.
- B. Maximum Trench Width: Unlimited, unless otherwise shown or specified, or unless excess width will cause damage to existing facilities, adjacent property, or completed Work.

### 3.04 EMBANKMENT AND CUT SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown, with proper allowance for topsoil or slope protection, where shown.
- B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.
- C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and rights-of-way, or adversely impacts existing facilities, adjacent property, or completed Work.

3.05 STOCKPILING EXCAVATED MATERIAL

- A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.
- B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.
- C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads or streets.
- D. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.06 DISPOSAL OF SPOIL

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.

**END OF SECTION**



**SECTION 31 23 19.01  
DEWATERING**

**PART 1 GENERAL**

1.01 SUBMITTALS

- A. Informational Submittals:
  - 1. Water control plan.
  - 2. Well permits.
  - 3. Discharge permits.

1.02 WATER CONTROL PLAN

- A. As a minimum, include:
  - 1. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment; methods; standby equipment and power supply, pollution control facilities, discharge locations to be utilized, and provisions for immediate temporary water supply as required by this section.
  - 2. Drawings showing locations, dimensions, and relationships of elements of each system.
  - 3. Design calculations demonstrating adequacy of proposed dewatering systems and components.
- B. If system is modified during installation or operation revise or amend and resubmit Water Control Plan.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 GENERAL

- A. Remove and control water during periods when necessary to properly accomplish Work.

3.02 SURFACE WATER CONTROL

- A. See Section 01 50 00, Temporary Facilities and Controls, Article Temporary Controls.
- B. Remove surface runoff controls when no longer needed.

3.03 DEWATERING SYSTEMS

- A. Provide, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry and to lower and maintain groundwater level a minimum of 2 feet below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.
- B. For Project dewatering systems shall include wells or well points, and other equipment and appurtenances installed outside structural limits and sufficiently below lowest point of excavation, or to maintain specified groundwater elevation.
- C. Design and Operate Dewatering Systems:
  - 1. To prevent loss of ground as water is removed.
  - 2. To avoid inducing settlement or damage to existing facilities, completed Work, or adjacent property.
  - 3. To relieve artesian pressures and resultant uplift of excavation bottom.

3.04 DISPOSAL OF WATER

- A. Obtain discharge permit for water disposal from authorities having jurisdiction.
- B. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.
- C. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed Work, or adjacent property.
- D. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

**END OF SECTION**

**SECTION 31 23 23  
FILL AND BACKFILL**

**PART 1 GENERAL**

**1.01 REFERENCES**

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
  - a. C117, Standard Test Method for Materials Finer Than 75-Micrometers (No. 200) Sieve in Mineral Aggregates by Washing.
  - b. C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
  - c. D75, Standard Practice for Sampling Aggregates.
  - d. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
  - e. D1556, Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
  - f. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
  - g. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
  - h. D4254, Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
  - i. D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

**1.02 DEFINITIONS**

A. Relative Compaction:

1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D1557.
2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by Engineer.

- B. Optimum Moisture Content:
  - 1. Determined in accordance with ASTM Standard specified to determine maximum dry density for relative compaction.
  - 2. Determine field moisture content on basis of fraction passing 3/4-inch sieve.
- C. Relative Density: Calculated in accordance with ASTM D4254 based on maximum index density determined in accordance with ASTM D4253 and minimum index density determined in accordance with ASTM D4254.
- D. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.
- E. Completed Course: A course or layer that is ready for next layer or next phase of Work.
- F. Lift: Loose (uncompacted) layer of material.
- G. Geosynthetics: Geotextiles, geogrids, or geomembranes.
- H. Well-Graded:
  - 1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
  - 2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
  - 3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.
- I. Influence Area: Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:
  - 1. 1 foot outside outermost edge at base of foundations or slabs.
  - 2. 1 foot outside outermost edge at surface of roadways or shoulder.
  - 3. 0.5 foot outside exterior at spring line of pipes or culverts.
- J. Borrow Material: Material from required excavations or from designated borrow areas on or near Site.
- K. Selected Backfill Material: Materials available onsite that Engineer determines to be suitable for specific use.



- L. Imported Material: Materials obtained from sources offsite, suitable for specified use.
- M. Structural Fill: Fill materials as required under structures, pavements, and other facilities.
- N. Embankment Material: Fill materials required to raise existing grade in areas other than under structures.

1.03 SUBMITTALS

- A. Informational Submittals: Certified test results from independent testing agency.

1.04 QUALITY ASSURANCE

- A. Notify Engineer when: Fill material appears to be deviating from Specifications.

1.05 SEQUENCING AND SCHEDULING

- A. Complete applicable Work specified in Section 31 23 16, Excavation; and Section 31 23 13, Subgrade Preparation, prior to placing fill or backfill.
- B. Obtain Engineer's acceptance of concrete work and attained strength prior to placing backfill.
- C. Backfill around water-holding structures only after completion of satisfactory leakage tests.
- D. Do not place granular base, subbase, or surfacing until after subgrade has been prepared as specified in Section 31 23 13, Subgrade Preparation.

**PART 2 PRODUCTS**

2.01 SOURCE QUALITY CONTROL

- A. Gradation Tests: As necessary to locate acceptable sources of imported material.

2.02 EARTHFILL

- A. Excavated material from required excavations free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.

- B. Provide imported material of equivalent quality, if required to accomplish Work.

2.03 GRANULAR FILL

- A. 1-inch minus crushed gravel or crushed rock.
- B. Free from dirt, clay balls, and organic material.
- C. Well-graded from coarse to fine and containing sufficient fines to bind material when compacted, but with maximum 8 percent by weight passing No. 200 sieve.

2.04 SAND

- A. Free from clay, organic matter, or other deleterious material.
- B. Gradation as determined in accordance with ASTM C117 and ASTM C136:

<u>Sieve Size</u>	<u>Percent Passing by Weight</u>
1/4-inch	100
No. 4	95 - 100
No. 200	0 - 8

2.05 WATER FOR MOISTURE CONDITIONING

- A. Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

**PART 3 EXECUTION**

3.01 GENERAL

- A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.
- B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.
- C. During filling and backfilling, keep level of fill and backfill around each structure and buried tank even.

- D. Do not place fill or backfill, if fill or backfill material is frozen, or if surface upon which fill or backfill is to be placed is frozen.
- E. If pipe, conduit, duct bank, or cable is to be laid within fill or backfill:
  - 1. Fill or backfill to an elevation 2 feet above top of item to be laid.
  - 2. Excavate trench for installation of item.
  - 3. Install bedding, if applicable, as specified in Section 31 23 23.15, Trench Backfill.
  - 4. Install item.
  - 5. Backfill envelope zone and remaining trench, as specified in Section 31 23 23.15, Trench Backfill, before resuming filling or backfilling specified in this section.
- F. Tolerances:
  - 1. Final Lines and Grades: Within a tolerance of 0.1 foot unless dimensions or grades are shown or specified otherwise.
  - 2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.
- G. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

### 3.02 BACKFILL UNDER AND AROUND STRUCTURES

- A. Under Facilities: Within influence area beneath structures, slabs, pavements, curbs, piping, conduits, duct banks, and other facilities, backfill with granular fill, unless otherwise shown. Place granular fill in lifts of 6-inch maximum thickness and compact each lift to minimum of 95 percent relative compaction as determined in accordance with ASTM D1557.
- B. Other Areas: Backfill with earthfill to lines and grades shown, with proper allowance for topsoil thickness where shown. Place in lifts of 6-inch maximum thickness and compact each lift to minimum 90 percent relative compaction as determined in accordance with ASTM D1557.

### 3.03 FILL

- A. Outside Influence Areas beneath Structures, Tanks, Pavements, Curbs, Slabs, Piping, and Other Facilities: Unless otherwise shown, place earthfill as follows:
  - 1. Allow for 6-inch thickness of topsoil where required.
  - 2. Maximum 8-inch thick lifts.

3. Place and compact fill across full width of embankment.
4. Compact to minimum 90percent relative compaction as determined in accordance with ASTM D1557.
5. Dress completed embankment with allowance for topsoil, crest surfacing, and slope protection, where applicable.

3.04 SITE TESTING

A. Gradation:

1. One sample from each 100 tons of finished product or more often as determined by Engineer, if variation in gradation is occurring, or if material appears to depart from Specifications.
2. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.
3. Remove material placed in Work that does not meet Specification requirements.

B. In-Place Density Tests: In accordance with ASTM D1556. During placement of materials, test as follows:

1. Granular Fill: One test per 1,000 square feet of each lift, or one test per lift, more stringent applies.

3.05 REPLACING OVEREXCAVATED MATERIAL

A. Replace excavation carried below grade lines shown or established by Engineer as follows:

1. Beneath Footings: Granular fill.
2. Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.

**END OF SECTION**

**SECTION 31 23 23.15  
TRENCH BACKFILL**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Public Works Association (APWA): Uniform Color Code.
  2. ASTM International (ASTM):
    - a. C33/C33M, Standard Specification for Concrete Aggregates.
    - b. C94/C94M, Standard Specification for Ready-Mixed Concrete.
    - c. C117, Standard Test Method for Materials Finer than 75 Micrometer (No. 200) Sieve in Mineral Aggregates by Washing.
    - d. C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
    - e. C150/C150M, Standard Specification for Portland Cement.
    - f. C618, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
    - g. C1012/C1012M, Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution.
    - h. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)).
    - i. D1140, Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75 micrometer) Sieve.
    - j. D1557, Standard Test Methods for Laboratory Compaction Characteristics of Soil using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN-m/m<sup>3</sup>)).
    - k. D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
    - l. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
    - m. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
    - n. D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
    - o. D4832, Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
  3. National Electrical Manufacturers Association (NEMA): Z535.1, Safety Colors.

1.02 DEFINITIONS

- A. Base Rock: Granular material upon which manhole bases and other structures are placed.
- B. Bedding Material: Granular material upon which pipes, conduits, cables, or duct banks are placed.
- C. Imported Material: Material obtained by Contractor from source(s) offsite.
- D. Lift: Loose (uncompacted) layer of material.
- E. Pipe Zone: Backfill zone that includes full trench width and extends from prepared trench bottom to an upper limit above top outside surface of pipe, conduit, cable or duct bank.
- F. Prepared Trench Bottom: Graded trench bottom after excavation and installation of stabilization material, if required, but before installation of bedding material.
- G. Relative Compaction: The ratio, in percent, of the as-compacted field dry density to the laboratory maximum dry density as determined by ASTM D1557. Corrections for oversize material may be applied to either as-compacted field dry density or maximum dry density, as determined by Engineer.
- H. Relative Density: As defined by ASTM D4253 and ASTM D4254.
- I. Selected Backfill Material: Material available onsite that Engineer determines to be suitable for a specific use.
- J. Well-Graded: A mixture of particle sizes that has no specific concentration or lack thereof of one or more sizes producing a material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids. Satisfying both of the following requirements, as defined in ASTM D2487:
  - 1. Coefficient of Curvature: Greater than or equal to 1 and less than or equal to 3.
  - 2. Coefficient of Uniformity: Greater than or equal to 4 for materials classified as gravel, and greater than or equal to 6 for materials classified as sand.

**PART 2 PRODUCTS**

2.01 MARKING TAPE

A. Detectable:

1. Solid aluminum foil, visible on unprinted side, encased in protective high visibility, inert polyethylene plastic jacket.
2. Foil Thickness: Minimum 0.35 mils.
3. Laminate Thickness: Minimum 5 mils.
4. Width: 6 inches.
5. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.
6. Joining Clips: Tin or nickel-coated furnished by tape manufacturer.
7. Manufacturers and Products:
  - a. Reef Industries; Terra Tape, Sentry Line Detectable.
  - b. Mutual Industries; Detectable Tape.
  - c. Presco; Detectable Tape.

B. Color: In accordance with APWA Uniform Color Code.

Color*	Facility
Green	Sewers and drain lines
*As specified in NEMA Z535.1, Safety Color Code.	

2.02 BEDDING MATERIAL AND PIPE ZONE MATERIAL

- A. Unfrozen, friable, and no clay balls, roots, or other organic material.
- B. Clean or gravelly sand with less than 5percent passing No. 200 sieve, as determined in accordance with ASTM D1140, or gravel or crushed rock within maximum particle size and other requirements as follows unless otherwise specified.
  1. Duct Banks: 3/4-inch maximum particle size.
  2. Pipe Under 18-Inch Diameter: 3/4-inch maximum particle size, except 1/4 inch for stainless steel pipe, copper pipe, tubing, and plastic pipe under 3-inch diameter.

2.03 EARTH BACKFILL

- A. Soil, loam, or other excavated material suitable for use as backfill.

- B. Free from roots or organic matter, refuse, boulders and material larger than 1/2 cubic foot, or other deleterious materials.

### **PART 3 EXECUTION**

#### **3.01 TRENCH PREPARATION**

- A. Water Control:
  - 1. As specified in Section 31 23 19.01, Dewatering.
  - 2. Remove water in a manner that minimizes soil erosion from trench sides and bottom.
  - 3. Provide continuous water control until trench backfill is complete.
- B. Remove foreign material and backfill contaminated with foreign material that falls into trench.

#### **3.02 TRENCH BOTTOM**

- A. Firm Subgrade: Grade with hand tools, remove loose and disturbed material, and trim off high areas and ridges left by excavating bucket teeth. Allow space for bedding material if shown or specified.
- B. Soft Subgrade: If subgrade is encountered that may require removal to prevent pipe settlement, notify Engineer. Engineer will determine depth of over excavation, if any required.

#### **3.03 BEDDING**

- A. Furnish imported bedding material where, in the opinion of Engineer, excavated material is unsuitable for bedding or insufficient in quantity.
- B. Place over full width of prepared trench bottom in two equal lifts when required depth exceeds 8 inches.
- C. Hand grade and compact each lift to provide a firm, unyielding surface.
- D. Minimum Thickness: 4 inches.
- E. Check grade and correct irregularities in bedding material. Loosen top 1 inch to 2 inches of compacted bedding material with a rake or by other means to provide a cushion before laying each section of pipe, conduit, direct-buried cable, or duct bank.
- F. Install to form continuous and uniform support except at bell holes, if applicable, or minor disturbances resulting from removal of lifting tackle.



- G. Bell or Coupling Holes: Excavate in bedding at each joint to permit proper assembly and inspection of joint and to provide uniform bearing along barrel of pipe or conduit.

#### 3.04 BACKFILL PIPE ZONE

- A. Movement during backfill operations.
- B. Place material simultaneously in lifts on both sides of pipe and, if applicable, between pipes, conduit, cables, and duct banks installed in same trench.
  - 1. Pipe 10-Inch and Smaller Diameter: First lift less than or equal to 1/2 pipe diameter.
  - 2. Pipe Over 10-Inch Diameter: Maximum 6-inch lifts.
- C. Thoroughly tamp each lift, including area under haunches, with handheld tamping bars supplemented by “walking in” and slicing material under haunches with a shovel to ensure voids are completely filled before placing each succeeding lift.

#### 3.05 MARKING TAPE INSTALLATION

- A. Continuously install marking tape along centerline of buried piping, at depth of 2 feet. Coordinate with piping installation drawings.

#### 3.06 BACKFILL ABOVE PIPE ZONE

- A. General:
  - 1. Process excavated material to meet specified gradation requirements.
  - 2. Adjust moisture content as necessary to obtain specified compaction.
  - 3. Do not allow backfill to free fall into trench or allow heavy, sharp pieces of material to be placed as backfill until after at least 2 feet of backfill has been provided over top of pipe.
  - 4. Do not use power driven impact type compactors for compaction until at least 4 feet of backfill is placed over top of pipe.
  - 5. Backfill to grade with proper allowances for topsoil, crushed rock surfacing, and pavement thicknesses, wherever applicable.
  - 6. Backfill around structures with same class backfill as specified for adjacent trench, unless otherwise shown or specified.
- B. Class A Backfill:
  - 1. Place in lifts not exceeding thickness of 9 inches.
  - 2. Mechanically compact each lift to a minimum of 95 percent relative compaction.

3.07 MAINTENANCE OF TRENCH BACKFILL

- A. After each section of trench is backfilled, maintain surface of backfilled trench even with adjacent ground surface until final surface restoration is completed.
- B. Concrete Pavement: Replace settled slabs as shown on the Drawings or as directed by Engineer.
- C. Asphaltic Pavement: Replace settled areas or fill with asphalt as shown on the Drawings or as directed by Engineer.
- D. Other Areas: Add excavated material where applicable and keep surface of backfilled trench level with adjacent ground surface.

3.08 SETTLEMENT OF BACKFILL

- A. Settlement of trench backfill, or of fill, or facilities constructed over trench backfill will be considered a result of defective compaction of trench backfill.

**END OF SECTION**

**SECTION 31 32 00  
SOIL STABILIZATION**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this section:  
Official Seed Analysts of North America.

1.02 DEFINITIONS

- A. Maintenance Period: Begin maintenance immediately after each area is planted and continue for a period of 8 weeks after planting under this section is completed.
- B. Satisfactory Stand: Grass or section of grass that has:
  - 1. No bare spots larger than 3 square feet.
  - 2. Not more than 10 percent of total area with bare spots larger than 1 square foot.
  - 3. Not more than 15 percent of total area with bare spots larger than 6 square inches.

1.03 SUBMITTALS

- A. Action Submittals: Product data for commercial products; seed, fertilizer, and lime.
- B. Informational Submittals:
  - 1. Seed certifications.
  - 2. Copies of delivery invoices or other proof of quantities of mulch, lime, and fertilizer.
  - 3. Manufacturer's Installation Instructions: Commercial products.

1.04 DELIVERY, STORAGE, AND PROTECTION

- A. As specified in Section 32 92 00, Turf and Grasses.
- B. Seed:
  - 1. Furnish in standard containers with seed name, lot number, net weight, percentages of purity, germination, and hard seed and maximum weed seed content, clearly marked for each container of seed.
  - 2. Keep dry during storage.

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- C. Hydroseeding Mulch: Mark package of wood fiber mulch to show air dry weight.

### 1.05 SEQUENCING AND SCHEDULING

- A. As specified in Section 32 92 00, Turf and Grasses.
- B. Prepare topsoil free of debris in accordance with industry standards before starting Work of this section.
- C. Complete soil preparation, seeding, liming, fertilizing, and mulching and matting within 10 days after final grades have been reached.
- D. Notify Engineer at least 3 days in advance of:
  - 1. Materials delivery.
  - 2. Start of planting/seeding activity.
- E. Seeding: Perform under favorable weather conditions during seasons that are normal for such Work as determined by accepted local practice.

### 1.06 MAINTENANCE

- A. Operations:
  - 1. Perform during maintenance period to include:
    - a. Watering: Keep seeded surface moist.
    - b. Washouts: Repair by filling with topsoil, fertilizing, seeding, and mulching.
    - c. Mulch: Replace wherever and whenever washed or blown away.
    - d. Reseed unsatisfactory areas or portions thereof immediately at end of maintenance period if a satisfactory stand has not been produced.
    - e. Reseed entire area if satisfactory stand does not develop within 6 weeks.
    - f. Mowing: Mow to 2 inches after grass height reaches 3 inches, and mow to maintain grass height from exceeding 3-1/2 inches.

## **PART 2 PRODUCTS**

### 2.01 FERTILIZER

- A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose.

B. Fertilizer shall have the following minimum percentage of plant food by weight:

1. Summer Mix:
  - a. Nitrogen: 20 percent.
  - b. Phosphoric Acid: 10 percent.
  - c. Potash: 10 percent.
2. Winter Mix:
  - a. Nitrogen: 16 percent.
  - b. Phosphoric Acid: 8 percent.
  - c. Potash: 0 percent.

## 2.02 SEED

A. As specified in Section 32 92 00, Turf and Grasses.

## 2.03 MULCH

A. Wood Cellulose Fiber Mulch:

1. Specially processed wood fiber containing no growth or germination inhibiting factors.
2. Dyed suitable color to facilitate inspection of material placement.
3. Manufactured such that after addition and agitation in slurry tanks with water, material fibers become uniformly suspended to form homogenous slurry.
4. When hydraulically sprayed on ground, material will allow absorption and percolation of moisture.

B. Straw:

1. Clean salt hay or threshed straw of oats, wheat, barley, or rye, free from seed of noxious weeds. Suitable for spreading with mulch blower equipment.
2. Average Stalk Length: 6 inches.
3. Seasoned before baling or loading.

## 2.04 EROSION CONTROL MATTING

A. Excelsior mat or straw blanket; staples as recommended by matting manufacturer.

2.05 REINFORCED PLASTIC COVERING

- A. Co-extruded, copolymer laminate reinforced with nonwoven grid of high strength nylon cord submersed in a permanently flexible adhesive media allowing for equal tear resistance in all directions.
- B. Black in color and ultraviolet stabilized.
- C. Physical Requirement (Minimum Average Roll Values):
  - 1. Tear Strength: 130 pounds.
  - 2. Elongation: 620 percent.
- D. Manufacturers:
  - 1. Reef Industries, Inc., Houston, TX.
  - 2. Griffolyn Co., Houston, TX.

**PART 3 EXECUTION**

3.01 SOIL PREPARATION

- A. Before start of hydroseeding or broad cast seeding, and after surface has been shaped and graded, and lightly compacted to uniform grade, scarify soil surface to minimum depth of 1 inch.

3.02 SEEDING

- A. Prepare 1-inch deep seed bed; obtain Engineer's acceptance prior to proceeding.
- B. Apply by hydroseeding or broad cast seeding method on moist soil, but only after free surface water has drained away. Prevent drift and displacement of mixture into other areas.
- C. Summer Application:
  - 1. Prepare and apply mix as follows:
    - a. Seed Mix: 100 pounds per acre.
    - b. Fertilizer, 20-10-10 300 pounds per acre.
    - c. Lime: 50 pounds per 1,000 square feet.
    - d. Water: As necessary.
  - 2. Irrigation: 1 inch per week to seeded areas from July 1 through August 1.

3.03 MULCHING

- A. Apply uniformly on seeded areas. Do not apply mulch on seeded areas that will be immediately covered with erosion control matting.
- B. Application: Sufficiently loose to permit penetration of sunlight and air circulation, and sufficiently dense to shade ground, reduce evaporation rate, and prevent or materially reduce erosion of underlying soil.
  - 1. Straw: Apply by hand or mechanical means to minimum depth of 2 inches.
  - 2. Wood Cellulose Fiber: 1,000 to 1,500 pounds per acre.

3.04 EROSION CONTROL MATTING

- A. Place on seeded slopes 3H:1V and steeper, staple/stake in place and with the appropriate overlap in accordance with manufacturer's instruction.

3.05 REINFORCED PLASTIC COVERING

- A. Place on areas where hydroseeding and erosion control matting have not controlled erosion.
- B. Install in single thickness, strips parallel to direction of drainage.
- C. Maintain tightly in place by using sandbags on ropes with a maximum 10-foot grid spacing in all directions.
- D. Tape or weight down full length, overlap seams at least 12 inches.
- E. Remove at final acceptance, unless notified otherwise by Engineer.

3.06 FIELD QUALITY CONTROL

- A. Upon completion of maintenance period and on written notice from Contractor, Engineer will within 15 days of receipt, determine if a satisfactory stand has been established.
- B. If a satisfactory stand has not been established, Engineer will make another determination upon written notice from Contractor following the next growing season.

**END OF SECTION**





**SECTION 32 92 00  
TURF AND GRASSES**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Maintenance Period: Begin maintenance immediately after each area is planted (seed, sod, or sprig) and continue for a period of 8 weeks after all planting under this section is completed.
- B. Satisfactory Stand: Grass that has:
  - 1. No bare spots larger than 3 square feet.
  - 2. Not more than 10 percent of total area with bare spots larger than 1 square foot.
  - 3. Not more than 15 percent of total area with bare spots larger than 6 square inches.

1.02 SUBMITTALS

- A. Action Submittals: Product labels/data sheets.
- B. Informational Submittals:
  - 1. Seed: Certification of seed analysis, germination rate, and inoculation:
    - a. Certify that each lot of seed has been tested by a testing laboratory certified in seed testing, within 6 months of date of delivery.  
Include with certification:
      - 1) Name and address of laboratory.
      - 2) Date of test.
      - 3) Lot number for each seed specified.
      - 4) Test Results: (i) name, (ii) percentages of purity and of germination, and (iii) weed content for each kind of seed furnished.
    - b. Mixtures: Proportions of each kind of seed.
  - 2. Seed Inoculant Certification: Bacteria prepared specifically for legume species to be inoculated.
  - 3. Description of required maintenance activities and activity frequency.

1.03 DELIVERY, STORAGE, AND PROTECTION

A. Seed:

1. Furnish in standard containers with seed name, lot number, net weight, percentages of purity, germination, and hard seed and maximum weed seed content, clearly marked for each container of seed.
2. Keep dry during storage.

B. Sod:

1. Do not harvest if sod is excessively dry or wet to the extent survival may be adversely affected.
2. Harvest and deliver sod only after laying bed is prepared for sodding.
3. Roll or stack to prevent yellowing.
4. Deliver and lay within 24 hours of harvesting.
5. Keep moist and covered to protect from drying from time of harvesting until laid.

C. Hydroseeding Mulch: Mark package of wood fiber mulch to show air dry weight.

1.04 WEATHER RESTRICTIONS

- A. Perform Work under favorable weather and soil moisture conditions as determined by accepted local practice.

1.05 SEQUENCING AND SCHEDULING

- A. Complete Work under this section within 10 days following completion of soil preparation.

B. Notify Engineer at least 3 days in advance of:

1. Each material delivery.
2. Start of planting activity.

C. Planting Season: Between March 1 and September 30.

1.06 MAINTENANCE SERVICE

- A. Contractor: Perform maintenance operations during maintenance period to include:

1. Watering: Keep surface moist.
2. Washouts: Repair by filling with topsoil, liming, fertilizing, seeding, and mulching.

3. Mulch: Replace wherever and whenever washed or blown away.
4. Mowing: Mow to 2 inches after grass height reaches 3 inches, and mow to maintain grass height from exceeding 3-1/2 inches.
5. Reseed unsatisfactory areas or portions thereof immediately at the end of the maintenance period if a satisfactory stand has not been produced.
6. Reseed/replant during next planting season if scheduled end of maintenance period falls after September 30.
7. Reseed/replant entire area if satisfactory stand does not develop by July 1 of the following year.

## **PART 2 PRODUCTS**

### **2.01 FERTILIZER**

- A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose. Minimum percentage of plant food by weight.
- B. Application Rates: Determined by soil analysis results.
- C. Mix:
  1. Nitrogen: 10.
  2. Phosphoric Acid: 10.
  3. Potash: 10.
  4. Bonemeal: Commercial, raw, finely ground, with minimum analysis of 4 percent nitrogen and 20 percent phosphoric acid.
  5. Superphosphate: Soluble mixture of phosphate obtained from treated mineral phosphates with minimum analysis of 20 percent available phosphoric acid.

### **2.02 SEED**

- A. Fresh, clean new-crop seed that complies with the tolerance for purity and germination established by Official Seed Analysts of North America.
- B. Seeds of Legumes: Inoculated with pure culture of nitrogen-fixing bacteria prepared specifically for legume species in accordance with inoculant manufacturer's instructions.
- C. Summer Seed: Bermuda.
- D. Winter Protective Seed: Annual ryegrass.

2.03 SOD

- A. Certified, containing grass mix: Bermuda.
- B. Strongly rooted pads, capable of supporting own weight and retaining size and shape when suspended vertically from a firm grasp on upper 10 percent of pad.
  - 1. Grass Height: Normal.
  - 2. Strip Size: 16 inches wide and at least 3 feet long.
  - 3. Soil Thickness: Uniform; 1 inch plus or minus 1/4 inch at time of cutting.
  - 4. Age: Not less than 10 months or more than 30 months.
  - 5. Condition: Healthy, green, moist; free of diseases, nematodes and insects, and of undesirable grassy and broadleaf weeds. Yellow sod, or broken pads, or torn or uneven ends will not be accepted.

2.04 HYDROSEEDING MULCH

- A. Wood Cellulose Fiber Mulch:
  - 1. Specially processed wood fiber containing no growth or germination inhibiting factors.
  - 2. Dyed a suitable color to facilitate inspection of material placement.
  - 3. Manufactured such that after addition and agitation in slurry tanks with water, the material fibers will become uniformly suspended to form homogenous slurry.
  - 4. When hydraulically sprayed on ground, material will allow absorption and percolation of moisture.

**PART 3 EXECUTION**

3.01 PREPARATION

- A. Grade areas to smooth, even surface with loose, uniformly fine texture.
  - 1. Roll and rake, remove ridges, fill depressions to meet finish grades.
  - 2. Limit such Work to areas to be planted within immediate future.
  - 3. Remove debris, and stones larger than 1-1/2-inch diameter, and other objects that may interfere with planting and maintenance operations.
- B. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry off before seeding. Do not create muddy soil.
- C. Restore prepared areas to specified condition if eroded or otherwise disturbed after preparation and before planting.

3.02 FERTILIZER

- A. Apply evenly over area in accordance with manufacturer's instructions. Mix into top 2 inches of topsoil, when applied by broad cast method.
- B. Application Rate: 23 pounds per 1,000 square feet (1,000 pounds per acre).

3.03 SEEDING

- A. Start within 2 days of preparation completion.
- B. Hydroseeding:
  - 1. Application Rate: Per manufacturer's recommendations.
  - 2. Apply on moist soil, only after free surface water has drained away.
  - 3. Prevent drift and displacement of mixture into other areas.
  - 4. Upon application, allow absorption and percolation of moisture into ground.
  - 5. Mixtures: Seed and fertilizer may be mixed together, apply within 30 minutes of mixing to prevent fertilizer from burning seed.
- C. Mulching: Apply uniform cover per manufacturer's recommendations.
- D. Water: Apply with fine spray after mulching to saturate top 4 inches of soil.

3.04 SODDING

- A. Do not plant dormant sod, or when ground is frozen.
- B. Lay sod to form solid mass with tightly fitted joints; butt ends and sides, do not overlap.
  - 1. Stagger strips to offset joints in adjacent courses.
  - 2. Work from boards to avoid damage to subgrade or sod.
  - 3. Tamp or roll lightly to ensure contact with subgrade; work sifted soil into minor cracks between pieces of sod, remove excess to avoid smothering adjacent grass.
  - 4. Complete sod surface true to finished grade, even, and firm.
- C. Fasten sod on slopes to prevent slippage with wooden pins 6 inches long driven through sod into subgrade, until flush with top of sod. Install at sufficiently close intervals to securely hold sod.
- D. Water sod with fine spray immediately after planting. During first week, water daily or more frequently to maintain moist soil to depth of 4 inches.
- E. Apply top dress fertilizer at rate of 1 pound per 1,000 square feet.

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### 3.05 FIELD QUALITY CONTROL

- A. 8 weeks after seeding is complete and on written notice from Contractor, Engineer will, within 15 days of receipt, determine if a satisfactory stand has been established.
- B. If a satisfactory stand has not been established, Engineer will make another determination after written notice from Contractor following the next growing season.

### 3.06 PROTECTION

- A. Protect from pedestrian traffic by erecting temporary fence around each newly seeded area.

**END OF SECTION**

**SECTION 33 05 01.02**  
**DUCTILE IRON PIPE AND FITTINGS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO): T99, Standard Method of Test for the Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-inch) Drop.
  2. American Society of Mechanical Engineers (ASME):
    - a. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges.
    - b. B16.42, Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300.
  3. American Water Works Association (AWWA):
    - a. C104/A21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
    - b. C105/A21.5, Polyethylene Encasement for Ductile-Iron Pipe Systems.
    - c. C110/A21.10, Ductile-Iron and Gray-Iron Fittings.
    - d. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
    - e. C115/A21.15, Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Fittings.
    - f. C116/A21.16, Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service.
    - g. C150/A21.50, Thickness Design of Ductile-Iron Pipe.
    - h. C151/A21.51, Ductile-Iron Pipe. Centrifugally Cast, for Water.
    - i. C153/A21.53, Ductile-Iron Compact Fittings for Water Service.
    - j. C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
    - k. C606, Grooved and Shouldered Joints.
  4. ASTM International (ASTM):
    - a. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
    - b. A563, Standard Specification for Carbons and Alloy Steel Nuts.
    - c. D882, Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
    - d. D1330, Standard Specification for Rubber Sheet Gaskets.

- e. D1922, Standard Test Method for Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method.
  - f. D2000, Standard Classification System for Rubber Products in Automotive Applications.
  - g. D4976, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.
5. International Organization for Standardization (ISO): 9001, Quality Management Systems – Requirements.

## 1.02 SUBMITTALS

### A. Action Submittals:

- 1. Shop Drawings: Marking plan and details of standard pipe section showing dimensions, pipe joints, fitting and special fitting pressure rating and thickness, size, coating and lining data.

### B. Informational Submittals:

- 1. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, stating that inspections and specified tests have been made and that results thereby comply with requirements of Article Source Quality Control.
- 2. Manufacturer shall furnish sworn certificates that pipe and fittings have been manufactured, tested, and inspected in accordance with this and all applicable Specifications.
- 3. Field Hydrostatic Testing Plan: Submit at least 15 days prior to testing and at minimum, include the following:
  - a. Testing dates.
  - b. Piping systems and section(s) to be tested.
  - c. Method of isolation.
  - d. Method of conveying water from source to system being tested.
  - e. Calculation of maximum allowable leakage for piping section(s) to be tested.
- 4. Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
- 5. Test documentation form and results.



1.03 QUALITY ASSURANCE

- A. Pipe manufacturer shall be ISO 9001 registered or provide the services of an independent inspection agency.
- B. Prior to start of manufacturing, manufacturer not meeting or having ISO registration requirements shall submit name of at least two independent inspection agencies for approval.
  - 1. Independent inspection agency shall be responsible, on a daily basis, for sample monitoring of chemical and mechanical tests, sample visual inspection of quality assurance tests performed on in-process pipe and fittings, and sample visual and dimensional inspection on finished products.

**PART 2 PRODUCTS**

2.01 MATERIALS

- A. General:
  - 1. Ductile iron pipe shall be manufactured, lined, coated, and tested domestically in the United States of America.
  - 2. Ductile iron fittings shall be manufactured, lined, coated, and tested domestically or for fittings produced outside of the United States of America they shall bear the name of the domestic manufacturer supplying the pipe.
  - 3. Pipe manufacturer shall certify source manufacturing facility has been producing ductile iron pipe of the specified diameters, pressure, dimensions and standards for a period of not less than 10 years.
  - 4. Ductile iron pipe and fitting shall be supplied by a single manufacturer.
    - a. Mixing of components and sources is not permitted.
    - b. Fitting from outside the United States of America shall be produced in a facility with a minimum of 5 years' documented experience manufacturing, coating, testing, and delivery of size and type specified to projects in the United States of America.
- B. Pipe:
  - 1. General:
    - a. Pipe shall be new and recently manufactured. Refurbished pipe shall not be provided.
    - b. Lined and coated as specified.

## Blackwater Golf Club Lift Station and Force Main

2. Meet requirements of AWWA C150/A21.50, AWWA C151/A21.51, and AWWA C111/A21.11.
3. Centrifugally cast, grade 60-42-10 iron.
4. Pressure rating of pipe from 4 inches to 18 inches in diameter shall be 150 psi.
5. Grooved end pipe shall be minimum Special Class 53.

### C. Joints:

1. Push-On Joint: Rated at minimum working pressure equal to pipe material design.
2. Restrained Joint:
  - a. Manufactured proprietary joint that mechanically restrains pipe to adjoining pipe.
  - b. Manufacturers and Products:
    - 1) American Cast Iron Pipe; Flex-Ring, Field Flex-Ring, and Lok-Ring.
    - 2) Pacific States Pipe; Thrust-Lock.
    - 3) U.S. Pipe; TR Flex and HP Lok.
3. Mechanical Wedge Action Type Joint:
  - a. Use only in areas where adjoining to fixed points where laying length is determined in field.
  - b. Prior to purchase and installation, type and application of this joint shall be approved by Engineer.
4. Use of set screws for restraint or field-lock gaskets shall not be allowed.
5. Ball Joint:
  - a. Meet requirements of AWWA C151/A21.51.
  - b. Minimum Working Pressure:
    - 1) 4-inch through 12-inch Diameter: 350 psi.
    - 2) Larger than 12-inch Diameter: 250 psi.
  - c. Manufacturers and Products:
    - 1) American Cast Iron Pipe; Flex-Lock.
    - 2) U.S. Pipe; USIFLEX.

### D. Fittings:

1. Fittings shall be new and recently manufactured. Refurbished fittings will not be accepted.

2. Mechanical, Push-On, Flanged, or Restrained Joint: In accordance with the following table:

<b>Minimum Pressure Ratings for AWWA C110/A21.10 and C115/A21.15 Ductile Iron Fittings</b>		
<b>Diameter (inches)</b>	<b>Rubber Gasket Joints (Push-on, Mechanical, Restrained) (psi)</b>	<b>Flanged Joints (psi)</b>
3 to 24	350	250
30 to 48	250	250
<b>Minimum Pressure Ratings for AWWA C153/A21.53 Ductile Iron Fittings</b>		
<b>Diameter (inches)</b>	<b>Rubber Gasket Joints (Push-on, Mechanical, Restrained) (psi)</b>	<b>Flanged Joints</b>
3 to 24	350	Not included in C153/A21.53 (refer to the C110/A21.10 Standard)
30 to 48	250	Not included in C153/A21.53 (refer to the C110/A21.10 Standard)
54 to 64	150	150 psi

3. Rubber Gasket Joints Including Mechanical Joints, Push-On Joints, and Flanged Joints: In accordance with AWWA C111/A21.11 or ASME B16.42.
4. Mechanical Joint Fittings: In accordance with AWWA C110/A21.10 and AWWA C153/A21.53.
- E. Welded Outlet: Only weld to pipe in manufacturer’s shop.
- F. Lining: Pipe and fittings for wastewater applications shall be epoxy lined with Permox CTF, Tnemec Permashield, or Owner-approved equal.

G. Coating:

1. Exposed to be coated with System No. 5:

- a. System No. 5 Exposed Metal—Mildly Corrosive:

Surface Prep.	Paint Material	Min. Coats, Cover
SP 10, Near-White Blast Cleaning	Epoxy Primer – Ferrous Metal	1 coat, 2.5 MDFT
	Polyurethane Enamel	1 coat, 3 MDFT

H. Polyethylene Encasement:

1. Virgin polyethylene raw material conforming to requirements of ASTM D4976.
2. Elongation: 800 percent, minimum, in machine and transverse direction (ASTM D882).
3. Tensile Strength: 3,600 psi, minimum.
4. Dielectric Strength: 800V per mil-thickness, minimum.
5. Propagation Tear Resistance: 2,550-gram force (gf), minimum, in machine and transverse direction (ASTM D1922).
6. Tube Form: Conform to AWWA C105/A21.5.
7. Film: 0.008-inch (8 mil) thick, minimum.
8. Number of Film Layers: One.

I. Bolting:

1. Flanged Connection Bolts: Carbon steel, ASTM A307, Grade A hex bolts and ASTM A563, Grade A hex head nuts.
2. Grooved End Connections Bolts: Manufacturer’s standard.

J. Gaskets:

1. Flat Faced Flange Gaskets:
  - a. Pipe Smaller than 54 Inches: Rated for working pressure 150 psi to 250 psi, 1/8-inch thick, red rubber (SBR), hardness 80 (Shore A), rated to 200 degrees F, conforming to ASME B16.21, AWWA C207, and ASTM D1330, Grade 1 and Grade 2.

## 2.02 SOURCE QUALITY CONTROL

### A. Factory Tests:

1. General:
  - a. Tests shall be performed on pipe with metal thickness equal to that specified.
  - b. Only pipe that passes leak test shall be shipped.
2. Hydrostatic Proof Test:
  - a. All Pipe: Perform at 500 psi for a minimum duration of 10 seconds.
  - b. Pipe 30 Inches and Larger: Additionally test to 75 percent of minimum yield strength during test duration which shall not be less than 15 seconds.
  - c. Record each test cycle on a strip chart.
  - d. Each test cycle for 30-inch and larger pipe shall be marked by pipe number.
  - e. Inspect each pipe during testing for leaks.
  - f. Pipe which shows evidence of leaks shall be scrapped.
  - g. Repair welding of leaks is not permitted.
3. Perform a 15-psi air test on welded-on outlet pipe.
4. Pipe ends (spigot end, bell and socket) shall be gauged with suitable gauges at sufficiently frequent intervals to ensure compliance to standard dimensions of AWWA C151/A21.51.
  - a. In addition, each socket and spigot shall be inspected in a well-lighted area for injurious defects which could affect the joint performance.
  - b. Remove defects by cutting of pipe ends.
  - c. Pipe with injurious defects in the bell shall be scrapped.
  - d. Manufacturer shall have a recommended ovality tolerance for pipes 18 inches inch and larger.
  - e. Each end of each 18-inch and larger pipe shall be measured and approved by manufacturer's quality assurance inspector to meet tolerances.
5. Submit a certified inspection report from the independent agency of witnessed tests within 10 days of the inspection: Test results shall show restrained joints in the sizes specified have been successfully tested to at least twice the specified pressure rating of the joint without leakage or failure.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Inspect pipe and fittings to ensure no cracked, broken, or otherwise defective materials are being used.

#### **3.02 PREPARATION**

- A. Trench Grade:
  - 1. When specified, grade bottom of trench by hand to specified line and grade with proper allowance for pipe thickness and pipe base. Trench bottom shall form a continuous and uniform bearing and support for pipe between bell holes.
  - 2. Before laying each section of pipe, check grade and correct irregularities found. Grade may be disturbed for removal of lifting tackle.
- B. Pipe Bedding: Place and compact pipe bedding material as follows:
  - 1. Install to full width of trench, from the following depths below bottom to springline of pipe:
    - a. Pipe 12-Inch Diameter: 4 inches to 6 inches.
    - b. Pipe Larger than 12-Inch Diameter: 6 inches to 8 inches.
  - 2. Compact to at least 95 percent of its maximum density as determined by AASHTO T99.
  - 3. Ensure that no unfilled or uncompacted areas occur beneath pipe.
- C. Bell (Joint) Holes: At each joint, dig bell holes of ample dimensions in bottom of trench, and at sides where necessary, to permit joint to be made properly and to permit easy visual inspection of entire joint.

#### **3.03 INSTALLATION**

- A. General:
  - 1. Provide and use proper implements, tools, and facilities for safe and proper prosecution of the Work.
  - 2. Lower pipe, fittings, and appurtenances into trench, piece by piece, by means of a crane, slings, or other suitable tools and equipment, in such a manner as to prevent damage to pipe materials, protective coatings and linings.
  - 3. Do not drop or dump pipe materials into trench.

B. Cleaning Pipe and Fittings:

1. Remove lumps, blisters, and excess coal tar coating from bell and spigot ends of each pipe. Wire brush outside of spigot and inside of bell and wipe clean, dry, and free from oil and grease before pipe is laid.
2. Wipe ends of mechanical joint pipe and fittings and of rubber gasket joint pipe and fittings clean of dirt, grease, and foreign matter.

C. Laying Pipe:

1. Direction of Laying: Lay pipe with bell end facing in direction of laying. For lines on an appreciable slope, face bells upgrade at discretion of Engineer.
2. Mechanical Joint, Push-On Joint, and Restrained Joint Pipe: After first length of pipe is installed in trench, secure pipe in place with approved backfill material tamped under and along sides to prevent movement. Keep ends clear of backfill. After each section is jointed, place backfill as specified to prevent movement.
3. Take precautions necessary to prevent floating of pipe prior to completion of backfill operation.
4. When using movable trench shield, take necessary precautions to prevent pipe joints from pulling apart when moving shield ahead.
5. Do not allow foreign material to enter pipe while it is being placed in trench.
6. Close and block open end of last laid section of pipe to prevent entry of foreign material or creep of gasketed joints when laying operations are not in progress, at close of day's work, or whenever workers are absent from job.

D. Joining Push-On Joint Pipe and Mechanical Joint Fittings:

1. Join pipe with push-on joints and mechanical joint fittings in accordance with manufacturer's recommendations.
2. Provide special tools and devices, such as, special jacks, chokers, and similar items required for installation.
3. Lubricate pipe gaskets using lubricant furnished by pipe manufacturer. No substitutes will be permitted.
4. Clean ends of fittings of dirt, mud, and foreign matter by washing with water and scrubbing with a wire brush, after which, slip gland and gasket on plain end of pipe. If necessary, lubricate end of pipe to facilitate sliding gasket in place, then guide fitting onto spigot of pipe previously laid.

E. Ball Joint Pipe:

1. Assemble and install in accordance with manufacturer's recommendations.
2. Hydrostatic Test:
  - a. Conduct on ball joint pipe independent of other pipe systems/type being installed.
  - b. Conduct test in accordance with requirements of these Specifications and manufacturer's recommendations.

F. Cutting Pipe:

1. General: Cut pipe for inserting valves, fittings, or closure pieces in a neat and workmanlike manner without damaging pipe or lining and so as to leave a smooth end, at right angles to axis of pipe.
2. Pipe: Cut pipe with milling type cutter or saw. Do not flame cut.
3. Dressing Cut Ends: Dress cut end of mechanical joint pipe to remove sharp edges or projections, which may damage rubber gasket. Dress cut ends of push-on joint pipe by beveling, as recommended by manufacturer.

G. Field Welding:

1. Use of field welded outlets will not be allowed. Welding for outlets shall be performed only in pipe manufacturer's shop.
2. Field installed outlets may be installed with saddle approved by Engineer. Opening in pipe shall be machined cut and not with cutting torch.

H. Line and Grade:

1. Minimum Pipe Cover: 3 feet, unless otherwise indicated.
2. No high points will be allowed between air valves.
3. Maintain pipe grade between invert elevations to provide minimum clearance at air valve locations of 4 feet from existing ground surface to top of pipe.
4. Install air valves as shown and field verify intervening low points. When field conditions warrant, exceptions may be made upon approval of Engineer.
5. Deviations exceeding 6 inches from specified line or 1 inch from specified grade will not be allowed without express approval of Engineer.
6. Pipeline sections that are not installed to elevations shown or installed as approved by Engineer shall be reinstalled to proper elevation.



- I. Thrust Restraint:
  - 1. Restrained joints. Use of thrust blocking will not be allowed.
  - 2. Primary method of restraint shall be through use of restrained joint pipe. Thrust blocking shall be used where detailed on the Drawings and as approved by Engineer.
  - 3. Backfill for Pipe Zone: Place and compact pipe zone material as follows:
  - 4. After pipe bedding is in place, place imported granular material at approximately same rate on each side of pipe.
  - 5. Place such that backfill elevation of is approximately equal on each side of pipe at all times.
  - 6. Place to the following depths:
    - a. 12-Inch Diameter Pipe: 4 inches to 6 inches above top of pipe barrel.
    - b. Pipe Larger than 12 Inches in Diameter: 6 inches to 12 inches above top of pipe barrel.
  - 7. Compact material to top of pipe zone in 6-inch lifts, to at least 95 percent of its maximum density, as determined by AASHTO T99.
- J. Hydrostatic Testing Procedure: Refer to Section 40 80 01, Process Piping Leakage Testing.
- K. Polyethylene Encasement:
  - 1. Encase pipe, fittings, and valves where specified in accordance with AWWA C105/A21.5, Method A.
  - 2. Cut polyethylene tube approximately 2 feet longer than pipe length.
  - 3. Slip tube around pipe, centering to provide 1-foot overlap on each adjacent section.
  - 4. Pull encasement to take out slack and wrap snug around pipe.
  - 5. Secure overlap in place and fold at quarter points of pipe length.
  - 6. Wrap and tape encasement snug around fittings and valves.

### 3.04 HYDROSTATIC TESTING

- A. Hydrostatic Testing Procedure: Refer to Section 40 80 01, Process Piping Leakage Testing.

**END OF SECTION**



**SECTION 33 05 01.09**  
**POLYVINYL CHLORIDE (PVC) PRESSURE PIPE AND FITTINGS**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. American Water Works Association (AWWA):
    - a. C110, Ductile-Iron and Gray-Iron Fittings.
    - b. C153, Ductile-Iron Compact Fittings, for Water Service.
    - c. C605, Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
    - d. C900, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 Inches Through 12 Inches (100 mm Through 300 mm), for Water Transmission and Distribution.
    - e. C905, Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 Inches through 48 Inches (350 mm through 1,200 mm) for Water Transmission and Distribution.
    - f. C907, Injection-Molded Polyvinyl Chloride (PVC) Pressure Fittings, 4 Inches through 12 Inches (100 mm Through 300 mm), for Water, Wastewater, and Reclaimed Water Service.
  2. ASTM International (ASTM):
    - a. D2241, Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
    - b. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
    - c. D2466, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
    - d. D2467, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
    - e. D2672, Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement.
    - f. D2855, Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
    - g. D3139, Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
  3. NSF International (NSF).

## 1.02 SUBMITTALS

- A. Action Submittals: Product data and drawings showing pipe diameter, pipe class, dimension ratio (DR) and fitting details.
- B. Informational Submittals:
  - 1. Manufacturer's Certificate of Compliance, in accordance with Section 01 33 00, Submittal Procedures.
  - 2. Hydrostatic Testing Plan: Submit at least 15 days prior to testing and at minimum, include the following:
    - a. Testing dates.
    - b. Piping systems and section(s) to be tested.
    - c. Method of isolation.
    - d. Method of conveying water from source to system being tested.
    - e. Method of disposing of test water.
    - f. Calculation of maximum allowable leakage for piping section(s) to be tested.
  - 3. Certification of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.
  - 4. Test report documentation.

## 1.03 DELIVERY, STORAGE, AND HANDLING

- A. Per manufacturer's recommendations.

## **PART 2 PRODUCTS**

### 2.01 MATERIALS

- A. Pipe:
  - 1. PVC, conforming to requirements of AWWA C900.
  - 2. DR 25 rating.
- B. Joints:
  - 1. Rubber gasketed.
  - 2. Conform to AWWA C900.
- C. Fittings: Ductile iron, conforming to AWWA C153 or AWWA C110.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. In accordance with AWWA C605.
- B. Joints:
  - 1. Rubber Gasketed: In accordance with manufacturer's written instructions.
- C. Pipe Bending for Horizontal or Vertical Curves:
  - 1. Bending of pipe barrels larger than 12 inches in diameter is not allowed.
  - 2. Radius of curves shall not exceed 75 percent of manufacturer's recommended values.
  - 3. Use blocks or braces at pipe joints to ensure axial deflection in gasketed or mechanical joints does not exceed allowable deflection.
- D. Maximum Joint Deflection at Mechanical Joint: 75 percent of manufacturer's recommended values.

**3.02 INSPECTION AND HYDROSTATIC TESTING**

- A. General:
  - 1. Notify Engineer in writing at least 5 days in advance of testing. Perform testing in presence of Engineer.
  - 2. Using water as test medium, all newly installed pipelines must successfully pass hydrostatic leakage test prior to acceptance.
  - 3. Conduct field hydrostatic test on buried piping after trench has been completely backfilled and compacted. Testing may, as approved by Engineer, be done prior to placement of asphaltic concrete or roadway structural section.
  - 4. Contractor may, if field conditions permit and as approved by Engineer, partially backfill trench and leave joints open for inspection and conduct an initial informal service leak test. Final field hydrostatic test shall not, however, be conducted until backfilling has been completed as specified above.
  - 5. Supply of Temporary Water: In accordance with Section 01 50 00, Temporary Facilities and Controls.
  - 6. Dispose of water used in testing in accordance with federal, state, and local requirements.

