

**BIDDING, CONTRACT DOCUMENTS, AND TECHNICAL SPECIFICATIONS**

**ISS PROJECT PCB003 | Project Manager: Brian Stahl, PE**

**WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
BID No. PCB22-13**

**CITY OF PANAMA CITY BEACH**

**200 N Gulf Blvd, Panama City Beach, FL 32413**



**INFRASTRUCTURE SOLUTION SERVICES, LLC**

120 Richard Jackson Bld. Suite 200C  
Panama City Beach, 32413

Phone: (850) 366-9942

Web Site: [INFRASTRUCTURESS.COM](http://INFRASTRUCTURESS.COM)

ISSUE DATE: **September 22<sup>nd</sup>, 2021**

REVISION: V2.1 | 100% Submittal  
**RELEASED FOR BID**

**Engineer of Record – Project Manager & Civil Engineer**

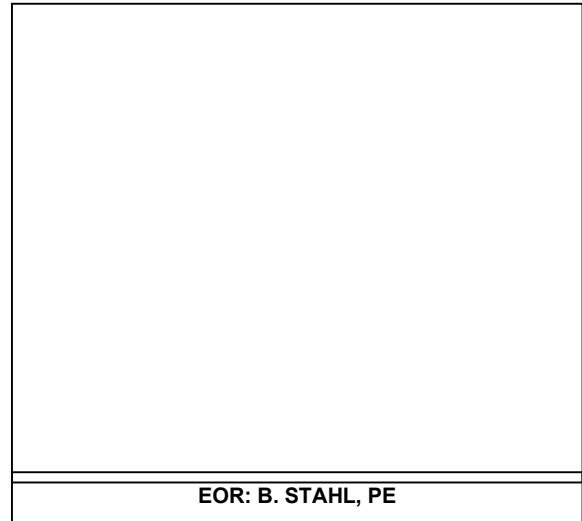
**Brian Stahl, PE**

License: Florida PE #48293



Infrastructure Solution Services, LLC  
Certificate of Authorization #29992  
120 Richard Jackson Bld. Suite 200C  
Panama City Beach, 32413

bstahl@infrastructuress.com  
(850) 366-9942



Responsible for the Following Divisions:

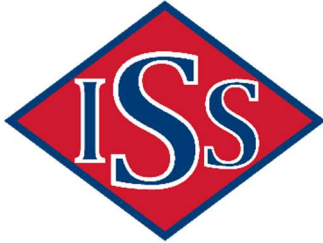
 **DIVISION 00**

 **DIVISION 01**

## Engineer of Record – Electrical Engineer

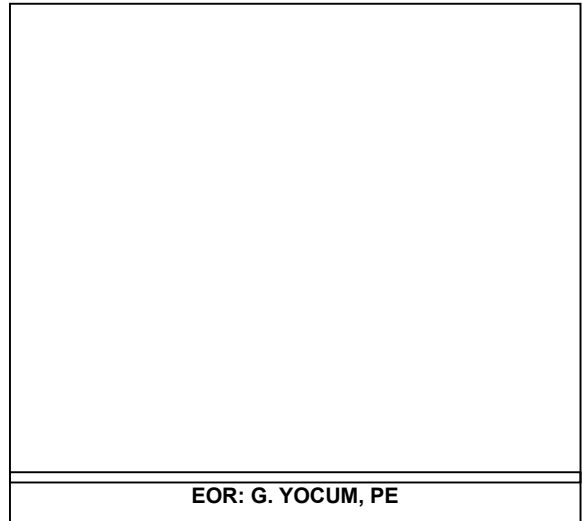
**Gary Yocum, PE**

License: Florida PE #61594



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Responsible for the Following Divisions:

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SECTION 00010

ADVERTISEMENT FOR BIDS

NOTICE TO RECEIVE SEALED BIDS

**WWTF#1 GENERATOR & ATS CONTROLS IMPROVEMENTS PROJECT**

The City of Panama City Beach hereby solicits sealed bids for the Wastewater Treatment Facility (WWTF) generators and automatic transfer switch system consisting of programmable logic controllers (PLC) and human machine interface (HMI) touch panels. These systems have proprietary password protected logic and configuration that prevents the City from modifying or easily maintaining the system. The City would like to replace the existing generator proprietary automatic transfer switch system with an open architecture system that the City can easily modify and maintain. The Contractor shall provide all materials, equipment, and labor to complete the project.

Bid Documents may be downloaded online at [www.demandstar.com](http://www.demandstar.com) or the City's website at <https://www.pcbfl.gov/about-us/rfp-posts-list> or by contacting the Purchasing Manager at [purchasing@pcbfl.gov](mailto:purchasing@pcbfl.gov) starting on October 26th, 2021.

Bids must be submitted upon the standard form contained in the bid documents.

The City reserves the right to reject any and all bids and to waive any informality in bids received. All bidders shall comply with all applicable state and local laws concerning licensing, registration, and regulations of businesses in the state of Florida.

The bid must conform to Section 287.133(3) Florida Statutes, with respect to Public Entity Crimes.

Bids will be received until **10:00 A.M. Central Standard Time, November 29th, 2021 at City of Panama City Beach City Hall, 17007 Panama City Beach Parkway, Panama City Beach, Florida, 32413.**

- Electronic Bids will only be accepted when submitted through the DemandStar's Bid portal. Emailed submissions will not be accepted.
- Alternately, one original and one copy, along with an electronic copy (CD or USB flash drive) may be delivered to the City Hall Office at the address below. Any sealed Bid submitted on paper must identify and clearly mark the **Bid # PCB22-13 ITB WWTF#1 Generator & ATS Controls Improvements Project** on the package. Receipt of a Bid by any Panama City Beach Office, receptionist or personnel other than the City Hall's front desk does not constitute "receipt" as required by this solicitation. The time received at City Hall shall be conclusive as to the timeliness of receipt.