7. Install temporary thrust blocking or other restraint as necessary to prevent movement of pipe and protect adjacent piping or equipment. Make necessary taps in piping prior to testing.
  8. Wait a minimum of 5 days after concrete thrust blocking is installed to perform pressure tests. If high-early strength cement is used for thrust blocking, wait may be reduced to 2 days.
  9. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
  10. New Piping Connected to Existing Piping:
    - a. Isolate new piping with grooved-end pipe caps, blind flanges, or other means as acceptable to Engineer.
    - b. Provide appropriate thrust blocking.
- B. Hydrostatic Testing Procedure: Refer to Section 40 80 01, Process Piping Leakage Testing.

**END OF SECTION**

**SECTION 40 05 15  
PIPING SUPPORT SYSTEMS**

**PART 1 GENERAL**

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Society of Civil Engineers (ASCE): 7, Minimum Design Loads for Buildings and Other Structures.
2. American Society of Mechanical Engineers (ASME): B31.1, Power Piping.
3. ASTM International (ASTM):
  - a. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - b. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process.
  - c. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
4. International Code Council (ICC).
5. International Building Code (IBC).
6. International Mechanical Code (IMC).
7. Manufacturers' Standardization Society (MSS):
  - a. SP 58, Pipe Hangers and Supports—Materials, Design and Manufacture.
  - b. SP 127, Bracing for Piping Systems Seismic-Wind-Dynamic Design, Selection, and Application.

1.02 DEFINITIONS

A. Wetted or Submerged: Submerged, less than 1 foot above liquid surface, below top of channel wall, under cover or slab of channel or tank, or in other damp locations.

1.03 SUBMITTALS

A. Action Submittals:

1. Catalog information and drawings of piping support system, locating each support, sway brace, seismic brace, hanger, guide, component, and anchor for piping 6 inches and larger. Identify support, hanger, guide, and anchor type by catalog number and Shop Drawing detail number.
2. Revisions to support systems resulting from changes in related piping system layout or addition of flexible joints.

## 1.04 DESIGN REQUIREMENTS

### A. General:

1. Design, size, and locate piping support systems throughout facility, whether shown or not.
2. Meet requirements of MSS SP 58 and ASME B31.1 or as modified by this section.

### B. Pipe Support Systems:

1. Design pipe support systems for gravity and thrust loads imposed by weight of pipes or internal pressures, including insulation and weight of fluid in pipes.
2. Maximum Support Spacing and Minimum Rod Size: In accordance MSS SP 58 Table 3 and Table 4.
  - a. Ductile-iron Pipe 8 Inches and Under: Maximum span limited to that for standard weight steel pipe for water service.
  - b. Ductile-iron Pipe 10 Inches and Larger: Maximum span limited to 20 feet.

### C. Anchoring Devices: Design, size, and space support anchoring devices, including anchor bolts, inserts, and other devices used to anchor support, to withstand shear and pullout loads imposed by loading and spacing on each particular support.

### D. Vertical Sway Bracing: 10-foot maximum centers or as shown.

### E. Existing Support Systems: Use existing supports systems to support new piping only if Contractor can show they are adequate for additional load, or if they are strengthened to support additional load.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. When specified items are not available, fabricate pipe supports of correct material and to general configuration indicated.
- B. Special support and hanger details may be required for cases where standard catalog supports are not applicable.
- C. Materials: In accordance with Table 1, attached as a Supplement at end of section.



2.02 WALL BRACKETS, SUPPORTS, AND GUIDES

- A. Offset Pipe Clamp: Anvil; Figure 103, sizes 3/4 inch through 8 inches.

2.03 PIPE SADDLES

- A. Provide 90-degree to 120-degree pipe saddle for pipe 6 inches and larger with baseplates drilled for anchors bolts.
  - 1. In accordance with Standard Detail 4005-515.
- B. Saddle Supports, Pedestal Type:
  - 1. Minimum standard weight pipe stanchion, saddle, and anchoring flange.
  - 2. Adjustable Saddle: MSS SP 58, Type 38 without clamp.
    - a. Anvil; Figure 264, sizes 2-1/2 inches through 36 inches with Figure 62C base.
    - b. B-Line; Figure B3092, sizes 3/4 inch through 36 inches with Figure B3088S base.

2.04 ELBOW AND FLANGE SUPPORTS

- A. Elbow with Adjustable Stanchion: Sizes 2 inches through 18 inches, Anvil; Figure 62C base.
- B. Flange Support with Adjustable Base: Sizes 2 inches through 24 inches, Standon; Model S89.

2.05 ACCESSORIES

- A. Anchor Bolts:
  - 1. Size and Material: 1/2-inch minimum diameter, stainless steel and as designed by equipment manufacturer.
  - 2. Bolt Length (Extension Above Top of Nut):
    - a. Minimum Length: Flush with top of nut preferred. If not flush, shall be no more than one thread recessed below top of nut.
    - b. Maximum Length: No more than a full nut depth above top of nut.
- B. Hanger Rods, Clevises, Nuts, Sockets, and Turnbuckles: In accordance with MSS SP 58.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

#### **A. General:**

1. Install support systems in accordance with MSS SP 58, unless shown otherwise.
2. Support piping connections to equipment by pipe support and not by equipment.
3. Support no pipe from pipe above it.
4. Support pipe at changes in direction or in elevation, adjacent to flexible joints and couplings, and where shown.
5. Do not use adhesive anchors for attachment of supports to ceiling or walls.
6. Brace hanging pipes against horizontal movement by both longitudinal and lateral sway bracing and to reduce movement after startup.
7. Install pipe anchors where required to withstand expansion thrust loads and to direct and control thermal expansion.
8. Repair mounting surfaces to original condition after attachments are completed.

#### **B. Standard Pipe Supports:**

1. Horizontal Suspended Piping:
  - a. Single Pipes: Clevis hangers or adjustable swivel split-ring.
  - b. Grouped Pipes: Trapeze hanger system.
2. Horizontal Piping Supported from Walls:
  - a. Single Pipes: Wall brackets, or attached to wall, or to wall mounted framing with anchors.
  - b. Stacked Piping: Wall mounted framing system and “J” hangers acceptable for pipe smaller than 3-inch.
  - c. Pipe clamp that resists axial movement of pipe through support is not acceptable. Use pipe rollers supported from wall bracket.
3. Horizontal Piping Supported from Floors:
  - a. Saddle Supports:
    - 1) Pedestal Type, elbow and flange.
    - 2) Provide minimum 1-1/2-inch grout beneath baseplate.
  - b. Floor Mounted Channel Supports:
    - 1) Use for pipe smaller than 3-inch running along floors and in trenches at pipe elevations lower than can be accommodated using pedestal pipe supports.
    - 2) Attach channel framing to floors with baseplate on minimum 1-1/2-inch nonshrink grout and with anchor bolts.
    - 3) Attach pipe to channel with clips or pipe clamps.
4. Vertical Pipe: Support with wall bracket and elbow support, or riser clamp on floor penetration.

3.02 SUPPLEMENTS

A. The supplement listed below, following “End of Section,” is a part of this Specification:

1. Table 1: Nonchemical Areas.

**END OF SECTION**



<b>Table 1 Nonchemical Areas</b>	
<b>Exposure Conditions</b>	<b>Support Material</b>
Process Areas: Wetted or Submerged	Stainless steel
Notes: 1. Stainless steel to be Type 316.	



**SECTION 40 27 00**  
**PROCESS PIPING—GENERAL**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section and any supplemental Data Sheets:
1. Air Force: A-A-58092, Tape, Antiseize, Polytetrafluorethylene.
  2. American Association of State Highway and Transportation Officials (AASHTO): HB-17, Standard Specifications for Highway Bridges.
  3. American Petroleum Institute (API): SPEC 5L, Specification for Line Pipe.
  4. American Society of Mechanical Engineers (ASME):
    - a. Boiler and Pressure Vessel Code, Section IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.
    - b. B1.20.1, Pipe Threads, General Purpose (Inch).
    - c. B16.1, Gray Iron Pipe Flanges and Flanged Fittings Classes 25, 125, and 250.
    - d. B16.3, Malleable Iron Threaded Fittings Classes 150 and 300.
    - e. B16.5, Pipe Flanges and Flanged Fittings NPS 1/2 through NPS 24 Metric/Inch Standard.
    - f. B16.9, Factory-Made Wrought Buttwelding Fittings.
    - g. B16.11, Forged Fittings, Socket-Welding and Threaded.
    - h. B16.15, Cast Copper Alloy Threaded Fittings Classes 125 and 250.
    - i. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges.
    - j. B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
    - k. B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings Classes 150, 300, 600, 900, 1500, and 2500.
    - l. B16.25, Buttwelding Ends.
    - m. B16.42, Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300.
    - n. B31.1, Power Piping.
    - o. B31.3, Process Piping.
    - p. B31.9, Building Services Piping.
    - q. B36.10M, Welded and Seamless Wrought Steel Pipe.
  5. American Society for Nondestructive Testing (ASNT): SNT-TC-1A, Recommended Practice for Personal Qualification and Certification in Nondestructive Testing.

6. American Water Works Association (AWWA):
  - a. C104/A21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
  - b. C105/A21.5, Polyethylene Encasement for Ductile-Iron Pipe Systems.
  - c. C110/A21.10, Ductile-Iron and Gray-Iron Fittings.
  - d. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
  - e. C115/A21.15, Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
  - f. C151/A21.51, Ductile-Iron Pipe, Centrifugally Cast.
  - g. C153/A21.53, Ductile-Iron Compact Fittings.
  - h. C207, Steel Pipe Flanges for Waterworks Service, Sizes 4 In. Through 144 In. (100 mm Through 3,600 mm).
  - i. C606, Grooved and Shouldered Joints.
7. American Welding Society (AWS):
  - a. Brazing Handbook.
  - b. A5.8M/A5.8, Specification for Filler Metals for Brazing and Braze Welding.
  - c. D1.1/D1.1M, Structural Welding Code - Steel.
  - d. QC1, Standard for AWS Certification of Welding Inspectors.
8. ASTM International (ASTM):
  - a. A47/A47M, Standard Specification for Ferritic Malleable Iron Castings.
  - b. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - c. A105/A105M, Standard Specification for Carbon Steel Forgings for Piping Applications.
  - d. A106/A106M, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
  - e. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
  - f. A135/A135M, Standard Specification for Electric-Resistance-Welder Steel Pipe.
  - g. A139/A139M, Standard Specification for Electro-Fusion (Arc)-Welded Steel Pipe (NPS 4 Inches and Over).
  - h. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - i. A181/A181M, Standard Specification for Carbon Steel Forgings, for General-Purpose Piping.
  - j. A182/A182M, Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
  - k. A183, Standard Specification for Carbon Steel Track Bolts and Nuts.



- l. A193/A193M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
- m. A194/A194M, Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both.
- n. A197/A197M, Standard Specification for Cupola Malleable Iron.
- o. A216/A216M, Standard Specification for Steel Castings, Carbon, Suitable for Fusion Welding, for High-Temperature Service.
- p. A234/A234M, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
- q. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- r. A276, Standard Specification for Stainless Steel Bars and Shapes.
- s. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- t. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- u. A312/A312M, Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
- v. A320/A320M, Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
- w. A351/A351M, Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.
- x. A395/A395M, Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
- y. A403/A403M, Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings.
- z. A409/A409M, Standard Specification for Welded Large Diameter Austenitic Steel Pipe for Corrosive or High-Temperature Service.
- aa. A536, Standard Specification for Ductile Iron Castings.
- bb. A563, Standard Specification for Carbon and Alloy Steel Nuts.
- cc. A587, Standard Specification for Electric-Resistance-Welded Low-Carbon Steel Pipe for the Chemical Industry.
- dd. A743/A743M, Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application.
- ee. A744/A744M, Standard Specification for Castings, Iron-Chromium-Nickel, Corrosion Resistant, for Severe Service.
- ff. A774/A774M, Standard Specification for As-Welded Wrought Austenitic Stainless Steel Fittings for General Corrosive Service at Low and Moderate Temperatures.

- gg. A778, Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products.
- hh. B32, Standard Specification for Solder Metal.
- ii. B43, Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
- jj. B61, Standard Specification for Steam or Valve Bronze Castings.
- kk. B62, Standard Specification for Composition Bronze or Ounce Metal Castings.
- ll. B75/B75M, Standard Specification for Seamless Copper Tube.
- mm. B88, Standard Specification for Seamless Copper Water Tube.
- nn. B98/B98M, Standard Specification for Copper-Silicon Alloy Rod, Bar and Shapes.
- oo. B462, Standard Specification for Forged or Rolled UNS N06030, UNS N06022, UNS N06035, UNS N06200, UNS N06059, UNS N10362, UNS N06686, UNS N08020, UNS N08024, UNS N08026, UNS N08367, UNS N10276, UNS N10665, UNS N10675, UNS N10629, UNS N08031, UNS N06045, UNS N06025, and UNS R20033 Alloy Pipe Flanges, Forged Fittings, and Valves and Parts for Corrosive High-Temperature Service.
- pp. B464, Standard Specification for Welded UNS N08020 Alloy Pipe.
- qq. B474, Standard Specification for Electric Fusion Welded Nickel and Nickel Alloy Pipe.
- rr. C582, Standard Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment.
- ss. D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- tt. D413, Standard Test Methods for Rubber Property-Adhesion to Flexible Substrate.
- uu. D543, Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.
- vv. D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.
- ww. D1330, Standard Specification for Rubber Sheet Gaskets.
- xx. D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
- yy. D1785, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- zz. D2000, Standard Classification System for Rubber Products in Automotive Applications.

- aaa. D2310, Standard Classification for Machine-Made “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
  - bbb. D2464, Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
  - ccc. D2466, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
  - ddd. D2467, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
  - eee. D2564, Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
  - fff. D2837, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
  - ggg. D2996, Standard Specification for Filament-Wound “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.
  - hhh. D3222, Standard Specification for Unmodified Poly(Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials.
  - iii. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
  - jjj. D4101, Standard Specification for Polypropylene Injection and Extrusion Materials.
  - kkk. D4894, Standard Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials.
  - lll. D4895, Standard Specification for Polytetrafluoroethylene (PTFE) Resin Produced from Dispersion.
  - mmm. F423, Standard Specification for Polytetrafluoroethylene (PTFE) Plastic-Lined Ferrous Metal Pipe, Fittings, and Flanges.
  - nnn. F436, Standard Specification for Hardened Steel Washers.
  - ooo. F437, Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
  - ppp. F439, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
  - qqq. F441/F441M, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
  - rrr. F493, Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
  - sss. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
  - ttt. F656, Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings.
- 9. FM Global (FM).
  - 10. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS): SP-43, Wrought and Fabricated Butt-Welding Fittings for Low-Pressure, Corrosion Resistant Applications.

11. NSF International (NSF):
  - a. ANSI 61: Drinking Water System Components - Health Effects.
  - b. ANSI 372: Drinking Water System Components - Lead Content.
12. National Electrical Manufacturers Association (NEMA): LI 1, Industrial Laminating Thermosetting Products.
13. National Fire Protection Association (NFPA): 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

## 1.02 DEFINITIONS

### A. Submerged or Wetted:

1. Zone below elevation of: Top face of precast lift station and valve vault walls and cover slabs.

## 1.03 DESIGN REQUIREMENTS

### A. Where pipe diameter, thickness, pressure class, pressure rating, or thrust restraint is not shown or specified, design piping system in accordance with the following:

1. Process Piping: ASME B31.3, normal fluid service unless otherwise specified.
2. Buried Piping: H20-S16 traffic load with 1.5 impact factor, AASHTO HB-17, as applicable.

## 1.04 SUBMITTALS

### A. Action Submittals:

1. Pipe Wall Thickness: Identify wall thickness and rational method or standard applied to determine wall thickness for each size of each different service including exposed, submerged, buried, and concrete-encased installations for Contractor-designed piping.
2. Hydraulic Thrust Restraint for Restrained Joints: Details including materials, sizes, assembly ratings, and pipe attachment methods.
3. Dissimilar Buried Pipe Joints: Joint types and assembly drawings.

### B. Informational Submittals:

1. Manufacturer's Certification of Compliance, in accordance with Section 01 33 00, Submittal Procedures.
2. Flanged Pipe and Fittings: Manufacturer's product data sheets for gaskets including torquing requirements and bolt tightening procedures.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with manufacturers' recommendations, and:
1. Flanges: Securely attach metal, hardboard, or wood protectors over entire gasket surface.
  2. Threaded or Socket Welding Ends: Fit with metal, wood, or plastic plugs or caps.
  3. Linings and Coatings: Prevent excessive drying.
  4. Cold Weather Storage: Locate products to prevent coating from freezing to ground.
  5. Handling: Use heavy canvas or nylon slings to lift pipe and fittings.

**PART 2 PRODUCTS**

2.01 PIPING

- A. Diameters Shown:
1. Standardized Products: Nominal size.
  2. Fabricated Steel Piping (Except Cement-Lined): Outside diameter, ASME B36.10M.

2.02 JOINTS

- A. Flanged Joints:
1. Flat-faced, carbon steel, or alloy flanges when mating with flat-faced cast or ductile iron flanges.
  2. Higher pressure rated flanges as required to mate with equipment when equipment flange is of higher pressure rating than required for piping.
- B. Mechanical Joint Anchor Gland Follower:
1. Ductile iron anchor type, wedge action, with break-off tightening bolts.
  2. Thrust rated to 250 psi minimum.
  3. Rated operating deflection not less than:
    - a. 3 degrees for sizes through 12 inches.
    - b. 2 degrees for sizes 14 inches through 16 inches.
    - c. 1.5 degrees for sizes 18 inches through 24 inches.
    - d. 1 degree for sizes 30 inches through 48 inches.
  4. UL and FM approved.

C. Flexible Mechanical Compression Joint Coupling:

1. Stainless steel, ASTM A276, Type 305 bands.
2. Manufacturers:
  - a. Pipeline Products Corp.
  - b. Fernco Joint Sealer Co.

2.03 GASKET LUBRICANT

- A. Lubricant shall be supplied by pipe manufacturer and no substitute or “Or-equal” will be allowed.

2.04 THRUST BLOCKS

- A. Concrete: Minimum 3,000 psi or as directed by Engineer.

2.05 THRUST TIES

- A. Steel Pipe: Fabricated lugs and rods in accordance with details shown on the Drawings

2.06 VENT AND DRAIN VALVES

- A. Pipeline 2-Inch Diameter and Smaller: 1/2-inch vent, 1-inch drain, unless shown otherwise.
- B. Pipelines 2-1/2-Inch Diameter and Larger: 3/4-inch vent, 1-inch drain, unless shown otherwise.

2.07 FABRICATION

- A. Mark each pipe length on outside with the following:
1. Size or diameter and class.
  2. Manufacturer’s identification and pipe serial number.
  3. Location number on laying drawing.
  4. Date of manufacture.
- B. Shop fabricate flanged pipe in shop, not in field, and delivered to Site with flanges in place and properly faced. Threaded flanges shall be individually fitted and machine tightened on matching threaded pipe by manufacturer.

2.08 FINISHES

- A. Factory prepare, prime, and finish coat in accordance with Pipe Data Sheet(s) and Piping Schedule.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify size, material, joint types, elevation, horizontal location, and pipe service of existing pipelines to be connected to new pipelines or new equipment.
- B. Inspect size and location of structure penetrations to verify adequacy of wall pipes, sleeves, and other openings.

### **3.02 PREPARATION**

- A. Inspect pipe and fittings before installation, clean ends thoroughly, and remove foreign matter and dirt from inside.
- B. Damaged Coatings and Linings: Repair using original coating and lining materials in accordance with manufacturer's instructions

### **3.03 INSTALLATION—GENERAL**

- A. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.
- B. Remove foreign objects prior to assembly and installation.
- C. Flanged Joints:
  - 1. Install perpendicular to pipe centerline.
  - 2. Bolt Holes: Straddle vertical centerlines, aligned with connecting equipment flanges or as shown.
  - 3. Use torque-limiting wrenches to ensure uniform bearing and proper bolt tightness.
  - 4. Raised-Face Flanges: Use flat-face flange when joining with flat-faced ductile or cast iron flange.
  - 5. Verify compatibility of mating flange to adapter flange gasket prior to selecting grooved adapter flanging.
  - 6. Flange fillers are to be avoided, but if necessary, may be used to make up for small angles up to 6 degrees and for filling gaps up to 2 inches between flanges. Stacked flange fillers shall not be used.
  - 7. Threaded flanged joints shall be shop fabricated and delivered to Site with flanges in-place and properly faced.
  - 8. Manufacturer: Same as pipe manufacturer.

- D. Pipe Connections at Concrete Structures: As shown on the Drawings or as directed by Engineer.
- E. PVC and CPVC Piping:
  - 1. Provide Schedule 80 threaded nipple where necessary to connect to threaded valve or fitting.
  - 2. Use strap wrench for tightening threaded plastic joints. Do not overtighten fittings.
  - 3. Do not thread Schedule 40 pipe.
- F. Ductile Iron Piping:
  - 1. Cutting Pipe: Cut pipe with milling type cutter, rolling pipe cutter, or abrasive blade cutter. Do not flame cut.
  - 2. Dressing Cut Ends:
    - a. General: As required for the type of joint to be made.
    - b. Rubber Gasketed Joints: Remove sharp edges or projections.
    - c. Push-On Joints: Bevel, as recommended by pipe manufacturer.
    - d. Flexible Couplings, Flanged Coupling Adapters, and Grooved End Pipe Couplings: As recommended by the coupling or adapter manufacturer.

### 3.04 INSTALLATION—EXPOSED PIPING

- A. Piping Runs:
  - 1. Parallel to building or column lines and perpendicular to floor, unless shown otherwise.
  - 2. Piping upstream and downstream of flow measuring devices shall provide straight lengths as required for accurate flow measurement.
- B. Supports: As specified in Section 40 05 15, Piping Support Systems.
- C. Unions or Flanges: Provide at each piping connection to equipment or instrumentation on equipment side of each block valve to facilitate installation and removal.
- D. Install piping so that no load or movement in excess of that stipulated by equipment manufacturer will be imposed upon equipment connection; install to allow for contraction and expansion without stressing pipe, joints, or connected equipment.



- E. Piping clearance, unless otherwise shown:
1. From Adjacent Work: Minimum 6 inches from nearest extremity of completed piping system including flanges, valve bodies or mechanisms, insulation, or hanger/support systems.
  2. Do not route piping in front of or to interfere with access ways, ladders, stairs, platforms, walkways, openings, doors, or windows.
  3. Do not route piping over, around, in front of, in back of, or below electrical equipment including controls, panels, switches, terminals, boxes, or other similar electrical work.

### 3.05 INSTALLATION—BURIED PIPE

- A. Joints:
1. Dissimilar Buried Pipes: Provide flexible mechanical compression joints for pressure pipe.
  2. Concrete Encased or Embedded Pipe: Do not encase joints in concrete, unless specifically shown.
- B. Placement:
1. Keep trench dry until pipe laying and joining are completed.
  2. Pipe Base and Pipe Zone: As specified in Section 31 23 23.15, Trench Backfill.
  3. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.
  4. Measure for grade at pipe invert, not at top of pipe.
  5. Excavate trench bottom and sides of ample dimensions to permit visual inspection and testing of entire flange, valve, or connection.
  6. Prevent foreign material from entering pipe during placement.
  7. Close and block open end of last laid pipe section when placement operations are not in progress and at close of day's work.
  8. Lay pipe upgrade with bell ends pointing in direction of laying.
  9. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:
    - a. Shorter pipe lengths.
    - b. Special mitered joints.
    - c. Standard or special fabricated bends.
  10. After joint has been made, check pipe alignment and grade.
  11. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.
  12. Prevent uplift and floating of pipe prior to backfilling.

C. PVC Pipe Placement:

1. Lay pipe snaking from one side of trench to other.
2. Offset: As recommended by manufacturer for maximum temperature variation between time of solvent welding and during operation.
3. Do not lay pipe when temperature is below 40 degrees F, or above 90 degrees F when exposed to direct sunlight.
4. Shield ends to be joined from direct sunlight prior to and during the laying operation.

D. Tolerances:

1. Deflection from Horizontal Line: Maximum 2 inches.
2. Deflection From Vertical Grade: Maximum 1/4 inch.
3. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.
4. Pipe Cover: Minimum 3 feet, unless otherwise shown.

3.06 PIPE CORROSION PROTECTION

A. Piping Accessories:

1. Exposed: Stainless steel.
2. Buried: Stainless steel.

3.07 THRUST RESTRAINT

A. Location:

1. Buried Piping: Where shown and where required to restrain force developed at pipeline tees, plugs, caps, bends, and other locations where unbalanced forces exist because of hydrostatic testing and normal operating pressure.
2. Exposed Piping: At all joints in piping.

B. Thrust Blocking:

1. Place between undisturbed ground and fitting to be anchored.
2. Quantity of Concrete: Sufficient to cover bearing area on pipe and provide required soil bearing area as shown.
3. Place blocking so that pipe and fitting joints will be accessible for repairs.
4. Place concrete in accordance with industry design standard requirements.

3.08 PIPE IDENTIFICATION

A. As specified in Section 31 23 23.15, Trench Backfill.

3.09 FIELD QUALITY CONTROL

A. Pressure Leakage Testing: As specified in Section 40 80 01, Process Piping Leakage Testing.

3.10 SUPPLEMENTS

A. The supplements listed below, following “End of Section,” are a part of this Specification:

1. Piping Schedule Legend.
2. Data Sheets.

<b>Number</b>	<b>Title</b>
40 27 00.01	Cement-Mortar-Lined Ductile Iron Pipe and Fittings
40 27 00.08	Stainless Steel Pipe and Fittings – General Service

**END OF SECTION**



**PIPING SCHEDULE LEGEND**

**SERVICE**

SS Sanitary Sewer

V Vents

FM Forcemain

**EXPOSURE**

ALL All

BUR Buried

EXP Exposed

**MATERIAL**

DI Ductile Iron

PVC Polyvinyl Chloride

SST Stainless Steel

**JOINT TYPE**

FL Flanged

PRJ Proprietary Restrained

RM Restrained Mechanical

**PRESSURE TEST**

G Gravity Service: Test pressure is not shown on gravity services. Test to highest liquid level that pipe can be subject to.

H Hydrostatic

NA Not Applicable



<b>SECTION 40 27 00.01 CEMENT-MORTAR-LINED DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
General	<p>Materials in contact with potable water shall conform to NSF 61 acceptance.</p> <p>Pipe manufacturer shall submit certification that source manufacturing facility has been producing ductile iron pipe of the specified diameters, dimensions, and standards for a period of not less than 10 years. Testing of pipe required by AWWA A21.51 shall be conducted in testing and laboratory facilities located in the USA and operating under USA laws and regulations. Pipe shall be handled during manufacture and shipped without nesting (without insertion of one pipe inside another).</p>
Pipe	<p>Buried Liquid Service Using Push-on, Mechanical, or Proprietary Restrained Joints: AWWA C111/A21.11, and AWWA C151/A21.51, pressure class conforming to Table 5 and Table 7 for Type 4 trench, 250 psi minimum working pressure. Follower glands shall be ductile iron.</p> <p>Exposed Pipe Using Grooved End and Flange Joints: AWWA C115/A21.15, thickness Class 53 minimum, 250 psi minimum working pressure.</p>
Lining	Epoxy lined. Acceptable products include Permox CTF and Tnemc permashield

<b>SECTION 40 27 00.01 CEMENT-MORTAR-LINED DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
Fittings	<p>Lined and coated same as pipe.</p> <p>Push-on: AWWA C110/A21.10, AWWA C111/A21.11, and AWWA C153/A21.53 ductile iron, 250 psi minimum working pressure. American Cast Iron Pipe Co., Fastite Joint; U.S. Pipe and Foundry, Tyton Joint.</p> <p>Mechanical: AWWA C110/A21.10, AWWA C111/A21.11, and AWWA C153/A21.53 ductile iron, 250 psi minimum working pressure. Follower glands shall be ductile iron.</p> <p>Proprietary Restrained: AWWA C110/A21.10, AWWA C111/A21.11, and AWWA C153/A21.53, ductile iron, 250 psi minimum working pressure. Restraint shall be achieved with removable metal elements fitted between a welded bar on the pipe barrel and the inside of the joint bell or fitting sizes smaller than 16 inches may be mechanical joint, restrained by anchor gland followers, ductile iron anchor type, wedge action, with break-off tightening bolts. Assembled joints shall be rated for deflection in operation at rated pressure. Rated deflection shall be not less than 1-1/2 degrees for 36-inch and smaller pipe. Rated deflection shall be not less than 1/2 degree for 42-inch and larger pipe. Clow Corp., American Cast Iron Pipe Co., U.S. Pipe. Restrained joints relying on metal teeth molded into the gasket to prevent joint separation under pressure will not be accepted.</p> <p>Flange: AWWA C110/A21.10 ductile iron, faced and drilled, Class 125 flat face. Gray cast iron will not be allowed.</p>
Joints	<p>Push-on: 250 psi minimum working pressure, AWWA C110/A21.10 and AWWA C111/A21.11. American Cast Iron Pipe Co., Fastite Joint; U.S. Pipe and Foundry, Tyton Joint.</p> <p>Mechanical: 250 psi minimum working pressure.</p> <p>Proprietary Restrained: 150 psi minimum working pressure. Clow Corp., Super-Lock; American Cast Iron Pipe Co., Flex-Ring or Lok-Ring; U.S. Pipe, TR Flex.</p> <p>Grooved End: Rigid type radius cut conforming to AWWA C606, 250 psi minimum working pressure; Victaulic.</p> <p>Flange: Class 125 flat face, ductile iron, threaded conforming to AWWA C115/A21.15. Gray cast iron will not be allowed.</p> <p>Branch connections 3 inches and smaller, shall be made with service saddles as shown on the Drawings.</p>



<b>SECTION 40 27 00.01 CEMENT-MORTAR-LINED DUCTILE IRON PIPE AND FITTINGS</b>	
<b>Item</b>	<b>Description</b>
Bolting	<p>Mechanical, Proprietary Restrained, and Grooved End Joints: Manufacturer's standard.</p> <p>Class 125 Flat-Faced Flange: Type 316 stainless steel, ASTM A320/A320M, Grade B8M hex head bolts; ASTM A194/A194M, Grade 8M hex nuts and ASTM F436/F436M Type 3 alloy washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.</p>
Gaskets	<p>General: Gaskets in contact with potable water shall be NSF 61 certified.</p> <p>Push-on, Mechanical, and Proprietary Restrained Joints; Water and Sewage Service: Rubber conforming to AWWA C111/A21.11.</p> <p>Flanged, Water, Sewage: 1/8-inch-thick, homogeneous black rubber (EPDM), hardness 60 (Shore A), rated to 275 degrees F, conforming to ASME B16.21 and ASTM D2000 4CA 415 A25 B35 C32 EA14 F19.</p> <p>Full face for Class 125 flat-faced flanges, flat-ring type for Class 250 raised-face flanges. Blind flanges shall be gasketed covering entire inside face with gasket cemented to blind flange.</p> <p>Gasket pressure rating to equal or exceed the system hydrostatic test pressure.</p>
Joint Lubricant	Manufacturer's standard.

**END OF SECTION**



<b>SECTION 40 27 00.08 STAINLESS STEEL PIPE AND FITTINGS—GENERAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Pipe	2-1/2" & smaller	Schedule 40S: ASTM A312/A312M, Type 316 seamless, pickled and passivated.
	3" thru 6"	Schedule 10S: ASTM A312/A312M, Type 316L, pickled and passivated.
	8" & larger	Schedule 5S: ASTM A312/A312M, Type 316L, pickled and passivated.
Joints	1-1/2" & smaller	Threaded or flanged at equipment as required or shown.
	2" & larger	Butt-welded or flanged at valves and equipment.
Fittings	1-1/2" & smaller	Threaded: Forged 1,000 CWP minimum, ASTM A182/A182M, Grade F316 or cast Class 150, ASTM A351/A351M, Grade CF8M/316.
	2" & 2-1/2"	Butt Welded: ASTM A403/A403M, Grade WP316L conforming to ASME B16.9 and MSS SP 43, annealed, pickled and passivated; fitting wall thickness to match adjoining pipe; long radius elbows, unless shown otherwise.
	3" & larger	Butt-Welded: ASTM A403/A403M, Type 316L pickled and passivated; fitting wall thickness to match adjoining pipe; long radius elbows, unless shown otherwise.
Branch Connections	1-1/2" & smaller	Tee or reducing tee in conformance with fittings above.
	2" & larger	Butt-welding tee or reducing tee in accordance with fittings above.

<b>SECTION 40 27 00.08 STAINLESS STEEL PIPE AND FITTINGS—GENERAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Flanges	All	<p>Forged Stainless Steel: ASTM A182/A182M, Grade F316L, ASME B16.5 Class 150 or Class 300, slip-on weld neck or raised face. Weld slip-on flanges inside and outside.</p> <p>Cast Carbon Steel: ASTM A216/A216M Grade WCA, drilled, ASME B16.5 Class 150 or Class 300 Van Stone Type with stainless steel stub ends, ASTM A240/A240M Type 316L “as-welded grade”, conforming to MSS SP 43, wall thickness same as pipe.</p> <p>Blind Flanges, exposed to the atmosphere and not buried nor immersed in liquid, may be either stainless steel or Class 125 ductile iron or Class 150 carbon steel with gaskets as specified herein.</p>
Unions	2" & smaller	<p>Threaded Forged: ASTM A182/A182M, Grade F316, 2,000-pound or 3,000-pound WOG, integral ground seats, AAR design meeting the requirements of ASME B16.11, bore to match pipe.</p>

<b>SECTION 40 27 00.08 STAINLESS STEEL PIPE AND FITTINGS—GENERAL SERVICE</b>		
<b>Item</b>	<b>Size</b>	<b>Description</b>
Bolting	All	<p>Forged Flanges: Type 316 stainless steel, ASTM A320/A320M Grade B8M hex head bolts, ASTM A194/A194M Grade 8M hex head nuts and ASTM F436 Type 3 alloy washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.</p> <p>Van Stone Flanges and anywhere mating flange on equipment is cast iron and gasket is flat ring: Carbon steel ASTM A307 Grade B hex head bolts, ASTM A563 Grade A hex head nuts and ASTM F436 hardened steel washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.</p> <p>Flanged Joints in Sumps, Wet Wells, and Submerged and Wetted Installations: Type 316 stainless steel, ASTM A320/A320M, Grade B8M hex head bolts and ASTM A194/A194M, Grade 8M hex nuts and ASTM F436 Type 3 alloy washers at nuts and bolt heads. Achieve 40 percent to 60 percent of bolt minimum yield stress.</p>
Gaskets	All Flanges	<p>Flanged, Water, Hot Air, Fuel Gas and Sewage Services: 1/8 inch thick, homogeneous black rubber (EPDM), hardness 60 (Shore A), rated to 250 degreesF. continuous and conforming to ASME B16.21 and ASTM D1330, Steam Grade.</p> <p>Blind Flanges: Gasketed covering entire inside face with gasket cemented to blind flange.</p>
Thread Lubricant	2" & smaller	General Service: 100 percent virgin PTFE Teflon tape.

**END OF SECTION**



**SECTION 40 27 02**  
**PROCESS VALVES AND OPERATORS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Gas Association (AGA): 3, Orifice Metering of Natural Gas and Other Related Hydrocarbon Fluids.
  2. American National Standards Institute (ANSI): Z21.15, Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves.
  3. American Society of Mechanical Engineers (ASME):
    - a. B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
    - b. B16.44, Manually Operated Metallic Gas Valves for Use in Above Ground Piping Systems up to 5 psi.
  4. American Society of Sanitary Engineers (ASSE): 1011, Performance Requirements for Hose Connection Vacuum Breakers.
  5. American Water Works Association (AWWA):
    - a. C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
    - b. C500, Metal-Seated Gate Valves for Water Supply Service.
    - c. C504, Rubber-Seated Butterfly Valves, 3 In. (75 mm) Through 72 In. (1,800 mm).
    - d. C508, Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS.
    - e. C509, Resilient-Seated Gate Valves for Water Supply Service.
    - f. C510, Double Check Valve Backflow Prevention Assembly.
    - g. C511, Reduced-Pressure Principle Backflow Prevention Assembly.
    - h. C512, Air-Release, Air/Vacuum, and Combination Air Valves for Waterworks Service.
    - i. C515, Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service.
    - j. C541, Hydraulic and Pneumatic Cylinder and Vane-Type Actuators for Valves and Slide Gates.
    - k. C542, Electric Motor Actuators for Valves and Slide Gates.
    - l. C550, Protective Interior Coatings for Valves and Hydrants.
    - m. C606, Grooved and Shouldered Joints.
    - n. C800, Underground Service Line Valves and Fittings.

6. ASTM International (ASTM):
  - a. A276, Standard Specification for Stainless Steel Bars and Shapes.
  - b. A351/A351M, Standard Specification for Castings, Austenitic, for Pressure-Containing Parts.
  - c. A380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
  - d. A564/A564M, Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes.
  - e. B61, Standard Specification for Steam or Valve Bronze Castings.
  - f. B62, Standard Specification for Composition Bronze or Ounce Metal Castings.
  - g. B98/B98M, Standard Specification for Copper-Silicon Alloy Rod, Bar, and Shapes.
  - h. B127, Standard Specification for Nickel-Copper Alloy (UNS N04400) Plate, Sheet, and Strip.
  - i. B139/B139, Standard Specification for Phosphor Bronze Rod, Bar and Shapes.
  - j. B164, Standard Specification for Nickel-Copper Alloy Rod, Bar, and Wire.
  - k. B194, Standard Specification for Copper-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar.
  - l. B584, Standard Specification for Copper Alloy Sand Castings for General Applications.
  - m. D429, Standard Test Methods for Rubber Property-Adhesion to Rigid Substrates.
  - n. D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
7. Canadian Standards Association, Inc. (CSA): 9.1, Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves.
8. Chlorine Institute (CI): Pamphlet 6, Piping Systems for Dry Chlorine.
9. FM Global (FM).
10. Food and Drug Administration (FDA).
11. International Association of Plumbing and Mechanical Officials (IAPMO).
12. Manufacturers Standardization Society (MSS):
  - a. SP-80, Bronze Gate, Globe, Angle, and Check Valves.
  - b. SP-81, Stainless Steel, Bonnetless, Flanged Knife Gate Valves.
  - c. SP-85, Gray Iron Globe and Angle Valves, Flanged and Threaded Ends.
  - d. SP-88, Diaphragm Valves.
  - e. SP-110, Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.



13. National Electrical Manufacturers Association (NEMA): 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
14. NSF International (NSF):
  - a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
  - b. NSF/ANSI 372, Drinking Water System Components - Lead Content.
15. UL.
16. USC Foundation for Cross-Connection Control and Hydraulic Research.

## 1.02 SUBMITTALS

### A. Action Submittals:

1. Shop Drawings:
  - a. Product data sheets for each make and model. Indicate valve Type Number, applicable Tag Number, and facility name/number or service where used.
  - b. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
  - c. Sizing calculations for open-close/throttle and modulating valves.

### B. Informational Submittals:

1. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, for:
  - a. Electric actuators; full compliance with AWWA C542.
  - b. Butterfly valves; full compliance with AWWA C504.
2. Operation and Maintenance Data as specified in Section 01 78 23, Operation and Maintenance Data.
3. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.

## **PART 2 PRODUCTS**

### 2.01 GENERAL

- A. Valves to include operator, actuator, handwheel, chain wheel, extension stem, floor stand, operating nut, chain, wrench, and accessories to allow a complete operation from the intended operating level.
- B. Valve to be suitable for intended service. Renewable parts not to be of a lower quality than specified.
- C. Valve same size as adjoining pipe, unless otherwise called out on Drawings or in Supplements.

- D. Valve ends to suit adjacent piping.
- E. Resilient seated valves shall have no leakage (drip-tight) in either direction at valve rated design pressure. All other valves shall have no leakage (drip-tight) in either direction at valve rated design pressure, unless otherwise allowed for in this section or in stated valve standard.
- F. Size operators and actuators to operate valve for full range of pressures and velocities.
- G. Valve to open by turning counterclockwise, unless otherwise specified.
- H. Factory mount operator, actuator, and accessories.
- I. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
  - 1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 SCHEDULE

2.03 MATERIALS

- A. Bronze and brass valve components and accessories that have surfaces in contact with water to be alloys containing less than 16 percent zinc and 2 percent aluminum.
  - 1. Approved alloys are of the following ASTM designations: B61, B62, B98/B98M (Alloy UNS No. C65100, C65500, or C66100), B139/B139M (Alloy UNS No. C51000), B584 (Alloy UNS No. C90300 or C94700), B164, B194, and B127.
  - 2. Stainless steel Alloy 18-8 may be substituted for bronze.
- B. Valve materials in contact with or intended for drinking water service to meet the following requirements:
  - 1. Materials to comply with requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements.
  - 2. Coatings materials to be formulated from materials deemed acceptable to NSF/ANSI 61.

## 2.04 FACTORY FINISHING

### A. General:

1. Interior coatings for valves and hydrants shall be in accordance with AWWA C550, unless otherwise specified.
2. Exterior coating for valves and hydrants shall be in accordance with Section 09 90 00, Painting and Coating.
3. Material in contact with potable water shall conform to NSF/ANSI 61.
4. Exposed safety isolation valves and lockout valves with handles, handwheels, or chain wheels shall be “safety yellow.”

### B. Where epoxy lining and coating are specified, factory finishing shall be as follows:

1. In accordance with AWWA C550.
2. Either two-part liquid material or heat-activated (fusion) material except only heat-activated material if specified as “fusion” or “fusion bonded” epoxy.
3. Minimum 7-mil dry film thickness except where limited by valve operating tolerances.

## 2.05 VALVES

### A. Gate Valves:

#### 1. General:

- a. AWWA gate valves to be in full compliance with stated AWWA standard and the following requirements:
  - 1) Provide 2-inch operating nut and handwheel for AWWA gate valves 12 inches and smaller.
  - 2) Provide totally enclosed spur or bevel gear operator with indicator for AWWA gate valves 14 inches and larger.
  - 3) Provide Affidavit of Compliance per the applicable AWWA standard for AWWA gate valves.
  - 4) Mark AWWA gate valves with manufacturer’s name or mark, year of valve casting, valve size, and working water pressure.
  - 5) Repaired AWWA gate valves shall not be submitted or supplied.
  - 6) Supply AWWA gate valves with stainless steel bolting.
  - 7) AWWA C509 and AWWA C515 valves may be substituted for each other.

2. Type V100 Gate Valve 3 Inches and Smaller:
  - a. All-bronze, screwed bonnet, packed gland, single solid wedge gate, nonrising stem, Class 125 rated 200 psi CWP, complies with MSS SP-80 Type 1.
  - b. Manufacturers and Products:
    - 1) Crane; Figure 438, NPT threaded ends.
    - 2) Stockham; Figure B103, NPT threaded ends.
    - 3) Crane; Figure 1324, soldered ends.
    - 4) Stockham; Figure B104, soldered ends.
  - c. All-bronze, screwed bonnet, packed gland, single solid wedge gate, rising stem, Class 125 rated 200 psi CWP, complies with MSS SP-80 Type 2.
  - d. Manufacturers and Products:
    - 1) Crane; Figure 428, NPT threaded ends.
    - 2) Stockham; Figure B-100, NPT threaded ends.
    - 3) Crane; Figure 1334, soldered ends.
    - 4) Stockham; Figure B-108, soldered ends.
3. Type V120 Gate Valve 3 Inches to 48 Inches for Water Service:
  - a. AWWA C500, iron body, bronze mounted, flanged ends, double-disc gate, nonrising bronze stem, working water pressure 200 psi for 3 inches through 12 inches and 150 psi for 14 inches through 48 inches.
  - b. Manufacturers and Products:
    - 1) M&H Valve Company; Style 67.
    - 2) Clow Valve Company; AWWA C500.
4. Type V122 Gate Valve 3 Inches to 48 Inches for Buried Water Service:
  - a. AWWA C500, iron body, bronze mounted, mechanical joint ends, double-disc gate, nonrising bronze stem, 2-inch operating nut, and O-ring sealed stuffing box, working water pressure of 200 psi for 3 inches through 12 inches and 150 psi for 14 inches through 48 inches.
  - b. Manufacturers and Products:
    - 1) M&H Valve Company; Style 67.
    - 2) Clow Valve Company; AWWA C500.

B. Ball Valves:

1. Type V306 Stainless Steel Ball Valve 2 Inches and Smaller:
  - a. Two-piece, full port, ASTM A276 GR 316 or ASTM A351/A351M GR CF8M stainless steel body and end piece, NPT threaded ends, ASTM A276 Type 316 stainless steel ball, reinforced PTFE seats, seals, and packing, adjustable packing gland, blowout proof stainless steel stem, stainless steel lever operator with vinyl grip, rated 1,000 psig CWP, complies with MSS SP-110.

- b. Manufacturers and Products:
  - 1) Conbraco Apollo; 76F-100 Series.
  - 2) Nibco; T-585-S6-R-66-LL.
  
- C. Check and Flap Valves:
  - 1. Type V608 Swing Check Valve 2 Inches to 24 Inches:
    - a. AWWA C508, 125-pound flanged ends, cast-iron body, bronze body seat, bronze mounted cast-iron clapper with bronze seat, stainless steel hinge shaft.
    - b. Valves, 2 inches through 12 inches rated 175-pound WWP and 14 inches through 24 inches rated 150-pound WWP. Valves to be fitted with adjustable outside lever and weight. Increasing-pattern body valve may be used where increased outlet piping size is shown.
    - c. Manufacturers and Products:
      - 1) M&H Valve; Style 59, 159, or 259.
      - 2) Mueller Co.; No. A-2600 Series.
  
- D. Self-Regulated Automatic Valves:
  - 1. Type V752 Sewage Air Release Valve 2 Inches to 4 Inches:
    - a. Suitable for sewage service; automatically exhausts entrained air that accumulates in a system.
    - b. Rated working pressure of 150 psi, typical operating pressure of 60 psi, built and tested to AWWA C512.
    - c. Materials: reinforced nylon body with NPT threaded inlet and outlet.
    - d. Manufacturers and Products: ARI Model S-025.
  - 2. Type V757 Sewage Rolling Seal Combination Air Valve 2 Inches to 8 Inches:
    - a. Designed for sewage service, uses rolling seal to allow smaller and larger amounts of air to automatically exhaust under pressure and air to enter when a vacuum occurs in a single valve body. Body designed to allow sewage solids to flow out of valve.
    - b. Stainless steel funnel shaped body with ASME B16.1 Class 150 flanged inlet and access flanges, reinforced nylon combination air and vacuum valve assembly and polypropylene discharge elbow, 250-psi working pressure, all-bronze drain/flush valve, flushing connection.
    - c. Foamed polypropylene float, EPDM rubber rolling seal mechanism with reinforced nylon plug, plug cover, and clamping stem, Buna-N O-ring.
    - d. Manufacturer and Product: ARI Valves; D-020.

## 2.06 OPERATORS AND ACTUATORS

### A. Manual Operators:

1. General:
  - a. For AWWA valves, operator force not to exceed requirements of applicable valve standard. Provide gear reduction operator when force exceeds requirements.
  - b. For non-AWWA valves, operator force not to exceed applicable industry standard or 80 pounds, whichever is less, under operating condition, including initial breakaway. Provide gear reduction operator when force exceeds requirements.
  - c. Operator self-locking type or equipped with self-locking device.
  - d. Position indicator on quarter-turn valves.
  - e. Worm and gear operators one-piece design, worm-gears of gear bronze material. Worm of hardened alloy steel with thread ground and polished. Traveling nut type operator's threaded steel reach rod with internally threaded bronze or ductile iron nut.
2. Exposed Operator:
  - a. Galvanized and painted handwheel.
  - b. Cranks on gear type operator.
3. Buried Operator:
  - a. Buried service operators on valves larger than 2-1/2 inches shall have a 2-inch AWWA operating nut. Buried operators on valves 2 inches and smaller shall have cross handle for operation by forked key. Enclose moving parts of valve and operator in housing to prevent contact with the soil.
  - b. Buried service operators to be grease packed and gasketed to withstand submersion in water to 20 feet minimum.
  - c. Buried valves shall have extension stems, bonnets, and valve boxes.

## 2.07 ACCESSORIES

- A. Extension Bonnet for Valve Operator: Complete with enclosed stem, extension, support brackets, and accessories for valve and operator.
  1. Manufacturers:
    - a. Pratt.
    - b. DeZurik.
- B. Cast-Iron Valve Box: Designed for traffic loads, sliding type, with minimum of 5-1/4-inch ID shaft.
  1. Box: Cast iron with minimum depth of 9 inches.

2. Lid: Cast iron, minimum depth 3 inches, nonlocking type, marked SEWER.
3. Extensions: Cast iron.
4. Two-piece box and lid for valves 4 inches through 12 inches, three-piece box and lid for valves larger than 12 inches with base sized for valve.
5. Valve extension stem for valves with operating nuts 3 feet or greater below finish grade.
6. Manufacturers and Products:
  - a. East Jordan Iron Works; Cast-Iron Valve Boxes.
  - b. Bingham & Taylor; Cast-Iron Valve Boxes.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

##### **A. Flange Ends:**

1. Flanged valve bolt holes shall straddle vertical centerline of pipe.
2. Clean flanged faces, insert gasket and bolts, and tighten nuts progressively and uniformly.

##### **B. Valve Installation and Orientation:**

1. General:
  - a. Install valves so handles operate from fully open to fully closed without encountering obstructions.
  - b. Install valves in location for easy access for routine operation and maintenance.
  - c. Install valves per manufacturer's recommendations.
2. Gate, Globe, and Ball Valves:
  - a. Install operating stem vertical when valve is installed in horizontal runs of pipe having centerline elevations 4 feet 6 inches or less above finished floor, unless otherwise shown.
  - b. Install operating stem horizontal in horizontal runs of pipe having centerline elevations greater than 4 feet 6 inches above finish floor, unless otherwise shown.
3. Check Valves:
  - a. Install valve in accordance with manufacturer's instructions and provide required distance from immediate upstream fitting.
  - b. Install valve in vertical flow (up) piping only for gas services.
  - c. Install swing check valve with shaft in horizontal position.
  - d. Install double disc swing check valve to be perpendicular to flow pattern when discs are open.

## Blackwater Golf Club Lift Station and Force Main

- C. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.
- D. Extension Stem for Operator: Where depth of valve operating nut is 3 feet or greater below finish grade, furnish operating extension stem with 2-inch operating nut to bring operating nut to a point within 6 inches of finish grade.

### 3.02 TESTS AND INSPECTION

- A. Valve may be either tested while testing pipelines, or as a separate step.
- B. Test that valves open and close smoothly under operating pressure conditions. Test that two-way valves open and close smoothly under operating pressure conditions from both directions.
- C. Inspect air and vacuum valves as pipe is being filled to verify venting and seating is fully functional.
- D. Count and record number of turns to open and close valve; account for discrepancies with manufacturer's data.
- E. Set, verify, and record set pressures for relief and regulating valves.
- F. Automatic valves to be tested in conjunction with control system testing. Set opening and closing speeds, limit switches, as required or recommended by Engineer.

**END OF SECTION**



**SECTION 40 80 01  
PROCESS PIPING LEAKAGE TESTING**

**PART 1 GENERAL**

**1.01 SUBMITTALS**

**A. Informational Submittals:**

1. Testing Plan:
  - a. Submit prior to testing and include at least the information that follows.
    - 1) Testing dates.
    - 2) Piping systems and section(s) to be tested.
    - 3) Test type.
    - 4) Method of isolation.
    - 5) Calculation of maximum allowable leakage for piping section(s) to be tested.
2. Certifications of Calibration: Testing equipment.
3. Certified Test Report.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Notify Engineer in writing 5 days in advance of testing. Perform testing in presence of Engineer.
- B. Pressure Piping:
  1. Install temporary thrust blocking or other restraint as necessary to protect adjacent piping or equipment and make taps in piping prior to testing.
  2. Wait 5 days minimum after concrete thrust blocking is installed to perform pressure tests. If high-early strength cement is used for thrust blocking, wait may be reduced to 2 days.
  3. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.
  4. New Piping Connected to Existing Piping:
    - a. Isolate new piping with grooved-end pipe caps, spectacle blinds, blind flanges, or as acceptable to Engineer.
  5. Test Pressure: As indicated on the Piping Schedule.

- C. Test section may be filled with water and allowed to stand under low pressure prior to testing.
- D. Gravity Piping:
  - 1. Perform testing after service connections, manholes, and backfilling have been completed between stations to be tested.
  - 2. Determine groundwater level at time of testing by exploratory holes or other method acceptable to Engineer.

### 3.02 HYDROSTATIC TEST FOR PRESSURE PIPING

- A. Fluid: Clean water of such quality to prevent corrosion of materials in piping system.
- B. Exposed Piping:
  - 1. Perform testing on installed piping prior to application of insulation.
  - 2. Maximum Filling Velocity: 0.25 foot per second, applied over full area of pipe.
  - 3. Vent piping during filling. Open vents at high points of piping system or loosen flanges, using at least four bolts, or use equipment vents to purge air pockets.
  - 4. Maintain hydrostatic test pressure continuously for 60 minutes, minimum, and for such additional time as necessary to conduct examinations for leakage.
  - 5. Examine joints and connections for leakage.
  - 6. Correct visible leakage and retest as specified.
- C. Buried Piping:
  - 1. Test after backfilling has been completed.
  - 2. Expel air from piping system during filling.
  - 3. Apply and maintain specified test pressure with hydraulic force pump. Valve off piping system when test pressure is reached.
  - 4. Maintain hydrostatic test pressure continuously for 2 hours minimum, reopening isolation valve only as necessary to restore test pressure.
  - 5. Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for duration of test.

6. Maximum Allowable Leakage:

$$L = \frac{SD(P)^{1/2}}{148,000}$$

where:

- L = Allowable leakage, in gallons per hour.
- S = Length of pipe tested, in feet.
- D = Nominal diameter of pipe, in inches.
- P = Test pressure during leakage test, in pounds per square inch.

7. Correct leakage greater than allowable, and retest as specified.

3.03 HYDROSTATIC TEST FOR GRAVITY PIPING

- A. Testing Equipment Accuracy: Plus or minus 1/2-gallon water leakage under specified conditions.
- B. Maximum Allowable Leakage: 0.16 gallon(s) per hour per inch diameter per 100 feet. Include service connection footage in test section, subjected to minimum head specified.
- C. Exfiltration Test:
  - 1. Hydrostatic Head:
    - a. At least 6 feet above maximum estimated groundwater level in section being tested.
    - b. No less than 6 feet above inside top of highest section of pipe in test section, including service connections.
  - 2. Length of Pipe Tested: Limit length such that pressure on invert of lower end of section does not exceed 30 feet of water column.
- D. Infiltration Test:
  - 1. Groundwater Level: At least 6 feet above inside top of highest section of pipe in test section, including service connections.
- E. Piping with groundwater infiltration rate greater than allowable leakage rate for exfiltration will be considered defective even if pipe previously passed a pressure test.
- F. Defective Piping Sections: Replace or test and seal individual joints, and retest as specified.

3.04 FIELD QUALITY CONTROL

A. Test Report Documentation:

1. Test date.
2. Description and identification of piping tested.
3. Test fluid.
4. Test pressure.
5. Remarks, including:
  - a. Leaks (type, location).
  - b. Repair/replacement performed to remedy excessive leakage.
6. Signed by Contractor and Engineer to represent that test has been satisfactorily completed.

**END OF SECTION**

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**ATTACHMENT**

**CRESTVIEW PROCUREMENT  
EQUIPMENT PACKAGE  
SPECIFICATIONS  
NOVEMBER 2021**

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CONTRACT DOCUMENTS  
FOR THE CONSTRUCTION OF THE  
**BLACKWATER LIFT STATION**



PREPARED FOR  
**CITY OF CRESTVIEW  
FLORIDA**  
EQUIPMENT PROCUREMENT  
PACKAGE

For information regarding  
this project, contact:

Scott Jernigan, PE / JACOBS  
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Pensacola, FL 32502  
Phone: 850-941-7282

Project No. D3553000

**JACOBS®**

NOV 2021





**CITY OF CRESTVIEW PUBLIC SERVICES**

**CRESTVIEW, FLORIDA**

**BIDDING REQUIREMENTS  
AND  
CONTRACT DOCUMENTS**

**PROCUREMENT EQUIPMENT PACKAGE**

**BLACKWATER GOLF CLUB LIFT STATION EQUIPMENT PROCUREMENT**

Contract No. \_\_\_\_\_

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**JACOBS**

November 2021

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Project No. D3553000

Copy No.\_\_\_\_



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**LEGAL**

**FRONT ENDS**

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## **General**

BIDS will be received by the City of Crestview (herein called the "OWNER") as specified in the Invitation to Bid. The BIDS will be publicly opened and read aloud at the designated time and place.

Each BID must be submitted in a sealed envelope addressed to the City of Crestview. Each sealed envelope containing a BID must be plainly marked on the outside with the name and the number of the project for which the BID is submitted; and the envelope should also show on the outside, the BIDDER's name and address.

BIDDERS must satisfy themselves as to the required quantities for the work by examination of the site and a review of the drawings and specifications including any addenda. After BIDS have been submitted the BIDDER shall not assert that there has been any misunderstanding concerning the quantities of work or of the nature of the work to be done.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required. The Bid form is the only document to be completed and signed at the bid opening.

A BIDDER may not modify its BID after BID opening. Errors in the extension of unit prices stated in a BID or in multiplication, division, addition, or subtraction in a BID may be corrected by the Director of Public Services prior to award. In such cases, unit prices shall not be changed.

Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID after the actual date of the opening thereof.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. A conditional or qualified BID may not be accepted.

BID tabulations will be posted for review on the city website: [www.cityofcrestview.org](http://www.cityofcrestview.org).

The OWNER may make such investigations as deemed necessary to determine the ability of the BIDDER to perform the work, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the AGREEMENT and to complete the work contemplated herein. The low BIDDER will be required to perform at least fifty percent (50%) of the contract work with his/her own employees. The BIDDER to whom the contract is being awarded shall supply the names and addresses of major material suppliers and subcontractors when required to do so by the OWNER.

Certificate of Insurance, as specified herein, shall be submitted at the time of signing the AGREEMENT if requested by the OWNER.

The BIDDER to whom the contract is being awarded will be required to execute the AGREEMENT and obtain the Insurance on or before ten (10) calendar days following delivery of the notice of award to the BIDDER. If the BIDDER fails to properly execute the AGREEMENT or obtain the required Insurance within the allotted time, the OWNER may consider the BIDDER in default.

The OWNER within ten (10) days of receipt of acceptable INSURANCE CERTIFICATES and the AGREEMENT signed by the CONTRACTOR to whom the contract is being awarded shall sign the AGREEMENT and return to such CONTRACTOR an executed duplicate of the AGREEMENT. Should the OWNER not execute the AGREEMENT within such period, the BIDDER may by written notice withdraw the signed AGREEMENT.

The NOTICE TO PROCEED shall be issued within ten (10) days of the receipt of the recorded bonds by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by agreement between the OWNER and CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the AGREEMENT by written notice to the OWNER.

### **Bid Protest Procedure**

Any person whose substantial interests are directly and adversely affected by the award or intended award of a purchase order or contract or by plans or specifications contained in an invitation to bid or request for proposals may file a protest.

Notice of protest of plans, specifications or other requirements contained in an invitation to bid or in a request for proposals shall be filed not later than 5:00 P.M. of the third business day following receipt of the plans or specifications. Notice of protest of the rejection of a bid or proposal as non-responsive shall be filed not later than 5:00 P.M. of the third business day following notice to the bidder of the rejection. Notice of protest of the award or intended award of a purchase order or contract to the lowest bidder shown on a posted bid tabulation shall be filed not later than 5:00 P.M. of the third business day following the posting of the bid tabulation. Notice of protest of the award or intended award of a purchase order or contract to a bidder other than the lowest bidder shown on a posted bid tabulation shall be filed not later than 5:00 P.M. of the third business day following notice of the award of a purchase order or contract.

A notice of protest shall be in writing and shall state the subject matter of the protest.

A formal written protest shall be filed within seven (7) business days after the filing of notice of protest. A formal written protest shall state with particularity the facts and the law on which the protest is based.

Notice of protest and formal written protest of plans or specifications for or the award or intended award of a contract shall be filed with the city clerk or her designee.

Failure to file a notice of protest or failure to file a formal written protest within the times permitted shall constitute a waiver of proceedings.

END OF SECTION



## PUBLIC ACCESS

Contractor shall comply with the requirements of Florida's Public Records law. In accordance with Section 119.0701, Florida Statutes hereby certifies that shall:

- a. Keep and maintain public records that would be required by the public agency to perform the service.
- b. Upon request from the public agency's custodian of public records, provide the public agency with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided under Florida's Public Law or as otherwise provided by law.
- c. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of the contract term and following completion of this contract if Contractor does not transfer the records to the public agency: and
- d. Upon completion of the contract, transfer, at no cost, to the public agency all public records in possession of Contractor or keep and maintain public records required by the public agency to perform the service. If the Contractor transfers all public records to the public agency upon completion of the contract, Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If Contractor keeps and maintains public records upon completion of this contract, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.

**e. If Contractor has questions regarding the application Chapter 119, Florida Statutes, to Contractor's duty to provide public records relating to this Agreement, Contractor shall contact the Custodian of Public Records at:**

**City Clerk, City of Crestview  
198 North Wilson Street  
P.O. Box 1209  
Crestview, Florida 32536  
(850) 682-1560 Extension 250  
[cityclerk@cityofcrestview.org](mailto:cityclerk@cityofcrestview.org)**

- f. In the event the public agency must initiate litigation against Contractor in order to enforce compliance with Chapter 119, Florida Statutes, or in the event of litigation filed against the public agency because Contractor failed to provide access to public records responsive to a public record request, the public agency shall be entitled to recover all costs, including but not limited to reasonable attorneys' fees, costs of suit, witness, fees, and expert witness fees extended as part of said litigation and any subsequent appeals.



SECTION 00300

BID FORM

SUBMITTED: \_\_\_\_\_  
Date

PROJECT IDENTIFICATION: **CITY OF CRESTVIEW  
Blackwater Golf Club Lift Station and Force Main  
Procurement Equipment Package**

NAME OF BIDDER: \_\_\_\_\_

BUSINESS ADDRESS: \_\_\_\_\_

Phone No.: \_\_\_\_\_ Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

CONTRACTOR'S FLORIDA LICENSE NO.: \_\_\_\_\_

THIS BID IS SUBMITTED TO: City of Crestview, Florida (hereinafter called Owner) acting through its City Commission.

1. The undersigned Bidder offers and agrees to enter into an Agreement with Owner in the form included in the Bidding Documents, to complete all work for the Contract Price and within the Contract Time, all in accordance with the Contract Documents.
2. Bidder accepts all of the terms and conditions of the Bidding Documents, including without limitation those dealing with the Owner's time for accepting for Bid and the disposition of Bid Bond.
3. In submitting this Bid, Bidder makes all representations required by the Instructions to Bidders and further warrants and represents that:

(a) Bidder has examined copies of all the Bidding Documents and of the following addenda:

No. _____	Dated _____;	No. _____	Dated _____
No. _____	Dated _____;	No. _____	Dated _____
No. _____	Dated _____;	No. _____	Dated _____
No. _____	Dated _____;	No. _____	Dated _____

(Receipt of all which is hereby acknowledged) and also copies of the Advertisement for Bids and the Instructions to Bidders.

(b) Bidder has examined the site and locality where the Work is to be performed and the legal requirements (Federal, State and local laws, ordinances, rules and regulations) and conditions affecting cost, degree of difficulty, progress or performance of the Work and has made such independent investigations as Bidder deems necessary.

- (c) This Bid is genuine and not made in the interest or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or a corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over Owner.
  - (d) Bidder hereby agrees if this Bid is accepted, to commence work under this contract on or before a date to be specified in the Notice to Proceed and to fully complete all work of the Project within the Contract Time stipulated in the Agreement (Section 00500). Bidder further agrees to pay as liquidated damages the amount stated in the Agreement for each consecutive calendar day completion of the work is delayed.
4. Bidder submits the following unit prices to perform all the Work as required by the Drawings and Specifications for the City of Crestview. Bid shall be awarded based on Total Base Bid. Estimated quantities may exceed items listed. Payment based on installed quantities.
5. All Bid Items shall include all materials, equipment, labor, permit fees, taxes, tests, miscellaneous costs of all types, overhead, and profit for the item to be complete, in place, and ready for operation in the manner contemplated by the Contract Documents.
6. The following documents are attached to and made a condition of this Bid:
- (a) Bid Security (Section 00410 and surety bond or cashier's check).
  - (b) Power of Attorney (for surety bond only).
  - (c) Public Entities Crime Form (Section 00470).
  - (d) Noncollusion Affidavit (Section 00480).
  - (e) Trench Safety Affidavit (Section 00490).
  - (f) Corporate authority to execute Bid (for any corporate employee other than president or vice president).
  - (g) Evidence of Bidder's Certification and License to perform the work.
  - (h) Experience and financial statement demonstrating the Bidder's ability to successfully complete the work.
  - (i) Drug Free Workplace (Section 00310).
7. The terms used in this Bid, which are defined in Article 1 of the General Conditions shall have the meanings assigned to them in the General Conditions as amended by the Supplementary Conditions.
8. **COMPLIANCE WITH FLORIDA TRENCH SAFETY ACT (90-96, LAWS OF FLORIDA)**
- Bidder hereby acknowledges that all costs for complying with the Florida Trench Safety Act (90-96, Laws of Florida) are included in the various items of the proposal and in the Total Bid Price. For informational purposes only, the Bidder is required to further identify these costs, to be summarized below:

	Trench Safety Measure Description	Units of Measure (LF, SY)	Unit (Quantity)	Unit Cost	Extended Cost
A	_____	_____	_____	\$ _____	\$ _____
B	_____	_____	_____	\$ _____	\$ _____
C	_____	_____	_____	\$ _____	\$ _____
D	_____	_____	_____	\$ _____	\$ _____
				TOTAL:	\$ _____

**THIS IS NOT A PAY ITEM.** The purpose of this form is to disclose information on the costs associated with trench safety measures and to insure that the Bidder has considered these costs and included them in the Bid Price. Contractor will not receive additional payment if actual quantities differ from those estimated above or if the Contractor uses a safety measure different than those listed.

Failure to complete the above may result in the Bid being declared non-responsive.

**BID SUMMARY**

<b>Item No.</b>	<b>Description</b>	<b>Estimated Quantity</b>	<b>Unit</b>	<b>Unit Cost</b>	<b>Item Cost</b>
1	Fiberglass Reinforced Plastic Wet Well	1	LS		
2	Submersible Pumps and Control Panel	1	LS		
3	Piping and Appurtenances	1	LS		

**TOTAL BASE BID**

---



---

(In words)

\$ 

---

 (In numbers)

NAME OF BIDDER: \_\_\_\_\_

If Bidder is: (ALL SIGNATORIES MUST HAVE THEIR NAME PRINTED OR TYPED  
BELOW THEIR SIGNATURE)

SOLE PROPRIETORSHIP

\_\_\_\_\_(SEAL)  
(Individual's Signature)

\_\_\_\_\_(SEAL)  
(Individual's Name)

Doing Business as: \_\_\_\_\_

Business Address: \_\_\_\_\_  
\_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Florida License No.: \_\_\_\_\_

A PARTNERSHIP

\_\_\_\_\_(SEAL)  
(Partnership Name)

\_\_\_\_\_(SEAL)  
(General Partner's Signature)

\_\_\_\_\_(SEAL)  
(General Partner's Name)

Business Address: \_\_\_\_\_  
\_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Florida License No.: \_\_\_\_\_

NAME OF BIDDER: \_\_\_\_\_

A CORPORATION

\_\_\_\_\_  
(Corporation Name)

\_\_\_\_\_  
(State of Incorporation)

By \_\_\_\_\_  
(Name of Person Authorized to Sign)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Authorized Signature)

(Corporate Seal)

Attest \_\_\_\_\_  
(Secretary)

Business Address: \_\_\_\_\_  
\_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Corporation President: \_\_\_\_\_

Florida License No.: \_\_\_\_\_



NAME OF BIDDER: \_\_\_\_\_

A JOINT VENTURE

By \_\_\_\_\_ (SEAL)  
(Name)

\_\_\_\_\_  
(Address)

By \_\_\_\_\_ (SEAL)  
(Name)

\_\_\_\_\_  
(Address)

Business Address: \_\_\_\_\_

\_\_\_\_\_  
Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

Florida License No.: \_\_\_\_\_

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above).

- 8. List the following in connection with the Surety which is providing the Bid Bond.

Surety's Name: \_\_\_\_\_

Surety's Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name and address of Surety's resident agent for service of process in Florida:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## SCHEDULE OF MANUFACTURERS/SUPPLIERS

The Contract Documents are based upon the equipment or products available from the manufacturers/suppliers denoted as "A", "B", etc. However, the Bidder must indicate in his Bid which Base Bid manufacturer/supplier he intends to use for each item of equipment listed by circling one (1) of the listed manufacturers/suppliers. Should the Bidder fail to circle a named supplier, he hereby agrees to provide the item listed as "A". After receipt of bids, the Bidder may not substitute for any manufacturer or supplier circled.

If the Bidder desires to propose one (1) or more substitution or "Or-equal" manufacturers/suppliers, he may write in the name of such substitution or "Or-equal" in the spaces provided on the pages following the lists, but he must, nevertheless, also circle one of the listed manufacturers/suppliers. All substitutions or "Or-equal" items must be identified at the time of Bid (see Paragraph 6.05 of the General Conditions as amended by the Supplementary Conditions). Substitutions or "Or-equal" items will **not** be considered when determining the Apparent Low Bidder. Substitutions or "Or-equal" items will **not** be evaluated or considered until after the "Effective Date" of the Agreement. The Bidder shall base his Bid on providing one of the listed manufacturers and shall assume for bidding purposes that all substitutions or "Or-equal" items will not be accepted.

If the proposed substitution or "Or-equal" manufacturer/supplier is determined "not equivalent" by the Engineer, the Bidder must use the circled manufacturer/supplier. If the Bidder fails to indicate which listed manufacturer/supplier he intends to use or if a substitution or "Or-equal" is rejected, he must use the supplier listed as "A". Also, if the Bidder circles more than one listed manufacturer/supplier, he must use the first manufacturer/supplier circled (unless a substitution or "Or-equal" is approved).

Each proposed substitution or "Or-equal" will be evaluated in accordance with Paragraph 6.05 of the General Conditions following the Effective Date of the Agreement.

In addition to the reimbursement required under Paragraph 6.05 of the General Conditions, the Contractor shall also reimburse the Owner for any engineering costs directly attributable to the change in manufacturers/suppliers, caused by the acceptance of proposed substitutions or "Or-equal" items, such as; additional field trips for the Engineer, additional redesign costs, and additional review costs, etc. Other costs directly attributable to the change in manufacturers/suppliers caused by the acceptance of proposed substitutions or "Or-equal" items such as increased electrical requirements, larger buildings, modifications to structures, additional pumps, piping or tankage, etc., shall be borne by the Contractor and not by the Owner. Bidder further agrees that the use of substitute equipment offered will not affect the completion date.

The Owner may request, and the Bidder shall supply any additional information on proposed substitutes or "Or-equal" items prior to Notice of Award.

SCHEDULE OF BASE BID MANUFACTURERS/SUPPLIERS

Item No.	Equipment Item or Material	Specification Section No.	Base Bid Manufacturer/Supplier
1.	Fiberglass Reinforced Plastic Wet Well	40 40 02	
2.	Submersible Pumps	44 42 56.04	
3.			
4.			
5.			
6.			
7.			
8.			
9.			

**SUBSTITUTIONS AND "OR-EQUAL"**

The undersigned as Bidder agrees that substitutions, or "Or-equal" items will not be considered until after the "Effective Date of the Agreement" and will be evaluated in accordance with Paragraph 6.05, of the General Conditions as amended by the Supplementary Conditions. If Bidder intends to propose substitutions or "Or-equal" items after the "Effective Date of the Agreement", it is agreed that these items will be listed on the Substitution List that must be included with the Bid (form provided herein). Only the proposed substitutions or "Or-equal" items listed on the Substitution List and submitted at the time of Bid will be evaluated by the Engineer in accordance with the General Conditions.

**SUBSTITUTION LIST OF  
MANUFACTURERS/SUPPLIERS**

Bidder proposes the following substitutions and "Or-equal" items of alternate manufacturers/suppliers for the equipment of material categories so identified:

	<u>Equipment Item Material</u>	<u>Drawing No.</u>	<u>Spec. Section</u>	<u>Substitute/"Or-equal" Manufacturer/Supplier (List One Only)</u>	<u>Proposed Price Deduct</u>
1.	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____
3.	_____	_____	_____	_____	_____
4.	_____	_____	_____	_____	_____
5.	_____	_____	_____	_____	_____
6.	_____	_____	_____	_____	_____
7.	_____	_____	_____	_____	_____
9.	_____	_____	_____	_____	_____
10.	_____	_____	_____	_____	_____

END OF SECTION

Section 00310

**DRUG-FREE WORK PLACE**

The undersigned vendor, in accordance with Florida Statute 287.087, hereby certifies that

\_\_\_\_\_ does:  
*(Name of Business)*

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

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

X  
\_\_\_\_\_  
Proposer's Signature

\_\_\_\_\_  
Date

(THIS FORM MUST BE COMPLETED IF APPLICABLE AND RETURNED WITH YOUR PROPOSAL)



SECTION 00470

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

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

1. This sworn statement is submitted to \_\_\_\_\_  
(print name of the public entity)
- by \_\_\_\_\_  
(print individual's name and title)
- for \_\_\_\_\_  
(print name of entity submitting sworn statement)

whose business address is

\_\_\_\_\_  
\_\_\_\_\_

and (if applicable) its Federal Employer Identification Number (FEIN) is \_\_\_\_\_

(If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: \_\_\_\_\_.)

2. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g), **Florida Statutes**, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or of the United States, including, but not limited to, any bid or contract for goods or services to be provided to any public entity or an agency or political subdivision of any other state or of the United States and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.
3. I understand that "convicted" or "conviction" as defined in Paragraph 287.133(1)(b), **Florida Statutes** means a finding of guilt or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo contendere.

4. I understand that an “affiliate” as defined in Paragraph 287.133(1)(a), **Florida Statutes**, means:

- a. A predecessor or successor of a person convicted of a public entity crime; or
- b. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term “affiliate” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm’s length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.

5. I understand that a “person” as defined in Paragraph 287.133(1)(e), **Florida Statutes**, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term “person” includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.

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

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

\_\_\_\_\_ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989.

\_\_\_\_\_ The entity submitting this sworn statement, or one or more of its officers, directors, executives, partners, shareholders, employees, members, or agents who are active in the management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989. However, there has been a subsequent proceeding before a Hearing Officer of the State of Florida, Division of Administrative Hearings and the Final Order entered by the Hearing Officer determined that it was not in the public interest to place the entity submitting this sworn statement on the convicted vendor list. (attach a copy of the final order.)



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

\_\_\_\_\_  
(signature)

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Personally known \_\_\_\_\_

OR Produced identification \_\_\_\_\_

\_\_\_\_\_  
(type of identification)

Notary Public - State of Florida

My commission expires \_\_\_\_\_

\_\_\_\_\_  
(printed, typed or stamped commissioned name of notary public.)

END OF SECTION



SECTION 00480  
NONCOLLUSION AFFIDAVIT

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

\_\_\_\_\_, being first duly sworn deposes and says that:

1. He (it) is the \_\_\_\_\_, of \_\_\_\_\_, the Bidder that has submitted the attached Bid;
2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;
3. Such Bid is genuine and is not a collusive or sham Bid;
4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affidavit, have in any way, colluded, conspired, connived or agreed, directly or indirectly, with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted; or to refrain from bidding in connection with such Contract; or have in any manner, directly or indirectly, sought by agreement or collusion, or communication, or conference with any Bidder, firm, or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit, or cost elements of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against (Recipient), or any person interested in the proposed Contract;

5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any other of its agents, representatives, owners, employees or parties in interest, including this affidavit.

By \_\_\_\_\_

Sworn and subscribed to before me this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, in the State of \_\_\_\_\_, County of \_\_\_\_\_.

\_\_\_\_\_ Notary Public

My Commission Expires: \_\_\_\_\_

END OF SECTION

SECTION 00500

AGREEMENT

THIS AGREEMENT made and entered into this \_\_\_\_\_ day of \_\_\_\_\_ 2021, by and between the CITY OF CRESTVIEW, FLORIDA, a municipality organized and existing under the laws of the State of Florida, hereinafter called the OWNER, and \_\_\_\_\_ hereinafter called CONTRACTOR;

WITNESSETH:

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE I - SCOPE OF WORK

CONTRACTOR shall complete all work as specified or indicated in the Contract Documents. The Work is generally described as follows:

**Blackwater Golf Club Lift Station Equipment Procurement**

**BID # 21-XX-XX**

All work for the Project shall be constructed in accordance with the Drawings and Specifications prepared by Jacobs and the proposed improvements will be awarded and constructed, if award is made, under one Contract. Bids shall be submitted for furnishing, delivering, and installing all materials, equipment and services, including labor, for the Work described.

This Project is to furnish the fiberglass wet well, submersible pumps, control panel and all piping and appurtenances internal to the wet well as specified and shown on the Drawings.

ARTICLE II - ENGINEER

The Engineer, Scott L Jernigan, P.E. (Jacobs), whose address is 25 West Cedar Street, Suite 350, Pensacola FL 32502, hereinafter referred to as ENGINEER and who will assume all duties and responsibilities and will have the rights and authority assigned to the Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE III - CONTRACT TIME

3.1 Schedule A: The Contractor shall furnish all equipment as outlined in the Contract Documents to the Owner within 180 days after the date when the Contract Time commences to run as provided in Paragraph 2.03 of the General Conditions.

Schedule B: The Contractor's Work including but not limited to installation assistance, start-up, and field testing will be substantially completed within 240 days after the date when the Contract Time commences to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 300 days after the date when the Contract Time commences to run.

3.2 Damages for Delay. OWNER and CONTRACTOR recognize that **TIME IS OF THE ESSENCE** in this Agreement and that the OWNER will suffer financial loss if the Work is not completed within the time specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions.

3.2.1 Uniqueness of the Work. The OWNER and the CONTRACTOR expressly acknowledge the unique characteristics of the Work, which cause time to be of the essence in this contract.

3.2.2 Liquidated Damages. OWNER and CONTRACTOR recognize that **TIME IS OF THE ESSENCE** in this Agreement and that Owner will suffer financial loss if the work is not substantially complete in the time specified in Paragraph 3.1 above. The parties also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by the OWNER if the Work is not substantially complete on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER \$1,000.00 (One Thousand Dollars) for each day that expires after the time specified in Paragraph 3.1 for Substantial Completion until the Work is substantially complete, and that the liquidated damages set forth herein bear a reasonable relationship to the estimated actual damages that the OWNER would suffer.

ARTICLE IV - CONTRACT PRICE

4.1 OWNER shall pay CONTRACTOR for performance of the Work in accordance with the Contract Documents in current funds at the lump sum or unit prices as presented in the Bid Form, which is incorporated herein and made a part hereof by this reference.

4.2 OWNER shall pay CONTRACTOR for completion of the work in accordance with the Contract Documents an amount in correct funds equal to the amount below:

Bid Total: \_\_\_\_\_  
(use words)

Bid Total: \$ \_\_\_\_\_  
(use figures)

4.3 The parties expressly agree that the Contract Price is a stipulated sum, except with regard to those items in the Bid which are subject to unit prices.

## ARTICLE V - PAYMENT PROCEDURES

5.1 CONTRACTOR shall submit Applications for Payment in accordance with the Contract Documents. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

5.2 OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S monthly Applications for Payment, as approved by the ENGINEER, which shall be submitted by the CONTRACTOR on or before the 10th day after the end of each calendar month for which payment is requested.

5.3 Progress payments prior to Substantial Completion will be made in the following manner:

5.3.1 Prior to Substantial Completion and prior to fifty percent (50%) of the Work being completed, progress payments shall be ninety percent (90%) of the value of Work complete and ninety percent (90%) of the value of materials and equipment not incorporated into the Work, but delivered and suitably stored, less in each case the aggregate of payments previously made.

5.3.2 After fifty percent (50%) of the Work has been completed as determined by the ENGINEER, and if the character and progress has been satisfactory to the OWNER and ENGINEER, OWNER, on the recommendation of ENGINEER, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no retainage on account of subsequent Work and materials and equipment not incorporated into the Work, but delivered and suitably stored, which results in the Owner withholding a retainage equal to five percent (5%) of the Contract Price until Substantial Completion. However, OWNER shall reserve the right to reinstate withholding a retainage of ten percent (10%) if OWNER, on the recommendation of ENGINEER, determines that the progress or character of the Work is not satisfactory.

5.3.3 Upon Substantial Completion of the Work, OWNER shall pay an amount sufficient to increase total payments to the CONTRACTOR to ninety-five percent (95%) of the Contract Price, less such amounts as ENGINEER shall determine in accordance with Article 14 of the General Conditions.”

5.4 Final Payment. Upon final completion of the Work in accordance with the Contract Documents, OWNER shall pay CONTRACTOR an amount sufficient to increase total payments to ninety-eight percent (98%) of the Contract Price. However, not less than two percent (2%) of the Contract Price shall be retained until Record Drawings, Specifications, addenda, modifications and Shop Drawings, including all manufacturers instructional and parts manuals are delivered to and accepted by the ENGINEER.

## ARTICLE VI - CONTRACTOR'S REPRESENTATIONS

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

6.1 CONTRACTOR has visited the work site and familiarized himself with the nature and extent of the Contract Documents, Work, locality, and all local conditions and federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

6.2 CONTRACTOR has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which were relied upon by the ENGINEER in the preparation of the Drawings and Specifications, and which have been identified in the General and Supplementary Conditions of the Contract Documents.

6.3 CONTRACTOR has made or caused to be made examinations, investigations, tests and studies of such reports and related data in addition to those referred to in Paragraph 6.2 above as he deems necessary for the performance of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are, or will be, required by CONTRACTOR for such purposes.

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

6.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to the CONTRACTOR.

#### ARTICLE VII - CONTRACT DOCUMENTS

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

- 7.1 This Agreement (Section 00500) (pages \_\_\_ to \_\_\_, inclusive).
- 7.2 Exhibits to this Agreement (sheets \_\_\_ to \_\_\_, inclusive). N/A
- 7.3 Performance Bond, Payment Bond and Certificates of Insurance.
- 7.4 Notice of Award and Notice to Proceed.
- 7.5 General Conditions (Section 00700) as amended by the Supplementary Conditions.
- 7.6 Supplementary Conditions (Section 00800).
- 7.7 Project Manual bearing the general title: "CITY OF CRESTVIEW, BLACKWATER GOLF CLUB LIFT STATION EQUIPMENT PROCUREMENT" and consisting of Divisions 0 through 16 as listed in the table of contents.
- 7.8 Drawings bearing the following general title: "CITY OF CRESTVIEW, BLACKWATER GOLF CLUB LIFT STATION EQUIPMENT PROCUREMENT" and consisting of the sheets as listed in the Drawings Index.
- 7.9 Addenda Numbers \_\_\_ through \_\_\_, inclusive.
- 7.10 Bid Form (Section 00300) (Pages 1 to 11, inclusive).
- 7.11 All applicable provisions of State and Federal Law and any modification, including Change Orders or written amendments duly delivered after execution of Agreement.



7.12 Advertisement for Bids, Instructions to Bidders, Bid Bond, Noncollusion Affidavit, General Requirements, Field Orders and State of Florida Contract Provisions.

There are no Contract Documents other than those listed above in this Article VII. The Contract Documents may only be altered, amended, or repealed in accordance with Article 3 of the General Conditions as modified in the Supplementary Conditions.

#### ARTICLE VIII - MISCELLANEOUS

8.1 No assignment by the parties hereto of any rights under, or interest in, the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically, but without limitation, monies that may become due and monies that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent of an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

8.2 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto, his partners, successors, assigns or legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

8.3 Terms used in this Agreement, which are defined in Article 1 of the General Conditions, shall have the meanings indicated in the General Conditions, as modified in the Supplementary Conditions.

#### ARTICLE IX - GOVERNING LAW

This Agreement shall be governed by the laws of the State of Florida. Both parties agree that the courts of the State of Florida shall have jurisdiction of any claim arising in connection with this Agreement. In the event of litigation arising out of this Agreement, the prevailing party shall be entitled to the award of attorney's fees and costs at both the trial and appellate level. Venue for any litigation arising out of this agreement shall be in Orange County, Florida.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement in triplicate. One (1) counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on \_\_\_\_\_, 2021.

OWNER: CITY OF CRESTVIEW, FLORIDA

By: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ATTEST: \_\_\_\_\_

CITY CLERK

APPROVED AS TO FORM AND CORRECTNESS: \_\_\_\_\_

CITY ATTORNEY

CONTRACTOR:

By: \_\_\_\_\_  
\_\_\_\_\_

Title: \_\_\_\_\_

(CORPORATE SEAL)

ATTEST: \_\_\_\_\_

SECRETARY

\_\_\_\_\_

END OF SECTION

SECTION 00650

CERTIFICATE OF INSURANCE

A. INSURANCE REQUIREMENTS

1. Contractor shall purchase and maintain such comprehensive general liability and other insurance as required by this document. Should any of the required insurance policies be canceled before the expiration date thereof, the insuring company shall provide written notice to each insured 30 days prior to cancellation.

B. CERTIFICATE OF INSURANCE FORM

1. The Certificate of Insurance submitted to the Owner and Engineer shall be on the Insurance Company's form with a format similar to the popular ACORD Corporation form.
2. The Owner's project name and project number shall be shown on the Certificate.
3. Three (3) Certificates shall be submitted along with the executed Contract Agreement.

A. Minimum Scope of Insurance:

Coverage shall be at least as broad as:

1. Insurance Services Office Form No. CG 0001 (11/85) or CG 0002 (2/86) Commercial General Liability; and Insurance Services Office Form No. GL 0404 (5181) Broad Form Comprehensive General Liability; endorsement, and
2. Insurance Services Office form No. CA 0001 (Ed. 1/87) covering Automobile Liability, code 1 "any auto", and CA 0002 (1/87), and
3. Workers' Compensation as required by the State of Florida and Employers' Liability insurance:

B. Minimum Limits of Insurance:

Contractor shall maintain coverage's and limits as follows:

1. General Liability:

Aggregate Limit: \$1,000,000.

Products and completed operation aggregate limit: \$500,000.

Personal and advertising injury limit: N/A.

Each occurrence limit: \$500,000.

Fire damage limit: \$50,000 any one fire.

Medical expense limit: \$5,000 per person.  
Blanket: no.

(1) Designated contractors (specify): City of Crestview

2. Automobile Liability:

- (a) Business auto with symbol(s): one (1)
- (b) Limit per accident: \$1,000,000.

3. Workers' Compensation as required by Florida laws, and Employer's Liability with the following minimum limits:

- (a) Each accident: \$100,000.
- (b) Per employee disease: \$100,000.
- (c) All claims disease: \$500,000.

C. Deductibles and Self-Insured Retentions:

Any deductible or self-insured retention must be declared to and approved by the City. At the option of the City, either the insurer shall reduce or eliminate such deductibles or self insured retentions as respects the City, its officials and employees, or the contractor shall procure a bond guaranteeing payment of losses and related investigation, claim administration and defense expenses.

D. Acceptability of Insurers: Insurance should be placed with insurers having a Bests' rating of A-Excellent and Xiii Financial Size.

E. Verification of Coverage: Successful Contractor shall furnish the City with certificates of insurance and with original endorsements affecting coverage's required by this appendix. The certificates and endorsement for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificate and endorsement are to be on forms provided or approved by the City and are to be received and approved in final form by the City before work commences.

F. Subcontractors: Contractor shall include all subcontractors as insured's under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverage's for subcontractors shall be subject to all of the requirements stated herein.

SECTION 00844

APPLICATION AND CERTIFICATE FOR PAYMENT FORM

Application No. \_\_\_\_\_ Progress \_\_\_\_\_ Final \_\_\_\_\_

Engineer's Project No.: \_\_\_\_\_

Project: **City of Crestview  
Blackwater Lift Station Equipment Procurement**

Contractor: \_\_\_\_\_ Contract Date: \_\_\_\_\_

Contract for: \_\_\_\_\_

Application Date: \_\_\_\_\_ For Period Ending \_\_\_\_\_

Change Order Summary		ADDITIONS	DEDUCTIONS
Change Orders approved in previous months by OWNER TOTAL			
Approved this month			
Number	Date Approved		
TOTALS			
Net Change by Change Orders			

- 1. ORIGINAL CONTRACT SUM \$ \_\_\_\_\_
- 2. Net Change by Change Order \$ \_\_\_\_\_
- 3. CONTRACT SUM TO DATE (Line 1 and 2) \$ \_\_\_\_\_
- 4. TOTAL COMPLETED AND STORED TO DATE \$ \_\_\_\_\_
- 5. RETAINAGE: (Column I & N, Forms 00845 and 00846)
  - a. \_\_\_\_% of Completed Work \$ \_\_\_\_\_
  - b. \_\_\_\_% of Stored Material \$ \_\_\_\_\_
  - Total Retainage (Line 5a and 5b) \$ \_\_\_\_\_
- 6. TOTAL EARNED LESS RETAINAGE  
(Line 4 less Line 5 Total) \$ \_\_\_\_\_
- 7. LESS PREVIOUS CERTIFICATES FOR PAYMENT  
(Line 6 from prior Certificate) \$ \_\_\_\_\_
- 8. AMOUNT DUE THIS APPLICATION \$ \_\_\_\_\_
- 9. BALANCE TO FINISH, PLUS RETAINAGE  
(Line 3 less Line 6) \$ \_\_\_\_\_

Contractor's Certification

The undersigned Contractor hereby swears under penalty of perjury that (1) all previous progress payments received from the Owner on account of Work performed under the contract referred to above have been applied by the undersigned to discharge in full all obligations of the undersigned incurred in connection with Work covered by prior Applications for Payment numbered 1 through \_\_\_\_\_ inclusive; and (2) all materials and equipment incorporated in said Project or otherwise listed in or covered by this Application for Payment are free and clear of all liens, claims, security interest and encumbrances; (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and not defective as that term is defined in the Contract Documents.

Dated \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
(Contractor)

By: \_\_\_\_\_  
(Name)

\_\_\_\_\_  
(Title)

COUNTY OF \_\_\_\_\_

STATE OF \_\_\_\_\_

Before me on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, personally appeared \_\_\_\_\_, known to me, who being duly sworn, deposes and says that (s)he is the \_\_\_\_\_ of the Contractor above mentioned; that(s) he executed the above Application for Payment and statement on behalf of said Contractor; and that all of the statements contained therein are true, correct and complete.

\_\_\_\_\_  
Notary Public  
My Commission Expires \_\_\_\_\_

Engineer's Recommendation

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

By: \_\_\_\_\_  
(Authorized Signature)

Date: \_\_\_\_\_

Owner's Approval

By: \_\_\_\_\_

\_\_\_\_\_  
(Title)

Acct. No. \_\_\_\_\_

Date: \_\_\_\_\_

END OF SECTION





SECTION 00849

CONTRACTOR'S FINAL RELEASE OF LIEN

Before me the undersigned authority in said County and State, appeared \_\_\_\_\_ who, being first duly sworn, deposes and says that he is \_\_\_\_\_ of \_\_\_\_\_, a company and/or corporation authorized to do business under the laws of Florida, which is the Contractor on the Contract described as: City of Crestview – Blackwater Lift Station Equipment Procurement dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, that the said deponent is duly authorized to make this affidavit by resolution of the Board of Directors of said company and/or corporation; that deponent knows of his own knowledge that said Contract has been complied with in every particular by said Contractor and that all parts of the work have been approved by the Owner's Engineers; that there are no bills remaining unpaid for labor, material, or otherwise, in connection with said Contract and work, and that there are no suits pending against the undersigned as Contractor or anyone in connection with the work done and materials furnished or otherwise under said Contract. Deponent further says that the final estimate which has been submitted to the owner simultaneously with the making of the affidavit constitutes all claims and demands against the Owner on account of said Contract or otherwise, and the acceptance of the sum specified in said final estimate will operate as a full and final release and discharge of the Owner from any further claims, demands or compensation by Contractor under the above Contract. Deponent further agrees that all guarantees under this Contract shall be in full force from the date of this release as spelled out in the Contract Documents.

Sworn to and subscribed to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Notary Public

My Commission Expires \_\_\_\_\_

We, the \_\_\_\_\_ having heretofore executed a Performance Bond for the above-mentioned Contractor covered Project and Section as described above in the sum of \_\_\_\_\_ dollars (\$ \_\_\_\_\_), hereby agree that the Owner may make full payment of the final estimate, including the retained percentage, to said Contractor.

It is fully understood that the granting of the right to the Owner to make payment of the final estimate to said Contractor and/or his assigns, shall in no way relieve the surety company of its obligations under its bond, as set forth in the Specifications, Contract and Bond pertaining to the above Project.

IN WITNESS WHEREOF, the \_\_\_\_\_ has caused this instrument to be executed on its behalf by its \_\_\_\_\_ and/or its duly authorized attorney in fact, and its corporate seal to be hereunto affixed, all of this \_\_\_\_\_ day of \_\_\_\_\_, A.D., 20\_\_\_\_\_.

\_\_\_\_\_  
Surety Company

\_\_\_\_\_  
Attorney in Fact

(Power of Attorney must be attached if executed by Attorney in Fact)

STATE OF FLORIDA

COUNTY OF \_\_\_\_\_

Before me the undersigned authority, personally appeared to me well known as the person described in and who executed the foregoing instrument in the name of \_\_\_\_\_ and/or \_\_\_\_\_ purpose therein expressed and that he had due and legal authority to execute the same on behalf of said \_\_\_\_\_, a corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
Notary Public

END OF SECTION

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**TECHNICAL  
SPECIFICATIONS**

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**SECTION 01 33 00**  
**SUBMITTAL PROCEDURES**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Action Submittal: Written and graphic information submitted by Contractor that requires Engineer's approval.
- B. Deferred Submittal: Information in accordance with 2009 IBC Section 107.3.4.2 submitted by Contractor for portions of design that are to be submitted to permitting agency for approval prior to installation of that portion of the Work, along with Engineer's review documentation that submittal has been found to be in general conformance with Project's design.
- C. Informational Submittal: Information submitted by Contractor that requires Engineer's review and determination that submitted information is in accordance with the Conditions of the Contract.

1.02 PROCEDURES

- A. Direct submittals to Engineer at the following, unless specified otherwise.
  - 1. JACOBS  
Attn: Scott Jernigan, P.E.
  - 2. E-mail: [Scott.Jernigan@Jacobs.com](mailto:Scott.Jernigan@Jacobs.com)
- B. Electronic Submittals: Submittals shall, unless specifically accepted, be made in electronic format.
  - 1. Each submittal shall be an electronic file in Adobe Acrobat Portable Document Format (PDF). Use the latest version available at time of execution of the Agreement.
  - 2. Electronic files that contain more than ten pages in PDF format shall contain internal bookmarking from an index page to major sections of the document.
  - 3. PDF files shall be set to open "Bookmarks and Page" view.
  - 4. Add general information to each PDF file, including title, subject, author, and keywords.
  - 5. PDF files shall be set up to print legibly at 8.5-inch by 11-inch, 11-inch by 17-inch, or 22-inch by 34-inch. No other paper sizes will be accepted.
  - 6. Submit new electronic files for each resubmittal.

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7. Include a copy of the Transmittal of Contractor's Submittal form, located at end of section, with each electronic file.
8. Provide Engineer with authorization to reproduce and distribute each file as many times as necessary for Project documentation.
9. Detailed procedures for handling electronic submittals will be discussed at the preconstruction conference.

C. Transmittal of Submittal:

1. Contractor shall:
  - a. Review each submittal and check for compliance with Contract Documents.
  - b. Stamp each submittal with uniform approval stamp before submitting to Engineer.
    - 1) Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval, and statement certifying submittal has been reviewed, checked, and approved for compliance with Contract Documents.
    - 2) Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form attached at end of this section.
3. Identify each submittal with the following:
  - a. Numbering and Tracking System:
    - 1) Sequentially number each submittal.
    - 2) Resubmission of submittal shall have original number with sequential alphabetic suffix.
  - b. Specification section and paragraph to which submittal applies.
  - c. Project title and Engineer's project number.
  - d. Date of transmittal.
  - e. Names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.
4. Identify and describe each deviation or variation from Contract Documents.

D. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.
2. Package submittal information by individual Specification section. Do not combine different Specification sections together in submittal package, unless otherwise directed in Specification.

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3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
  4. Index with labeled tab dividers in orderly manner.
- E. Timeliness: Schedule and submit in accordance Schedule of Submittals and requirements of individual Specification sections.
- F. Processing Time:
1. Time for review shall commence on Engineer's receipt of submittal.
  2. Engineer will act upon Contractor's submittal and transmit response to Contractor not later than 30 days after receipt, unless otherwise specified.
  3. Resubmittals will be subject to same review time.
  4. No adjustment of Contract Times or Price will be allowed as a result of delays in progress of Work caused by rejection and subsequent resubmittals.
- G. Resubmittals: Clearly identify each correction or change made.
- H. Incomplete Submittals:
1. Engineer will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
  2. When any of the following are missing, submittal will be deemed incomplete:
    - a. Contractor's review stamp; completed and signed.
    - b. Transmittal of Contractor's Submittal; completed and signed.
    - c. Insufficient number of copies.
- I. Submittals not required by Contract Documents:
1. Will not be reviewed and will be returned stamped "Not Subject to Review."
  2. Engineer will keep one copy and return submittal to Contractor.

1.03 ACTION SUBMITTALS

- A. Prepare and submit Action Submittals required by individual Specification sections.

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B. Shop Drawings:

1. Copies: Six.
2. Identify and Indicate:
  - a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
  - b. Equipment and Component Title: Identical to title shown on Drawings.
  - c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
  - d. Project-specific information drawn accurately to scale.
3. Manufacturer's standard schematic drawings and diagrams as follows:
  - a. Modify to delete information that is not applicable to the Work.
  - b. Supplement standard information to provide information specifically applicable to the Work.
4. Product Data: Provide as specified in individual specifications.
5. Deferred Submittal: See Drawings for list of deferred submittals.
  - a. Contractor-design drawings and product data related to permanent construction.
    - 1) Written and graphic information.
    - 2) Drawings.
    - 3) Cut sheets.
    - 4) Data sheets.
    - 5) Action item submittals requested in individual Specification section.
  - b. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit required supporting data and drawings for review and acceptance by Engineer. Documentation of review and approval provided on Engineer's comment form, along with completed submittal, shall be filed with permitting agency by Contractor and approved by permitting agency prior to installation.
6. Foreign Manufacturers: When proposed, include names and addresses of at least two companies that maintain technical service representatives close to Project.



C. Samples:

1. Copies: Two, unless otherwise specified in individual Specifications.
2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
  - a. Manufacturer name.
  - b. Model number.
  - c. Material.
  - d. Sample source.
3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
4. Full-size Samples:
  - a. Size as indicated in individual Specification section.
  - b. Prepared from same materials to be used for the Work.
  - c. Cured and finished in manner specified.
  - d. Physically identical with product proposed for use.

D. Action Submittal Dispositions: Engineer will review, comment, stamp, and distribute as noted:

1. Approved:
  - a. Contractor may incorporate product(s) or implement Work covered by submittal.
  - b. Distribution: Electronic.
2. Approved as Noted:
  - a. Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
  - b. Distribution: Electronic.
3. Partial Approval, Resubmit as Noted:
  - a. Make corrections or obtain missing portions, and resubmit.
  - b. Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
  - c. Distribution: Electronic.
4. Revise and Resubmit:
  - a. Contractor may not incorporate product(s) or implement Work covered by submittal.
  - b. Distribution: Electronic.

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1.04 INFORMATIONAL SUBMITTALS

A. General:

1. Copies: Submit three copies, unless otherwise indicated in individual Specification section.
2. Refer to individual Specification sections for specific submittal requirements.
3. Engineer will review each submittal. If submittal meets conditions of the Contract, Engineer will forward copy to appropriate parties. If Engineer determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Engineer will retain one copy and return remaining copy with review comments to Contractor, and require that submittal be corrected and resubmitted.

B. Certificates:

1. General:
  - a. Provide notarized statement that includes signature of entity responsible for preparing certification.
  - b. Signed by officer or other individual authorized to sign documents on behalf of that entity.
2. Welding: In accordance with individual Specification sections.
3. Installer: Prepare written statements on manufacturer's letterhead certifying installer complies with requirements as specified in individual Specification section.
4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual Specification sections.
6. Manufacturer's Certificate of Proper Installation: In accordance with Section 01 43 33, Manufacturers' Field Services.

C. Contractor-design Data (related to temporary construction):

1. Written and graphic information.
2. List of assumptions.
3. List of performance and design criteria.
4. Summary of loads or load diagram, if applicable.
5. Calculations.
6. List of applicable codes and regulations.

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7. Name and version of software.
  8. Information requested in individual Specification section.
- D. Deferred Submittals: See Drawings for list of deferred submittals.
1. Contractor-design data related to permanent construction:
    - a. List of assumptions.
    - b. List of performance and design criteria.
    - c. Summary of loads or load diagram, if applicable.
    - d. Calculations.
    - e. List of applicable codes and regulations.
    - f. Name and version of design software.
    - g. Factory test results.
    - h. Informational submittals requested in individual Specification section.
  2. Prior to installation of indicated structural or nonstructural element, equipment, distribution system, or component or its anchorage, submit calculations and test results of Contractor-designed components for review by Engineer. Documentation of review and indication of compliance with general design intent and project criteria provided on Engineer's comment form as meets conditions of the Contract, along with completed submittal, shall be filed with permitting agency by Contractor and approved by permitting agency prior to installation.
- E. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual Specification section.
- F. Operation and Maintenance Data: As required by Engineer.
- G. Payment:
1. Application for Payment: Per manufacturer's standard approved by Owner.
- H. Quality Control Documentation: As required.
- I. Special Guarantee: Supplier's written guarantee as required in individual Specification sections.
- J. Statement of Qualification: Evidence of qualification, certification, or registration as required in Contract Documents to verify qualifications of professional land surveyor, engineer, materials testing laboratory, specialty Subcontractor, trade, Specialist, consultant, installer, and other professionals.

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- K. Submittals Required by Laws, Regulations, and Governing Agencies:
1. Promptly submit promptly notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
  2. Transmit to Engineer for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.
- L. Test, Evaluation, and Inspection Reports:
1. General: Shall contain signature of person responsible for test or report.
  2. Factory:
    - a. Identification of product and Specification section, type of inspection or test with referenced standard or code.
    - b. Date of test, Project title and number, and name and signature of authorized person.
    - c. Test results.
    - d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
    - e. Provide interpretation of test results, when requested by Engineer.
    - f. Other items as identified in individual Specification sections.
  3. Field:
    - a. As a minimum, include the following:
      - 1) Project title and number.
      - 2) Date and time.
      - 3) Record of temperature and weather conditions.
      - 4) Identification of product and Specification section.
      - 5) Type and location of test, Sample, or inspection, including referenced standard or code.
      - 6) Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
      - 7) If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
      - 8) Provide interpretation of test results, when requested by Engineer.
      - 9) Other items as identified in individual Specification sections.
- M. Testing and Startup Data: In accordance with equipment Specifications.

- N. Training Data: In accordance with Section 01 43 33, Manufacturers' Field Services.

1.05 SUPPLEMENTS

- A. The supplement listed below, following "End of Section", is part of this Specification.

- 1. Form: Transmittal of Contractor's Submittal.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**



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<b>TRANSMITTAL OF CONTRACTOR'S SUBMITTAL</b> (ATTACH TO EACH SUBMITTAL)	
DATE: _____	
<b>TO:</b> _____ _____ _____ _____ _____  <b>FROM:</b> _____ <div style="text-align: center;">Contractor</div> _____ _____ _____	Submittal No.: _____ <input type="checkbox"/> New Submittal <input type="checkbox"/> Resubmittal Project: _____ Project No.: _____ Specification Section No.: _____ <b>(Cover only one section with each transmittal)</b> Schedule Date of Submittal: _____
<b>SUBMITTAL TYPE:</b> <input type="checkbox"/> Shop Drawing	<input type="checkbox"/> Sample
<input type="checkbox"/> Deferred	<input type="checkbox"/> Informational

**The following items are hereby submitted:**

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: \_\_\_\_\_  
Contractor (Authorized Signature)





**SECTION 01 43 33**  
**MANUFACTURERS' FIELD SERVICES**

**PART 1 GENERAL**

1.01 DEFINITIONS

- A. Person-day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS

- A. Informational Submittals:

1. Training Schedule: Submit, in accordance with requirements of this Specification, not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.
2. Lesson Plan: Submit, in accordance with requirements of this Specification, proposed lesson plan not less than 21 days prior to scheduled training and revise as necessary for acceptance.

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

- A. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified in the individual Specification section.
- B. Representative subject to acceptance by Owner and Engineer. No substitute representatives will be allowed unless prior written approval by such has been given.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

- A. Furnish manufacturers' services, when required by an individual Specification section, to meet the requirements of this section.
- B. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, time required to perform specified services shall be considered incidental.

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- C. Schedule manufacturer' services to avoid conflict with other onsite testing or other manufacturers' onsite services.
- D. Determine, before scheduling services, that conditions necessary to allow successful testing have been met.
- E. Only those days of service approved by Engineer will be credited to fulfill specified minimum services.
- F. When specified in individual Specification sections, manufacturer's onsite services shall include:
  - 1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
  - 2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
  - 3. Providing, on a daily basis, copies of manufacturers' representatives field notes and data to Engineer.
  - 4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Engineer.
  - 5. Resolution of assembly or installation problems attributable to or associated with respective manufacturer's products and systems.
  - 6. Assistance during functional and performance testing, and facility startup and evaluation.
  - 7. Training of Owner's personnel in the operation and maintenance of respective product as required.

3.02 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

- A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by equipment manufacturer's representative.
- B. Such form shall certify signing party is a duly authorized representative of manufacturer, is empowered by manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to ensure equipment is complete and operational.

3.03 TRAINING

A. General:

1. Furnish manufacturers' representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information.
3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule:

1. List specified equipment and systems that require training services and show:
  - a. Respective manufacturer.
  - b. Estimated dates for installation completion.
  - c. Estimated training dates.
2. Allow for multiple sessions when several shifts are involved.
3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by manufacturers' representatives. Adjust schedule for interruptions in operability of equipment.

C. Lesson Plan: When manufacturer or vendor training of Owner personnel is specified, prepare a lesson plan for each required course containing the following minimum information:

1. Title and objectives.
2. Recommended attendees (such as, managers, engineers, operators, maintenance).
3. Course description, outline of course content, and estimated class duration.
4. Format (such as, lecture, self-study, demonstration, hands-on).
5. Instruction materials and equipment requirements.
6. Resumes of instructors providing training.

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- D. Prestartup Training:
  - 1. Coordinate training sessions with Owner's operating personnel and manufacturers' representatives, and with submission of operation and maintenance manuals.
  - 2. Complete at least 14 days prior to beginning of facility startup.
- E. Post-startup Training: If required in Specifications, furnish and coordinate training of Owner's operating personnel by respective manufacturer's representatives.

3.04 SUPPLEMENTS

- A. The supplement listed below, following "End of Section," is part of this Specification.
  - 1. Manufacturer's Certificate of Proper Installation.

**END OF SECTION**

**MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION**

OWNER \_\_\_\_\_ EQPT SERIAL NO: \_\_\_\_\_  
EQPT TAG NO: \_\_\_\_\_ EQPT/SYSTEM: \_\_\_\_\_  
PROJECT NO: \_\_\_\_\_ SPEC. SECTION: \_\_\_\_\_

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- Installed in accordance with Manufacturer's recommendations.
- Inspected, checked, and adjusted.
- Serviced with proper initial lubricants.
- Electrical and mechanical connections meet quality and safety standards.
- All applicable safety equipment has been properly installed.
- Functional tests.
- System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: \_\_\_\_\_, 20\_\_\_\_

Manufacturer: \_\_\_\_\_

By Manufacturer's Authorized Representative: \_\_\_\_\_  
(Authorized Signature)



**SECTION 40 90 01**  
**INSTRUMENTATION AND CONTROL FOR PROCESS SYSTEMS**

**PART 1 GENERAL**

**1.01 REFERENCES**

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
    - a. A182, Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
    - b. A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
    - c. A312, Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
    - d. B32, Standard Specification for Solder Metal.
    - e. B88, Standard Specification for Seamless Copper Water Tube.
  2. International Society of Automation (ISA):
    - a. S5.1, Instrumentation Symbols and Identification (NRC ADOPTED).
    - b. PR12.6, Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations.
    - c. S5.4, Standard Instrument Loop Diagrams.
    - d. S20, Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves.
    - e. S50.1, Compatibility of Analog Signals for Electronic Industrial Process Instruments.
  3. National Electrical Manufacturers Association (NEMA):
    - a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
    - b. ICS 1, General Standards for Industrial Control and Systems.
  4. National Institute of Standards and Technology (NIST).
  5. NSF International (NSF):
    - a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
    - b. NSF/ANSI 372, Drinking Water System Components - Lead Content.
  6. UL: 508A, Standard for Safety, Industrial Control Panels.

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1.02 SUMMARY

A. Work Includes:

1. Engineering, furnishing, installing, calibrating, adjusting, testing, documenting, starting up, and Owner training for complete Process Instrumentation and Control (PIC) for the lift station.
2. Major parts are:
  - a. Blackwater Golf Club Lift Station:
    - 1) Omni Site Crystal Ball cellular remote telemetry unit (RTU).
    - 2) Surge suppression for field devices.
    - 3) RTU Control Panel.
    - 4) Programming of PLC/RTU per Specifications.
    - 5) PIC Supplier to develop and implement all software.
    - 6) Integration of RTU signals into existing SCADA system. Creation of new graphic display(s) to monitor and control the new equipment.
    - 7) Where applicable, update Historian data logging, remote alarming, and plant reports.

B. Detailed Design: PIC as shown and specified includes functional and performance requirements and component specifications. Complete detailed PIC design.

C. Acceptable PIC Supplier: Contractor shall use the services of an approved PIC Supplier.

D. PIC Programming Notes:

1. PIC Supplier shall coordinate any Virtual Private Network (VPN) or similar remote access with Owner. Remote programming will only be allowed with Owner permission on a case-by-case basis. In general, programming changes are expected to be performed by the PIC programmer onsite.

1.03 DEFINITIONS

A. Abbreviations:

1. CP: Control Panel.
2. FDT: Factory Demonstration Test.
3. FP: Field Panel.
4. HMI: Human Machine Interface.
5. LCP: Local Control Panel.



6. MCC: Motor Control Center.
  7. I/O: Input/Output.
  8. OIT: Operator Interface Terminal.
  9. PAT: Performance Acceptance Test.
  10. PIC: Process Instrumentation and Control.
  11. PLC: Programmable Logic Controller.
  12. SCADA: Supervisory Control and Data Acquisition.
  13. RTU: Remote Telemetry Unit.
- B. Rising/Falling: Terms used to define actions of discrete devices about their setpoints.
1. Rising: Contacts close when an increasing process variable rises through setpoint.
  2. Falling: Contacts close when a decreasing process variable falls through setpoint.
- C. Signal Types:
1. Analog Signals, Current Type:
    - a. 4 mA to 20 mA dc signals conforming to ISA S50.1.
    - b. Unless otherwise indicated for specific PIC Subsystem components, use the following ISA 50.1 options:
      - 1) Transmitter Type: Number 2, two-wire.
      - 2) Transmitter Load Resistance Capacity: Class L.
      - 3) Fully isolated transmitters and receivers.
  2. Analog Signals, Voltage Type: 1 to 5 volts dc within panels where a common high precision dropping resistor is used.
  3. Discrete signals, two-state logic signals using dc or 120V ac sources as indicated.
  4. Pulse Frequency Signals:
    - a. Direct current pulses whose repetition rate is linearly proportional to process variable.
    - b. Pulses generated by contact closures or solid state switches as indicated.
    - c. Power source less than 30V dc.
  5. Special Signals: Other types of signals used to transmit analog and digital information between field elements, transmitters, receivers, controllers, and digital devices.

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D. Instrument Tag Numbers:

1. Tag numbers are provided in the following format:

Format: W-D-X-Y

<u>Notation</u>	<u>Explanation</u>
W	Unit process number (facility)
D	ISA or Equipment designator (see Drawings for complete listings)
X	Loop number
Y	Unit number

1.04 SUBMITTALS

A. Action Submittals:

1. General:
  - a. Shop Drawings, full-scaled details, wiring diagrams, catalog cuts, and descriptive literature.
  - b. Identify proposed items and options. Identify installed spares and other provisions for future work (for example, reserved panel space; unused components, wiring, and terminals).
  - c. Legends and Abbreviation Lists: Complete definition of symbols and abbreviations used on this Project (for example, engineering units, flow streams, instruments, structures, and other process items used in nameplates, legends, and data sheets).
2. Bill of Materials: List of required equipment.
  - a. Group equipment items as follows:
    - 1) I&C Components: By component identification code.
    - 2) Other Equipment: By equipment type.
  - b. Data Included:
    - 1) Equipment tag number.
    - 2) Description.
    - 3) Manufacturer, complete model number, and all options not defined by model number.
    - 4) Quantity supplied.
    - 5) Component identification code where applicable.
    - 6) Plant location.
3. Catalog Cuts: I&C Components, Electrical Devices, and Mechanical Devices:
  - a. Catalog information, mark to identify proposed items and options.

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- b. Descriptive literature.
  - c. External power and signal connections.
  - d. Scaled drawings showing exterior dimensions and locations of electrical and mechanical interfaces.
4. Component Data Sheets: Data sheets for I&C components.
- a. Format and Level of Detail: In accordance with ISA-S20.
  - b. Include component type identification code and tag number on data sheet.
  - c. Specific features and configuration data for each component:
    - 1) Location or service.
    - 2) Manufacturer and complete model number.
    - 3) Size and scale range.
    - 4) Setpoints.
    - 5) Materials of construction.
    - 6) Options included.
  - d. Name, address, and telephone number of manufacturer's local office, representative, distributor, or service facility.
5. Sizing and Selection Calculations:
- a. Primary Elements: Complete calculations plus process data used. Example, for flow elements, minimum and maximum values, permanent head loss, and assumptions made.
  - b. Controlling, Computing and Function Generating Modules: Actual scaling factors with units and how they were computed.
6. Panel Construction Drawings:
- a. Scale Drawings: Show dimensions and location of panel mounted devices, doors, louvers, and subpanels, internal and external.
  - b. Panel Legend: List front of panel devices by tag numbers, nameplate inscriptions, service legends, and annunciator inscriptions.
  - c. Bill of Materials: List devices mounted within panel that are not listed in panel legend. Include tag number, description, manufacturer, and model number.
  - d. Construction Details: NEMA rating, materials, material thickness, structural stiffeners and brackets, lifting lugs, mounting brackets and tabs, door hinges and latches, and welding and other connection callouts and details.
  - e. Construction Notes: Finishes, wire color schemes, wire ratings, wire and terminal block, numbering and labeling scheme.
7. Panel Control Diagrams: For discrete control and power circuits.
- a. Diagram Type: Ladder diagrams. Include devices, related to discrete functions, that are mounted in or on the panel and that require electrical connections. Show unique rung numbers on left side of each rung.

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- b. Item Identification: Identify each item with attributes listed.
  - 1) Wires: Wire number and color. Cable number if part of multiconductor cable.
  - 2) Terminals: Location (enclosure number, terminal junction box number, or MCC number), terminal strip number, and terminal block number.
  - 3) Discrete Components:
    - a) Tag number, terminal numbers, and location (“FIELD”, enclosure number, or MCC number).
    - b) Switching action (open or close on rising or falling process variable), setpoint value and units, and process variable description (for example, Sump Level High).
  - 4) Relay Coils:
    - a) Tag number and its function.
    - b) On right side of run where coil is located, list contact location by ladder number and sheet number.  
Underline normally closed contacts.
  - 5) Relay Contacts: Coil tag number, function, and coil location (ladder rung number and sheet number).
- c. Show each circuit individually. No “typical” diagrams or “typical” wire lists will be permitted.
- d. Ground wires, surge protectors, and connections.
8. Panel Wiring Diagrams: Show point-to-point and terminal-to-terminal wiring within panel.
  - a. Panel I/O Module Drawings shall include the following information:
    - 1) ISA and/or Equipment Tag Number from Contract Drawings (show on field element).
    - 2) Detailed description of the signal.
    - 3) System Tag ID.
9. Panel Plumbing Diagrams: For each panel containing piping and tubing. Show type and size for: Pipes and Tubes: Thickness, pressure rating, and materials.
  - a. Components: Valves, regulators, and filters.
  - b. Connections to panel mounted devices.
  - c. Panel interface connections.
10. Loop Diagrams: Individual wiring diagram for each analog or pulse frequency loop.
  - a. Conform to the minimum requirements of ISA S5.4.
  - b. Under Paragraph 5.3 of ISA S5.4, include the information listed under subparagraphs 2 and 6.
  - c. Drawing Size: Individual 11-inch by 17-inch sheet for each loop.

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- d. Divide each loop diagram into areas for panel face, back-of-panel, and field.
  - e. Show:
    - 1) Terminal numbers, location of dc power supply, and location of common dropping resistors.
    - 2) Switching contacts in analog loops and output contacts of analog devices. Reference specific control diagrams where functions of these contacts are shown.
    - 3) Tabular summary on each diagram:
      - a) Transmitting Instruments: Output capability.
      - b) Receiving Instruments: Input impedance.
      - c) Loop Wiring Impedance: Estimate based on wire sizes and lengths shown.
      - d) Total loop impedance.
      - e) Reserve output capacity.
    - 4) Circuit and raceway schedule names.
11. Interconnecting Wiring Diagrams:
- a. Diagrams, device designations, and symbols in accordance with NEMA ICS 1.
  - b. Show:
    - 1) Electrical connections between equipment, consoles, panels, terminal junction boxes, and field mounted components.
    - 2) Component and panel terminal board identification numbers, and external wire and cable numbers.
    - 3) Circuit names matching Circuit and Raceway Schedule.
    - 4) Intermediate terminations between field elements and panels (for example, to terminal junction boxes and pull boxes).
    - 5) Pull boxes.
12. Installation Details: Include modifications or further details required to adequately define installation of I&C components.
13. List of spares, expendables, test equipment and tools.
14. Additional Equipment Recommended: List of, and descriptive literature for, additional spares, expendables, test equipment and tools recommended.
- B. Informational Submittals: For PIC equipment, provide Manufacturer's Certificate of Proper Installation and readiness for operation.
- 1. Owner Training Plan. Reference Section 01 43 33, Manufacturers' Field Services.
  - 2. Operation and Maintenance (O&M) Manuals:
    - a. Content and Format:
      - 1) Complete sets O&M manuals.

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- 2) Sufficient detail to allow operation, removal, installation, adjustment, calibration, maintenance and purchasing replacements for each PIC component.
- 3) Final versions of Legend and Abbreviation Lists.
- 4) Manual format per Owner's direction.
- b. Include:
  - 1) Process and Instrumentation Diagrams: One reproducible copy of revised P&ID to reflect as-built PIC design.
  - 2) Refer to paragraph Shop Drawings for the following items:
    - a) Bill of Materials.
    - b) Catalog Cuts.
    - c) Component Data Sheets.
    - d) Panel Control Diagrams.
    - e) Panel Wiring Diagrams, one reproducible copy.
    - f) Panel Plumbing Diagrams, one reproducible copy.
    - g) Loop Diagrams, one reproducible copy.
    - h) Interconnecting Wiring Diagrams, one reproducible copy.
    - i) Application Software Documentation.
  - 3) Device O&M manuals for components, electrical devices, and mechanical devices include:
    - a) Operations procedures.
    - b) Installation requirements and procedures.
    - c) Maintenance requirements and procedures.
    - d) Troubleshooting procedures.
    - e) Calibration procedures.
    - f) Internal schematic and wiring diagrams.
    - g) Component Calibration Sheets from field quality control calibrations.
  - 4) List of spares, expendables, test equipment and tools provided.
  - 5) List of additional spares, expendables, test equipment and tools recommended.
3. Performance Acceptance Tests (PAT) Submittals:
  - a. Preliminary Test Procedures: Outlines of proposed tests, forms, and checklists.
  - b. Final Test Procedures: Proposed test procedures, forms, and checklists.
  - c. Test Documentation: Copy of signed off test procedures when tests are completed.

1.05 SOFTWARE DESIGN WORKSHOP

- A. Location: Owner's facility during the course of the Project.
- B. Objective: To provide a vehicle for the Owner to oversee the applications software development.
- C. Documentation: PIC Supplier summarizes resolutions reached in each workshop and distribute copies to Owner and Engineer.

1.06 QUALITY ASSURANCE

- A. Calibration Instruments: Each instrument used for calibrating PIC equipment shall bear the seal of a reputable laboratory certifying that instrument has been calibrated within the previous 12 months to a standard endorsed by the NIST.
- B. Coordination Meetings:
  - 1. Location: Owner's Site.
  - 2. Attended By: Engineer, Owner, and Contractor.
  - 3. Minimum of one is required. Specific dates will be established in Progress Schedule.
  - 4. First Meeting: Within 60 days after Notice to Proceed.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Provide Site and warehouse storage facilities for PIC equipment.
- B. Prior to shipment, include corrosive-inhibitive vapor capsules in shipping containers, and related equipment as recommended by the capsule manufacturer.
- C. Prior to installation, store items in dry indoor locations. Provide heating in storage areas for items subject to corrosion under damp conditions.
- D. Cover panels and other elements that are exposed to dusty construction environments.

1.08 ENVIRONMENTAL REQUIREMENTS

- A. Standard Environmental Requirements: Unless otherwise noted, design equipment for continuous operation in these environments:
  - 1. Freestanding Panel and Consoles:
    - a. Outside, Fan Cooled: NEMA 4X.

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2. Smaller Panels and Assemblies (that are not Freestanding):
    - a. All Locations: NEMA 4X.
  3. Field Elements: Outside.
- B. Environmental Design Requirements: Following defines the types of environments referred to in the above.
1. Outside:
    - a. Temperature: Minus 20 to 104 degrees F.
    - b. Relative Humidity: 10 to 95 percent noncondensing, freezing rain.
    - c. NEC Classification: Nonhazardous.
    - d. Sunshade: Aluminum or Stainless Steel; if noted.
  2. Outside, Corrosive:
    - a. Temperature: Minus 20 to 104 degrees F.
    - b. Relative Humidity: 10 to 95 percent noncondensing, freezing rain.
    - c. Corrosive Environment: Chlorine gas; Hydrogen sulfide gas.
    - d. NEC Classification: Nonhazardous.
    - e. Sunshade: Aluminum or Stainless Steel; if noted.

1.09 SEQUENCING AND SCHEDULING

- A. Activity Completion: The following is a list of key activities and their completion criteria:
1. Shop Drawings: Reviewed and approved.
  2. Quality Control Submittals: Reviewed and accepted.
  3. Hardware Delivery: Hardware delivered to Site and inventoried by Contractor.
  4. PAT: Completed and required test documentation accepted.
- B. PIC Substantial Completion: When Engineer issues Certificate of Substantial Completion.
1. Prerequisites:
    - a. All PIC Submittals have been completed.
    - b. PIC has successfully completed PAT.
    - c. Owner training plan is on schedule.
    - d. All spares, expendables, and test equipment have been delivered to Owner.
- C. PIC Acceptance: When Engineer issues a written notice of Final Payment and Acceptance.
1. Prerequisites:
    - a. Certificate of Substantial Completion issued for PIC.
    - b. Punch-list items completed.



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- c. Final revisions to O&M manuals accepted.
  - d. Maintenance service agreements for PIC accepted by Owner.
- D. Prerequisite Activities and Lead Times: Do not start the following key Project activities until the prerequisite activities and lead times listed below have been completed and satisfied:

<u>Activity</u>	<u>Prerequisites and Lead Times</u>
Submittal reviews by Engineer	Engineer acceptance of Submittal breakdown and schedule.
Hardware purchasing, fabrication, and assembly	Associated Shop Drawing Submittals completed.
FAT	Programming and unwitnessed testing completed; notice 4 weeks prior to start.
Shipment	Completion of PIC Shop Drawing Submittals, FAT Testing, and preliminary O&M manuals.
PAT	Startup, Owner training, and PAT procedures completed; notice 4 weeks prior to start.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. PIC functions as shown on the Drawings and as required for each loop. Furnish equipment items as required. Furnish all materials, equipment, and software, necessary to effect required system and loop performance.
- B. First Named Manufacturer: PIC design is based on first named manufacturers of equipment and materials.
  - 1. If an item is proposed from other than first named manufacturer, obtain approval from Engineer for such changes in accordance with Article Submittals.
  - 2. If using proposed item requires other changes, provide work and equipment to implement these changes. Changes that may be required include, but are not limited to: different installation, wiring, raceway, enclosures, connections, isolators, intrinsically safe barriers, software, and accessories.

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C. Like Equipment Items:

1. Use products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's services.
2. Implement all same or similar functions in same or similar manner. For example, control logic, sequence controls, and display layouts.

2.02 LOOP SPECIFICATIONS

A. Location: Article Supplements.

B. Organization: By unit process and loop number.

C. Functional Requirements for Control Loops:

1. Shown on the Drawings, in Panel Control Diagrams, and Process and Instrumentation Diagrams (P&ID). P&ID format and symbols are in accordance with ISA S5.1, except as specified or shown on the Drawings.
2. Supplemented by Loop Specifications.

D. Subheadings for Each Loop:

1. Functions: Clarifies functional performance of loop, including abstract of interlocks.
  - a. Components: Lists major components for each loop. Information listed include: Tag numbers.
  - b. Component Identification Codes: Alphanumeric codes of required components. Refer to Component Specification referenced in Article Supplements.
  - c. Component Names and Options: Required to tailor general Component Specifications to specific application. For example, special materials, mounting, size, unit range, scale, setpoints, and controller options.

2.03 I&C COMPONENTS

- A. Furnish all equipment that is necessary to achieve required loop performance.
- B. Component Specifications: Generalized specifications for each type of component are located in Article Supplements.

- C. Programmable Logic Controller/Remote Telemetry Unit Components: PLC/RTU series is Omnisite Crystal Ball. PLC/RTU components are specifically identified in the Panel Equipment List in Article Supplements. No substitutions are allowed unless an identified PLC module is obsolete. Note that interposing relays may be required in some instances to properly interface control voltages to the PLC.

## 2.04 NETWORK COMPONENTS

### A. Ethernet Patch Cables:

- 1. General:
  - a. In accordance with TIA 568.
  - b. Function: Connect network devices to network nodes, such as ethernet switches, PLCs, and computer workstations.
  - c. Length: Standard, to meet requirements shown, plus minimum 3 meters at workstations.
  - d. Type: Category 6, Shielded.
  - e. Color: Per standards or as indicated.

## 2.05 NAMEPLATES AND TAGS

### A. Panel Nameplates: Enclosure identification located on the enclosure face.

- 1. Location and Inscription: As shown.
- 2. Materials: Laminated plastic attached to panel with stainless steel screws.
- 3. Letters: 1/2-inch white on black background, unless otherwise noted.

### B. Component Nameplates—Panel Face: Component identification located on panel face under or near component.

- 1. Location and Inscription: As shown.
- 2. Materials: Laminated plastic attached to panel with stainless steel screws.
- 3. Letters: 3/16-inch white on black background, unless otherwise noted.

### C. Component Nameplates—Back of Panel: Component identification located on or near component inside of enclosure.

- 1. Inscription: Component tag number.
- 2. Materials: Adhesive backed, laminated plastic.
- 3. Letters: 3/16-inch white on black background, unless otherwise noted.

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- D. Legend Plates for Panel Mounted Pushbuttons, Lights, and Switches.
  - 1. Inscription: Refer to:
    - a. Table under paragraph Standard Pushbutton Colors and Inscriptions.
    - b. Table under paragraph Standard Light Colors and Inscriptions.
    - c. P&IDs in Drawings.
  - 2. Materials: Stainless steel, keyed legend plates. Secured to panel by mounting nut for pushbutton, light, or switch.
  - 3. Letters: Black on gray or white background.
- E. Service Legends: Component identification nameplate located on face of component.
  - 1. Inscription: As shown.
  - 2. Materials: Adhesive backed, laminated plastic.
  - 3. Letters: 3/16-inch white on black background, unless otherwise noted.
- F. Nametags: Component identification for field devices.
  - 1. Inscription: To match system data point tagname from P&IDs.
  - 2. Materials: 16-gauge, Type 304 stainless steel.
  - 3. Letters: 3/16-inch imposed.
  - 4. Mounting: Affix to component with 16- or 18-gauge stainless steel wire or stainless steel screws.

2.06 ELECTRICAL REQUIREMENTS

- A. In accordance with Division 26, Electrical and as specified herein.
- B. I&C and electrical components, terminals, wires, and enclosures: UL recognized or UL listed.
- C. Wires within Enclosures:
  - 1. ac Circuits:
    - a. Type: 300-volt, Type MTW stranded copper.
    - b. Size: For current to be carried, but not less than 18 AWG.
  - 2. Analog Signal Circuits:
    - a. Type: 300-volt stranded copper, twisted shielded pairs.
    - b. Size: 18 AWG, minimum.
  - 3. Other dc Circuits.
    - a. Type: 300-volt, Type MTW stranded copper.
    - b. Size: For current carried, but not less than 18 AWG.

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4. Special Signal Circuits: Use manufacturer's standard cables.
  5. Wire Identification: Numbered and tagged at each termination.
    - a. Wire Tags: Machine printed, heat shrink.
    - b. Manufacturers:
      - 1) Brady PermaSleeve.
      - 2) Tyco Electronics.
- D. Wires entering or leaving enclosures, terminate and identify as follows:
1. Analog and discrete signal, terminate at numbered terminal blocks.
  2. Special signals, terminated using manufacturer's standard connectors.
  3. Identify wiring in accordance with Electrical Specification, Conductors.
- E. Terminal Blocks for Enclosures:
1. Quantity:
    - a. Accommodate present and spare indicated needs.
    - b. Wire spare PLC/RTU I/O points to terminal blocks.
    - c. One wire per terminal for field wires entering enclosures.
    - d. Maximum of two wires per terminal for 18-WG wire for internal enclosure wiring.
    - e. Spare Terminals: 20 percent of all connected terminals, but not less than 5 per terminal block.
  2. General:
    - a. Connection Type: Screw compression clamp.
    - b. Compression Clamp:
      - 1) Complies with DIN-VDE 0611.
      - 2) Hardened steel clamp with transversal groves that penetrate wire strands providing a vibration-proof connection.
      - 3) Guides strands of wire into terminal.
    - c. Screws: Hardened steel, captive and self-locking.
    - d. Current Bar: Copper or treated brass.
    - e. Insulation:
      - 1) Thermoplastic rated for minus 55 to plus 110 degree C.
      - 2) Two funneled shaped inputs to facilitate wire entry.
    - f. Mounting:
      - 1) Standard DIN rail.
      - 2) Terminal block can be extracted from an assembly without displacing adjacent blocks.
      - 3) End Stops: Minimum of one at each end of rail.

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- g. Wire preparation: Stripping only permitted.
- h. Jumpers: Allow jumper installation without loss of space on terminal or rail.
- i. Marking System:
  - 1) Terminal number shown on both sides of terminal block.
  - 2) Allow use of preprinted and field marked tags.
  - 3) Terminal strip numbers shown on end stops.
  - 4) Mark terminal block and terminal strip numbers as shown on Panel Control Diagrams and Loop Diagrams.
  - 5) Fuse Marking for Fused Terminal Blocks: Fuse voltage and amperage rating shown on top of terminal block.
- 3. Terminal Block, General-Purpose:
  - a. Rated Voltage: 600V ac.
  - b. Rated Current: 30 amp.
  - c. Wire Size: 22 AWG to 10 AWG.
  - d. Rated Wire Size: 10 AWG.
  - e. Color: Grey body.
  - f. Spacing: 0.25 inch, maximum.
- 4. Terminal Block, Ground:
  - a. Wire Size: 22 AWG to 12 AWG.
  - b. Rated Wire Size: 12 AWG.
  - c. Color: Green and yellow body.
  - d. Spacing: 0.25 inch, maximum.
  - e. Grounding: Ground terminal blocks electrically grounded to the mounting rail.
- 5. Terminal Block, Blade Disconnect Switch:
  - a. Rated Voltage: 600V ac.
  - b. Rated Current: 10-amp.
  - c. Wire Size: 22 AWG to 12 AWG.
  - d. Rated Wire Size: 12 AWG.
  - e. Color: Grey body, orange switch.
  - f. Spacing: 0.25 inch, maximum.
- 6. Terminal Block, Fused, 24V dc:
  - a. Rated Voltage: 600V dc.
  - b. Rated Current: 16-amp.
  - c. Wire Size: 22 AWG to 10 AWG.
  - d. Rated Wire Size: 10 AWG.
  - e. Color: Grey body.
  - f. Fuse: 0.25 inch by 1.25 inches.
  - g. Indication: LED diode 24V dc.
  - h. Spacing: 0.512 inch, maximum.
- 7. Terminal Block, Fused, 120V ac:
  - a. Rated Voltage: 600V ac.
  - b. Rated Current: 16-amp.

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- c. Wire Size: 22 AWG to 10 AWG.
  - d. Rated Wire Size: 10 AWG.
  - e. Color: Grey body.
  - f. Fuse: 0.25 inch by 1.25 inches.
  - g. Indication: Neon Lamp 110V ac.
  - h. Leakage Current: 1.8 mA, maximum.
  - i. Spacing: 0.512 inch, maximum.
8. Terminal Block, Fused, 120V ac, High Current:
- a. Rated Voltage: 600V ac.
  - b. Rated Current: 35 amps.
  - c. Wire Size: 18 AWG to 8 AWG.
  - d. Rated Wire Size: 8 AWG.
  - e. Color: Grey.
  - f. Fuse: 13/32 inch by 1.5 inches.
  - g. Spacing: 0.95 inch, maximum.

F. Grounding of Enclosures:

- 1. Furnish isolated copper grounding bus for signal and shield ground connections.
- 2. Ground bus grounded at a common signal ground point in accordance with National Electrical Code requirements.
- 3. Single Point Ground for Each Analog Loop:
  - a. Locate at dc power supply for loop.
  - b. Use to ground wire shields for loop.
- 4. Ground terminal block rails to ground bus.

G. Power Distribution within Panels:

- 1. Feeder Circuits:
  - a. One or more 120V ac, 60-Hz feeder circuits as shown on the Drawings.
  - b. Make provisions for feeder circuit conduit entry.
  - c. Furnish terminal board for termination of wires.
- 2. Power Panel: Furnish main circuit breaker and a circuit breaker on each individual branch circuit distributed from power panel.
  - a. Locate to provide clear view of and access to breakers when door is open.
  - b. Breaker sizes: Coordinate such that fault in branch circuit will blow only branch breaker but not trip the main breaker.
    - 1) Branch Circuit Breaker: 15 amps at 250V ac.
  - c. Breaker Manufacturers and Products: Refer to Division 26, Electrical.

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3. Circuit Wiring: P&IDs and Control Diagrams on the Drawings show function only. Use following rules for actual circuit wiring:
  - a. Devices on Single Circuit: 20, maximum.
  - b. Multiple Units Performing Parallel Operations: To prevent failure of any single branch circuit from shutting down entire operation, do not group all units on same branch circuit.
  - c. Branch Circuit Loading: 12 amperes continuous, maximum.
  - d. Panel Lighting and Service Outlets: Put on separate 15-amp, 120V ac branch circuit.
  - e. Provide 120V ac plugmold for panel components with line cords.

H. Signal Distribution:

1. Within Panels: 4 mA to 20 mA dc signals may be distributed as 1 to 5V dc.
2. Outside Panels: Isolated 4 mA to 20 mA dc only.
3. All signal wiring twisted in shielded pairs.

I. Relays:

1. General:
  - a. Relay Mounting: Plug-in type socket.
  - b. Relay Enclosure: Furnish dust cover.
  - c. Socket Type: Screw terminal interface with wiring.
  - d. Socket Mounting: Rail.
  - e. Provide holddown clips.
2. Signal Switching Relay:
  - a. Type: Dry circuit.
  - b. Contact Arrangement: 2 Form C contacts.
  - c. Contact Rating: 0 to 5 amps at 28V dc or 120V ac.
  - d. Contact Material: Gold or silver.
  - e. Coil Voltage: As noted or shown.
  - f. Coil Power: 0.9 watts (dc), 1.2VA (ac).
  - g. Expected Mechanical Life: 10,000,000 operations.
  - h. Expected Electrical Life at Rated Load: 100,000 operations.
  - i. Indication Type: Neon or LED indicator lamp.
  - j. Seal Type: Hermetically sealed case.
3. Control Circuit Switching Relay, Nonlatching:
  - a. Type: Compact general-purpose plug-in.
  - b. Contact Arrangement: 3 Form C contacts.
  - c. Contact Rating: 10A at 28V dc or 240V ac.
  - d. Contact Material: Silver cadmium oxide alloy.
  - e. Coil Voltage: As noted or shown.
  - f. Coil Power: 1.8 watts (dc), 2.7VA (ac).



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- g. Expected Mechanical Life: 10,000,000 operations.
- h. Expected Electrical Life at Rated Load: 100,000 operations.
- i. Indication Type: Neon or LED indicator lamp.
- j. Push to test button.
- 4. Control Circuit Switching Relay, Latching:
  - a. Type: Dual coil mechanical latching relay.
  - b. Contact Arrangement: 2 Form C contacts.
  - c. Contact Rating: 10A at 28V dc or 120V ac.
  - d. Contact Material: Silver cadmium oxide alloy.
  - e. Coil Voltage: As noted or shown.
  - f. Coil Power: 2.7 watts (dc), 5.3VA (ac).
  - g. Expected Mechanical Life: 500,000 operations.
  - h. Expected Electrical Life at Rated Load: 50,000 operations.
- 5. Control Circuit Switching Relay, Time Delay:
  - a. Type: Adjustable time delay relay.
  - b. Contact Arrangement: 2 Form C contacts.
  - c. Contact Rating: 10A at 240V ac.
    - 1) Contact Material: Silver cadmium oxide alloy.
  - d. Coil Voltage: As noted or shown.
  - e. Operating Temperature: Minus 10 to 55 degrees C.
  - f. Repeatability: Plus or minus 2 percent.
  - g. Delay Time Range: Select range such that time delay setpoint fall between 20 to 80 percent of range.
  - h. Time Delay Setpoint: As noted or shown.
  - i. Mode of Operation: As noted or shown.
  - j. Adjustment Type: Integral potentiometer with knob external to dust cover.

J. Power Supplies:

- 1. Furnish to power instruments requiring external dc power, including two-wire transmitters and dc relays.
- 2. Convert 120V ac, 60-Hz power to dc power of appropriate voltage(s) with sufficient voltage regulation and ripple control to assure that instruments being supplied can operate within their required tolerances.
- 3. Provide output over voltage and over current protective devices to:
  - a. Protect instruments from damage due to power supply failure.
  - b. Protect power supply from damage due to external failure.
- 4. Enclosures: NEMA 1 in accordance with NEMA 250.
- 5. Mount such that dissipated heat does not adversely affect other components.
- 6. Fuses: For each dc supply line to each individual two-wire transmitter.
  - a. Type: Indicating.
  - b. Mount so fuses can be easily seen and replaced.

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K. Enclosure Door Switch:

1. Type: Mounts to enclosure frame.
2. Quantity: One per PLC panel.
3. Wire to PLC discrete input for Panel Door Status.

L. Internal Panel Lights for Freestanding Panels:

1. Type: Switched LED back-of-panel lights.
2. Quantity: One light for every 4 feet of panel width.
3. Mounting: Inside and in the top of back-of-panel area.
4. Protective metal shield for lights.

M. Service Outlets for Freestanding Panels:

1. Type: Three-wire, 120-volt, 15-ampere, GFCI duplex receptacles.
2. Quantity:
  - a. For panels 4 feet wide and smaller: One.
  - b. For panels wider than 4 feet: One for every 4 feet of panel width, two minimum per panel.
3. Mounting: Evenly spaced along back-of-panel area.

N. Internal Panel Lights and Service Outlets for Smaller Panels:

1. Internal Panel Light: Switched LED light.
2. Service Outlet: Breaker protected 120-volt, 15-amp, GFCI duplex receptacle.

O. Standard Pushbutton Colors and Inscriptions: Use following color code and inscriptions for pushbuttons, unless otherwise noted on the Drawings.

<b>Tag Function</b>	<b>Inscription(s)</b>	<b>Color</b>
OO	ON OFF	Black Black
OC	OPEN CLOSE	Black Black
OCA	OPEN CLOSE AUTO	Black Black Black
OOA	ON OFF AUTO	Black Black Black

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<b>Tag Function</b>	<b>Inscription(s)</b>	<b>Color</b>
MA	MANUAL AUTO	Black Black
SS	START STOP	Black Black
RESET	RESET	Black
EMERGENCY STOP	EMERGENCY STOP	Red

- a. Lettering Color:
  - 1) Black on white and yellow buttons.
  - 2) White on black, red, and green buttons.

- P. Standard Light Colors and Inscriptions: Use following color code and inscriptions for service legends and lens colors for indicating lights, unless otherwise noted on the Drawings.

<b>Tag Function</b>	<b>Inscription(s)</b>	<b>Color</b>
ON	ON	Green
OFF	OFF	Red
OPEN	OPEN	Green
CLOSED	CLOSED	Red
LOW	LOW	Green
FAIL	FAIL	Amber
HIGH	HIGH	Red
AUTO	AUTO	White
MANUAL	MANUAL	Yellow
LOCAL	LOCAL	White
REMOTE	REMOTE	Yellow

1. Lettering Color:
  - a. Black on white and amber lenses.
  - b. White on red and green lenses.

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2.07 SPARE PARTS

Description	Percent of Each Type and Size Used	No Less Than
dc power supplies	20	2
Fuses	20	5
Relays	20	3
Terminal Blocks	10	10

2.08 OTHER REQUIREMENTS

A. Float Switches:

1. Float-operated mercury switches shall be provided to operate duplex submersible pumps with a minimum of 50 feet of cable shall be provided.
2. Float Mounting Bracket: A float mounting bracket shall be provided. Float mounting bracket shall provide cord grips to hold the level control cords and allow adjustment of level controls to desired pumping alarm levels. Continuous cords are to run from pump(s) and level controls to control panel. No splices shall be made in wiring. Float mounting bracket shall be fabricated from stainless steel for corrosion resistance. Float mounting bracket shall attach to access frame with 300 series stainless steel fasteners.

B. Pump/Motor Power Cords: Cord shall be flexible and serviceable under heavy use conditions and shall meet NEC standards for the installation; ground fault interruption protection shall be provided for the cable; cord terminal fittings shall be corrosion-resistant and provide moisture protection for the cable, shall have strain-relief appurtenances, and shall be constructed to facilitate field-connecting.

C. Submersible Pumping Equipment: The motor shall be designed to operate on 3-phase, 60-cycle, 240-volt or 480-volt alternating current.

D. Controls:

1. Certifications:
  - a. Panel shall be designed to meet UL508A Industrial Control Panel Standards.

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- b. Panel builder must be a UL certified organization. Panels must include UL labels affixed to inside of outer cabinet door(s) as required by UL.
  - c. All wires will be color coded. Adhesive numbers or labels will not be allowed.
2. Power Control:
- a. The lift station control panel's main circuit breaker shall be fed from a 240-volt or 480-volt AC, 3 phase (3 wire plus ground) power source.
  - b. Optional Generator Receptacle per site requirement. Please provide Part Number if required.
  - c. Main and emergency circuit breakers shall be 3 pole and must be rated a minimum of 125 percent of maximum panel load. (If required) Emergency power circuit breaker.
  - d. There shall be two pumps protected by thermal-magnetic circuit breakers. Circuit breakers shall be sized a minimum of 150 percent of the full load amps of the pump motors.
  - e. Control of pumps shall be achieved by variable frequency drives (VFD's). Danfoss Variable Frequency Drives, Model FC-202XXXXXXXXX, for primary starting of the pumps with "Heat Sink thru the back" of Enclosure with exterior louvered covers with fine mesh stainless steel bug screen to fit over the heat sinks and Danfoss VFD. The CFD's must have 10-year on-site warranty that covers lighting, power surges, corrosion and heat damage. The VFD fuses will be integral to the drives and will also be covered by the warranty. 10-year Warranty provides for on-site Danfoss certified Technician to perform repairs or replacement when required.
  - f. Back-up RVSS (Soft Starters) shall be Danfoss Model MCD6XXXXXXXX, The RVSS shall have a separate power Circuit Breaker / Isolation Contactor with mechanical interlock a Bypass switch for VFD / Soft Starter operation. 10-year Warranty provides for on-site Danfoss certified Technician to perform repairs or replacement when required.
  - g. Mixer will be powered by thermal-magnetic circuit breaker. Circuit breakers shall be sized a minimum of 150 percent of the full load amps of the pump motors. Shall use a NEMA rated Starter rated for 3.4HP KSB Mixer and 24 timer circuit to control on and off times/ Hand-Off-Auto switch and Run Lights.
  - h. Blower circuit with Danfoss Micro Variable Frequency Drive Model FC-051PXXXXXXXX with 24-hour time clock and Hand/Off/Auto switch.

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- i. 120V ac control power shall be achieved by connecting to phase “A” on the load side of the Main (MCB) and Emergency (ECB) circuit breakers, and to the incoming power neutral.
  - j. Provide a 20-amp, 1 pole control circuit breakers for “GFI Receptacle” power.
  - k. Provide a 15-amp, 1 pole control circuit breakers for “Control” power.
  - l. All circuit breakers must be mounted on a raised hat section, with operators accessible without opening the inner door.
  - m. 3 phase power will be monitored by a 3-phase monitor relay. Phases must be balanced, have correct rotation, and voltage within tolerance. Otherwise, the phase monitor relay will disable the pump controls, preventing the pumps from running.
  - n. Provide an LED work light and mount to the inside top of the enclosure. Work light to be controlled by a switch located on the dead front.
3. Pump Controls:
- a. The pump control system consists of a pump controller with cellular RTU functionality for primary operation, and back-up float control with relay logic for automatic operation, and door mounted controller keypad and three position switches for manual control.
  - b. The Omni Site Crystal Ball for primary Control/Telemetry with Relay Logic with lead – lag selector switched alternator relay as backup to primary control. Omni Site unit must include (3) years of monitoring service and unit must be warranted for the lifetime of the panel and include repair/software upgrades/hardware upgrades/repair and replacement when required. Omni Site shall read the wet well level via (four) Mini Opti Floats and shall start pumps by relay output contact closures. Controller shall run pumps according to field adjusted wet well level set-points, including necessary alternation and simultaneous pump run conditions.
  - c. Under normal operation (Omni Site), the wet well fluids will rise to the “start lead” level. If one pump is insufficient to keep up with the inflow and the fluids continue to rise to the “start lag” level, then the lag pump will turn on. Regardless of the number of pumps running at a time, those pumps will all continue to run until the fluids are lowered to below the “pumps off” level, at which point all pumps will stop.

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- d. The Relay Logic system shall be activated using a 2-position switch on the inner door Crystal Ball / Relay Logic. In the “Crystal Ball” mode the floats will be controlled by the Omni Site Crystal Ball. When switch is positioned in the “relay Logic” mode the Omni Site Crystal Ball will be disabled for float inputs but will monitor alarms. While in “Relay Logic” the control circuit will utilize the alternator and float relays to control pump operation.
  - e. In the event of Omni Site Crystal Ball power loss, the control panel shall automatically switch to the “Relay Logic” circuit.
  - f. Manual pump operation shall be achieved via 3-position, “Hand-Off-Auto” switches on the control panel inner door.
  - g. Pumps will be disabled in the event of a phase failure (as previously mentioned), upon a VFD fault condition, or upon a pump housing over-temperature condition.
4. Alarm Circuitry:
- a. Control panel alarm system shall be 120V ac.
  - b. Alarm condition shall be triggered by tipping of the back-up high level float.
  - c. A flashing alarm beacon shall be mounted on left side using Myers Hub on the control panel, and an audible alarm horn (and silence button) shall be mounted on the exterior (left side) of the control panel enclosure.
  - d. The alarm will activate and remain activated until the high-level condition is no longer present. The alarm horn may be silenced with the silence button. The silence command shall reset upon clearing the alarm condition. Thus, a new alarm condition will sound the horn again.
5. Control Devices and Indication:
- a. Selector switches shall be provided for the following:
    - 1) 3-position “Hand-Off-Auto” switches for each pump.
    - 2) 2-position “Control Mode” mode switch.
  - b. Pushbuttons shall be provided for the following:
    - 1) Alarm horn silence – located external on left had side of enclosure.
  - c. Pilot light indication shall be provided for the following:
    - 1) Green “Run” indication for each pump.
    - 2) Yellow pump “Seal Failure” fault indication for each pump.
    - 3) Yellow motor “Overtemp” fault indication for each pump.
    - 4) Red “VFD Fault” indication for each pump.
    - 5) Green control mode in “Crystal Ball” indication.
    - 6) Yellow control mode in “Relay Logic” indication.
  - d. Elapsed run time meters shall be provided for each pump.

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6. Telemetry:
  - a. Lift station conditions shall be monitored by an Omni Site Crystal Ball cellular remote telemetry unit (RTU).
  - b. The standard operating program of the RTU monitors up to (fourteen) digital inputs and the alarm limits on up to (four) analog inputs. This information is immediately displayed on the RTU's web site, and user selectable alarm notifications for critical events can be sent via pager, e-mail, telephone call, or any combination thereof.
  - c. RTU digital inputs include:
    - 1) Pin – 1 DI1 - Float high level.
    - 2) Pin – 2 DI2 – Pump 1 fault.
    - 3) Pin – 3 DI3 – Pump 2 fault.
    - 4) Pin – 4 DI4 – Crystal Ball Power.
    - 5) Pin – 5 DI5 – Phase loss.
    - 6) Pin – 6 DI6 – Pump 1 seal fail.
    - 7) Pin – 7 DI7 – Pump 2 seal fail.
    - 8) Pin – 8 DI8 – (if required -Triplex) Lag-Lag level.
    - 9) Pin – 9 DI9 – Lag level.
    - 10) Pin – 10 DI10 – Lead level.
    - 11) Pin – 11 DI11 – Off level.
    - 12) Pin – 12 DI12 – Pump 1 runtime.
    - 13) Pin – 13 DI13 – Pump 2 runtime.
    - 14) Pin – 14 DI14 – Pump 3 runtime.
  - d. RTU relay outputs include:
    - 1) RO1 - Pump 1 start.
    - 2) RO2 - Pump 2 start.
  - e. RTU analog inputs include:
    - 1) 2+ / 2- (return) Pump 1 Amps from VFD1 (4-20 mA).
    - 2) 3+ / 3- (return) Pump 2 Amps from VFD2 (4-20 mA).
7. Variable Frequency Drives (Pumps):
  - a. Manufacture and type shall be Danfoss VLT Aqua series, FC202P.
  - b. Operator interface shall be graphical LCP.
  - c. Must include conformal coated PCB.
  - d. Enclosure must be IP21 / NEMA type 1.
  - e. Shall include internal mains fuses.
  - f. VFD's must include the panel through mount accessory kit to allow for heat sinks to be external of the control panel enclosure.
  - g. VFD's must be used when HP exceeds 15 HP.
  - h. Across the line starters can be used only upon approval by The City of Crestview.



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- i. In some installations it will be required to have VFD's as primary starters and across the line starters as Emergency back-up. Mode shall be via switch in panel.
8. Pump Controller/RTU:
  - a. Manufacturer and type shall be OmniSite Crystal Ball.
  - b. The OmniSite Crystal Ball is a multi-channel monitoring and control device that has been optimized for use by the water and wastewater utilities. It is designed for indoor or outdoor environments and operates from 120V ac or plus 15-20V dc solar panels and power supplies.
  - c. The module's internal cellular modem module provides two-way communications through the fully automated OmniSite operations center to the [www.omnisite.com](http://www.omnisite.com) web site.
  - d. The standard operating program of the RTU monitors all (fourteen) digital inputs and the alarm limits on (four) analog inputs and reports any changes. This information is immediately displayed on the web site, and user selectable alarm notifications for critical events can be sent via pager, e-mail, telephone call or any combination thereof.
  - e. Equipment status reports can be time scheduled in advance or requested at any time.
  - f. The Crystal Ball also has pump controller functionality.
9. Liquid Level Float System:
  - a. Manufacture and type shall Cox Research, Opti-Float (mini).
  - b. Two-float systems require input power of 12V dc, which is provided by the OPTI-PS2 12vdc power supply, fed to the OPTI-TR3 transceiver modules.
  - c. Opti-Float liquid level detectors/floats are mercury and lead free and are "inherently safe" as viewed by UL. The floats use no electrical wires to connect to the control system.
  - d. If the fiber-optic power supply and transceivers shall be installed in the junction box.
  - e. Pressure transducers, when required will be by "Blue Ribbon" and must have the lifetime warranty.

2.09 ELECTRICAL EQUIPMENT

- A. General: All electrical equipment shall be installed in accordance with NEC, as last revised. All materials used shall be new and unused, of the highest quality, and of proper type for the use intended. Where applicable, all material shall carry the approval of UL. Substitutes which tend to lower the quality of the work will not be permitted. The project is to result in a complete and operable Lift Station. Any items not specified, but normally included in such installations shall be furnished and installed regardless of omissions from specifications. However, specified omissions are not affected by this requirement. The electrical service and starting gear shall be mounted on a suitably sized panel board constructed as detailed on the construction plans. All details of service characteristics shall be verified with the local utility.
- B. Materials:
1. Conduit and conduit fittings shall be either aluminum or PVC; Electrical connectors and couplings shall be of the approved water-tight type.
  2. Wire and cable shall be properly sized to carry the anticipated loading. Insulation, unless otherwise noted, shall be type RHW neoprene jacket for all sizes.
  3. Conduit into wet well shall be large enough for easy removal of pump leads. There shall be one conduit for each pump, plus one for float switch cables, and one extra.
- C. Installation:
1. All wires entering the control panel from the wet well shall have a liquid/gas tight cord connector.
  2. Outlets, switches, boxes, etc., shall be rigidly secured and located properly with respect to easy accessibility.
  3. No electrical splices allowed except in control panel.
  4. All work shall be tested and subject to final approval of the Engineer.
- D. Stand-by Facilities: A double throw safety switch with attached emergency generator receptacle shall be installed between the main disconnect and the controller. The unit shall be housed in a NEMA rated steel enclosure. The receptacle shall be a Crouse-Hinds Model #5, Type AR-1048, rated for 100 Amp Service.
- E. Lightning Arrestor: The lightning arrestor for the main service entrance shall be Joshlan "Or-equal" approved.

- F. Main Disconnect: The main disconnect safety switch shall be an enclosed service entrance, weather-proof enclosure, 4 wire S/N, 240 Volt ac of sufficient size to carry both pumps operating simultaneously.

## 2.10 FABRICATION

### A. General:

1. Panels with external dimensions and instruments arrangement as shown on the Drawings.
2. Panel Construction and Interior Wiring: In accordance with the National Electrical Code, state and local codes, NEMA, ANSI, UL, and ICECA.
3. Fabricate panels, install instruments, wire, and plumb, at the PIC factory.
4. Electrical Work: In accordance with Division 26, Electrical.

- B. Factory Assembly: Assemble panels at the manufacturer's factory. No fabrication other than correction of minor defects or minor transit damage shall be done on panels at Site.

- C. UL Listing Mark for Enclosures: Mark stating "Listed Enclosed Industrial Control Panel" per UL 508A.

- D. All wires will be color coded. Adhesive numbers or labels will not be allowed.

### E. Wiring Within PIC Panels:

1. Restrain by plastic ties or ducts or metal raceways.
2. Hinge Wiring: Secure at each end so that bending or twisting will be around longitudinal axis of wire. Protect bend area with sleeve.
3. Arrange wiring neatly, cut to proper length, and remove surplus wire.
4. Abrasion protection for wire bundles which pass through holes or across edges of sheet metal.
5. Connections to Screw Type or Compression Clamp Type Terminals:
  - a. Strip, prepare, and install wires in accordance with terminal manufacturer's recommendations.
  - b. Wires installed in a compression screw and clamp, maximum of one for field wires entering enclosure, otherwise maximum of two.
6. Splicing and tapping of wires, allowed only at device terminals or terminal blocks.
7. Terminate 24V dc and analog signal circuits on separate terminal block from ac circuit terminal blocks.

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8. Separate analog and dc circuits by at least 6 inches from ac power and control wiring, except at unavoidable crossover points and at device terminations.
9. Arrange wiring to allow access for testing, removal, and maintenance of circuits and components.
10. Plastic Wire Ducts Fill: Do not exceed manufacturer's recommendation.

F. Temperature Control:

1. Freestanding Panels:
  - a. Nonventilated Panels: Size to adequately dissipate heat from equipment mounted inside panel or on panel.
  - b. Ventilated Panels:
    - 1) Furnish with louvers and forced ventilation as required to prevent temperature buildup from equipment mounted inside panel or on panel.
    - 2) For panels with backs against wall, furnish louvers on top and bottom of panel sides.
    - 3) For panels without backs against wall, furnish louvers on top and bottom of panel back.
    - 4) Louver Construction: Stamped sheet metal.
    - 5) Ventilation Fans:
      - a) Furnish where required to provide adequate cooling.
      - b) Create positive internal pressure within panel.
      - c) Fan Motor Power: 120V ac, 60-Hz, thermostatically controlled.
    - 6) Air Filters: Washable aluminum, Hoffman Series A-FLT.
2. Refrigerated System: Furnish where heat dissipation cannot be adequately accomplished with natural convection or forced ventilation. Smaller Panels (that are not freestanding): Size to adequately dissipate heat from equipment mounted inside panel or in panel face.
3. Space Heaters: Hygrostatically controlled to maintain internal panel temperatures above dew point. Hoffman AMHUM, "Or-equal", for controlling humidity.

G. Freestanding Panel Construction:

1. Control Panel Enclosure:
  - a. Control panel enclosure shall be of type 4X, constructed of Type 304 stainless steel, and be powder-coated white or green (over cleaned phosphatized surfaces) inside and out.
  - b. The enclosure shall be of seam-welded construction and be equipped with a drip shield to prevent water penetration around the outer doors.

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- c. Control panel includes (Type 304 stainless steel or Aluminum) – please choose option - Air Brake Pedestal 24-inch high with hinged pedestal base doors/quarter turn latches/ bug screen and lift off hinge, powder coated white or green.
- d. Enclosure outer door(s) must be equipped with 3-point (Type 316 stainless steel) pad-lockable handles. Door stop mechanisms are to be provided to hold doors open during maintenance. Doorstops must be at least 90 degrees.
- e. Hinged inner door swing panels shall be provided to allow for lift station operation without exposure to hazardous voltages. Inner doors shall be fabricated of a minimum thickness 0.125 inch, type 5052 marine-grade aluminum with a black matte powder coated finish (both sides). All component labels and markings shall be engraved. Inner doors shall have quarter-turn latches and must also include minimum 90-degree door stop mechanisms.
- f. Removable, back mounted subpanels shall be provided for mounting control and power devices (excluding pump VFD's). Enclosure shall be construction with cutouts in the rear to allow for the pump VFD's to be mounted with the heat-sinks protruded through the rear of the enclosure.
- g. VFD heat-sinks shall be cover by a removable (bolt-on), vented hood.
- h. Two vertical stainless steel uni-struts shall be provided and tack welded to the back of the enclosure. An aluminum 3/16-inch plate with White powder coat finish shall be bolted to the welded uni-strut.

H. Junction Box Enclosure Construction:

- 1. Junction box enclosure shall be of type 4X, constructed of Aluminum, and be powder-coated white or green (over cleaned phosphatized surfaces) inside and out.
- 2. The enclosure shall be of seam-welded construction and be equipped with a drip shield to prevent water penetration around the outer doors.
- 3. Enclosure door must be equipped with 3-point (Type 316 stainless steel) pad-lockable handle.
- 4. Provide a removable, back-mounted subpanel and a vertical divider panel to separate intrinsically safe control wires from non-intrinsically safe power and control wires. Float connections must be kept separated from pump connections. A .125 aluminum powder coated black back panel shall have labels for each wire termination engraved into the back panel.

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5. Junction box shall be mounted on a vented, air-break pedestal constructed of Aluminum. Pedestal height shall be 32 inches. Hinged access doors must be provided to allow access to the conduit/cable stub-up area beneath the junction box. The air brake expanded metal must include stainless steel fine mesh bug screen to prevent wasp/bees/yellow jackets from entering Pedestal area and building nest/hives.
6. Pedestal shall be powder-coated forest green or white to match enclosure.
7. Manufacturers:
  - a. Hoffman Engineering Co.
  - b. Saginaw Control and Engineering (SCE).

I. Factory Finishing:

1. Enclosures:
  - a. Stainless Steel and Aluminum: Outdoor PLC panels shall be painted white or green.
  - b. Nonmetallic Panels: Not painted.
2. Manufacturer's standard finish color, except where specific color is indicated. If manufacturer has no standard color, finish equipment with light gray color.

2.11 CORROSION PROTECTION

A. Corrosion-Inhibiting Vapor Capsule Manufacturers:

1. Northern Instruments; Model Zerust VC.
2. Hoffmann Engineering Co; Model A-HCI.

2.12 ELECTRICAL TRANSIENT PROTECTION

A. General:

1. Function: Protect elements of PIC against damage due to electrical transients induced in interconnecting lines by lightning and nearby electrical systems.
2. Implementation: Provide, install, coordinate, and inspect grounding of surge suppressors at:
  - a. Connection of ac power to PIC equipment including panels, consoles assemblies, and field mounted analog transmitters and receivers.
  - b. At the field and panel, console, or assembly connection of signal circuits that have portions of the circuit extending outside of a protective building.

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3. Construction: First-stage high energy metal oxide varistor and second-stage bipolar silicon avalanche device separated by series impedance. Includes grounding wire, stud, or terminal.
  4. Response: 5 nanoseconds maximum.
  5. Recovery: Automatic.
  6. Temperature Range: Minus 20 degrees C to plus 85 degrees C.
- B. Suppressors on 120V ac Power Supply Connections:
1. Occurrences: Tested and rated for a minimum of 50 occurrences of IEEE 587 Category B test waveform.
  2. First-Stage Clamping Voltage: 350 volts or less.
  3. Second-Stage Clamping Voltage: 210 volts or less.
  4. Continuous Operation: Power supplies for one four-wire transmitter or receiver: 5 amps minimum at 130V ac. All other applications: 30 amps minimum at 130V ac.
- C. Suppressors on Analog Signal Lines:
1. Test Waveform: Linear 8 microsecond rise in current from 0 amps to a peak current value followed by an exponential decay of current reaching one half the peak value in 20 microseconds.
  2. Surge Rating: Tested and rated for 50 occurrences of 2,000-amp peak test waveform.
    - a. dc Clamping Voltage: 20 to 40 percent above operating voltage for circuit.
    - b. dc Clamping Voltage Tolerance: Less than plus or minus 10 percent.
    - c. Maximum Loop Resistance: 18 ohms per conductor.
- D. Physical Characteristics:
1. Type "SS1", for 120V ac Lines within Control Panels:
    - a. Manufacturer and Model: DEHN DR M 2P 150 (953 204).
  2. Type "SS2", for Analog Signals Lines within Control Panels:
    - a. Manufacturer and Model: DEHN BSP M4 BE 24 (926 324).
  3. Type "SS3", if Field Mounted at Two-Wire Instruments:
    - a. Dual Signal, Manufacturer and Model: Phoenix Contact 2800037.
    - b. Single Signal, Manufacturer and Model: ASCO, Model 157 series.
  4. Type "SS4", if Field Mounted at Four-Wire Instruments:
    - a. Enclosure: NEMA 4X fiberglass or Type 316 stainless steel with door.
      - 1) Maximum Size: 12 inches by 12 inches by 8 inches deep.
    - b. Manufacturer and Product: ASCO; Model 265 series.

## 2.13 SOURCE QUALITY CONTROL

### A. General:

1. Engineer may actively participate in any of the tests.
2. Engineer reserves right to test or retest specified functions.
3. Engineer's decision will be final regarding acceptability and completeness of testing.
4. Procedures, Forms, and Checklists:
  - a. Complete I/O checklist with verification that all points (including spares) have been tested.
  - b. Control Strategy verification form which includes a narrative summary of the control strategy and cause-effect testing procedures for each loop
  - c. Have space after each test item description for sign off by appropriate party after satisfactory completion.
5. Required Test Documentation: Test procedures, forms, and checklists signed by PIC Supplier.
6. Conducting Tests:
  - a. Provide special testing materials and equipment.
  - b. Wherever possible, perform tests using actual process variables, equipment, and data.
  - c. If not practical to test with real process variables, equipment, and data provide suitable means of simulation.
  - d. Define simulation techniques in test procedures.
  - e. Test Format: Cause and effect.
    - 1) Person conducting test initiates an input (cause).
    - 2) Specific test requirement is satisfied if correct result (effect), occurs.

### B. Unwitnessed Factory Test:

1. Scope: Inspect and test PIC to ensure it is operational, ready for Witnessed Factory Demonstration Test.
2. Location: PIC System Integrator's facility.
3. Integrated Test:
  - a. Interconnect and test PIC, except for primary elements and smaller panels.
  - b. Exercise and test functions.
  - c. Provide stand-alone testing of smaller panels.
  - d. Simulate inputs and outputs for primary elements, final control elements, and panels excluded from test.
  - e. Inspect and test entire PIC to ensure it is ready for shipment, installation, and operation.



- C. Witnessed Factory Demonstration Test (FDT):
  - 1. Scope: Inspect and test entire PIC to ensure it is ready for shipment, installation, and operation. Panels are not allowed to ship until witnessed factory testing is approved by Engineer.
  - 2. Location: Manufacturer's factory or Engineer approved staging Site.
  - 3. Test: Exercise and test all functions.
  - 4. Temporary PLC/RTU software configuring to allow PLC testing.
    - a. Provide capability to simulate sensors, valves and pumps.
    - b. Demonstrate interaction between PLC/RTU's, sensors, valves and pumps.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. For equipment not provided by PIC, but that directly interfaces with the PIC, verify the following conditions:
  - 1. Proper installation.
  - 2. Calibration and adjustment of positioners and I/P transducers.
  - 3. Correct control action.
  - 4. Switch settings and dead bands.
  - 5. Opening and closing speeds and travel stops.
  - 6. Input and output signals.

### **3.02 INSTALLATION**

- A. Material and Equipment Installation: Retain a copy of manufacturers' instructions at Site, available for review at all times.
- B. Electrical Wiring: As specified in Division 26, Electrical and as specified herein.
- C. Mechanical Systems:
  - 1. Drawings for PIC Mechanical Systems are diagrammatic and not intended to specifically define element locations or piping and tubing run lengths. Base materials and installations on field measurements.
  - 2. Copper and Stainless Steel Tubing Support: Continuously supported by an aluminum tubing raceway system.
  - 3. Plastic Tubing Supports: Except as shown on the Drawings, provide continuous support in conduits or by aluminum tubing raceway system.

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4. Install tubing conduit for plastic tubing and tubing raceways parallel with, or at right angles to, structural members of buildings. Make vertical runs straight and plumb.
5. Tubing and Conduit Bends:
  - a. Tool-formed without flattening, and all of same radius.
  - b. Bend Radius: Equal to or larger than conduit and tubing manufacturer's recommended minimum bend radius.
  - c. Slope instrument connection tubing in accordance with installation details.
  - d. Do not run liquid filled instrument tubing immediately over or within a 3-foot plan view clearance of electrical panels, motor starters, or mechanical mounting panel without additional protection. Where tubing must be located in these zones, shield electrical device to prevent water access to electrical equipment.
  - e. Straighten coiled tubing by unrolling on flat surface. Do not pull to straighten.
  - f. Cut tubing square with sharp tubing cutter. Deburr cuts and remove chips. Do not gouge or scratch surface of tubing.
  - g. Blow debris from inside of tubing.
  - h. Make up and install fittings in accordance with manufacturer's recommendations. Verify makeup of tube fittings with manufacturer's inspection gauge.
  - i. Use lubricating compound or TFE tape on stainless steel threads to prevent seizing or galling.
  - j. Run tubing to allow, for example, clear access to doors, controls, and control panels; and to allow for easy removal of equipment.
  - k. Provide separate support for components in tubing runs.
  - l. Supply expansion loops and use adapters at pipe, valve, or component connections for proper orientation of fitting.
  - m. Keep tubing and conduit runs at least 12 inches from hot pipes.
  - n. Locate and install tubing raceways in accordance with manufacturer's recommendations. Locate tubing to prevent spillage, overflow, or dirt from above.
  - o. Securely attach tubing raceways to building structural members.
6. Enclosure Lifting Rings: Remove rings following installation and plug holes.

D. Removal or Relocation of Materials and Equipment:

1. Remove from Site materials that were part of the existing facility but are no longer used, unless otherwise directed by Engineer to deliver to Owner.
2. Repair affected surfaces to conform to type, quality, and finish of surrounding surface.

3.03 FIELD FINISHING

- A. As specified herein.

3.04 FIELD QUALITY CONTROL

- A. Startup and Testing Team:

1. Thoroughly inspect installation, termination, and adjustment for components and systems.
2. Perform fiber optic cable terminations.
3. Complete onsite tests.
4. Complete onsite training.
5. Provide startup assistance.

- B. Operational Readiness Inspections and Calibrations: Prior to startup, inspect and test to ensure that entire PIC is ready for operation.

1. Loop/Component Inspections and Calibrations:
  - a. Check PIC for proper installation, calibration, and adjustment on a loop-by-loop and component-by-component basis.
  - b. Prepare component calibration sheet for each active component (except simple hand switches, lights, gauges, and similar items).
    - 1) Project name.
    - 2) Loop number.
    - 3) Component tag number.
    - 4) Component code number.
    - 5) Manufacturer for elements.
    - 6) Model number/serial number.
    - 7) Summary of functional requirements, for example:
      - a) Indicators and recorders, scale and chart ranges.
      - b) Transmitters/converters, input and output ranges.
      - c) Computing elements' function.
      - d) Controllers, action (direct/reverse) and control modes (PID).
      - e) Switching elements, unit range, differential (fixed/adjustable), reset (auto/manual).
    - 8) Calibrations, for example:
      - a) Analog Devices: Actual inputs and outputs at 0, 10, 50, and 100 percent of span, rising and falling.
      - b) Discrete Devices: Actual trip points and reset points.
      - c) Controllers: Mode settings (PID).
    - 9) Space for comments.

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- c. These inspections and calibrations will be spot checked by Engineer.

C. Performance Acceptance Tests (PAT):

- 1. General:
  - a. Test all PIC elements to demonstrate that PIC satisfies all requirements.
  - b. Test Format: Cause and effect.
    - 1) Person conducting test initiates an input (cause).
    - 2) Specific test requirement is satisfied if correct result (effect) occurs.
  - c. Procedures, Forms, and Checklists:
    - 1) Conduct tests in accordance with, and documented on, Engineer accepted procedures, forms, and checklists.
    - 2) Describe each test item to be performed.
    - 3) Have space after each test item description for sign off by appropriate party after satisfactory completion.
  - d. Required Test Documentation: Test procedures, forms, and checklists. All signed by Engineer and Contractor.
  - e. Conducting Tests:
    - 1) Provide special testing materials, equipment, and software.
    - 2) Wherever possible, perform tests using actual process variables, equipment, and data.
    - 3) If it is not practical to test with real process variables, equipment, and data, provide suitable means of simulation.
    - 4) Define simulation techniques in test procedures.
  - f. Coordinate PIC testing with Owner and affected Subcontractors.
    - 1) Excessive Test Witnessing: Refer to Supplementary Conditions.
- 2. Test Requirements:
  - a. Once facility has been started up and is operating, perform a witnessed PAT on complete PIC to demonstrate that it is operating as required. Demonstrate each required function on a paragraph-by-paragraph and loop-by-loop basis.
  - b. Perform local and manual tests for each loop before proceeding to remote and automatic modes.
  - c. Where possible, verify test results using visual confirmation of process equipment and actual process variable. Unless otherwise directed, exercise and observe devices supplied by others, as needed to verify correct signals to and from such devices and to confirm overall system functionality. Test verification by means of disconnecting wires or measuring signal levels is acceptable only where direct operation of plant equipment is not possible.

- d. Make updated versions of documentation required for PAT available to Engineer at Site, both before and during tests.
- e. Make one copy of O&M manuals available to Engineer at the Site both before and during testing.

### 3.05 TRAINING

#### A. General:

1. Provide an integrated training program to meet specific needs of Owner's personnel.
2. Include training sessions, classroom and field, for managers, engineers, operators, and maintenance personnel.
3. Provide instruction on one working shift as needed to accommodate the Owner's personnel schedule.
4. Owner reserves the right to make and reuse video recordings of training sessions.

#### B. Operations and Maintenance Training:

1. Include a review of O&M manuals and survey of spares, expendables, and test equipment.
2. Use equipment similar to that provided or currently owned by Owner.
3. Provide training suitable for instrument technicians with at least a 2-year associate engineering or technical degree, or equivalent education and experience in electronics or instrumentation.

#### C. Operations Training:

1. Training Session Duration: One 8-hour instructor day.
2. Number of Training Sessions: One.
3. Location: Owner/Project Site.
4. Content: Conduct training on loop-by-loop basis.
  - a. Loop Functions: Understanding of loop functions, including interlocks for each loop.
  - b. Loop Operation: For example, adjusting process variable setpoints, AUTO/MANUAL control transfer, AUTO and MANUAL control, annunciator acknowledgement and resetting.
  - c. Interfaces with other control systems.

#### D. Maintenance Training:

1. Training Session Duration: One 8-hour instructor day.
2. Number of Training Sessions: One.
3. Location: Owner/Project Site.

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4. Content: Provide training for each type of component and function provided.
  - a. Loop Functions: Understanding details of each loop and how they function.
  - b. Component calibration.
  - c. Adjustments: For example, controller tuning constants, current switch trip points, and similar items.
  - d. Troubleshooting and diagnosis for components.
  - e. Replacing lamps, fuses.
  - f. Component removal and replacement.
  - g. Periodic maintenance.

3.06 CLEANING/ADJUSTING

- A. Repair affected surfaces to conform to type, quality, and finish of surrounding surface.
- B. Cleaning:
  1. Prior to closing system using tubing, clear tubing of interior moisture and debris.
  2. Upon completion of Work, remove materials, scraps, and debris from interior and exterior of equipment.

3.07 PROTECTION

- A. Protect enclosures and other equipment containing electrical, instrumentation and control devices, including spare parts, from corrosion through the use of corrosion-inhibiting vapor capsules.
- B. Periodically replace capsules in accordance with capsule manufacturer's recommendations. Replace capsules just prior to Final Payment and Acceptance.

**END OF SECTION**

**SECTION 40 94 04**  
**PROGRAMMABLE LOGIC CONTROLLER (PLC)**

**PART 1 GENERAL**

1.01 WORK INCLUDED

- A. This section covers Work related to the Programmable Logic Controller (PLC) or RTU, and supplements Section 40 90 01, Instrumentation and Control for Process Systems. Note that this section does not stand alone. Many key technical definitions and functional requirements for the Programmable Logic Controller (PLC) are given in Section 40 90 01, Instrumentation and Control for Process Systems, and related Subsystems.

1.02 PLC/RTU OVERVIEW

- A. The PLC/RTU shall provide the control functions specified for the Instrumentation and Control for Process System and shall consist of the required number and configuration of programmable logic controllers (PLCs) to meet those requirements. The PLC/RTU shall provide control logic for automatic and manually directed control, plus alarm and status reporting. The PLC/RTU shall integrate and report run times for all monitored equipment.

1.03 SUBMITTALS

- A. General: Provide all submittals in accordance with Section 40 90 01, Instrumentation and Control for Process Systems, and in addition, provide Hardware and Software submittals for the PLC/RTU equipment.
- B. Hardware Submittals:
  - 1. Provide the Following for all Elements of the PLC/RTU:
    - a. Loop Diagrams: Full-scaled detailed interconnecting wiring diagrams showing point-to-point connections for each I/O point shown on the P&IDs. Diagrams shall show all PLC/RTU elements, their interconnecting cables wiring terminations, and all terminations to field instrumentation. Terminations shall be numbered.
    - b. Block Diagram: A diagram showing all major PLC/RTU components. Identify components by manufacturer and model number. Show interconnecting cables diagrammatically.

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- c. Bill-of-Materials: A list of all PLC/RTU components. Group components by component type and include:
  - 1) Component manufacturer, model number, and part number.
  - 2) Component description.
  - 3) Quantity supplied.
  - 4) Reference to component catalog information.
- d. Descriptive Information: Catalog information, descriptive literature, performance Specifications, internal wiring diagrams, power and grounding requirements, power consumption, and heat dissipation of all elements of the PLC/RTU. Clearly mark all options and features proposed for this Project.
- e. Outline Drawings: Equipment envelope drawings showing: external dimensions, enclosure materials, conduit connections, and installation requirements.
- f. Installation Details: Any modifications or further details as may be required to supplement the Contract Documents and adequately define the installation of the PLC/RTU elements.
- g. Input/Output List: For each PLC/RTU, provide an I/O point list which includes for each physical I/O point; point type, tag number of the source or final control element, equipment description, station number, terminal identification, software address, and data bit or word used for access to/from the PLC/RTU.

C. Software Submittals:

- 1. Provide a complete set of standard user's manuals for the PLC/RTU. These manuals shall cover all aspects of programming, documenting, and using the PLC/RTU equipment.
- 2. Provide a detailed design description of the PLC/RTU programs. Submit this material in sequential order during the program development stage. This submittal shall be reviewed by the Owner/Engineer, and include:
  - a. Control Diagram Description: A written overview description of each control program. These descriptions shall lead the user through the major subsections of the programs. They shall generally describe the programming methods and techniques to be used to implement the functional requirements of this Specification and the distribution of these programs within the PLC/RTU hardware.



3. Preliminary Software Documentation: Provide this submittal at least 4 weeks prior to the Factory Demonstration Test. Here the term “preliminary” refers only to the timing of this submittal, not the level of detail to be provided. This submittal shall be a fully detailed version of all the material described hereinafter under Article O & M Manuals, paragraph Software, except that the electronic copies and final binding are not required at this time.

#### 1.04 O&M MANUALS

##### A. Hardware:

1. Provide the Following:
  - a. Updated versions of all material described under Article Submittals, paragraph Hardware.
  - b. Component Manufacturers' O & M Manuals: Include manuals to cover installation, operation, maintenance, troubleshooting, and calibration.
  - c. List of spare parts and expendables provided and list of spare parts recommended.

##### B. Software:

1. Provide the Following:
  - a. Programming Manuals: Component manufacturers' standard programming manuals.
  - b. Software Development Manuals: Producer's standard usage manuals.
  - c. Software Documentation: Provide a final version of the material called for under paragraph Software Submittals.
  - d. Provide copies of all programs with full documentation in electronic and in hard copy form.

#### 1.05 FUNCTIONAL REQUIREMENTS

- A. General: The PLC/RTU shall be used for monitoring, signal coordination, and control. The operations described hereinafter are intended to identify minimum acceptable performance. The Contractor shall provide all hardware and software features required to make the PLC/RTU and its integration with other systems totally operational.

- B. PLC/RTU Process Inputs/Outputs (I/O):
1. Physical Input/Output (I/O) points are shown on the P&IDs and on PLC/RTU Input/Output List which is a supplement to this section. These points are transmitted to/from the PLC/RTU. This method of depiction is not intended to be all-inclusive. Provide any additional inputs, outputs, functions, or operations required to provide a completely operational system. Note that this depiction does not show the PLC/RTU diagnostic fault detection I/O points. Include these points as part of the PLC/RTU process I/O points. In case of a conflict between P&IDs and PLC/RTU Input/Output List, P&IDs take precedence.
  2. Spare I/O:
    - a. The PLC/RTUs shall have installed spare I/O points. For each type of I/O points used at a given location, the number of spare points of that type shall be at least 20 percent of the total points of that type that are used at the given I/O location.
    - b. All spare I/O points shall be wired to terminal blocks.
  3. Analog Input Isolation:
    - a. Provide full isolation (at least 1,000 volts) of 4-wire analog signals input into the PLC/RTU. Implement full isolation in either of two ways:
      - 1) Provide all analog modules as inherently fully isolated.
      - 2) Use the following practices if using non-isolated Analog Input Modules.
        - a) Provide isolators on each 4-wire analog loop. Locate isolators in the same panel as the analog input module. Acceptable manufacturers being Acromag, Rochester, and AGM.
- C. General Data Acquisition and Control Requirements: The PLC/RTU shall serve as the high level system controller, coordinating multiple inputs to meet the process requirements.
- D. Specific Data Acquisition and Control Requirements: The specific data acquisition and control requirements for the PLC/RTU are shown in the Drawings and detailed in Section 40 90 01, Instrumentation and Control for Process Systems and Supplements.
- E. Fault Detection: The Fault Detection System shall consist of the following components: Loss of communication with specific components and/or loss of function over a data highway.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 EQUIPMENT SPECIFICATIONS**

- A. General: All components and interconnecting wiring shall be provided as required to satisfy the functional and operational requirements of this Specification.

**3.02 ENVIRONMENTAL REQUIREMENTS**

- A. General: Refer to paragraph Environmental Requirements for definitions of different environments in Section 40 90 01, Instrumentation and Control for Process Systems.
- B. Standard Environmental Requirements: Unless otherwise noted, design PLC/RTU equipment for continuous operation in these environments:
  - 1. Freestanding Panels and Consoles: Inside and air conditioned.
  - 2. Smaller Panels and Assemblies (that are Not Freestanding): Inside.
  - 3. Field Elements: Outside.

**3.03 ENCLOSURE RATINGS AND MATERIALS**

- A. General: Refer to Paragraph Panel Fabrication in Section 40 90 01, Instrumentation and Control for Process Systems, for enclosure ratings and materials.

**3.04 TEMPERATURE CONTROL**

- A. Size all enclosures of the PLC/RTUs to house PLC/RTUs, I/O chassis, and support equipment plus adequately dissipate heat generated within them.

**3.05 CORROSION CONTROL**

- A. All enclosures for elements of the PLC/RTUs shall be protected from internal corrosion by the use of corrosion inhibiting vapor capsules as manufactured by Northern Instruments Model Zerust VC; Hoffman Engineering Model A-HCI; or equal.

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3.06 POWER SUPPLY

- A. PLC/RTU equipment shall operate on 120V ac, plus or minus 10 percent, single-phase, 60-Hz, plus or minus 0.5-Hz power. The 120V ac power source may have transient impulses of plus or minus 100 volts for up to 2 milliseconds, and line voltage dropouts of up to 2 cycles. Furnish all equipment necessary for the proper conditioning of the input power to prevent interruption, damage, or improper operation of the PLC/RTUs.
- B. Provide Uninterruptible Power Supply (UPS) at PLC/RTU location to support the PLC/RTU and its associated equipment (including primary field devices).

3.07 CABLES

- A. PLC/RTU Internal Cables: Provide and install all cables for interconnecting all components of the PLC/RTU inside the panel. These cables shall include cables to network bridge, power supplies, central processing unit.
- B. PLC/RTU External Cables: Provide all Data Highway cables needed to interface with vendor supplied PLC/RTU equipment, as shown on Drawings.

**END OF SECTION**

**SECTION 43 40 02**  
**FIBERGLASS REINFORCED PLASTIC WET WELL**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Society of Mechanical Engineers (ASME):
    - a. B16.5, Pipe Flanges and Flanged Fittings: NPS 1/2 through 24.
    - b. RTP-1, Reinforced Thermoset Plastic Corrosion Resistant Equipment.
  2. ASTM International (ASTM):
    - a. C582, Standard Specification for Contact-Molded Reinforced Thermosetting Plastic (RTP) Laminates for Corrosion-Resistant Equipment.
    - b. D883, Standard Terminology Related to Plastics.
    - c. D2583, Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
    - d. D2584, Standard Test Method for Ignition Loss of Cured Reinforced Resins.
    - e. D3299, Standard Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks.
    - f. D3753, Standard Specifications for Glass-Fiber-Reinforced Polyester Manholes and Wet Wells.
    - g. D4097, Standard Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Chemical-Resistant Tanks.
    - h. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
    - i. E1067, Standard Practice for Acoustic Emission Examination of Fiberglass Reinforced Plastic Resin (FRP) Tanks/Vessels.
  3. Occupational Safety and Health Act (OSHA): Part 1910.24, Subpart D, Walking-Working Surfaces.

1.02 DEFINITIONS

- A. FRP: Fiberglass reinforced plastic.

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1.03 DESIGN REQUIREMENTS

- A. Design, test, fabricate and install the fiberglass wet well in accordance with the design requirements provided herein. The fiberglass wet well and anti-flotation concrete support base shall be designed by a qualified engineer registered in the State of Florida.
- B. Design Loads:
1. The wet well shall have a minimum dynamic-load rating of 16,000 ft-lbs when tested in accordance with ASTM 3753, Section 8, test methods D790 and D695.
  2. The wet well shall not leak, crack, or incur other damage when load tested to 40,000 ft-lbs.
  3. Max vertically downward deflection of no more than 1/4 inch at the point of load application when loaded to 24,000 ft-lbs.
- C. Stiffness:
1. The wet well cylinder shall have a minimum pipe-stiffness value as shown in the following table when tested in accordance with ASTM 3753, Section 8:

<b>Stiffness</b>	
<b>Length (ft)</b>	<b>F/AY (psi)</b>
10 – 20	2.01
21 – 30	3.02
31 - 40	5.24

<b>Physical Properties</b>		
<b>Property</b>	<b>Hoop Direction (psi)</b>	<b>Axial Direction (psi)</b>
Tensile Strength	18,000	5,000
Tensile Modulus	$0.8 \times 10^6$	$0.7 \times 10^6$
Flexural Strength	26,000	4,500
Flexural Modulus (no ribs – 48”, 60”, 72”) (with ribs – 96”, 144”)	$1.4 \times 10^6$ $0.7 \times 10^6$	$0.7 \times 10^6$ $0.7 \times 10^6$

- D. Design tank, including resin selection (unless specified), wall thickness, methods and locations of support, and stiffener requirements. Design shall be prepared and sealed by designer meeting requirements of Article Quality Assurance.

- E. All concrete shall be 3,000 psi strength minimum and reinforcing steel shall be Grade 60.
- F. Coordinate with pump manufacturer to be installed in tank to ensure tank support design are suitable for use. Secure the following: Manufacturer drawings of required pump supports.

#### 1.04 SUBMITTALS

##### A. Action Submittals:

- 1. Shop Drawings:
  - a. Fabricators catalog information, descriptive literature, specifications, and identification of materials of construction, including complete resin system information.
  - b. Detailed fabrication drawings.
  - c. Tank data indicating equipment number, pressure rating, diameter, straight shell lengths, overall lengths, wall thickness, corrosion barrier thickness, and details of nozzle designs.
  - d. Fabricator's detailed requirements for tank foundations.
- 2. Samples: Laminate sample representative of production quality of surface finish and visual imperfections.

##### B. Informational Submittals:

- 1. Complete design calculations for tanks, supports and appropriate accessories.
- 2. Provide engineered design for wet well's concrete anti-flotation base to satisfy anti-flotation needs and structural support for bottom of wet well per manufacturer's requirements.
- 3. Fabricator's Certificate of Compliance with fabrication requirements.
- 4. Qualifications of Fabricator's Quality Assurance Supervisor.
- 5. Copy of fabricator's Quality Assurance Program.
- 6. Quality Assurance Inspection:
  - a. Qualifications of Independent FRP Quality Assurance Inspector.
  - b. Initial QA Inspection Report.
  - c. Certification of Factory Testing.
- 7. Certification that equipment, supports, hatches, and access nozzles have been coordinated with actual equipment being furnished.
- 8. Special shipping, storage and protection, and handling instructions.
- 9. Fabricator's printed installation and tank support instructions.
- 10. Manufacturer's Certificate of Proper Installation in accordance with Section 01 43 33, Manufacturers' Field Services.
- 11. Manufacturer's Warranty.

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1.05 QUALITY ASSURANCE

- A. Fabricator's Quality Assurance Supervisor: Minimum of 3 years' experience in fabrication of fiberglass structures.
- B. Designer: Registered professional engineer licensed in State of Florida.
- C. Calculations required for Contractor design and Shop Drawings shall be sealed, signed and dated by a registered engineer licensed in state where Project will be constructed.
- D. Independent FRP Quality Assurance Inspector:
  - 1. Minimum 5 years' experience as FRP inspector.
  - 2. Representing a corporately and financially independent organization that can function as an unbiased inspection authority.
  - 3. Professionally independent of manufacturers, suppliers, and installers of systems being inspected.

1.06 WARRANTY

- A. The fiberglass Manufacturer shall warrant the fiberglass wet well against defects for at least 20 years after the date of acceptance. Defects are defined as cracking, delaminating, or leaking. The warranty shall require the Manufacturer to supply all necessary labor, materials, and equipment to repair all defects to the satisfaction of the Owner.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. In accordance with the Manufacturer's recommended procedures. In addition, prepare and protect tank for shipment as follows:
  - 1. Mount tank on padded cradles if shipped horizontally or on a suitable skid if shipped vertically.
  - 2. Protect flanged nozzles with wooden blinds bolted to flange and having a diameter of 2 inches greater than outside diameter of flange.
  - 3. Provide either rigid plugs inside ends to prevent deflection or wooden boxes for unflanged components. Brace open end of tank with suitable stiffening member to prevent deflection.
  - 4. Do not ship components or other pieces loose inside tank.
  - 5. Load tank with at least 2 inches of clearance between tank (including fittings) and bulkheads, or bed of vehicle.
  - 6. Regardless of mode of transportation, firmly fasten and pad components to prevent shifting of load or flexing of components while in transit.



7. The tank shall not be dropped or impacted.
8. Use of chains or cables in contact with the tank surface is prohibited.

1.08 SEQUENCING AND SCHEDULING

- A. Do not ship tank from factory until Engineer's review of Certification of Factory Testing is completed.

**PART 2 PRODUCTS**

2.01 APPROVED MANUFACTURERS

- A. L.F. Manufacturing, Inc. (LFM).
- B. Associated Fiberglass Enterprises (AFE).

2.02 GENERAL

- A. Wet well shall be a one-piece unit, unless otherwise approved by Owner.
- B. Bottom perimeter of wet well must have 12-inch fillet to direct solids toward suction pumps; grouted all around.
- C. The exterior surface shall be relatively smooth with no sharp projections.
- D. The exterior surface shall be free of blisters larger than 1/2-inch diameter, delamination and fiber showing.
- E. The interior surface shall be resin rich with no exposed fibers.
- F. The interior surface shall be free of blisters larger than 1/2-inch diameter, crazing, delamination, wrinkles of 1/8 inch or greater in depth.
- G. Surface pits greater than 3/4-inch diameter and or greater than 1/8-inch deep will not be permitted.
- H. Steps are not required inside the wet well.

2.03 MATERIALS

- A. Filament-Wound: Fabricate in accordance with ASTM D3299, Type I, Grade 1.

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B. Resin:

1. Suitable for intended service.
2. Commercial grade unsaturated polyester resins with fiberglass reinforcements.
3. Use same resin throughout entire tank shell.
4. Add ultraviolet absorbers to surfacing resin to improve weather resistance.
5. No dyes, pigments, or colorants, except in exterior gel coat.
6. Fillers, when used, shall be inert to the environment and wet well construction. Additives, such as thixotropic agents, catalysts, promoters, etc., may be added as required by the specific manufacturing process to be used. The resulting reinforced plastic material must meet the requirements of this Specification.
7. Curing System:
  - a. As recommended by resin manufacturer or as specified herein.
  - b. Cure products as specified in ASTM D3299.

C. Reinforcements:

1. Surfacing Veil: Commercial grade surfacing mat Type E, continuous roving, chopped roving, roving fabric, or a combination the above, having a coupling agent that will provide a suitable bond between the glass reinforcements and the resin.

D. Laminate:

1. If reinforcing materials are used on the surface exposed to the contained substance, it shall be a commercial grade chemical-resistant glass that will provide a suitable bond with the resin and leave a resin rich surface.
2. Consists of inner surface (corrosion barrier), interior layer, and exterior layer (structural layer).
3. Meet visual acceptance criteria in ASTM C582.
4. Meet requirements of mechanical properties in ASTM D3299.
5. Reinforce inner surface with resin-rich surfacing veil as specified herein.

E. Color: Inside and outside surface of wet well shall be white in color. Other colors will not be accepted without Owner approval.

F. Marking:

1. Identify each tank with fabricator's name, ASTM designation, serial number, date of manufacturer, diameter, length, and warranty length.

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2. Provide permanent marking. Seal decals, labels, etc., into laminate exterior with clear resin affixed to top inside and top outside walls.

G. Mounting Brackets:

1. Affix 1/4-inch thick Type 316 stainless steel backer plates to exterior of wet well at locations where brackets attach to wet well.
2. Manufacturer shall determine quantity and size of Type 316 stainless hardware to be used for fastening.
3. The bolts are to be inserted through backer plates with bolt heads welded to backer plate.
4. Bolts and nuts shall be fastened together to bracket on interior of wet well.
5. Exterior backer plate shall be glassed over at factory.

H. Pipe Connections:

1. Discharge Pipes: Discharge wall penetrations shall have fiberglass necks large enough to accept O.D. of pipe discharge flange and shall be installed via a gas tight, water tight Link Seal system.
2. Influent Pipes:
  - a. Factory install a laminated fiberglass neck at influent pipe locations shown on the Drawings. The neck diameter and length shall be sized to accept the Link Seal required for the influent pipe diameter. Fill annular space on both sides of Link Seal with fiberglass.
  - b. Alternately, and with Owner approval, the Manufacturer may install the laminated fiberglass neck in the field. Neither the Contractor nor Manufacturer's field representatives will be allowed to do this field installation. Any performed field installations shall be covered by the manufacturer's 20-year warranty.

- I. Piping: All piping inside and through wet well shall be stainless steel for corrosion resistance.

J. Plates, Sheets and Shapes:

1. Aluminum Plates, Sheets and Shapes:
  - a. All aluminum plates and shapes shall be of Type AA 5052 alloy conforming to applicable requirements of ASTM B209, (Latest Revision).
  - b. Aluminum extended shapes shall be 6061 or 6062 alloy conforming to ATM B221, (Latest Revision).

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- c. All surfaces in contact with concrete shall be coated with Bitumastic (Koppers 50 “Or-equal”).
2. Stainless Steel Plates, Sheets and Shapes:
  - a. All stainless steel plates and sheets shall be Type 304 alloy conforming to the applicable requirements of ASTM A182, (Latest Revision).
  - b. Stainless steel pipe shall be schedule 40, Type 304 alloy conforming to the applicable requirements of ASTM-312, (Latest Revision).
3. Fasteners:
  - a. Fasteners, insofar as practicable, shall be concealed. Where exposed, fastening shall be of the same material, color and finish as associated metal, where not indicated otherwise and countersunk wherever possible.
  - b. All hardware used to assemble cast iron fittings shall be stainless steel.
  - c. All fastenings coming into contact with aluminum and/or submerged shall be of stainless steel.

2.04 APPURTENANCES

- A. Lifting Lugs: Provide suitably attached for tank weighing over 100 pounds.

2.05 SOURCE QUALITY CONTROL

- A. Independent FRP Inspector:
  1. To be present at point of manufacture at time fabrication is started, to perform the following:
    - a. Observe manufacturing methods, machinery, and techniques to ensure compliance with industry standards and these Specifications.
    - b. Observe initial fabrication to verify compliance with these Specifications.
    - c. Observe quality control methods for mixing resins and testing of completed equipment.
    - d. Generally observe quality of other ongoing fabrication.
    - e. Prepare Initial QA Inspection Report.
  2. To be present at point of manufacture, upon completion of fabrication and prior to shipment, to perform or witness the following:
    - a. Visual inspection to requirements of ASTM C582.
    - b. Barcol Hardness measurements per ASTM D2583.
    - c. Acetone sensitivity test for internal secondary bonds.
    - d. Glass content by ignition loss on three cutouts per ASTM D2584.

- e. Hydrostatic Leak Test:
  - 1) Perform on each tank.
  - 2) Fill to top nozzle; allow to stand for 2 hours with no visible leakage.
- 3. Prior to beginning repair work, repairs deemed acceptable by Independent FRP Inspector shall be approved by Engineer.
- B. Identify and retain cutouts. Engineer may select certain cutouts for testing for physical properties of laminate.
- C. Factory Test Reports:
  - 1. Certify results, by signature, of the following:
    - a. Inspections.
    - b. Results of hydrostatic testing.
    - c. Test reports of physical properties of standard laminates.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. In accordance with fabricator's written instructions.
- B. Install wet well at final grades as shown on the Drawings.
- C. Install concrete support base cast around the tanks anti-flotation collar per manufacturer and delegated engineering design requirements.

#### **3.02 MANUFACTURER'S FIELD SERVICES**

- A. Provide fabricator's representative at Site for installation assistance, inspection and certification of proper installation for specified component, subsystem, equipment, or system.

**END OF SECTION**



**SECTION 44 42 56.04**  
**SUBMERSIBLE PUMPS**

**PART 1 GENERAL**

1.01 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
1. American Bearing Manufacturers Association (ABMA):
    - a. 9, Load Ratings and Fatigue Life for Ball Bearings.
    - b. 11, Load Rating and Fatigue Life for Roller Bearings.
  2. American Society of Mechanical Engineers (ASME): B16.1, Gray Iron Pipe Flanges and Flanged Fittings, Class 25, 125, and 150.
  3. ASTM International (ASTM):
    - a. A48, Standard Specification for Gray Iron Castings.
    - b. A576, Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality.
  4. Hydraulic Institute Standards (HIS):
    - a. 11.6, Submersible Pump Test.
    - b. 14.6, Rotodynamic Pumps for Hydraulic Performance Acceptance Tests.
  5. National Electrical Manufacturers Association (NEMA).
  6. National Fire Protection Association (NFPA):
    - a. 70, National Electrical Code.
    - b. 497, Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.
  7. UL.

1.02 DEFINITIONS

- A. Terminology pertaining to pumping unit performance and construction shall conform to ratings and nomenclature of Hydraulic Institute Standards.

1.03 SUBMITTALS

- A. Action Submittals:
1. Make, model, weight, and horsepower of each equipment assembly.
  2. Complete catalog information, descriptive literature, specifications, and identification of materials of construction, including cable seal details.

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3. Performance data curves showing head, capacity, horsepower demand, and pump efficiency over entire operating range of pump, from shutoff to maximum capacity. Indicate separately head, capacity, horsepower demand, overall efficiency, and minimum submergence required at guarantee point.
4. For variable speed motors, provide variable speed curves for every 50 rpm over the operational range.
5. Power and control wiring diagrams, including terminals and numbers.
6. Motor data.
7. Adjustable frequency drive data.
8. Factory-finish system.
9. L-10 bearing life calculations per ABMA.
10. If required, wiring for motor protection module.

B. Informational Submittals:

1. Special shipping, storage and protection, and handling instructions.
2. Manufacturer's printed installation instructions.
3. Factory and Field Performance Test Reports.
4. Suggested spare parts list to maintain equipment in service for period of 5 years. Include list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
5. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.
6. Operation and Maintenance Data as required by the Owner.
7. Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.

1.04 EXTRA MATERIALS

- A. Furnish for this set of pumps: One complete set of special tools required to dismantle pump.

**PART 2 PRODUCTS**

2.01 GENERAL

- A. Submersible, vertical shaft, centrifugal, nonclog, heavy-duty, recessed impeller type, for pumping wastewater.
- B. Designed for continuous operation under submerged or partially submerged conditions, and intermittent operation when totally dry without damage to pump or motor.



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- C. Pump and Electrical Driver: Meet requirements for class, group, and division location in accordance with NFPA 70.
- D. Thrust and radial bearings shall be of the ball type. The motor shaft shall be stainless steel and designed for extremely difficult sewage pumping service.
- E. Where adjustable speed drives are required, furnish a coordinated operating system complete with pump, drive, and speed controller.
- F. Pumps furnished under this section to be provided by a single manufacturer.

2.02 SUPPLEMENTS

- A. Specific requirements are attached to this section as supplements.

2.03 COMPONENTS

- A. Equipment consists of pump complete with motor, control system, guide rail, anchoring brackets, base elbow, power cable, and pump lifting cable and control panel and level switches.
- B. Characteristics:
  - 1. Motor and rotating parts shall be removable from motor end of pump.
  - 2. Mating surfaces to be watertight and fitted with nitrile O-rings.
  - 3. Pumps fitted with dynamically balanced recessed vortex nonclog impellers designed to pass course solids and stringy materials.
- C. Hydraulic Sealing Flange: A hydraulically operated sealing flange, complete with Buna N rubber diaphragm type sealing gasket, shall be mounted on each pump discharge. The diaphragm shall be held in place by a 300 series stainless steel ring with stainless steel fasteners.
- D. Lifting Arrangement:
  - 1. Each pumping unit shall be provided with a lifting chain. The lifting chain shall be 3/8-inch stainless steel minimum and shall be of sufficient length to extend from the pumping unit at one end to the top of the wet well at the other end. The access frame shall provide a hook to attach the lifting chain (minimum 1/4-inch stainless steel) when not in use. The lifting chain shall be sized according to the pump weight.
  - 2. The top end of the chain shall have a minimum of 4-inch loop fastened with stainless steel fittings.
  - 3. All lift eyes within the interior of wet well shall be cut off flush with the interior surface.

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E. Sliding Guide Bracket:

1. Integral part of pump unit.
2. Pump unit to be guided by no less than two guide bars and pressed tightly against discharge connection elbow with metal-to-metal contact or through use of profile-type gasket, provided gasket is attached to pump's flange and can be easily accessed for inspection when pump is lifted out of wet well.
3. Pump metal parts that come into contact with guide rail or cable system shall be made of nonsparking materials.
4. The rail shall be a 2-inch stainless steel pipe and positioned on the centerline of the pump to each side so that no weight of the pump bears on either of the two guide rails at any time. The guide rails shall serve truly as a guide rail.
5. A sliding guide bracket shall be attached to the pump. The sliding guide bracket shall be stainless steel. The carrier shall be mounted on the pump so lifting is done from the carrier and no strain is placed on the pump or guide rails. Fasteners shall be 300 series stainless steel. Carrier shall be designed to lift from centered hoop.

F. Discharge Base Elbow with Base Plate:

1. A discharge elbow shall be furnished for each pump and shall be attached to a flat steel fabricated base plate which rests squarely on the wet well floor to provide a smooth surface on which to rest.
2. The base plate shall include a leveling bolt adjustment as well as adjustable guide rails supports which hold guide rail pipes at the bottom.
3. The base elbow shall be heavily coated with zinc spray to provide a smooth corrosion resistant and abrasion resistant surface.
4. All fasteners shall be Type 316 stainless steel.

G. Motor nameplate horsepower not to be exceeded at head-capacity point on pump curve.

H. Pump motor and sensor cables shall be suitable for submersible pump application and cable sizing shall conform to NFPA 70 specifications for pump motors. Cables shall be of sufficient length to reach junction boxes without strain or splicing.

I. Motor Protection Module:

1. Provide pump with a motor protection module for remote mounting.

2. Contract Drawings are based on first named submersible pump manufacturer and motor protection module. If pump and motor protection module other than first named manufacturer is provided, provide revised wiring for the motor protection module.

#### 2.04 CONTROL PANEL

- A. Reference Instrumentation and Control for Process Systems, Section 40 90 01, Instrumentation and Control for Process Systems for all control panel information.

#### 2.05 ACCESSORIES

- A. Level Switches: See Section 40 90 01, Instrumentation and Control for Process Systems.
- B. Equipment Identification Plate: Each piece of mechanical equipment and motors shall be provided with a substantial nameplate of non-corrodible metal, securely fastened in place, and clearly and permanently inscribed with the manufacturer's name, model, or type designation, serial number, rated capacity, electrical or other power characteristics, and other appropriate nameplate data. Spare nameplates shall be provided for each lift station and placed inside each control panel.
- C. Anchor Bolts: Type 316 stainless steel, sized by equipment manufacturer.
- D. Lubricants: All the equipment shall be delivered fully lubricated with oil and/or grease insofar as possible. If any point cannot be so serviced, it shall be clearly marked to the effect that it is not lubricated and requires servicing prior to operation. An adequate supply of proper lubricant, with the instructions for its application shall be supplied with the equipment for each point not lubricated prior to shipment. The contractor shall also provide the Owner with a sufficient amount of proper lubricants for one complete change of lubricant for all equipment furnished.
- E. Access Frame and Hatch:
  1. Size as shown on the Drawings or if not shown, sized by equipment manufacturer.
  2. An access frame assembly shall be supplied with separate hinged cover for removal of each pump. Access frame and hatch shall be either corrosion resistant or coated with a corrosion resistant coating.
  3. Upper rail guide brackets shall be attached to the access frame as well as the float switch holding bracket.

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4. Cover shall be provided with lifting handle, safety latch to hold cover in open position and locking hasp.
5. Hatch to be provided with fall protection safety grating.
6. Load Capacity: 300 psf with H 20 wheel loading capacity.
7. Gasketed and odor tight.

2.06 FACTORY FINISHING

- A. Manufacturer's standard epoxy system for continuous submergence in corrosive water.

2.07 WARRANTY

- A. The manufacturer shall warrant to the City of Crestview, for permanent installation in municipal sewage service, the submersible pump and motor against defects in materials and workmanship for a period of 5 years from substantial completion, including normal wear and tear to the following parts: mechanical seals, bearings, shafts, motor electrical cables, motor stators, and impeller furnish a written warranty for the equipment specified in this section.

2.08 SOURCE QUALITY CONTROL

- A. Control Panel:
  1. Factory Inspections: Inspect control panel for required construction, electrical connection, and intended function.
- B. Pump:
  1. Factory Performance Test:
    - a. In accordance with HIS 11.6, Level A for submersible pump tests.
    - b. Include curve test results.
  2. Conduct on each pump.
  3. Perform under actual or approved simulated operating conditions.
    - a. Throttle discharge valve to obtain pump data points on curve at 2/3, 1/3, and shutoff conditions.
- C. Submersible Motor Functional Test: In accordance with HIS 11.6.

**PART 3 EXECUTION**

3.01 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions.

- B. Mount the discharge elbow to the floor of the wet well floor with stainless steel bolts and per the Drawing details.
- C. Connect piping without imposing strain to flanges.
- D. No portion of pump shall bear directly on floor of sump.

### 3.02 FIELD QUALITY CONTROL

- A. Functional Test: Conduct on each pump.
  - 1. Alignment: Test complete assemblies for correct rotation, proper alignment and connection, and quiet operation.
  - 2. Flow Output: Measured by plant instrumentation and storage volumes.
  - 3. Test for continuous 3-hour period.
  - 4. Test Report Requirements: In accordance with Hydraulic Institute Standards for submersible pump tests HIS 14.6 and 11.6.
- B. Pump Test:
  - 1. General:
    - a. Conduct on each pump provided.
    - b. Conduct in accordance with HIS 11.6.
  - 2. Routine Production Tests:
    - a. Check impeller, motor rating and electrical connections for compliance to Specification.
    - b. Test motor and cable insulation for moisture content and insulation defects.
    - c. Prior to submergence, run pump dry to establish correct rotation and mechanical integrity.
    - d. Conduct abbreviated three-point operational performance test.
    - e. After operational performance test, perform insulation test again.

### 3.03 MANUFACTURER'S SERVICES

- A. Manufacturer's Representative: Present at Site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:
  - 1. One person-day for functional and performance testing and completion of Manufacturer's Certificate of Proper Installation.
  - 2. 1/2 person-day for facility startup.
  - 3. 1/2 person-day for post-startup training of Owner's personnel.
- B. See Section 01 43 33, Manufacturers' Field Services.

Blackwater Golf Club Lift Station and Force Main  
Procurement Equipment Package

3.04 SUPPLEMENTS

A. The supplements listed below, following “End of Section,” are part of this Specification.

1. Data Sheets: Pump and Motor.

**END OF SECTION**

**SUBMERSIBLE PUMP DATA SHEET, 44 42 56.04**

Tag Numbers: 20-P-20-1 and 20-P-20-2

Pump Name: Blackwater Lift Station Pumps 1 and 2

Manufacturer and Model Number: (1) KSB KRT F 100-316

(2) Barnes 4EXSHVBA

**SERVICE CONDITIONS**

Liquid Pumped (Material and Percent Solids): Raw Wastewater

Pumping Temperature (Fahrenheit): Normal: 70 Max 90 Min 50

Specific Gravity at 60 Degrees F: 1 Viscosity Range: 1.05

pH: 6 – 8 typical

Abrasive (Y/N) Y Possible Scale Buildup (Y/N): N

Minimum diameter solid pump can pass (inches) 4

Min. NPSH Available (Ft. Absolute): 35

**PERFORMANCE REQUIREMENTS**

Capacity (US gpm): Rated: 250

Total Dynamic Head (Ft): Rated: 140

Maximum Shutoff Pressure (Ft): 168

Min. Rated Pump Hydraulic Efficiency at Rated Capacity (%): 53

Max. Pump Speed at Rated Capacity (rpm): Constant (Y/N): 1790 (N)

Adjustable (Y/N): Y

**DESIGN AND MATERIALS**

Pump Type: Heavy-Duty Nonclog (Y/N) Y Other: Vortex

Volute Material: Cast Iron ASTM A48

Pump Casing Material: Cast Iron ASTM A48

Blackwater Golf Club Lift Station and Force Main  
Procurement Equipment Package

Motor Housing Material: Cast Iron ASTM A48\_\_\_\_\_

Wear Rings Case (Y/N): Y\_\_\_\_\_ Material: \_\_\_\_\_

Wear Ring Impeller (Y/N): Y\_\_\_\_\_ Material: \_\_\_\_\_



**SUBMERSIBLE PUMP DATA SHEET, 44 42 56.04**

Tag Numbers: 20-P-20-1 and 20-P-20-2

Pump Name: Blackwater Lift Station Pumps 1 and 2

Elastomers: Nitrile Rubber

Fasteners: Stainless Steel

Impeller: Type: Double-Shrouded Non-Clog (Y/N): \_\_\_\_\_ Other: Vortex

Material: Chilled Cast Iron ASTM 532, 15% Cr-Mo

Shaft Material: Stainless steel.

Base Elbow: Cast Iron ASTM A48

Double Mechanical Seal (Y/N): \_\_\_\_\_ Bearing Life (Hrs): 100,000

**DRIVE MOTOR**

Horsepower: 40 Voltage: 480 Phase: 3 Synchronous Speed (rpm): 1800

Enclosure: Submersible - EXP

CLASSIFICATION: Class 1, Group D, Division 1

Adjustable Speed Drive Range: 50% min to 100% max

Other Features: \_\_\_\_\_

Moisture Detection Switches (Y/N): Y

Thermal Protection Embedded in Windings (Y/N): Y

**REMARKS:** Motors shall be inverter-duty rated.



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**DRAWINGS**

**(BOUND SEPARATELY)**

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**ATTACHMENT**

**CRESTVIEW PROCUREMENT  
EQUIPMENT PACKAGE**

**DRAWINGS**

**NOVEMBER 2021**

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1

2

3

4

5

6

# GENERAL NOTES

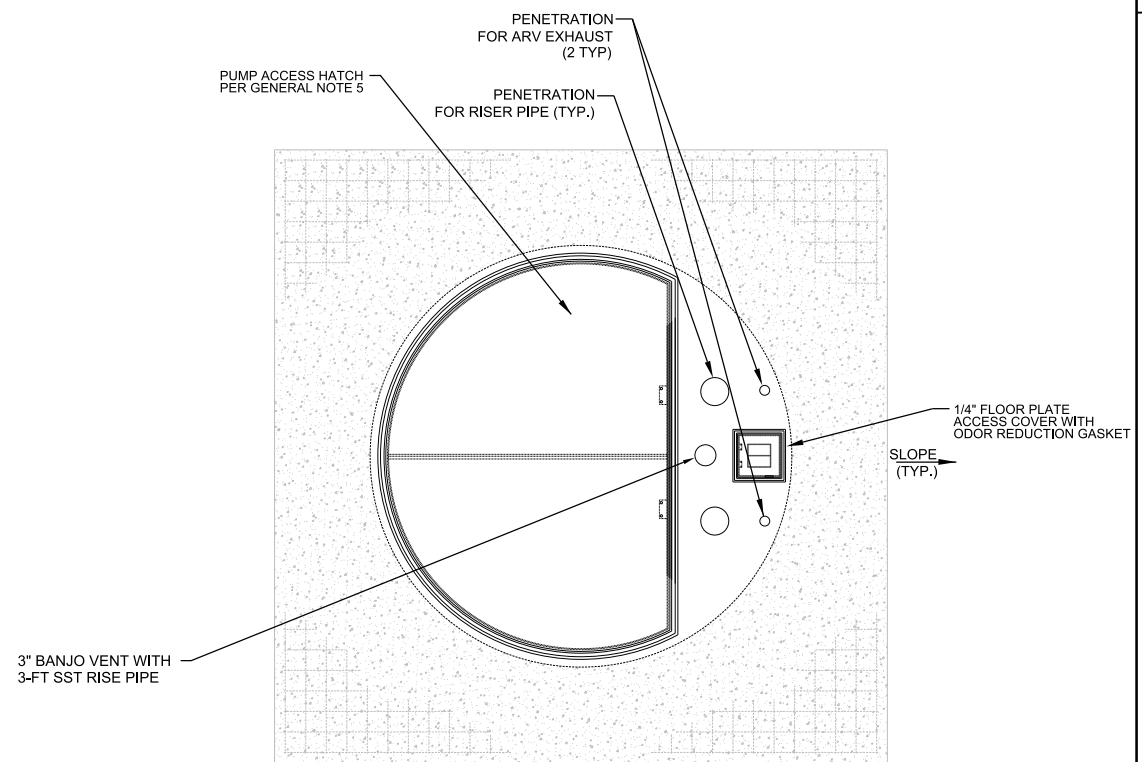
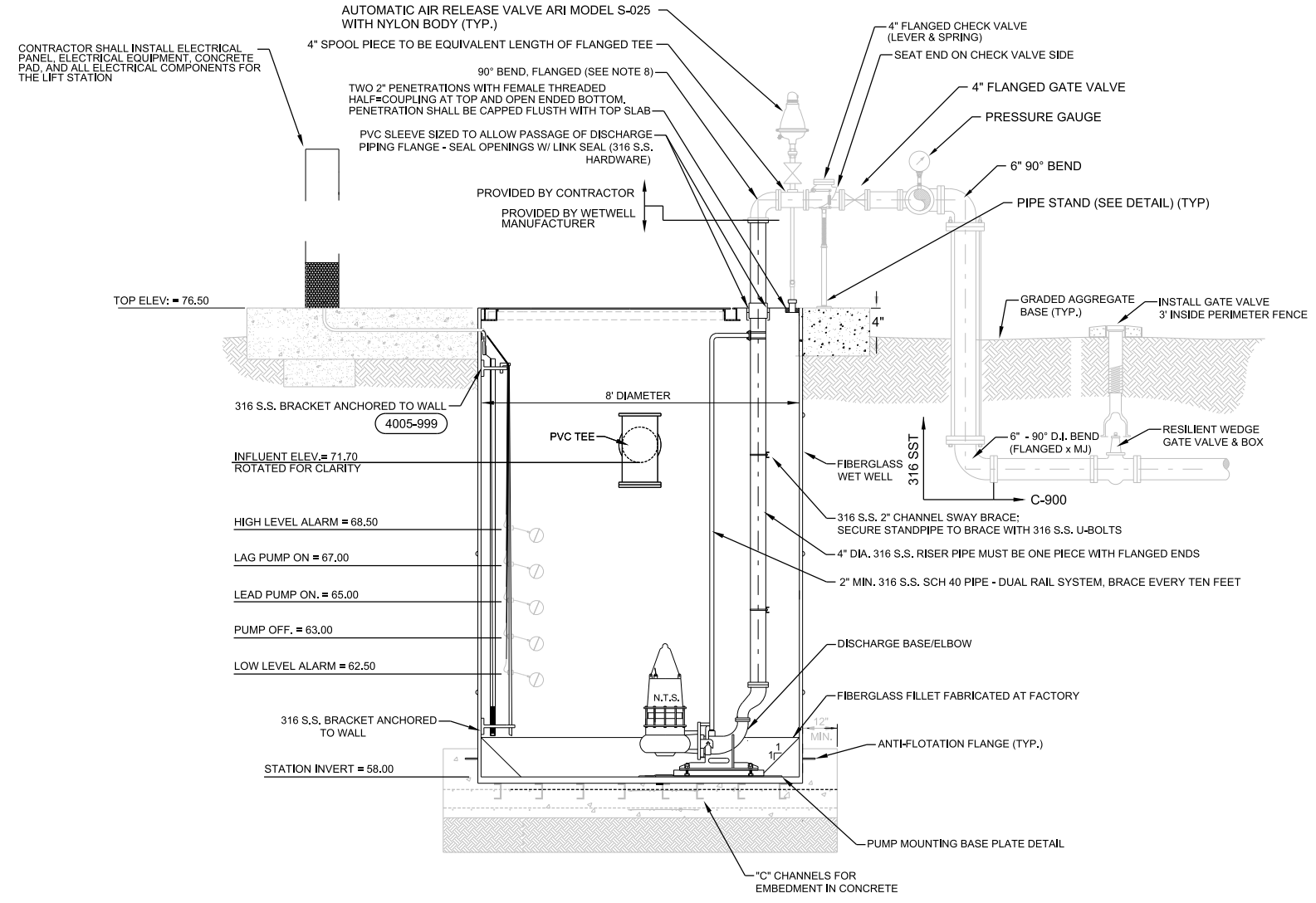
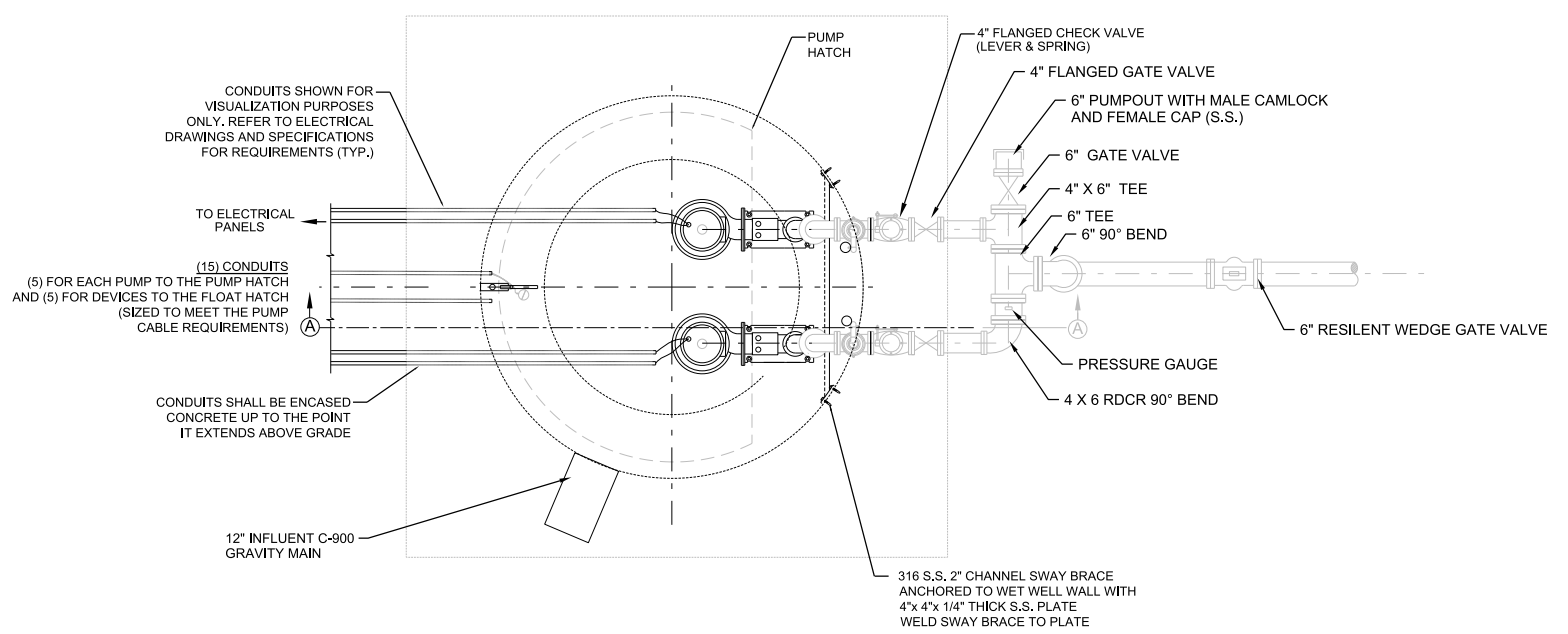
- 1. WETWELL, PUMPS, AND CONTROL PANEL TO BE PURCHASED BY THE OWNER AND PROVIDED TO CONTRACTOR AS OWNER FURNISHED EQUIPMENT.
- 2. WETWELL MANUFACTURER SHALL PROVIDE SIGNED AND SEALED SHOP DRAWINGS.
- 3. CONTRACTOR SHALL INSTALL WETWELL AND ALL OWNER FURNISHED EQUIPMENT. CONTRACTOR SHALL COORDINATE WITH WETWELL MANUFACTURER DURING INSTALLATION AND START UP.
- 4. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL PIPING AND APPURTENANCES STARTING WITH THE FIRST 90° ELBOW ATTACHED TO THE RISER PIPE.
- 5. WET WELL MANUFACTURER SHALL PROVIDE HATCHES AS SHOWN. HATCHES SHALL BE MANUFACTURED BY USF FABRICATION OR APPROVED EQUAL.
- 6. WETWELL MANUFACTURER SHALL NOTE LOCATIONS WHERE EQUIPMENT IS MOUNTED TO WET WELL WALL.
- 7. ALL INFLUENT PIPING AND FITTINGS SHALL BE 8" DR 25.
- 8. WETWELL MANUFACTURER SHALL PROVIDE ANTI FLOATION CALCULATIONS. CONTRACTOR SHALL PROVIDE A MINIMUM OF 7.5 CY CONCRETE FOR ANTI FLOATION.
- 9. PRESSURE GAUGE SHALL BE AN ANALOG ASHCROFT UTILITY SERIES 1000 PRESSURE GAUGE, RATED FOR A RANGE 0-100 PSI.

A

B

C

D



- NOTES:
- 1. ALL ALUMINUM SURFACES IN CONTACT WITH CONCRETE SHALL BE COATED WITH A BITUMASTIC PAINT.

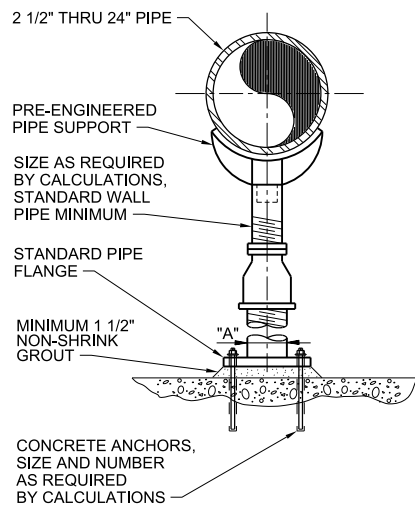
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				REVISION	BY APVD
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BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

**Jacobs**  
EQUIPMENT PROCUREMENT  
**LIFT STATION PLAN AND SECTION**

VERIFY SCALE	
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DATE	NOV 2021
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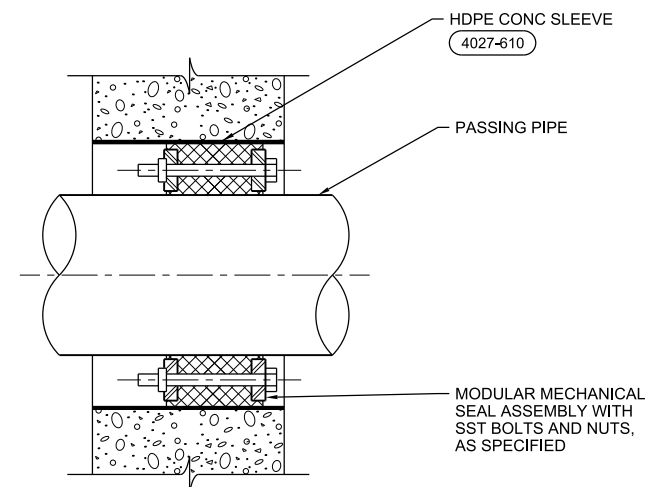


PIPE SIZE	"A" MINIMUM NOMINAL PIPE SIZE
2-1/2"	2-1/2"
3"	2-1/2"
4"	3"
6"	3"
8"	3"
10"	3"
12"	3"
14"	4"
16"	4"
20"	6"
24"	6"

NOTE:  
SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

**PIPE SUPPORT  
SADDLE SUPPORT PEDISTAL TYPE - ADJUSTABLE**  
NTS

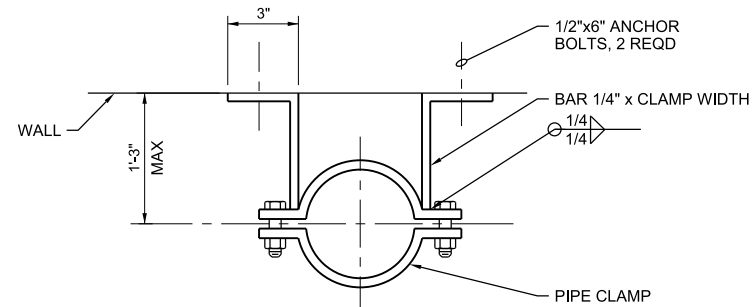
4005-500



NOTE:  
HDPE SLEEVE TO BE CAST WITH PRECAST STRUCTURE.

**WALL PIPE PENETRATION SEAL**  
NTS

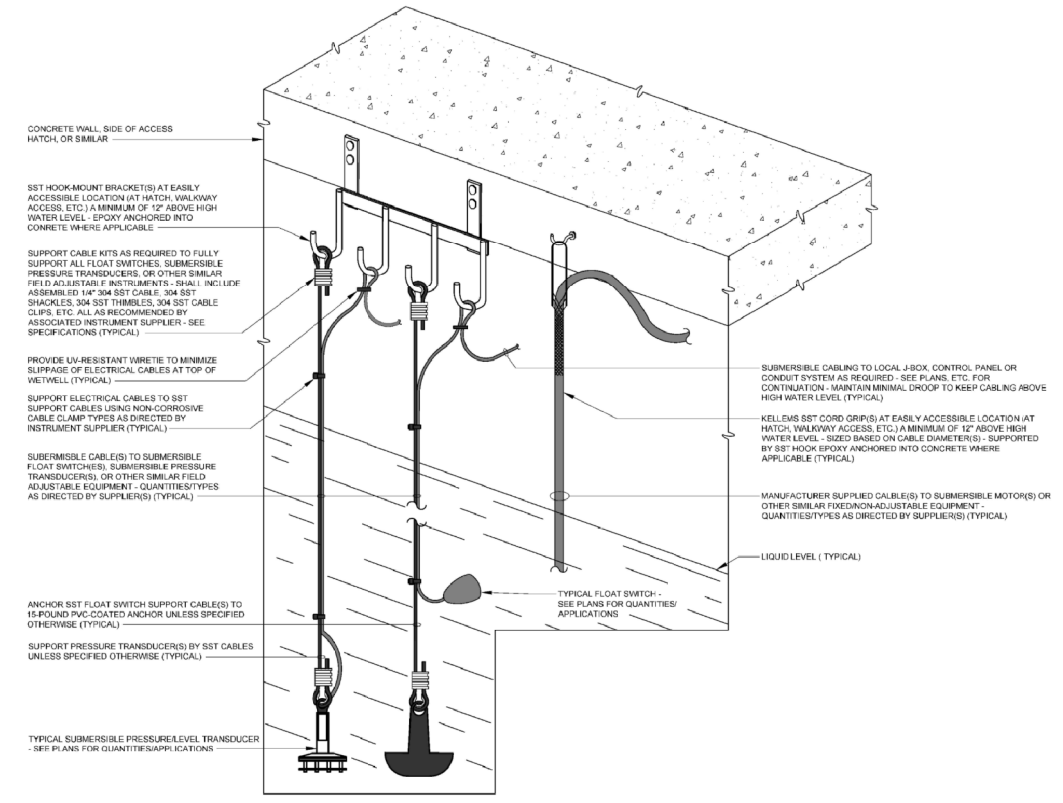
4027-607



NOTE:  
MATERIAL OF CONSTRUCTION : 316 SST.

**TYPE B PIPE SWAY BRACE**  
NTS

4005-711



**FLOAT HANGER BRACKET**  
NTS

**SUBMERSIBLE CABLE SUPPORT**  
SCALE: NONE

4005-999

NO.	DATE	DR	CHK	REVISION	BY	APVD
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		S. STATMAN	S. JERNIGAN			S. JERNIGAN

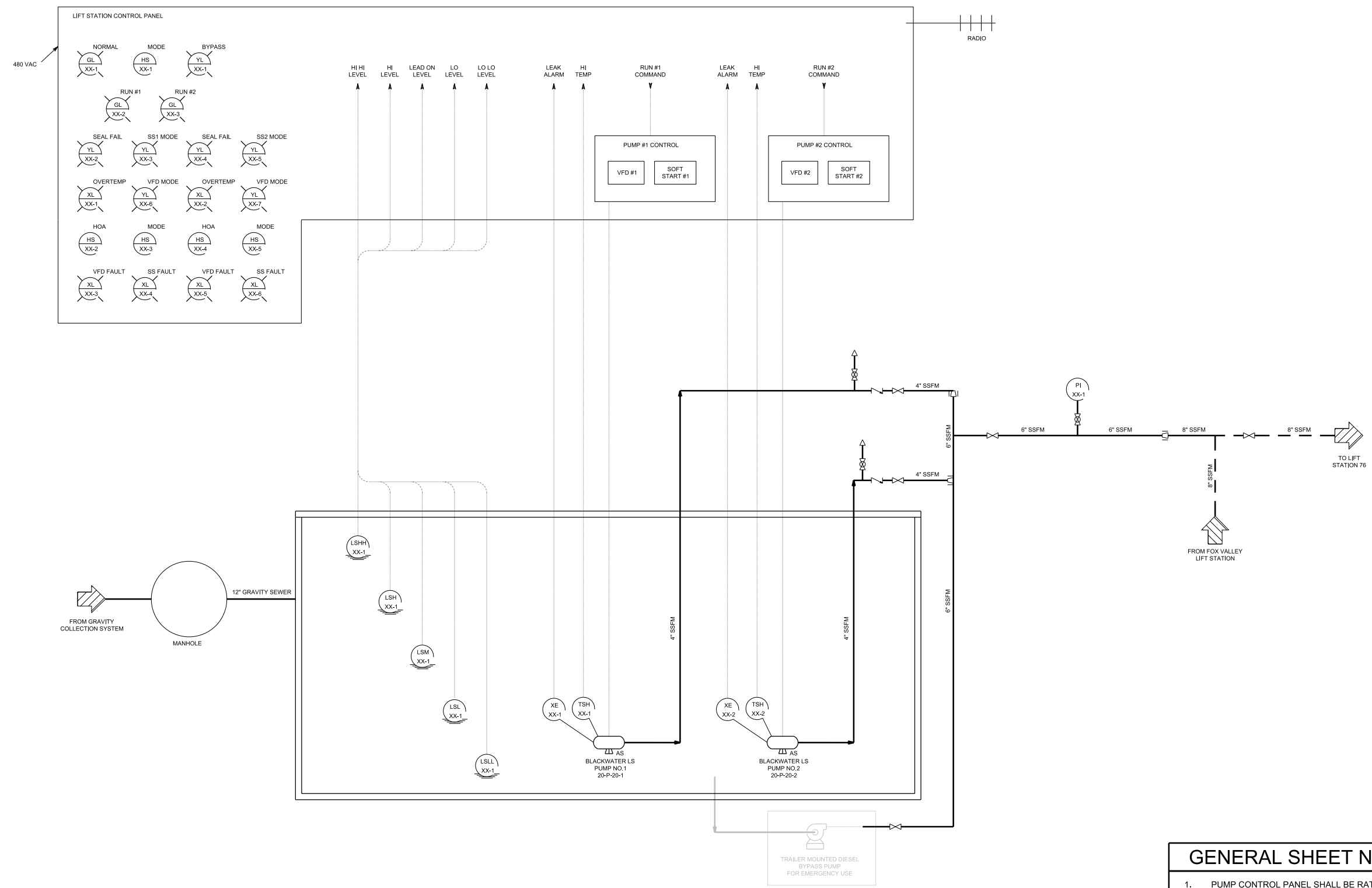
BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

**Jacobs**  
EQUIPMENT PROCUREMENT  
PROCESS DETAILS

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**GENERAL SHEET NOTES**

- PUMP CONTROL PANEL SHALL BE RATED NEMA 4X, 316 SS.

**SHEET KEYNOTES**

- RTU ANTENNA TO BE MOUNTED ON ENCLOSURE. COORDINATE WITH CITY STAFF TO INTEGRATE WITH EXISTING MONITORING SYSTEM.

Jacobs

BID DOCUMENTS

EQUIPMENT PROCUREMENT  
P&ID

BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

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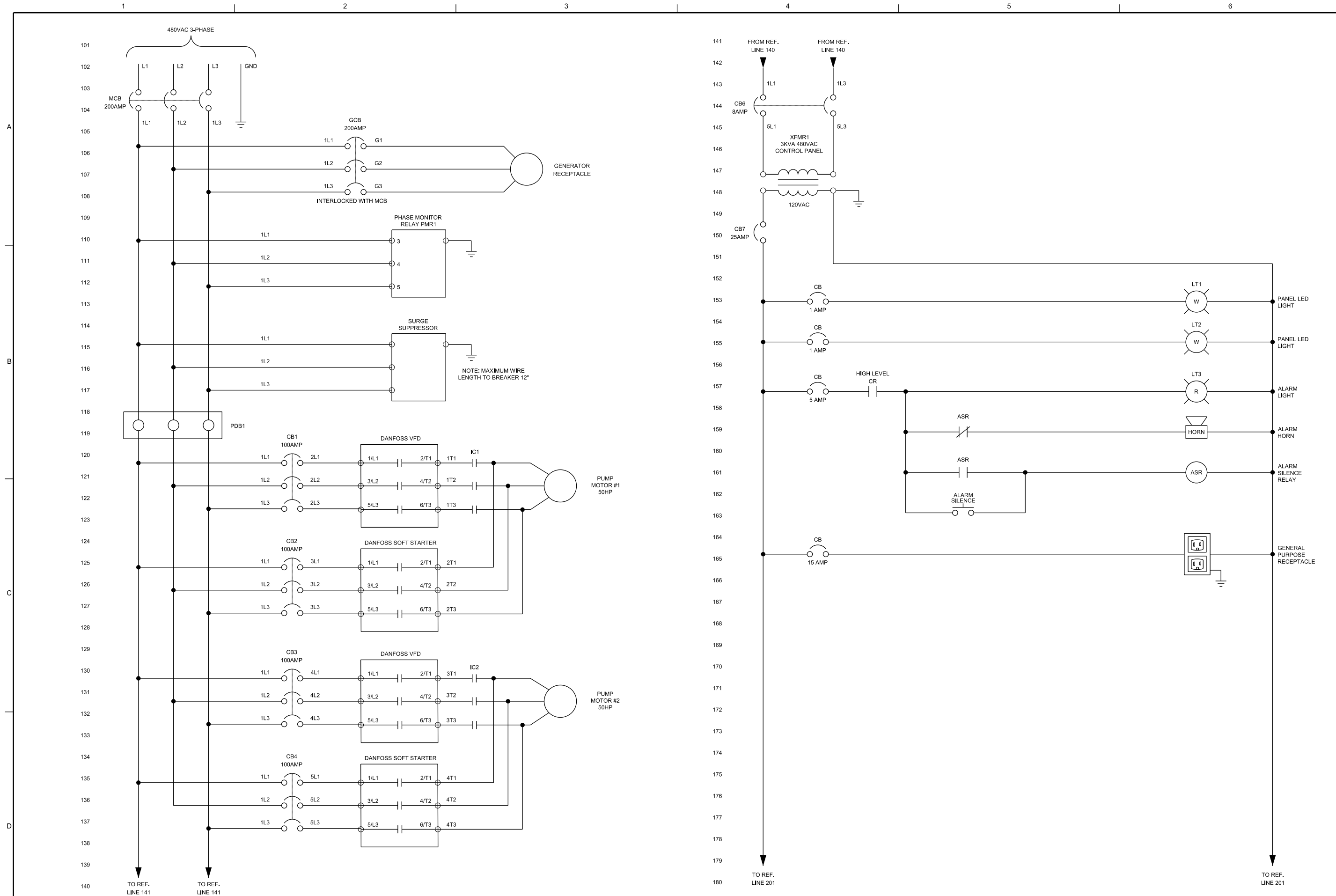
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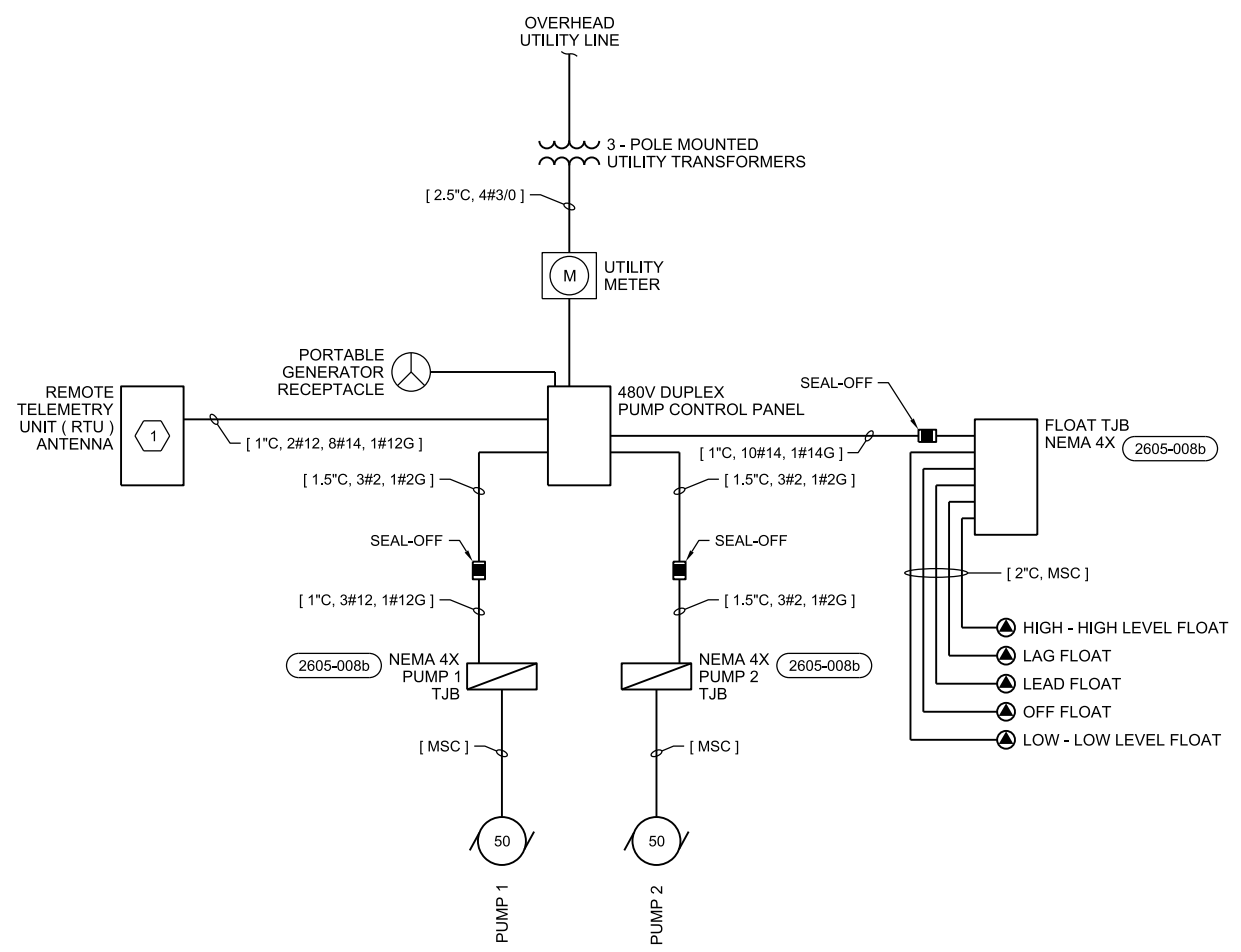
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C HUJESTON		S STATMAN		K WADDELL							
<p>BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN CRESTVIEW PUBLIC SERVICES CRESTVIEW, FLORIDA</p>											
<p><b>Jacobs</b> EQUIPMENT PROCUREMENT P&amp;ID PUMP CONTROL PANEL DIAGRAM</p>											
<p>VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING.</p>											
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**GENERAL SHEET NOTES**

- PUMP CONTROL PANEL SHALL BE RATED NEMA 4X, 316 SS.

**SHEET KEYNOTES**

- RTU ANTENNA TO BE MOUNTED ON ENCLOSURE. COORDINATE WITH CITY STAFF TO INTEGRATE WITH EXISTING MONITORING SYSTEM.



EQUIPMENT PROCUREMENT  
**RISER DIAGRAM AND  
 POWER PLAN**

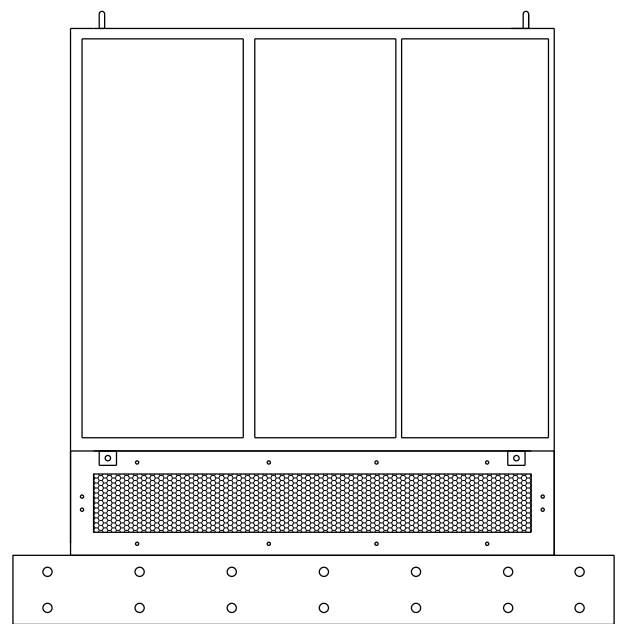
BLACKWATER GOLF CLUB LIFT STATION  
 AND FORCE MAIN  
 CRESTVIEW PUBLIC SERVICES  
 CRESTVIEW, FLORIDA

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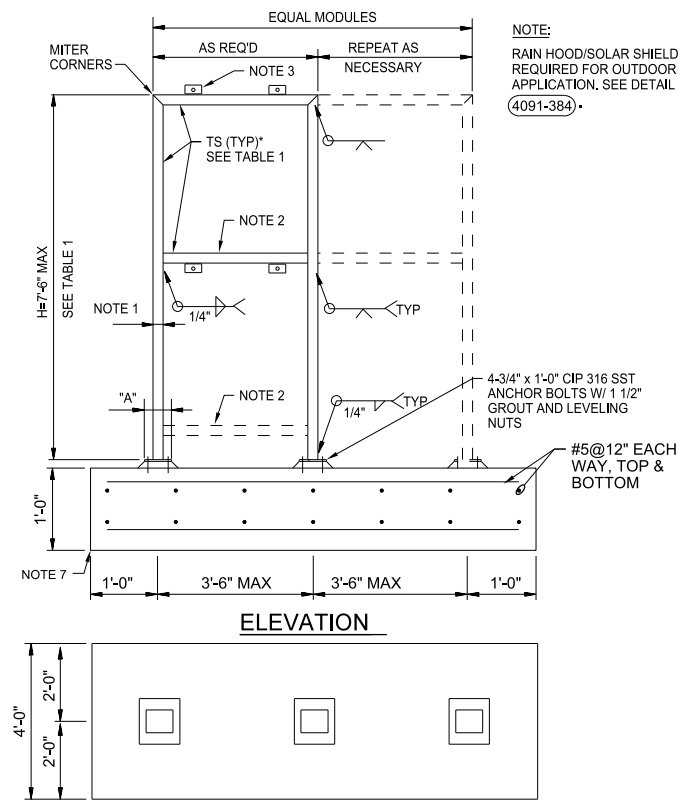
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- NOTES:**
1. PROVIDE LIFTING RINGS AT THE TOP OF THE PANEL
  2. GRIND ALL WELDS AND SHARP CORNERS SMOOTH.
  3. VENTILATED MOUNTING PEDESTAL FABRICATED FROM TYPE 304 STAINLESS STEEL.
  4. PANEL OR INSTRUMENT FRONT FACES NORTH, UNLESS OTHERWISE NOTED.
  5. PROVIDE REINFORCED PAD..
  6. RAIN HOOD / SOLAR SHIELD REQUIRED FOR OUTDOOR APPLICATION.
  7. PROVIDE #6 BARE COPPER GROUND WIRE FROM EACH PANEL AND INSTRUMENT MOUNTED ON RACK TO GROUND STUD. CONNECTION TO GROUND GRID.
  8. FINAL DESIGN STRUCTURAL DESIGN TO BE THE RESPONSIBILITY OF THE CONTRACTOR TO MEET ALL LOCAL CODES AND WIND REQUIREMENTS.
  9. CUSTOM FABRICATED PANEL TO BE INSTALLED AROUND THE BASE OF EACH CONTROL PANEL ON ALL 4 SIDES. CUSTOM FABRICATED PANEL TO BE FLUSH MOUNTED WITH OUTER EDGES OF CONTROL PANEL. EXPANDED METAL TO BE INSTALLED INSIDE THE OUTER EDGE TO ALLOW AIRFLOW BUT PROTECT THE WIRING CONTAINED WITHIN BELOW THE CONTROL PANEL.

**PUMP CONTROL PANEL DETAIL**  
NTS

4091-669



**NOTE:**  
RAIN HOOD/SOLAR SHIELD REQUIRED FOR OUTDOOR APPLICATION. SEE DETAIL 4091-384.

**NOTES:**

1. TOTAL WEIGHT OF PANEL(S) SHALL NOT EXCEED 750 LB IN EACH MODULE.
2. FOR PANELS WITH "H" GREATER THAN 4'-0". ONE HORIZONTAL MEMBER MUST BE LOCATED WITHIN THE MIDDLE THIRD OF THE FRAME HEIGHT. PROVIDE ADD'L MEMBERS AS NECESSARY FOR PANEL MOUNTING.
3. PROVIDE L 2 1/2"x 2 1/2"x 1/4"x 0'-3" WELD ALL AROUND TO TS: TYP AT EACH PANEL MOUNT.
4. GRIND ALL WELDS AND SHARP CORNERS SMOOTH.
5. THIS DETAIL APPLIES TO NON-FREE STANDING ELECTRICAL EQUIPMENT OVER 25 LB WHICH IS NOT MOUNTED ON A FREE STANDING FRAME OR IS NOT WALL MOUNTED.
6. PANEL OR INSTRUMENT FRONT FACES NORTH, UNLESS OTHERWISE NOTED.
7. PROVIDE REINFORCED PAD SHOWN EXCEPT WHERE THE RACK CAN BE MOUNTED ON SUITABLE EXISTING PAD.
8. PROVIDE #6 BARE COPPER GROUND WIRE FROM EACH PANEL AND INSTRUMENT MOUNTED ON RACK TO GROUND STUD. CONNECTION TO GROUND GRID SPECIFIED UNDER DIVISION 26.

HEIGHT "H"	TABLE 1			
	ALUMINUM FRAME		BASE PLATE (IN)	
	TS (MIN SIZE)	A	t	
5'-0" MAX.	TS 3 x 3 x .188	8	1/2	
7'-6" MAX.	TS 4 x 4 x .188	9	5/8	

**PANEL MOUNTING RACK WITH CONCRETE PAD**  
NTS

4091-402C



**ELECTRICAL DETAILS**

BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

DATE	NOV 2021
PROJ	D3553000
DWG	E-501
SHEET	20 of 20

BID DOCUMENTS

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**DRAWINGS**

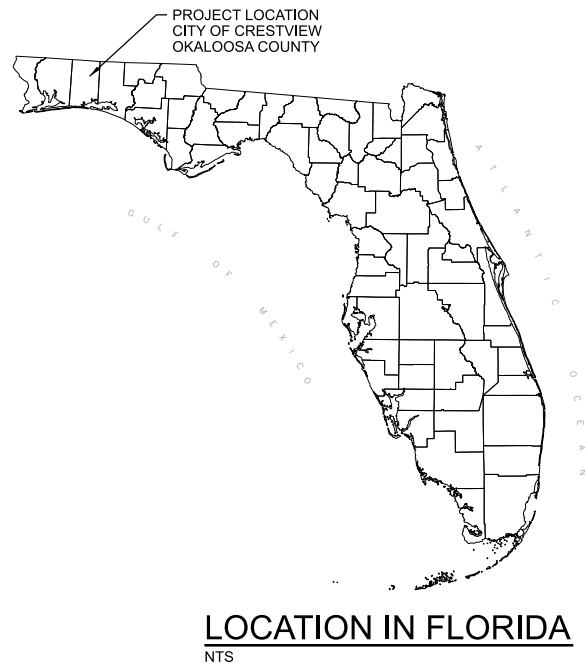
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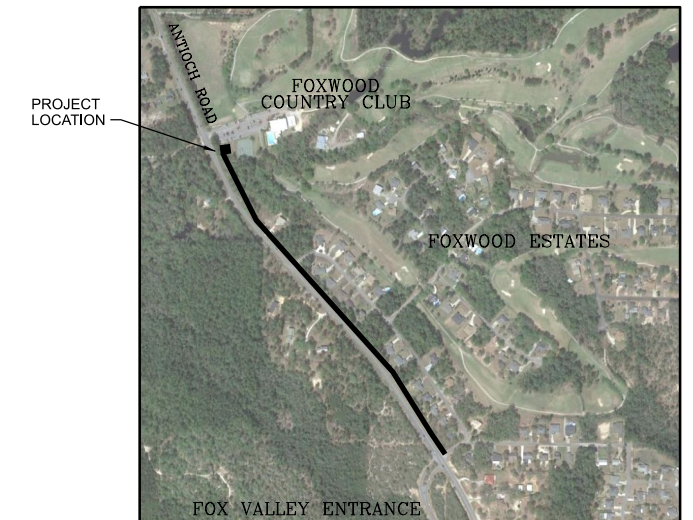


CONTRACT DOCUMENTS  
FOR THE CONSTRUCTION OF THE

# BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN PROJECT



CITY OF CRESTVIEW  
FLORIDA  
BID DOCUMENTS



LOCATION MAP  
NTS

INDEX OF DRAWINGS	
SHEET NO.	TITLE
G-001	COVER SHEET / INDEX OF DRAWINGS
G-002	ABBREVIATIONS
G-003	GENERAL, CIVIL LEGEND AND NOTES
G-004	PROCESS MECHANICAL LEGEND
G-005	ELECTRICAL LEGEND
C-101	EXISTING CONDITIONS
C-102	OVERALL PROJECT PLAN
C-103	BLACKWATER GOLF CLUB LIFT STATION SITE PLAN
C-201	FORCE MAIN PLAN
C-202	FORCE MAIN PLAN
C-203	FORCE MAIN PLAN
C-501	CIVIL DETAILS
C-502	CIVIL DETAILS
M-201	BLACKWATER GOLF CLUB LIFT STATION
M-501	PROCESS DETAILS
E-101	LIFT STATION LAYOUT PLAN
E-201	ELECTRICAL RISER DIAGRAM AND POWER PLAN
E-501	ELECTRICAL DETAILS

For information regarding  
this project, contact:

Scott Jernigan, PE  
25 W Cedar Street, Suite 350  
Pensacola, FL 32502  
Phone: 850-941-7282

**JACOBS**

Project No. D3553000

DECEMBER 2021

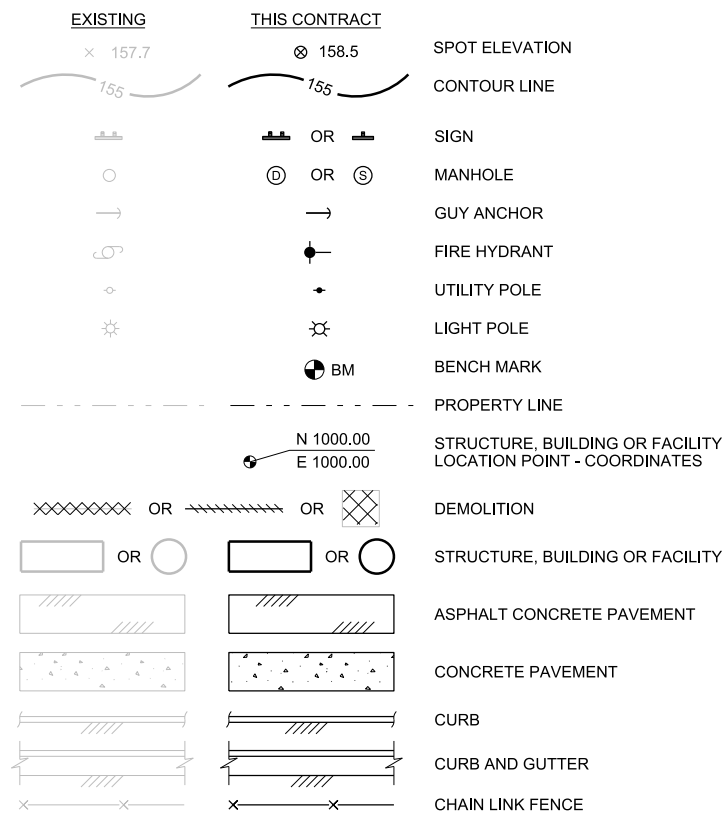




**GENERAL SITE NOTES:**

- CONTRACTOR TO OBTAIN OKALOOSA COUNTY AND CITY OF CRESTVIEW UTILITY PERMITS AND SUBMIT A MAINTENANCE OF TRAFFIC PLAN FOR WORK IN THE RIGHT-OF-WAYS.
- STAGING AREA SHALL BE FOR CONTRACTOR'S EMPLOYEE PARKING, CONTRACTOR'S TRAILERS, AND ON-SITE STORAGE OF MATERIALS.
- CONTRACTOR SHALL NOT DISTURB AREAS OUTSIDE EXISTING RIGHTS-OF-WAY OR TEMPORARY CONSTRUCTION EASEMENTS.
- CONTRACTOR TO ADJUST ALL EXISTING UTILITY CASTINGS INCLUDING VALVE BOXES, MANHOLES, HAND HOLES, PULL BOXES, INLETS AND SIMILAR STRUCTURES WITHIN PAVED AREAS TO MATCH FLUSH WITH FINISHED GRADE.
- THE CONTRACTOR SHALL REPAIR AND RESTORE EXISTING PAVEMENT, SIDEWALKS, CURBS, DRIVEWAYS, PIPES, IRRIGATION LINES, CONDUIT, CABLES, ETC. AS A RESULT OF THE CONSTRUCTION ACTIVITIES.
- NO DEBRIS OR CONSTRUCTION MATERIALS WILL BE BURIED OR DISPOSED OF ONSITE. ALL SUCH MATERIAL SHALL BE DISPOSED OF IN ACCORDANCE WITH LOCAL AND STATE REGULATIONS.
- SEE SEPARATE VOLUME FOR PROJECT SPECIFICATIONS.
- SOURCE OF TOPOGRAPHY SHOWN ON THE CIVIL PLANS ARE BASE MAPS PROVIDED BY THE CITY. ADDITIONAL MAPPING HAS BEEN ADDED FROM AS-BUILT DATA AND SUPPLEMENT SURVEY FROM OTHER PROJECT INFORMATION IN THE AREA. EXISTING CONDITIONS MAY VARY FROM THOSE SHOWN ON THESE PLANS. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND ADJUST WORK PLAN ACCORDINGLY PRIOR TO BEGINNING CONSTRUCTION. NOTIFY ENGINEER AND OWNER OF DISCREPANCIES AND CONFLICTS.
- EXISTING TOPOGRAPHY, STRUCTURES, AND SITE FEATURES ARE SHOWN SCREENED AND/OR LIGHT-LINED. NEW FINISH GRADE, STRUCTURES, AND SITE FEATURES ARE SHOWN HEAVY-LINED.
- MAINTAIN, RELOCATE, OR REPLACE EXISTING SURVEY MONUMENTS, CONTROL POINTS, AND STAKES WHICH ARE DISTURBED OR DESTROYED. PERFORM THE WORK TO PRODUCE THE SAME LEVEL OF ACCURACY AS THE ORIGINAL MONUMENT(S) IN A TIMELY MANNER, AND AT THE CONTRACTOR'S EXPENSE.
- COORDINATES AND DIMENSIONS SHOWN FOR ROADWAY IMPROVEMENTS ARE TO FACE OF CURB OR EDGE OF PAVEMENT.
- PROVIDE TEMPORARY FENCING AS NECESSARY TO MAINTAIN SECURITY AT ALL TIMES.
- ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE SHOWN.
- SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
- CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION CONTROL DEVICES DURING CONSTRUCTION. EROSION CONTROL DEVICES (3125-165) AND (3125-186) ARE THE MINIMUM REQUIRED.
- CONTRACTOR SHALL TAKE ALL OTHER MEASURES TO POSITIVELY PRECLUDE EROSION MATERIALS FROM LEAVING THE SITE. CONTRACTOR TO SUBMIT EROSION CONTROL PLAN.
- CONTRACTOR SHALL MAP EXISTING UTILITIES ALONG ALIGNMENT USING GPR OR EQUIVALENT IN ADDITION TO THE REQUIREMENT TO CONTACT 811 TO MARK UTILITIES. CONTRACTOR IS RESPONSIBLE FOR THE COST OF REPAIRING ALL DAMAGED UTILITIES.

**CIVIL LEGEND**



**GENERAL YARD PIPING AND UTILITIES NOTES:**

- EXISTING UNDERGROUND UTILITIES OBTAINED FROM AS-BUILTS AND FROM FIELD SURVEY. CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION PRIOR TO EXCAVATION. PROTECT ALL EXISTING UTILITIES DURING CONSTRUCTION.
- UNLESS OTHERWISE SHOWN ALL PIPING SHALL HAVE A MINIMUM OF 3'-0" COVER.
- ALL PIPES SHALL HAVE A CONSTANT SLOPE BETWEEN INVERT ELEVATIONS UNLESS A FITTING IS SHOWN.
- FOR TRENCHING AND BACKFILL, SEE (3123-110).
- FOR SURFACE RESTORATION OF ASPHALT CONCRETE, SEE (3123-115).
- MINIMUM ALLOWABLE CLEARANCE BETWEEN PIPES AT CROSSINGS SHALL BE 3". CONTROLLED DENSITY FILL SUPPORT IS REQUIRED, SEE (3123-120).

**DESIGN CRITERIA**

- APPLICABLE CODE: 2020 FLORIDA (FBC) BUILDING CODE (FBC), AS AMENDED BY CITY OF CRESTVIEW, FL AND ALL OTHER APPLICABLE LOCAL AGENCIES.
- REFER TO THE DRAWINGS FOR ADDITIONAL AND SPECIFIC STRUCTURE LOADINGS AND REQUIREMENTS.

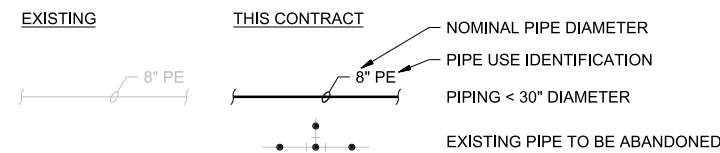
SOIL DESIGN PARAMETERS:

- A. NET ALLOWABLE SOIL BEARING PRESSURES: 1,500 PSF
- B. COEFFICIENT OF FRICTION: 0.28 to 0.34 (CONCRETE-FINE SAND)
- C. NATIVE SOIL MOIST UNIT WEIGHT: 115 to 125 PCF
- D. GROUND WATER (GW) ELEVATION:  
NORMAL HIGH GW EL 73.0 FT.  
100 YEAR FLOOD ABOVE GRADE
- E. FACTOR OF SAFETY FOR UPLIFT RESISTANCE (SOIL FRICTION AND WEDGE FAILURE NOT CONSIDERED):  
NORMAL HIGH GW ELEVATION: FOS = 1.50  
100 YEAR FLOOD ELEVATION: FOS = 1.25

**GENERAL INFORMATION**

- FOR ABBREVIATIONS NOT LISTED, SEE ASME Y14.38 "ABBREVIATIONS AND ACRONYMS: PUBLICATION AS DISTRIBUTED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME).
- DESIGN DETAILS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS OCCURRING THROUGHOUT THE PROJECT, WHETHER OR NOT THEY ARE INDIVIDUALLY CALLED OUT.
- VERIFY FINAL OPENING DIMENSIONS IN WALLS, SLABS, AND DECKS WITH OTHER DISCIPLINE DRAWINGS PRIOR TO CONSTRUCTION OF THESE ELEMENTS.
- DO NOT CUT OR MODIFY STRUCTURAL MEMBERS FOR PIPES, DUCTS, ETC. UNLESS SPECIFICALLY DETAILED OR APPROVED IN WRITING BY THE ENGINEER.
- INFORMATION (DETAILING, DIMENSIONS, CONFIGURATIONS, AND ELEVATIONS, ETC.) OF EXISTING CONSTRUCTION SHOWN REFLECTS AVAILABLE EXISTING DESIGN DOCUMENTS, AND DOES NOT NECESSARILY REPRESENT THE AS-CONSTRUCTED CONDITIONS. THE CONTRACTOR SHALL FIELD VERIFY DIMENSIONS, ELEVATIONS AND DETAILING OF THE EXISTING STRUCTURES PRIOR TO UNDERTAKING ANY WORK THAT IS AFFECTED BY THE EXISTING STRUCTURE.

**YARD PIPING LEGEND**



**FORMWORK, SHORING, AND BRACING**

- STRUCTURES SHOWN ON THE DRAWINGS HAVE BEEN DESIGNED FOR STABILITY UNDER FINAL CONDITIONS ONLY. DESIGN SHOWN DOES NOT INCLUDE NECESSARY COMPONENTS OR EQUIPMENT FOR STABILITY OF THE STRUCTURES DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR WORK RELATING TO CONSTRUCTION ERECTION METHODS, BRACING, SHORING, RIGGING, GUYS, SCAFFOLDING, FORMWORK, AND OTHER WORK AIDS REQUIRED TO SAFELY PERFORM THE WORK SHOWN.
- TEMPORARY SHORING SHALL REMAIN IN PLACE UNTIL ELEVATED CONCRETE FLOOR OR SLABS HAVE REACHED 80 PERCENT OF THE 28 DAY COMPRESSIVE STRENGTH AS DETERMINED BY FIELD CYLINDER BREAKS.
- "BURY" BARS OR "CARRIER" BARS ARE NOT ALLOWED FOR THE BOTTOM MATS OF REINFORCING IN ALL ELEVATED SLABS AND ARE NOT ALLOWED FOR THE TOP MATS OF REINFORCING IN ELEVATED SLABS LESS THAN 12 INCHES THICK.

**FOUNDATIONS**

- REFER TO GEOTECHNICAL DATA REPORT BY LMJ, DATED 2021. THIS GEOTECHNICAL REPORT CAN BE FOUND AS AN APPENDIX IN THE PROJECT SPECIFICATIONS.
- EXCAVATIONS SHALL BE SHORED TO PREVENT SUBSIDENCE OR DAMAGE TO ADJACENT EXISTING STRUCTURES, ROADS, UTILITIES, ETC.
- FOUNDATION SLABS, SLABS-ON-GRADE AND WALL AND COLUMN FOUNDATIONS SPECIFICALLY NOTED TO BE ON FILL SHALL BEAR ON COMPACTED GRANULAR FILL AS SPECIFIED.
- NO BACKFILL SHALL BE PLACED BEHIND WALLS UNTIL THE WALLS AND TOP SUPPORTING SLAB'S CONCRETE HAS ATTAINED 80 PERCENT OF THEIR SPECIFIED 28 DAY COMPRESSIVE STRENGTH.
- CONTRACTOR TO GRADE SOIL ADJACENT TO ALL SLABS-ON-GRADE AND FOUNDATIONS ON GRADE SO THAT THE TOP OF SLABS OR FOUNDATIONS ARE NO MORE THAN 6 INCHES ABOVE GRADE.

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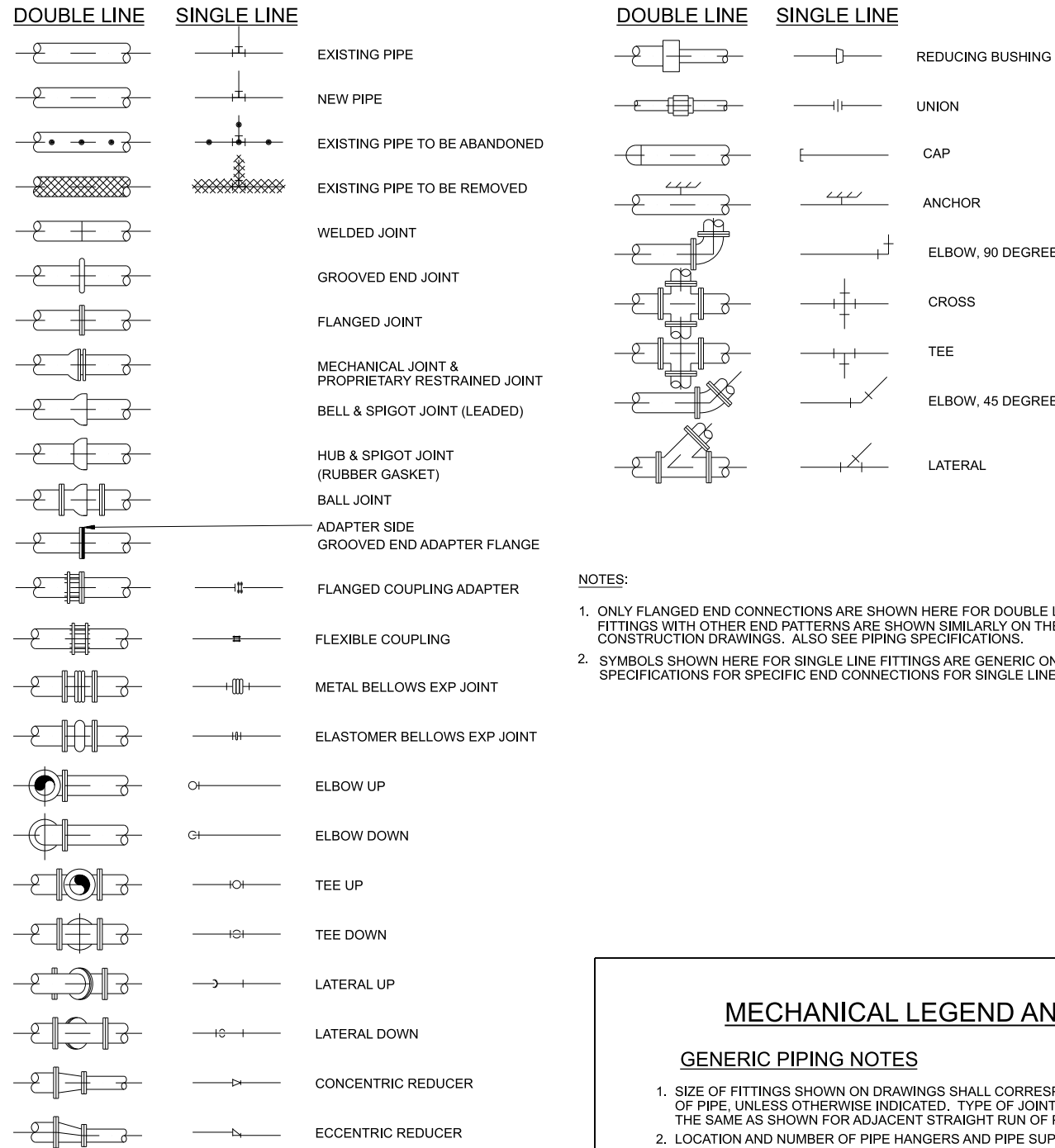
BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

GENERAL  
**JACOBS**  
GENERAL, CIVIL, LEGEND,  
AND NOTES

VERIFY SCALE  
BAR IS ONE INCH ON ORIGINAL DRAWING.

DATE	NOV 2021
PROJ	D3553000
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### PIPE AND FITTING SYMBOLS



**NOTES:**

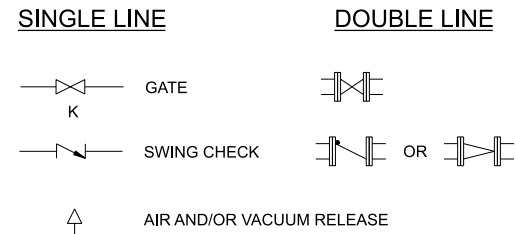
- ONLY FLANGED END CONNECTIONS ARE SHOWN HERE FOR DOUBLE LINE FITTINGS. FITTINGS WITH OTHER END PATTERNS ARE SHOWN SIMILARLY ON THE CONSTRUCTION DRAWINGS. ALSO SEE PIPING SPECIFICATIONS.
- SYMBOLS SHOWN HERE FOR SINGLE LINE FITTINGS ARE GENERIC ONLY. REFER TO PIPING SPECIFICATIONS FOR SPECIFIC END CONNECTIONS FOR SINGLE LINE PIPE AND FITTINGS.

### MECHANICAL LEGEND AND NOTES

#### GENERIC PIPING NOTES

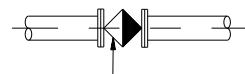
- SIZE OF FITTINGS SHOWN ON DRAWINGS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.
- LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. CONTRACTOR SHALL DESIGN SUPPORTS AS SPECIFIED.
- ALL JOINTS SHALL BE WATERTIGHT. WALL PIPES SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.
- ALL FLEXIBLE CONNECTORS AND COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST PROTECTION AS SPECIFIED, UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED.
- SYMBOLS, LEGENDS, AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE DRAWINGS, WHEREVER APPLICABLE. NOT ALL OF THE VARIOUS PIPING COMPONENTS ARE NECESSARILY USED IN THE PROJECT.
- ALL BURIED PIPING SPECIFIED TO BE PRESSURE TESTED, EXCEPT FLANGED, WELDED, OR SCREWED PIPING, SHALL BE PROVIDED WITH THRUST PROTECTION AS SPECIFIED, UNLESS OTHERWISE NOTED.
- NUMBER AND LOCATION OF UNIONS SHOWN ON DRAWINGS IS ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.
- WHERE A GROOVED END COUPLING IS SHOWN, IT SHALL BE THE RIGID JOINT TYPE, UNLESS OTHERWISE SPECIFIED. WHERE A FLANGED COUPLING ADAPTER IS SHOWN, A STANDARD FLANGE SHALL BE JOINED TO THE COUPLING ADAPTER.
- ALL DUCTILE IRON PIPE AND FITTING SHALL BE EPOXY-LINED UNLESS OTHERWISE INDICATED.

### VALVE SYMBOLS



### VALVE DESIGNATIONS

#### MANUAL VALVES AND CHECK VALVES

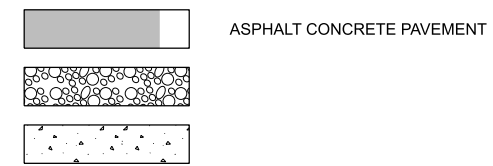
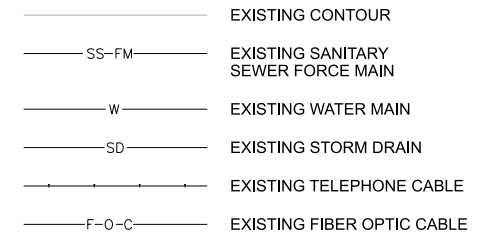


VALVE DESIGNATION  
V 500

VALVE TYPE, SEE SPECIFICATIONS

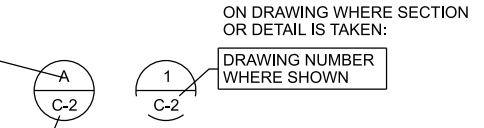
#### CONTROL VALVES

### CIVIL LEGEND

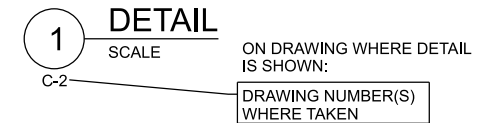
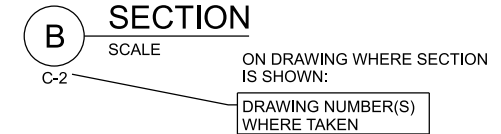


### SECTION / DETAIL DESIGNATIONS

SECTION (LETTER) OR DETAIL (NUMERAL) DESIGNATION



DRAWING NUMBER (REPLACED WITH A LINE IF TAKEN AND SHOWN ON SAME SHEET)



BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

GENERAL  
**PROCESS MECHANICAL LEGEND**

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SYMBOL	DESCRIPTION
<b>POWER SYSTEM PLAN-1</b>	
	CONNECTION POINT TO EQUIPMENT SPECIFIED, RACEWAY, CONDUCTOR, TERMINATION AND CONNECTION IN THIS DIVISION.
	MAJOR ELECTRICAL COMPONENT OR DEVICE - NAME OR IDENTIFYING SYMBOL AS SHOWN.
	PANELBOARD - SURFACE MOUNTED
	PANELBOARD LETTER OR NUMBER FACILITY NUMBER LP - LOW VOLTAGE PANEL DP - DISTRIBUTION PANEL
	PANELBOARD - FLUSH MOUNTED
	TERMINAL JUNCTION BOX
	MOTOR, SQUIRREL CAGE INDUCTION
	GENERATOR, VOLTAGE AND SIZE AS INDICATED.
	HOME RUN - DESTINATION SHOWN
	EXPOSED CONDUIT AND CONDUCTORS*
	CONCEALED CONDUIT AND CONDUCTORS*
<b>NOTE:</b> ALL UNMARKED CONDUIT RUNS CONSIST OF TWO NO. 12, ONE NO. 12 GROUND CONDUCTORS IN 3/4" CONDUIT. RUNS MARKED WITH CROSSHATCHES INDICATE NUMBER OF NO. 12 CONDUCTORS. CROSSHATCH WITH SUBSCRIPT "G" INDICATES GREEN GROUND WIRE.	
	CROSSHATCHES WITH BAR INDICATE NO.10 CONDUCTOR. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE.
	CONDUIT AND CONDUCTOR CALLOUT, SEE LEGEND.
	CONDUIT DOWN
	CONDUIT UP
	CONDUIT, STUBBED AND CAPPED
	CONDUIT TERMINATION AT CABLE TRAY
	EXISTING CONDUIT/ DUCT BANK
	DIRECT BURIED CONDUIT
	FIBER OPTIC CONDUIT
	TRANSFORMER
	GENERAL CONTROL OR WIRING DEVICE. LETTER SYMBOLS OR ABBREVIATIONS INDICATE TYPE OF DEVICE
	CONTROL STATION, SEE CONTROL DIAGRAMS FOR CONTROL DEVICE(S) REQUIRED.
	NONFUSED DISCONNECT SWITCH, CURRENT RATING INDICATED, 3 POLE
	FUSED DISCONNECT SWITCH, CURRENT RATING INDICATED (60/40, 60=SWITCH RATING / 40=FUZE RATING) 3 POLE
	COMBINATION CIRCUIT BREAKER AND MAGNETIC STARTER, NEMA SIZE INDICATED

SYMBOL	DESCRIPTION
<b>GROUND SYSTEM PLAN</b>	
	GROUND ROD
	GROUND ROD IN TEST WELL
	GROUNDING CONDUCTOR, SIZE AS INDICATED
	PIGTAIL FOR CONNECTION TO EQUIPMENT CABINET OR FRAME
	EQUIPMENT GROUND BUS
	EQUIPMENT NEUTRAL BUS
	WALL SWITCH:
2-	DOUBLE POLE
3-	THREE WAY
4-	FOUR WAY
WP-	WEATHER PROOF
EX-	EXPLOSION PROOF
M-	MOTOR RATED
P-	PILOT LIGHT
K-	KEY OPERATED
D-	DIMMER
CRE-	CORROSION RESISTANT
L-	MOMENTARY 3-WAY
MS-	MANUAL STARTER WITH OVERLOADS
<b>NOTES:</b>	
1. THESE ARE STANDARD LEGEND SHEETS. SOME SYMBOLS AND ABBREVIATIONS MAY APPEAR ON THE LEGEND AND NOT ON THE DRAWINGS.	
2. FOR ADDITIONAL ABBREVIATIONS OF OTHER DIVISIONS (HVAC, MECHANICAL, AND STRUCTURAL/ARCHITECTURAL) SEE OTHER LEGENDS.	

SYMBOL	DESCRIPTION
<b>ONE-LINE DIAGRAM</b>	
	CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 3 POLE, UNO
	CIRCUIT BREAKER, STATIC TRIP UNIT, SENSOR AMP TRIP AND FRAME RATINGS SHOWN, 3 POLE, UNO
	CIRCUIT BREAKER, MAGNETIC TRIP ONLY, TRIP RATING SHOWN, 3 POLE, UNO
	SWITCH, CURRENT RATING INDICATED, 3 POLE, UNO
	FUSE, CURRENT RATING AND QUANTITY INDICATED
	MAGNETIC STARTER WITH OVERLOAD, NEMA SIZE INDICATED, FVNR UNO
	ELECTRONIC STARTER/SPEED CONTROL RVSS = REDUCED VOLTAGE SOFT STARTER AFD = AC ADJUSTABLE FREQUENCY DRIVE DC = DC ADJUSTABLE SPEED DRIVE RVAT = REDUCED VOLTAGE AUTO TRANSFORMER TYPE RVRT = REDUCED VOLTAGE REACTOR TYPE
	CABLE OR BUS CONNECTION POINT
	KEY INTERLOCK
	SURGE ARRESTER (GAP TYPE)
	CAPACITOR - KVAR INDICATED, 3 PHASE
	AC MOTOR, SQUIRREL CAGE INDUCTION - HORSEPOWER INDICATED
	GENERATOR, KW/KVA RATING SHOWN
	ANALOG METER WITH SWITCH - SCALE RANGE SHOWN V = VOLTAGE                      KW = KILOWATTS A = AMPERAGE                      KVAR = KILOVARS PF = POWER FACTOR
	DIGITAL POWER METER (MULTIFUNCTION)
	UTILITY REVENUE METER
	GROUND
	15 KVA 480-120/240V 1 PH TRANSFORMER, SIZE, VOLTAGE RATINGS, AND PHASE INDICATED
	SHIELDED ISOLATION TRANSFORMER
	480-120V (3) POTENTIAL TRANSFORMER, VOLTAGE RATING AND QUANTITY INDICATED
	100:5 (3) CURRENT TRANSFORMER, RATIO(100:5) AND QUANTITY INDICATED (3)
	CONNECTION POINT TO EQUIPMENT SPECIFIED IN OTHER DIVISIONS, RACEWAY, CONDUCTOR AND CONNECTION IN THIS DIVISION
	TRANSIENT VOLTAGE SURGE SUPPRESSOR
	SPECIAL PURPOSE RECEPTACLE

SYMBOL	DESCRIPTION
<b>ABBREVIATIONS</b>	
A	AMPERE, AUTOMATIC AUTOMATIC TRANSFER SWITCH
BKR	BREAKER
C	CONDUIT, CONTACTOR, CONDUCTOR, CLOSE CONTROL RELAY
CR	CONTROL RELAY
DC	DIRECT CURRENT
F, F.U.	FUSE
G	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
HH	HANDHOLE
HP	HORSEPOWER
HS	HAND SWITCH
J, JB	JUNCTION BOX
KA	KILOAMPERES
KV	KILOVOLT
KVA	KILOVOLT AMPERES
KW	KILOWATTS
M	MAGNETIC CONTACTOR COIL, MOTOR MANUAL
MCC	MOTOR CONTROL CENTER
MH	MANHOLE, METAL HALIDE, MOUNTING HEIGHT, MOTOR HEATER
MSC	MANUFACTURED SUPPLIED CABLE
OL	OVERLOAD RELAY
PB	PULL BOX
RGS	RIGIS GALVANISED STEEL CONDUIT
TPS	TEMPERATURE PROTECTION SYSTEM
TYP	TYPICAL
V	VOLTAGE, VOLTS
W	WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER

<b>JACOBS</b>	
BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN CRESTVIEW PUBLIC SERVICES CRESTVIEW, FLORIDA	
<b>GENERAL ELECTRICAL LEGEND</b>	
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING.	
DATE	NOV 2021
PROJ	D3553000
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SHEET	5 of 18

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2. THE ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
3. SURVEY PROVIDED BY SEASIDE ENGINEERING AND SURVEYING.

		CIVIL <b>EXISTING CONDITIONS</b>		BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN CRESTVIEW PUBLIC SERVICES CRESTVIEW, FLORIDA	
		DATE NOV 2021 PROJ D3553000 DWG C-101 SHEET 6 of 18		REVISION NO. DATE DSGN DR STATMAN S JERNIGAN S JERNIGAN BY APVD S JERNIGAN	
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A  
B  
C  
D





PLAN WINDOW

C-0X

DWG NO.

**LEGEND**

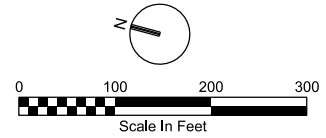
INDICATES LOWER RIGHT OF PLAN WINDOW

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2. THE ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

**NOTES**

1. CONTRACTOR TO FIELD VERIFY EXISTING FORCE MAIN TIE IN LOCATION AND GEOMETRY PRIOR TO ORDERING MATERIALS.
2. ALL FORCE MAIN FITTINGS SHALL BE MECHANICALLY RESTRAINED AT THE JOINT. ADDITIONALLY, THE FIRST TWO PIPE FULL (20') JOINTS UPSTREAM AND DOWNSTREAM OF EACH FITTING SHALL BE MECHANICALLY RESTRAINED.



<b>Jacobs</b>		CIVIL		OVERALL PROJECT PLAN		BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN		CRESTVIEW PUBLIC SERVICES		CRESTVIEW, FLORIDA	
DATE		NOV 2021		PROJ		D3553000		DWG		C-102	
SHEET		7 of 18		NO.		DATE		DR		S. JERNIGAN	
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APVD		S. JERNIGAN		BY		APVD		S. JERNIGAN		BY	

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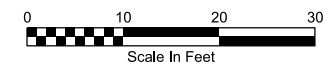
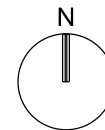


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- 2. THE ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

**NOTES**

- 1. CONTRACTOR TO FIELD VERIFY EXISTING SANITARY SEWER LATERALS MATERIAL AND ELEVATIONS PRIOR TO ORDERING MATERIALS.
- 2. EXISTING UTILITIES ARE SHOWN AS APPROXIMATE BASED ON SURVEY INFORMATION. CONTRACTOR SHALL FIELD VERIFY LOCATION, SIZE, AND MATERIAL PRIOR TO BEGINNING CONSTRUCTION.
- 3. OWNER TO CONSTRUCT GRAVITY SEWER COLLECTION SYSTEM BETWEEN THE BLACKWATER GOLF CLUB FACILITIES AND THE PROPOSED LIFT STATION. CONTRACTOR SHALL COORDINATE WITH CITY FOR CONNECTION OF GRAVITY COLLECTION SYSTEM TO THE NEW BLACKWATER GOLF CLUB LIFT STATION
- 4. CONTRACTOR SHALL CONNECT PROPOSED LOW PRESSURE SSFM TO EXISTING MANHOLE. THIS CONNECTION SHALL PROVIDE A WATER TIGHT SEAL.



CIVIL  
**BLACKWATER GOLF CLUBSITE PLAN  
 LIFT STATION SITE PLAN**

BLACKWATER GOLF CLUB LIFT STATION  
 AND FORCE MAIN  
 CRESTVIEW PUBLIC SERVICES  
 CRESTVIEW, FLORIDA

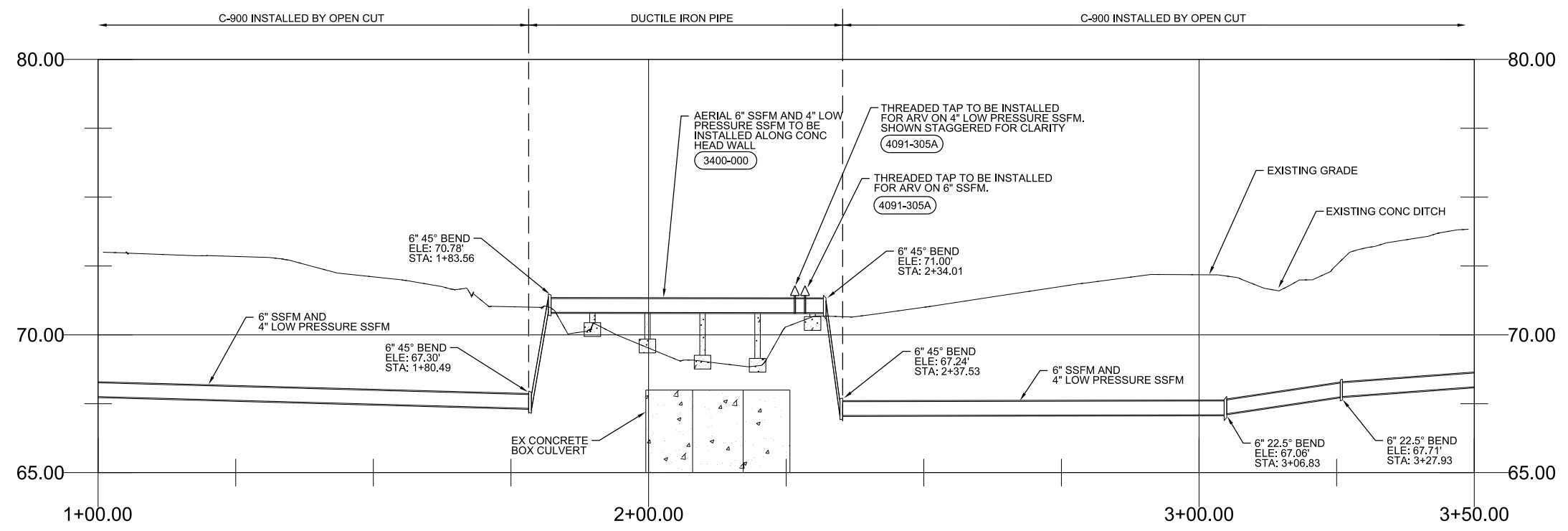
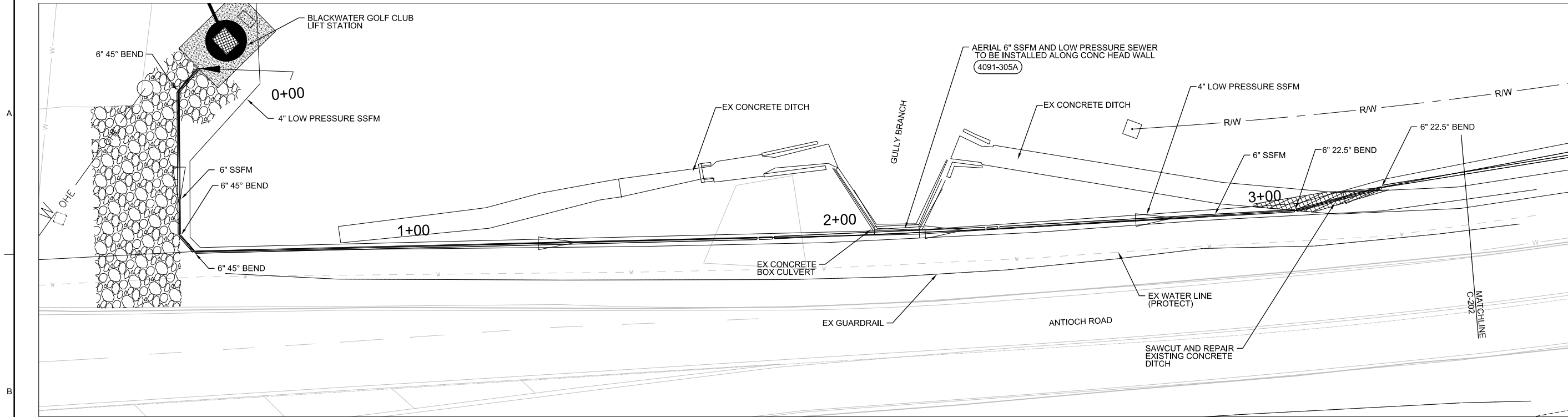
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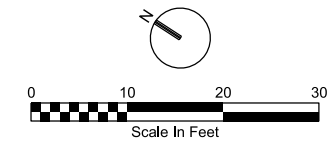


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**NOTES**

1. ALL FORCE MAIN FITTINGS SHALL BE MECHANICALLY RESTRAINED AT THE JOINT. ADDITIONALLY, THE FIRST TWO PIPE FULL (20') JOINTS UPSTREAM AND DOWNSTREAM OF EACH FITTING SHALL BE MECHANICALLY RESTRAINED.
2. NOTIFY PROPERTY OWNER A MINIMUM OF 7 DAYS IN ADVANCE OF OPEN CUTTING DRIVEWAY OR RESIDENTIAL ACCESS ROAD. PROVIDE CONTINUOUS ACCESS FOR ALL RESIDENTS DURING CONSTRUCTION.
3. WATER MAIN LOCATIONS SHOWN ARE BASED OFF PRIOR SURVEY AND EXISTING UTILITY RECORDS. CONTRACTOR SHALL FIELD VERIFY LOCATION OF ALL WATER MAINS AND MAINTAIN THE HORIZONTAL AND VERTICAL SPACINGS AS REQUIRED BY THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ALL OTHER APPLICABLE REGULATORY AGENCIES.
4. PRIOR TO INSTALLING THE AERIAL 6" SSFM, STAKE OUT CENTERLINE OF PIPE TO VISUALLY OBSERVE ELEVATION & LOCATION OF SSFM. COORDINATE WITH ENGINEER FOR INSPECTION. ADJUST ALIGNMENT AS DIRECTED BY THE ENGINEER.
5. CONTRACTOR SHALL INSTALL 4" LOW PRESSURE SSFM PARALLEL TO THE 6" SSFM AND INCLUDE ALL REQUIRED FITTINGS, VALVES, AND APPURTANCES TO DO SO.



NO.	DATE	DR	CHK	REVISION	BY

BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

CIVIL  
**FORCE MAIN PLAN**

VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING.	
DATE	NOV 2021
PROJ	D3553000
DWG	C-201
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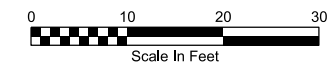


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2. NOTIFY PROPERTY OWNER A MINIMUM OF 7 DAYS IN ADVANCE OF OPEN CUTTING DRIVEWAY OR RESIDENTIAL ACCESS ROAD. PROVIDE CONTINUOUS ACCESS FOR ALL RESIDENTS DURING CONSTRUCTION.
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4. 6" SSFM IS TO BE INSTALLED WITH A MINIMUM OF 3' COVER AND WITH A UNIFORM SLOPE TO AVOID HIGH POINTS.
5. CONTRACTOR TO INSTALL 400 LF OF 4" LOW PRESSURE SSFM AND CAP END FOR FUTURE CONNECTION BY OTHERS.



**Jacobs**

CIVIL  
**FORCE MAIN PLAN**

BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

VERIFY SCALE	
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STATMAN S JERNIGAN

BY APVD S JERNIGAN

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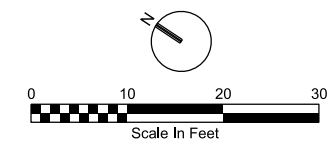


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2. THE ELEVATIONS SHOWN HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.

**NOTES**

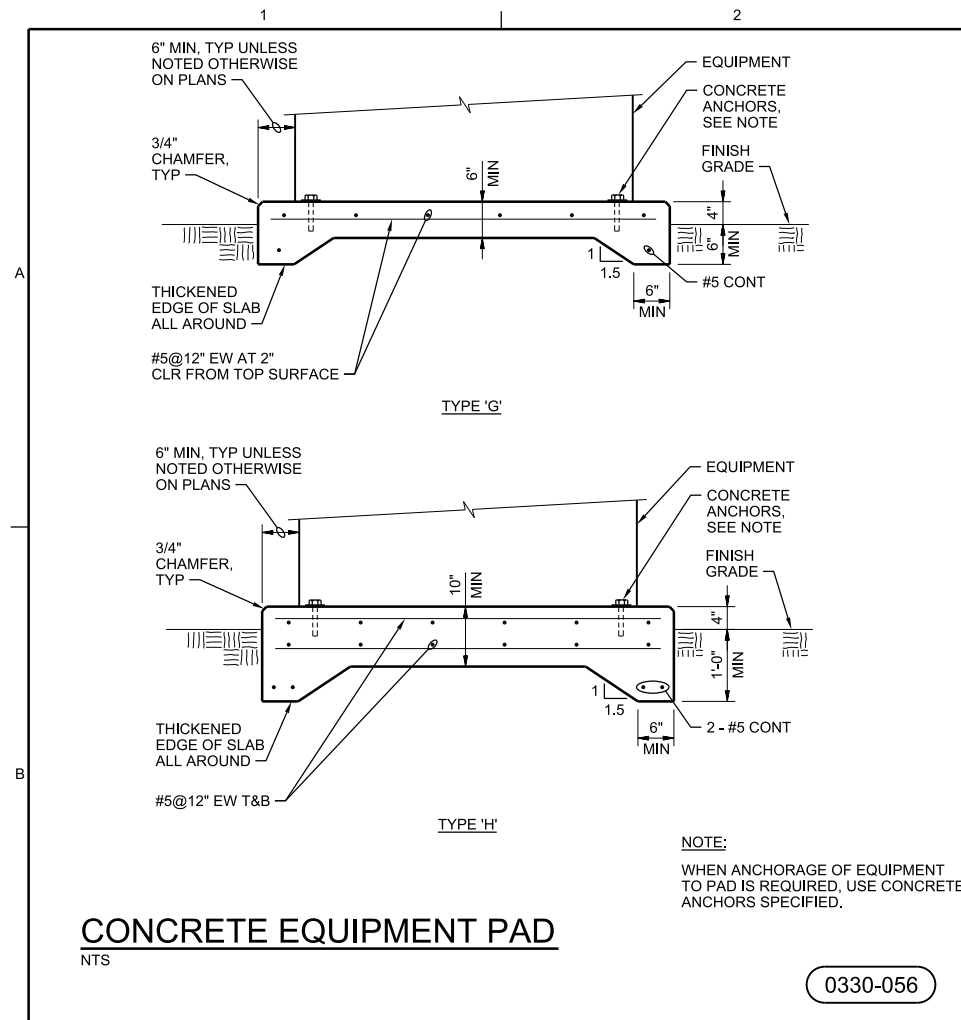
1. ALL FORCE MAIN FITTINGS SHALL BE MECHANICALLY RESTRAINED AT THE JOINT. ADDITIONALLY, THE FIRST TWO PIPE FULL (20') JOINTS UPSTREAM AND DOWNSTREAM OF EACH FITTING SHALL BE MECHANICALLY RESTRAINED.
2. NOTIFY PROPERTY OWNER A MINIMUM OF 7 DAYS IN ADVANCE OF OPEN CUTTING DRIVEWAY OR RESIDENTIAL ACCESS ROAD. PROVIDE CONTINUOUS ACCESS FOR ALL RESIDENTS DURING CONSTRUCTION.
3. WATER MAIN LOCATIONS SHOWN ARE BASED OFF PRIOR SURVEY AND EXISTING UTILITY RECORDS. CONTRACTOR SHALL FIELD VERIFY LOCATION OF ALL WATER MAINS AND MAINTAIN THE HORIZONTAL AND VERTICAL SPACINGS AS REQUIRED BY THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ALL OTHER APPLICABLE REGULATOR AGENCIES.
4. 6" SSFM IS TO BE INSTALLED WITH A MINIMUM OF 3' COVER AND WITH A UNIFORM SLOPE TO AVOID HIGH POINTS.



		CIVIL <b>FORCE MAIN PLAN</b>		BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN CRESTVIEW PUBLIC SERVICES CRESTVIEW, FLORIDA	
		DATE NOV 2021 PROJ D3553000 DWG C-203 SHEET 11 of 18	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING.	DSGN NO. DATE DR REVISION CHK APVD	S. JERNIGAN S. JERNIGAN S. JERNIGAN S. JERNIGAN

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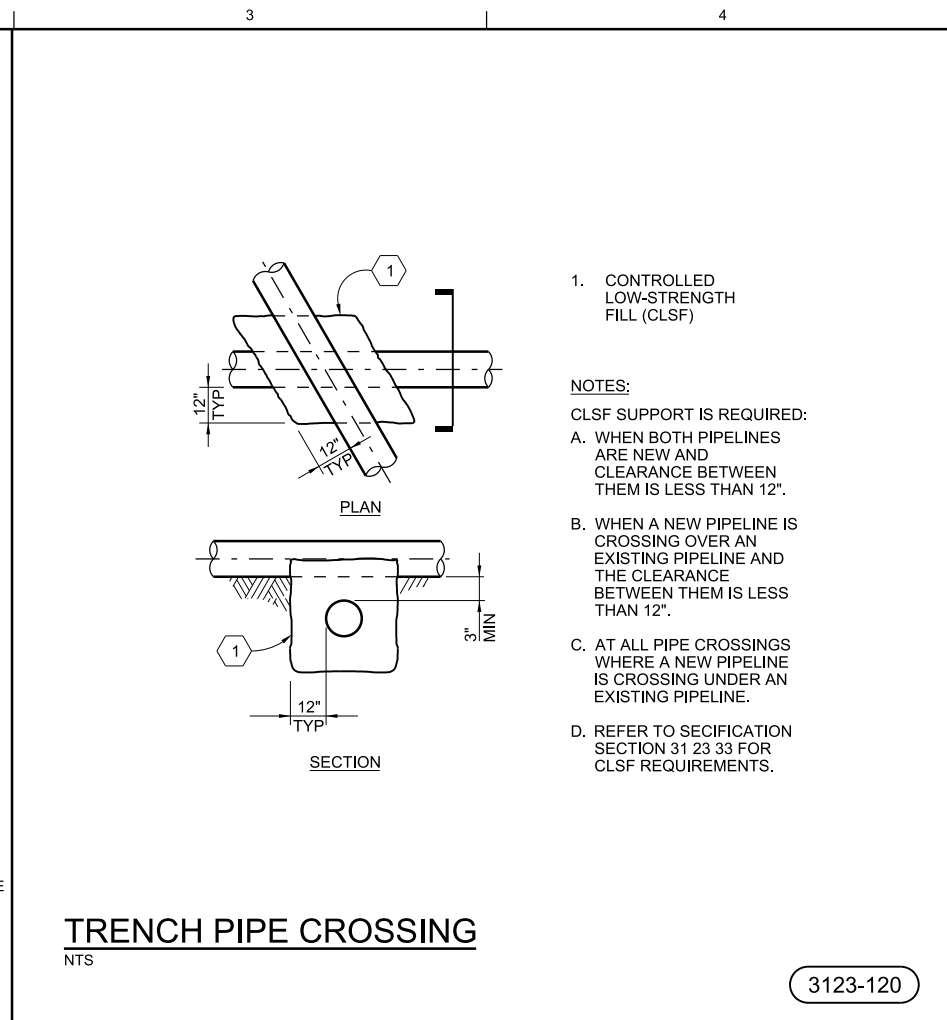




**CONCRETE EQUIPMENT PAD**

NTS

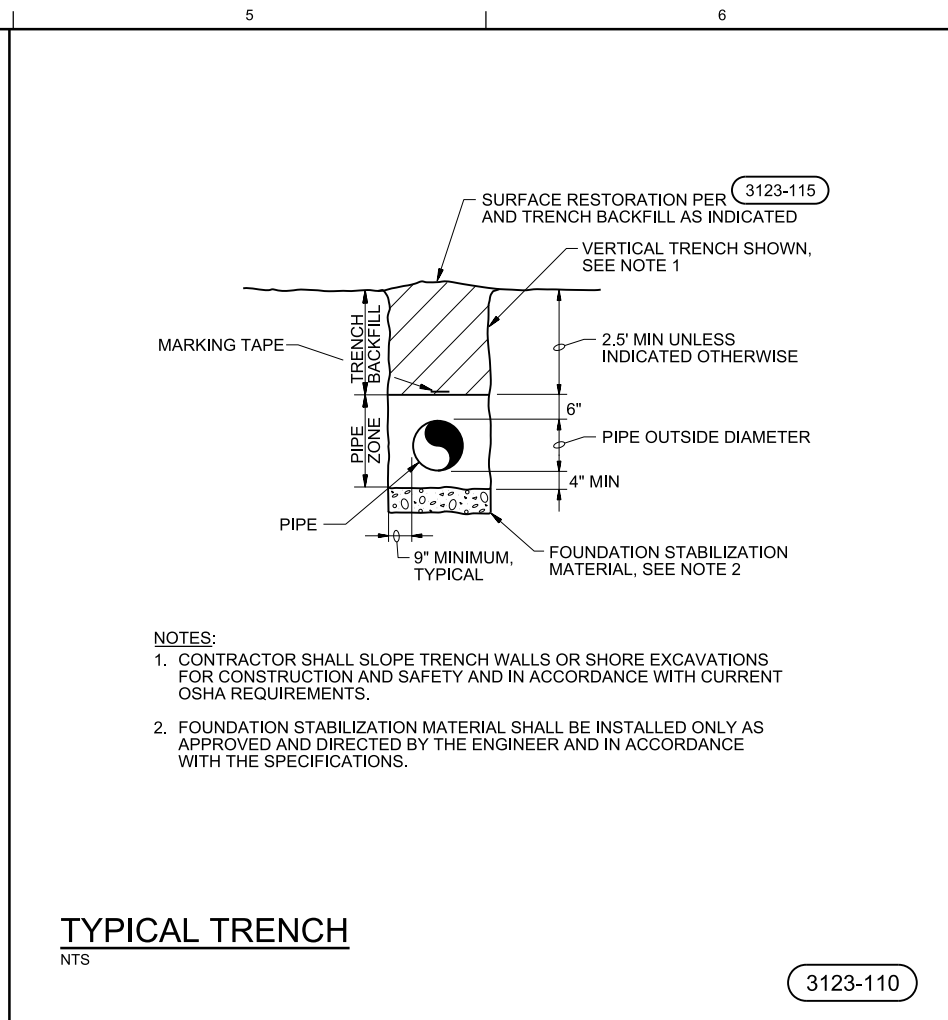
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**TRENCH PIPE CROSSING**

NTS

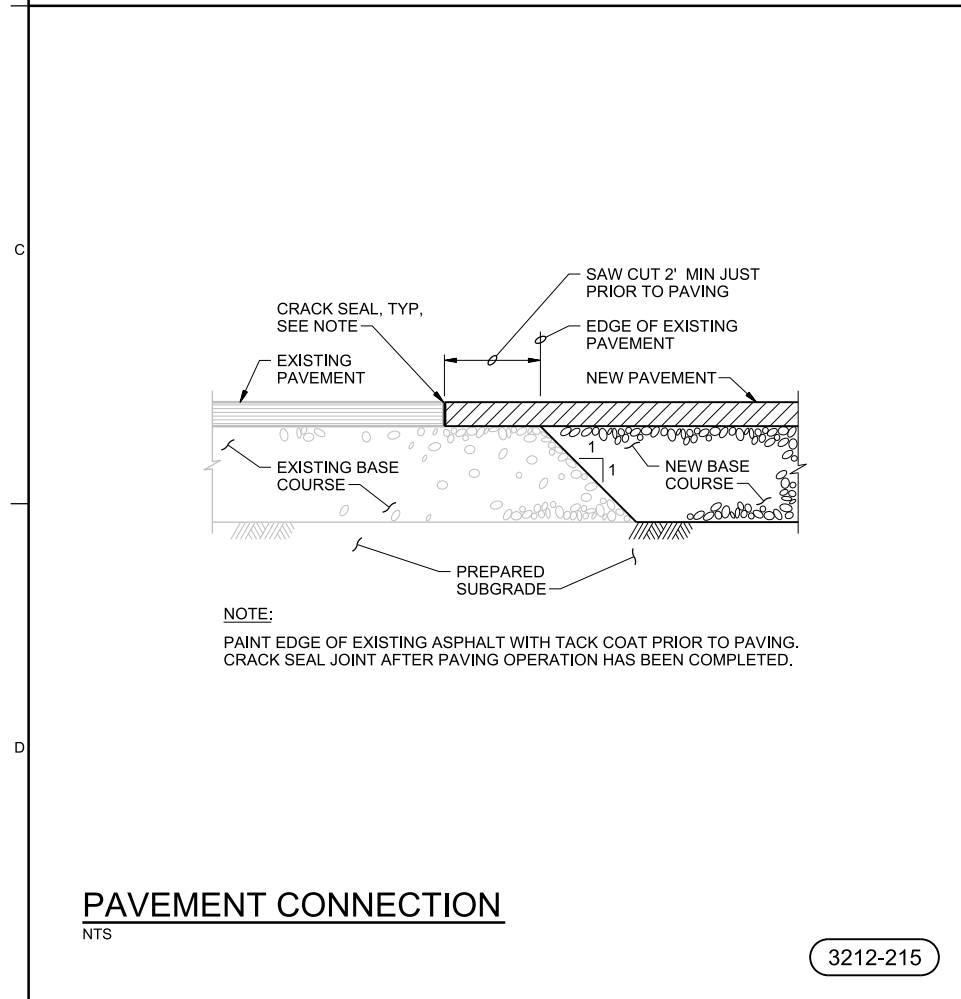
3123-120



**TYPICAL TRENCH**

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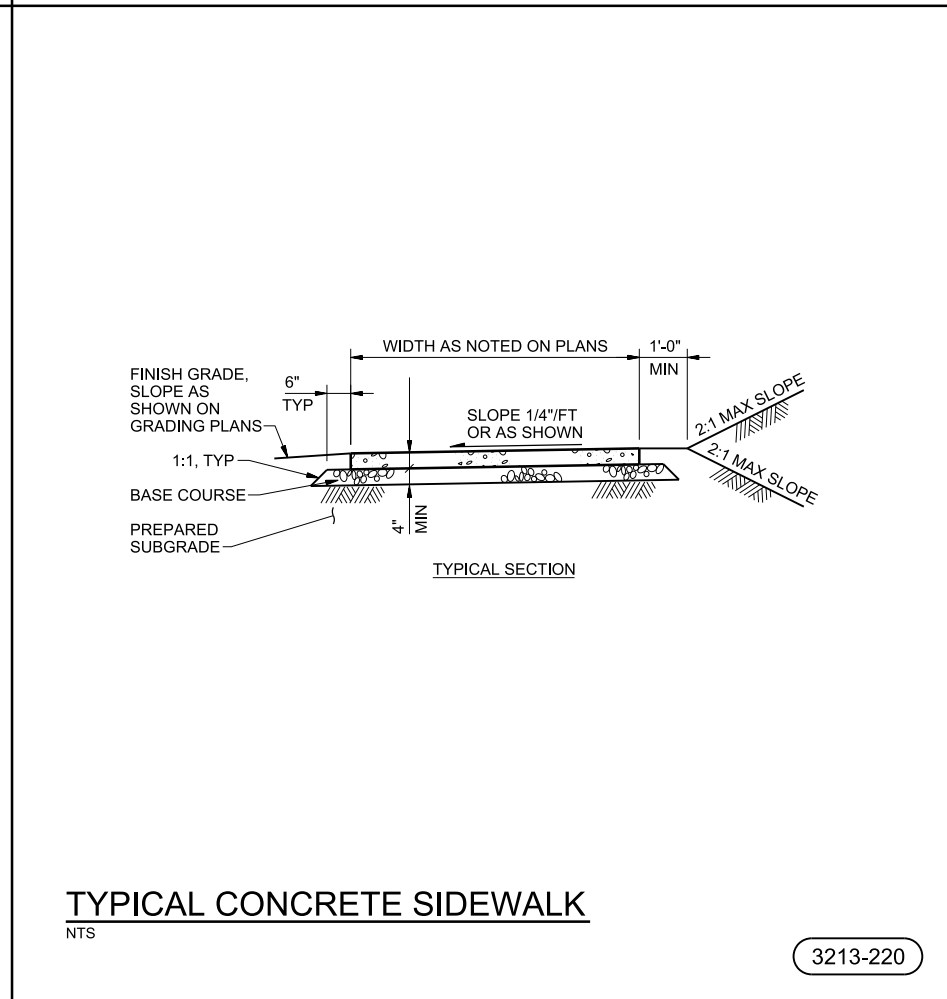
3123-110



**PAVEMENT CONNECTION**

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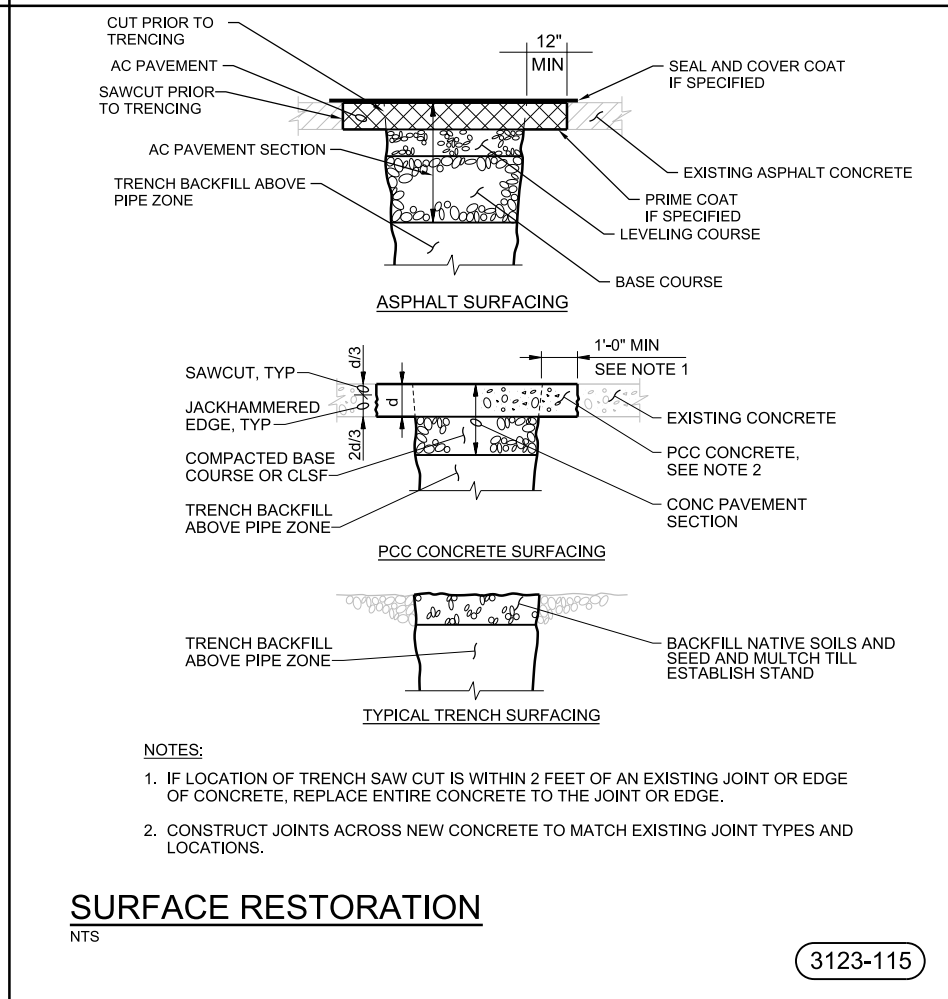
3212-215



**TYPICAL CONCRETE SIDEWALK**

NTS

3213-220



**SURFACE RESTORATION**

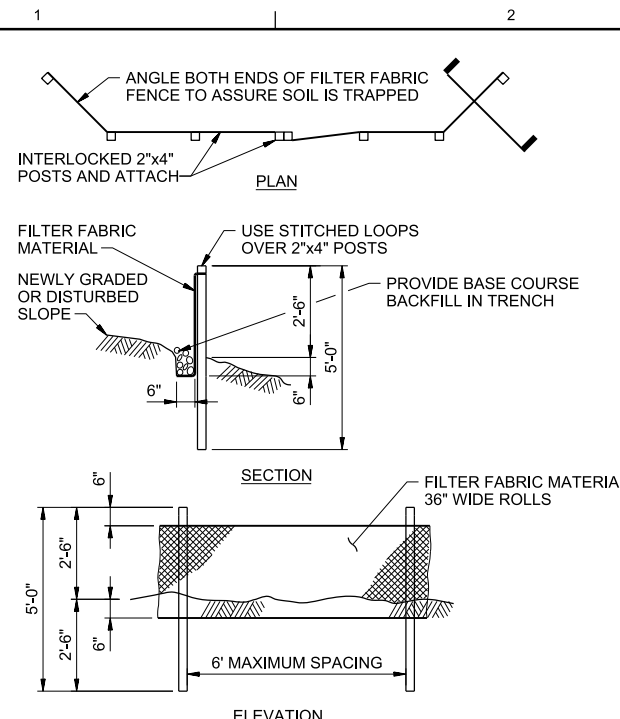
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		S. STATMAN	S. JERNIGAN			S. JERNIGAN
CIVIL <b>DETAILS</b>						
BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN CRESTVIEW PUBLIC SERVICES CRESTVIEW, FLORIDA						
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING.						
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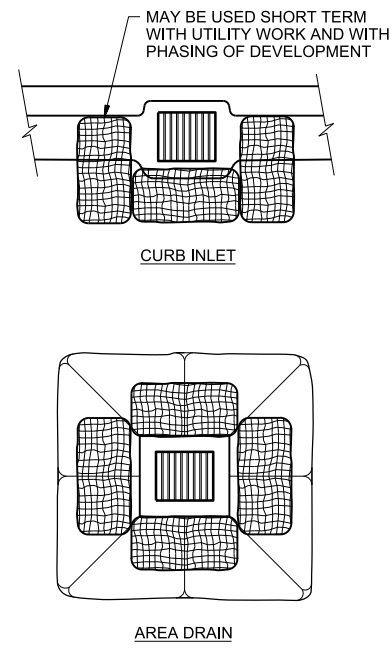


- NOTES:**
1. BURY BOTTOM OF FILTER FABRIC 6" VERTICALLY BELOW FINISHED GRADE.
  2. 2"x4" DOUGLAS FIR OR STEEL FENCE POSTS.
  3. STITCHED LOOPS TO BE INSTALLED DOWNHILL SIDE OF SLOPE.
  4. COMPACT ALL AREAS OF FILTER FABRIC TRENCH.

**SEDIMENT FENCE**

NTS

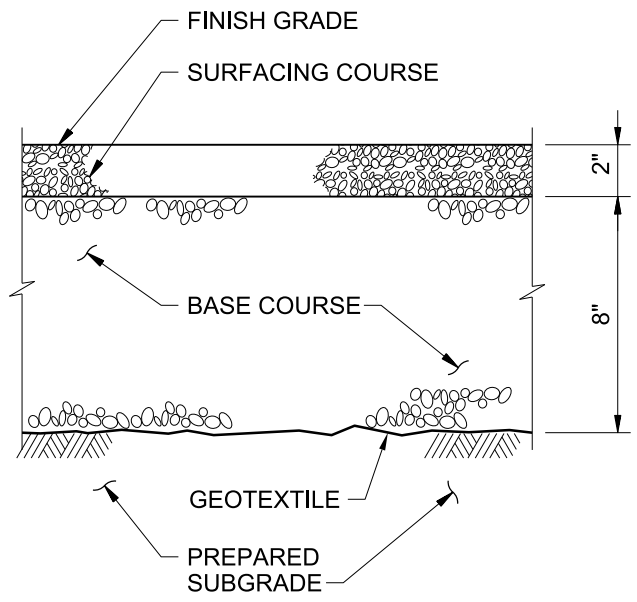
3125-165



**BIOFILTER BAG INLET BARRIER**

NTS

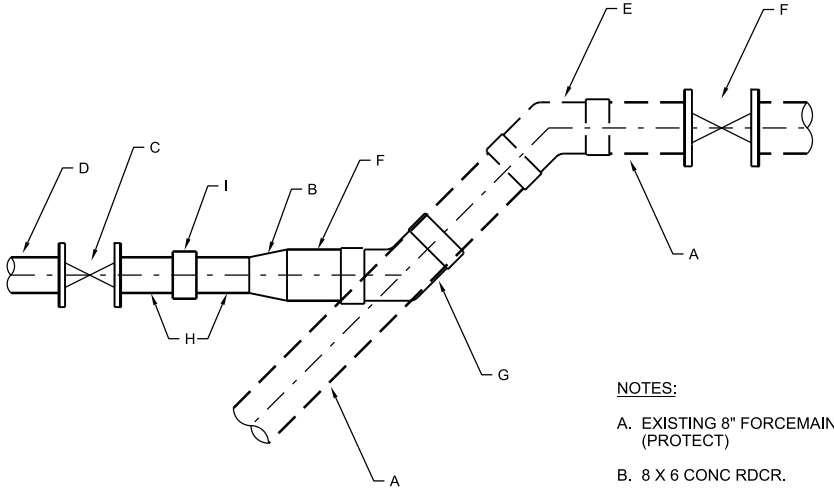
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**GRAVEL SURFACING**

NTS

3215-260

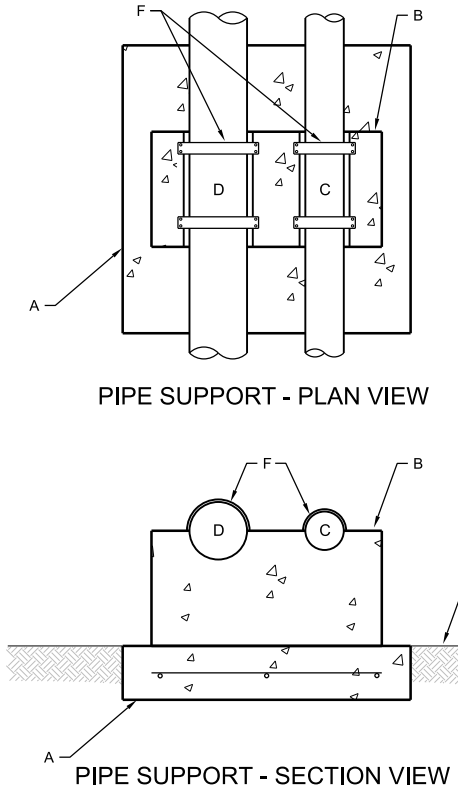


- NOTES:**
- A. EXISTING 8" FORCEMAIN (PROTECT)
  - B. 8 X 6 CONC RDCR.
  - C. 6" GATE VALVE.
  - D. BLACKWATER GOLF COURSE 6" PVC FORCE MAIN
  - E. EXISTING 8" 45° BEND
  - F. EXISTING ISOLATION VALVE
  - G. NEW 8" DI WYE TO CONNECT PROPOSED FORCE MAIN TO EXISTING FORCE MAIN
  - H. 6" SPOOL PIECE
  - I. 6" RESTRAINED PIPE COUPLING

**FORCEMAIN INNERCONNECTION**

NTS

3300-000

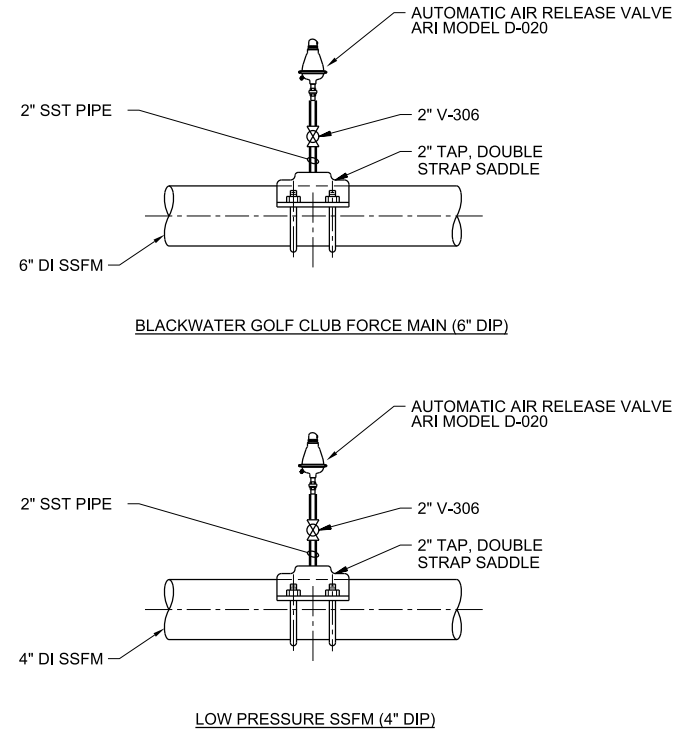


- NOTES:**
- A. 3' X 3' SQUARE CONCRETE BASE W/ #6 REBAR @12" OC EW. PIPE SUPPORTS TO BE SPACED AT A MAXIMUM 10-FT INTERVALS.
  - B. CONCRETE SUPPORTS 2-FT WIDE BY 1-FT LONG. HEIGHT SHALL BE VARIABLE AS REQUIRED TO MAINTAIN A CONSISTANT FORCE MAIN SLOPE
  - C. 4" LOW PRESSURE FORCE MAIN. AERIAL FORCE MAIN TO BE DIP.
  - D. 6" BLACKWATER CREEK GOLF CLUB FORCE MAIN. AERIAL FORCE MAIN TO BE DIP.
  - E. 18" CLEAR SPACING BETWEEN CONCRETE PIPE CRADLE AND EXISTING CONCRETE HEADWALL.
  - F. ANCHOR PIPING WITH SST STRAP AND NEOPRENE COLAR TO PREVENT PIPE CONTACTING CONCRETE
  - G. EXISTING CONCRETE HEADWALL. (PROTECT)

**AERIAL PIPE CRADLE**

NTS

3400-000



**TAPPING SADDLE FOR CARV**

NTS

4091-305A

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		S. JERNIGAN	S. JERNIGAN	S. JERNIGAN
NO.	DATE	DR	CHK	BY
		S. JERNIGAN	S. JERNIGAN	S. JERNIGAN

BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

**Jacobs**  
CIVIL  
DETAILS

VERIFY SCALE  
BAR IS ONE INCH ON ORIGINAL DRAWING.

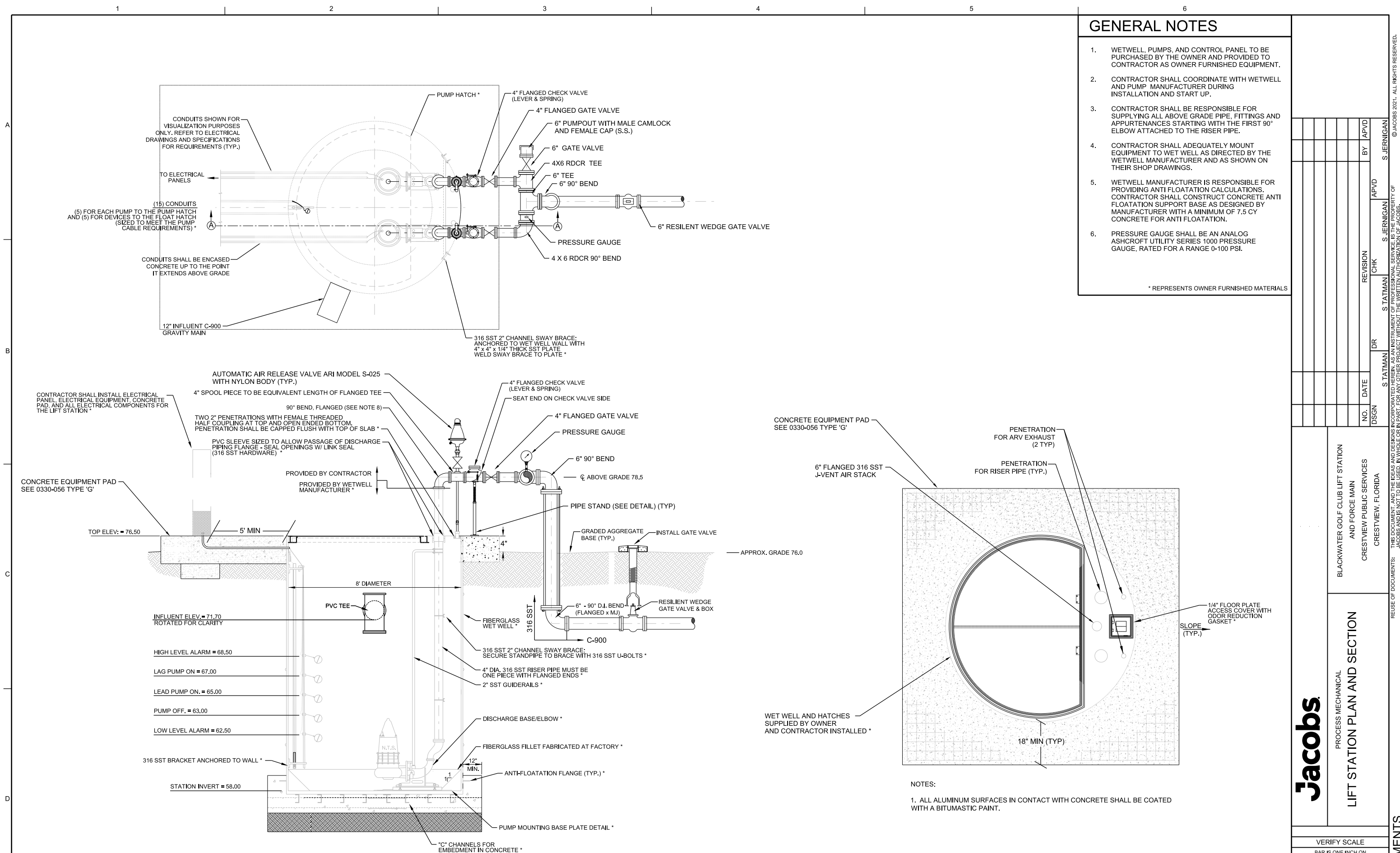
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BID DOCUMENTS

## GENERAL NOTES

1. WETWELL, PUMPS, AND CONTROL PANEL TO BE PURCHASED BY THE OWNER AND PROVIDED TO CONTRACTOR AS OWNER FURNISHED EQUIPMENT.
2. CONTRACTOR SHALL COORDINATE WITH WETWELL AND PUMP MANUFACTURER DURING INSTALLATION AND START UP.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING ALL ABOVE GRADE PIPE, FITTINGS AND APPURTENANCES STARTING WITH THE FIRST 90° ELBOW ATTACHED TO THE RISER PIPE.
4. CONTRACTOR SHALL ADEQUATELY MOUNT EQUIPMENT TO WET WELL AS DIRECTED BY THE WETWELL MANUFACTURER AND AS SHOWN ON THEIR SHOP DRAWINGS.
5. WETWELL MANUFACTURER IS RESPONSIBLE FOR PROVIDING ANTI FLOATION CALCULATIONS. CONTRACTOR SHALL CONSTRUCT CONCRETE ANTI FLOATION SUPPORT BASE AS DESIGNED BY MANUFACTURER WITH A MINIMUM OF 7.5 CY CONCRETE FOR ANTI FLOATION.
6. PRESSURE GAUGE SHALL BE AN ANALOG ASHCROFT UTILITY SERIES 1000 PRESSURE GAUGE, RATED FOR A RANGE 0-100 PSI.

\* REPRESENTS OWNER FURNISHED MATERIALS



BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
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PROCESS MECHANICAL  
**LIFT STATION PLAN AND SECTION**

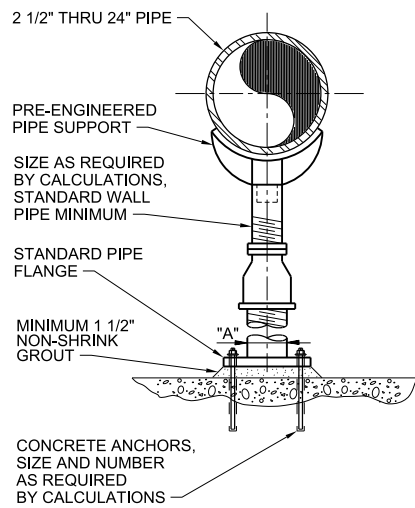
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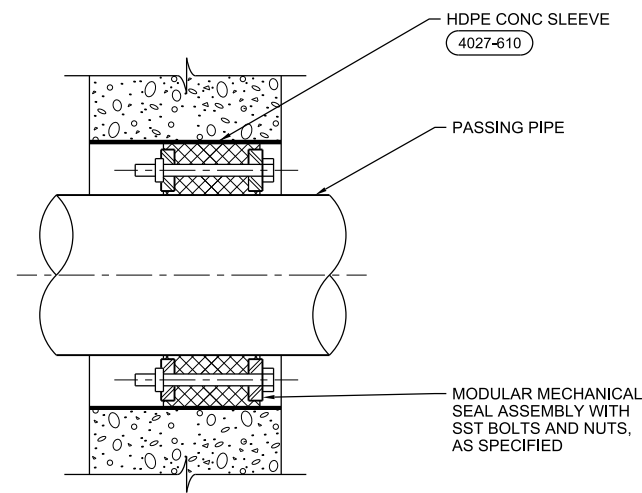


PIPE SIZE	"A" MINIMUM NOMINAL PIPE SIZE
2-1/2"	2-1/2"
3"	2-1/2"
4"	3"
6"	3"
8"	3"
10"	3"
12"	3"
14"	4"
16"	4"
20"	6"
24"	6"

NOTE:  
SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

**PIPE SUPPORT  
SADDLE SUPPORT PEDISTAL TYPE - ADJUSTABLE**  
NTS

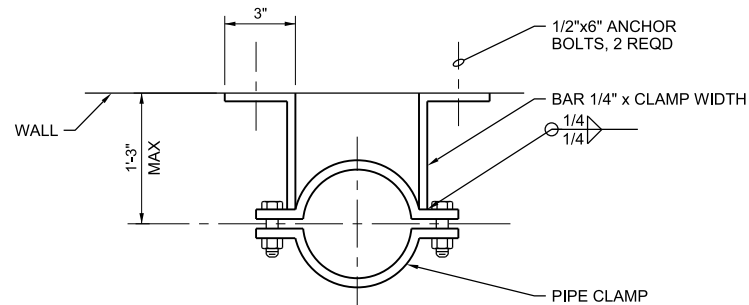
4005-500



NOTE:  
HDPE SLEEVE TO BE CAST WITH PRECAST STRUCTURE.

**WALL PIPE PENETRATION SEAL**  
NTS

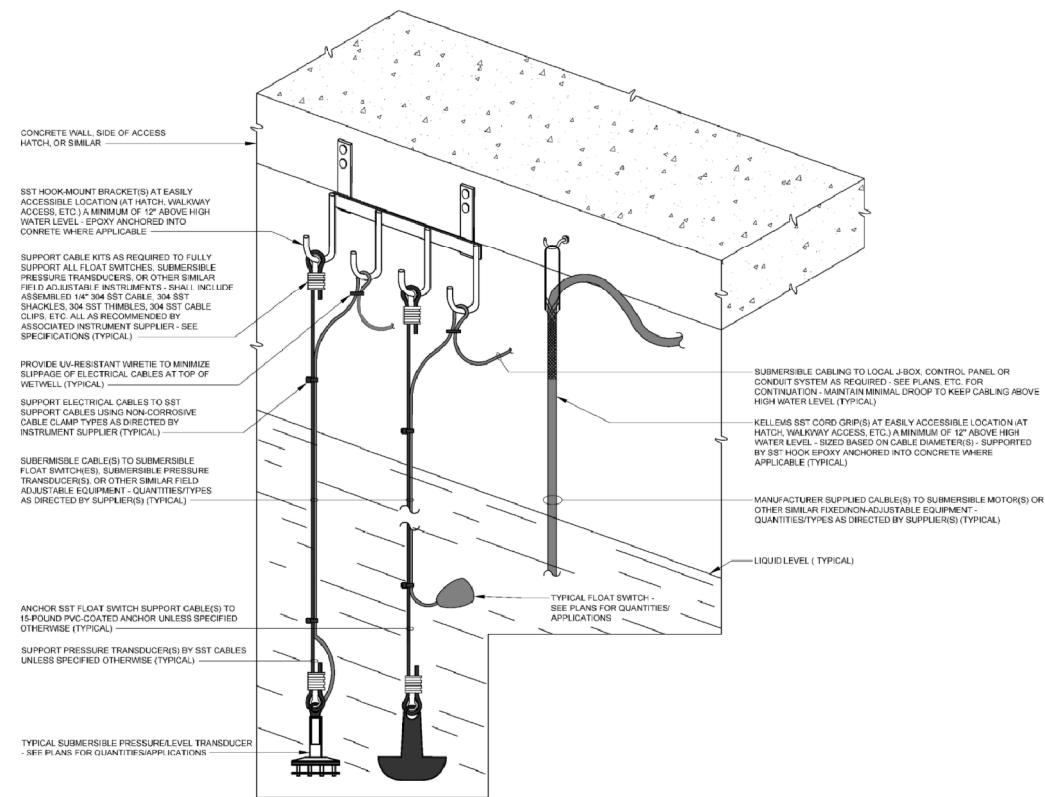
4027-607



NOTE:  
MATERIAL OF CONSTRUCTION : 316 SST.

**TYPE B PIPE SWAY BRACE**  
NTS

4005-711



**FLOAT HANGER BRACKET**  
NTS

**SUBMERSIBLE CABLE SUPPORT**  
SCALE: NONE

4005-999

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		S. STATMAN	S. STATMAN	S. JERNIGAN	S. JERNIGAN	S. JERNIGAN

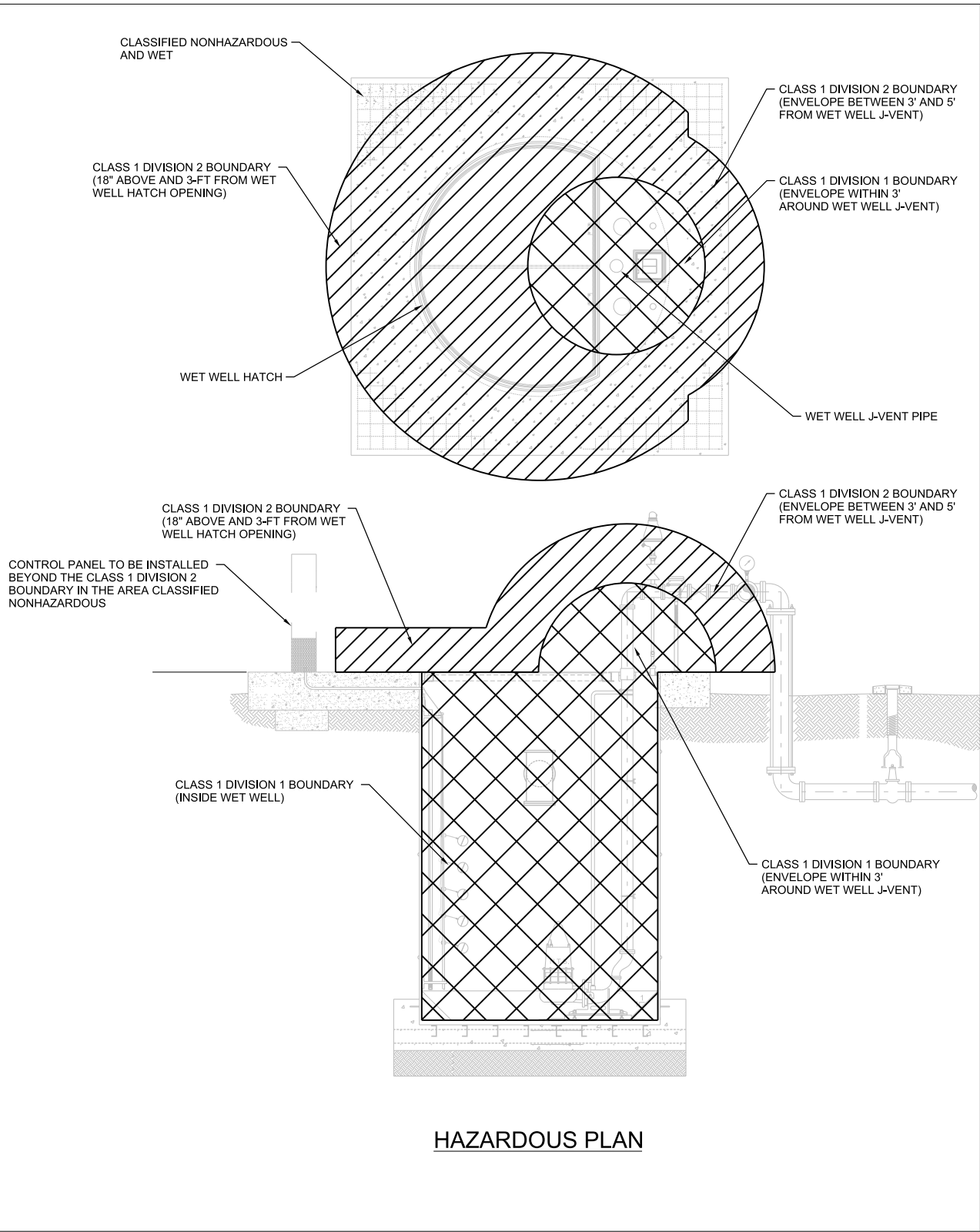
BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN  
CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

**Jacobs**  
PROCESS MECHANICAL  
DETAILS

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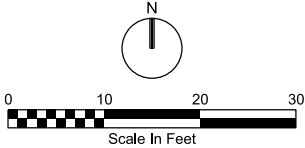




HAZARDOUS PLAN

NOTES

- 1. CONTRACTOR TO COORDINATE NEW ELECTRICAL SERVICE WITH CITY STAFF AND SERVING UTILITY. OVERHEAD LINE SHALL BE PROVIDED BY SERVING UTILITY, BUT CONTRACTOR IS RESPONSIBLE FOR PROVIDING POLE AND CONDUIT TO TOP OF POLE FROM METER ENCLOSURE. SERVING UTILITY WILL LOCATE AND PROVIDE 3-PHASE TRANSFORMERS.



ELECTRICAL  
SITE PLAN

BLACKWATER GOLF CLUB LIFT STATION  
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CRESTVIEW PUBLIC SERVICES  
CRESTVIEW, FLORIDA

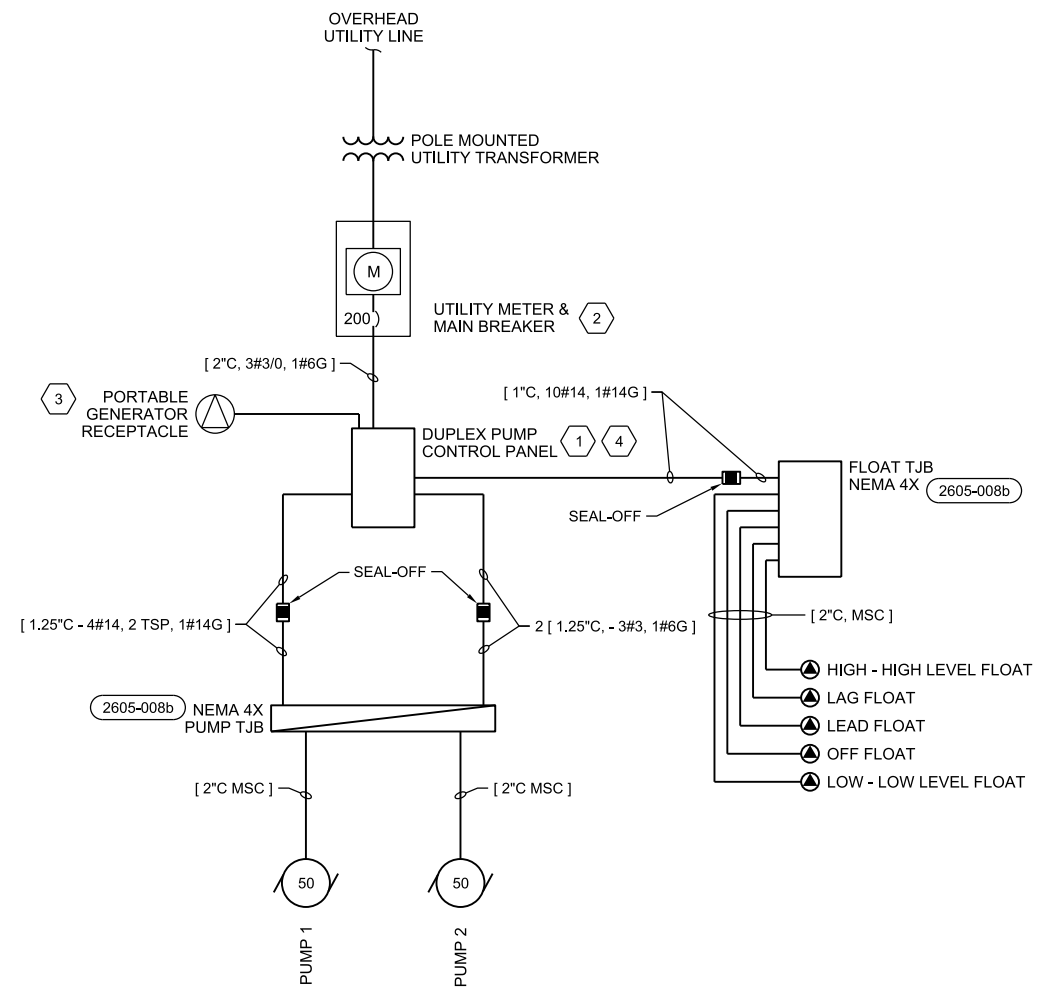
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SHEET KEYNOTES	
1.	DUPLEX PUMP CONTROL PANEL TO BE SUPPLIED BY OWNER. CONTRACTOR TO MOUNT AND TERMINATE CONDUCTORS AND CONDUIT AT PANEL AS SHOWN.
2.	PROVIDE UTILITY METER AND MAIN BREAKER IN ACCORDANCE WITH SERVING UTILITY REQUIREMENTS. PROVIDE MAIN BONDING JUMPER AT THIS LOCATION.
3.	INTEGRAL TO DUPLEX PUMP CONTROL PANEL AND SUPPLIED AS A PACKAGE FROM OWNER.
4.	CONTRACTOR SHALL VERIFY PRIOR TO TERMINATING CIRCUITS THAT CONTROL CIRCUITS ARE INTRINSICALLY SAFE.



BLACKWATER GOLF CLUB LIFT STATION  
AND FORCE MAIN  
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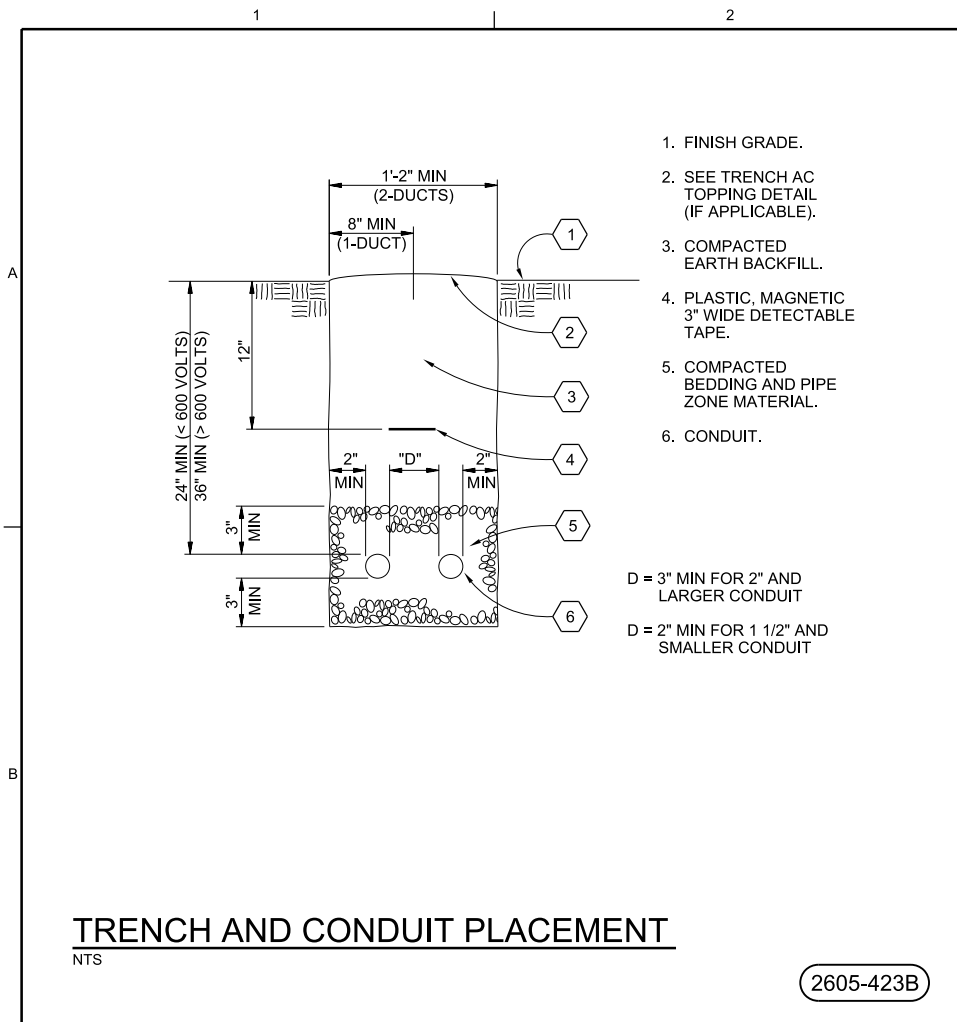
**RISER DIAGRAM AND  
POWER PLAN**

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SHEET	17 of 18

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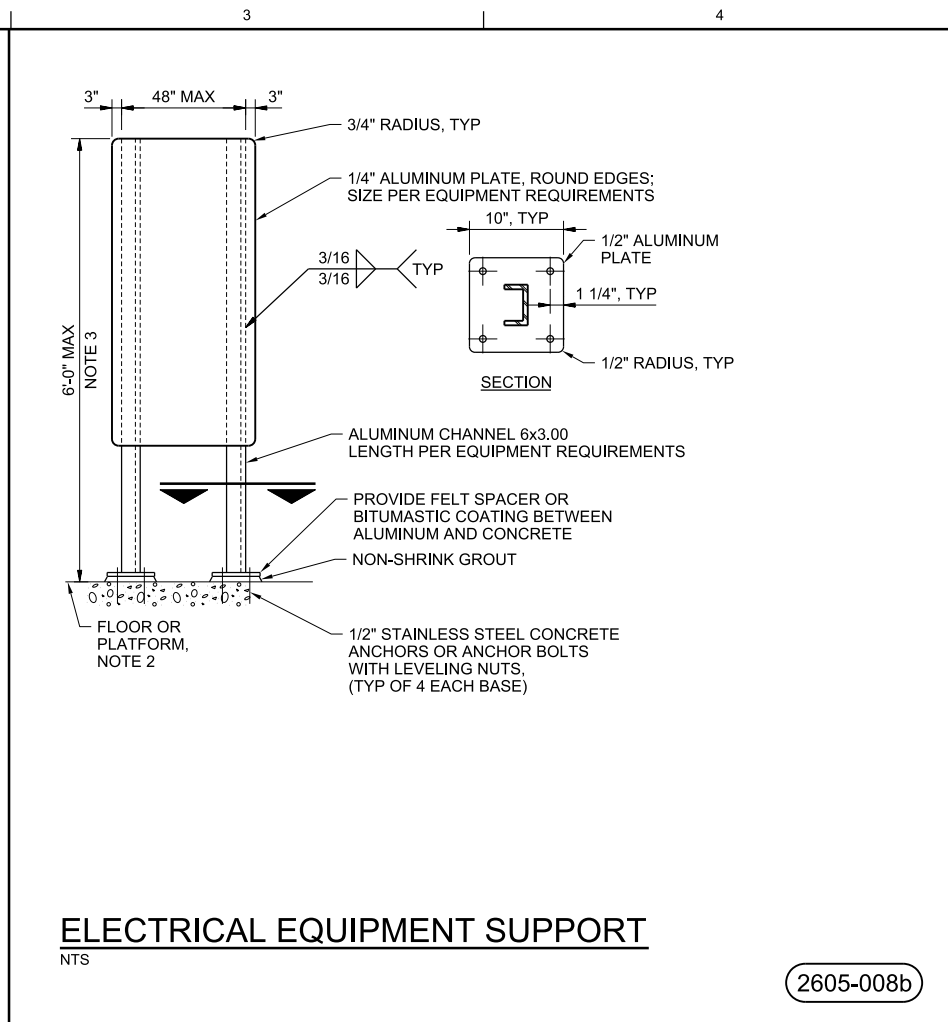
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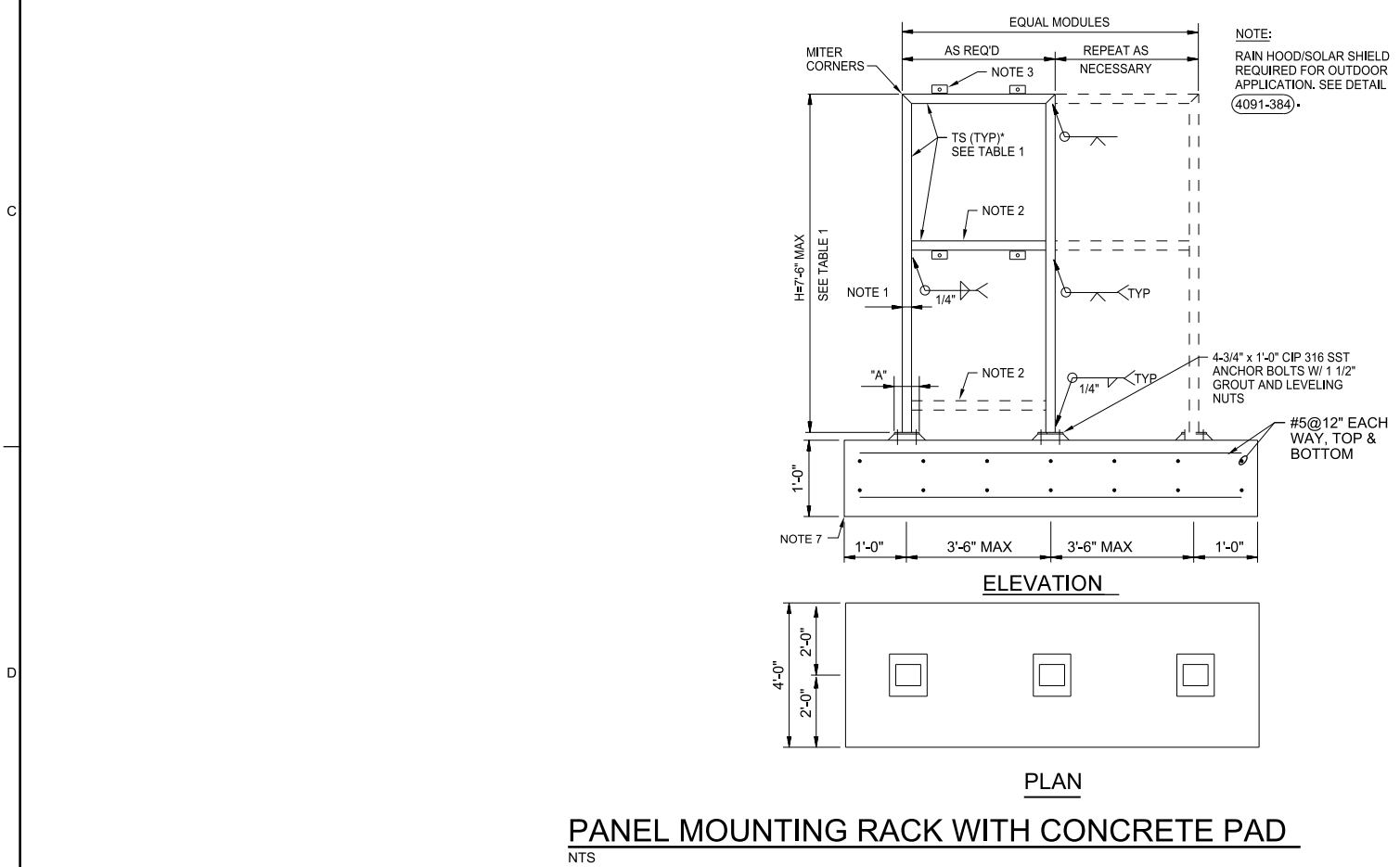


1. FINISH GRADE.
2. SEE TRENCH AC TOPPING DETAIL (IF APPLICABLE).
3. COMPACTED EARTH BACKFILL.
4. PLASTIC, MAGNETIC 3" WIDE DETECTABLE TAPE.
5. COMPACTED BEDDING AND PIPE ZONE MATERIAL.
6. CONDUIT.

D = 3" MIN FOR 2" AND LARGER CONDUIT  
D = 2" MIN FOR 1 1/2" AND SMALLER CONDUIT



- 3/4" RADIUS, TYP
- 1/4" ALUMINUM PLATE, ROUND EDGES; SIZE PER EQUIPMENT REQUIREMENTS
- 3/16 3/16 TYP
- 10", TYP
- 1/2" ALUMINUM PLATE
- 1 1/4", TYP
- 1/2" RADIUS, TYP
- ALUMINUM CHANNEL 6x3.00 LENGTH PER EQUIPMENT REQUIREMENTS
- PROVIDE FELT SPACER OR BITUMASTIC COATING BETWEEN ALUMINUM AND CONCRETE
- NON-SHRINK GROUT
- FLOOR OR PLATFORM, NOTE 2
- 1/2" STAINLESS STEEL CONCRETE ANCHORS OR ANCHOR BOLTS WITH LEVELING NUTS, (TYP OF 4 EACH BASE)



- NOTES:**
1. TOTAL WEIGHT OF PANEL(S) SHALL NOT EXCEED 750 LB IN EACH MODULE.
  2. FOR PANELS WITH "H" GREATER THAN 4'-0", ONE HORIZONTAL MEMBER MUST BE LOCATED WITHIN THE MIDDLE THIRD OF THE FRAME HEIGHT, PROVIDE ADD'L MEMBERS AS NECESSARY FOR PANEL MOUNTING.
  3. PROVIDE L 2 1/2"x 2 1/2"x 1/4"x 0'-3" WELD ALL AROUND TO TS; TYP AT EACH PANEL MOUNT.
  4. GRIND ALL WELDS AND SHARP CORNERS SMOOTH.
  5. THIS DETAIL APPLIES TO NON-FREE STANDING ELECTRICAL EQUIPMENT OVER 25 LB WHICH IS NOT MOUNTED ON A FREE STANDING FRAME OR IS NOT WALL MOUNTED.
  6. PANEL OR INSTRUMENT FRONT FACES NORTH, UNLESS OTHERWISE NOTED.
  7. PROVIDE REINFORCED PAD SHOWN EXCEPT WHERE THE RACK CAN BE MOUNTED ON SUITABLE EXISTING PAD.
  8. PROVIDE #6 BARE COPPER GROUND WIRE FROM EACH PANEL AND INSTRUMENT MOUNTED ON RACK TO GROUND STUD. CONNECTION TO GROUND GRID SPECIFIED UNDER DIVISION 26.

HEIGHT "H"	ALUMINUM FRAME		BASE PLATE (IN)	
	TS (MIN SIZE)		A	t
5'-0" MAX.	TS 3 x 3 x,188		8	1/2
7'-6" MAX.	TS 4 x 4 x,188		9	5/8

BLACKWATER GOLF CLUB LIFT STATION AND FORCE MAIN				CRESTVIEW PUBLIC SERVICES		CRESTVIEW, FLORIDA	
				ELECTRICAL DETAILS		NO.	DATE
						REVISION	CHK
						DR	APVD
DATE NOV 2021 PROJ D3553000 DWG E-501 SHEET 18 of 18				S. STATMAN C. HUJESTON DR APVD BY APVD			

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