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A Bid Bond in the amount of 5% of the total amount of the Bid shall accompany the Bid. The City of Panama City Beach ("City") reserves the right to reject any and all Bids. All Bids shall be firm (including all labor and material prices) for a period of 60 days after opening.

The City shall award the contract to the lowest fully responsive and responsible bidder; provided, that the City Council may award the contract to a bidder other than the lowest bidder should it find the lowest bidder does not offer the reliability, quality of service or product afforded by such other bidder. Where a bid other than the lowest bid is taken, the City Council shall state the reasons upon which such award was made.

BIDDER qualifications are described in detail in Appendix A of the Specifications. Documentation describing BIDDER's qualifications shall be submitted on the provided Bidder Qualification Form.

**A MANDATORY pre-bid conference will be held at 10:00 A.M. Central Standard Time on November 9th, 2021** at the Panama City Beach WWTP located at 200 N. Gulf Boulevard, Panama City Beach, Florida. Point of Contact for questions will be Tina Kunst, City of Panama City Beach Purchasing Manager; 17007 Panama City Beach Parkway, Panama City Beach, Florida, 32413. Email [Purchasing@pcbfl.gov](mailto:Purchasing@pcbfl.gov), or Telephone (850) 233-5100, extension 2332. Official questions must be submitted in writing no later than 4:00 P.M. (CST) on November 22, 2021 to the Purchasing Manager.

Each bidder must comply with all applicable state and local laws concerning licensing, registration, and regulations of contractors doing business in Florida.

Advertisement Dates: **November 1 and November 8, 2021**

Notice to Publisher – Please forward the original "Proof of Publication" and the invoice to:

City of Panama City Beach  
17007 Panama City Beach Parkway  
Panama City Beach, Florida 32413

[END OF SECTION 00010]

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT**  
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SECTION 00020

INFORMATION FOR BIDDERS

BIDS will be received by the City of Panama City Beach (herein called the "OWNER"), at 17007 Panama City Beach Parkway, Panama City Beach, Florida 32413 until **10:00 AM Central Time, Monday, November 29<sup>th</sup>, 2021**, then opened and read publicly promptly thereafter.

Each BID must be submitted in a sealed envelope addressed to City of Panama City Beach City Hall, 17007 Panama City Beach Parkway, Panama City Beach, Florida 32413. Each sealed envelope containing a BID must be plainly marked on the outside as **"PCB22-13 ITB WWTF #1 Generator Control & ATS Improvement Project"** and the envelope should bear on the outside the BIDDER'S name, address and license number if applicable. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER - City of Panama City Beach, at 17007 Panama City Beach Parkway, Panama City Beach, Florida 32413, and reference the name of the project for which the bid is submitted.

Starting on **October 26<sup>th</sup>, 2021**, Documents may be downloaded online at [www.demandstar.com](http://www.demandstar.com), the City's website at <https://www.pcbfl.gov/about-us/rfp-posts-list>, or by contacting the Purchasing Manager at [purchasing@pcbfl.gov](mailto:purchasing@pcbfl.gov).

- Electronic Bids will only be accepted when submitted through the DemandStar's Bid portal. Emailed submissions will not be accepted.
- Alternatively, one original and one paper copy along with an electronic copy (CD or USB flash drive) may be delivered to City Hall at the address above. Any sealed Bid submitted on paper must identify and clearly mark the Bid # **PCB22-13 ITB WWTF#1 Generator Controls & ATS Improvements Project** on the package. Receipt of a Bid by any Panama City Beach Office, receptionist or personnel other than the City Hall's front desk does not constitute "receipt" as required by this solicitation. The time received at City Hall shall be conclusive as to the timeliness of receipt.

Bidders submitting paper Bids must submit two (2) complete Bid responses (one (1) original and one (1) copy) along with a digital copy (USB preferred) which must include all the required documentation:

A complete BID response shall consist of:

1. 00030 Bid Proposal Form
2. Bidders Qualification Form
3. 00040 Bid Bond
4. 00095 Drug Free Workplace
5. 00096 Trench Safety Act
6. 00097 Public Entity Crimes

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7. 00098 Other Required Forms: Non-Collusion Affidavit
8. 00098 Other Required Forms: E-Verify Form
9. 00098 Other Required Forms: Conflict of Interest Statement
10. 00098 Other Required Forms: Litigation Statement
11. 00099 Certificate of Insurance Cover sheet
12. 00099 Certificate of Insurance Form
13. 00808 Sales Tax Exemption

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn by the BIDDER 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 within 60 days after the actual date of the opening thereof.

Should there be reasons why the contract cannot be awarded within the specified period the time may be extended by mutual agreement between the OWNER and the apparent successful BIDDER.

**This is a Lump Sum Price Contract.** BIDDERS must satisfy themselves of the accuracy of any estimated quantities in the BID Schedules or Contract Documents 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 was misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done. **The CONTRACTOR shall visit the site before submitting a BID.**

The OWNER shall provide to BIDDERS prior to BIDDING, information which is pertinent to, and delineates and describes, the land upon which the WORK is to be performed, including its ownership and rights-of-way acquired or to be acquired.

If necessary, ADDENDA will be issued to the Contract Documents. The BIDDERS must submit all questions, if any, in writing at least seven (7) days prior to the BID date.

The CONTRACT DOCUMENTS contain the provisions required for construction of the WORK. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the successful BIDDER or relieve the successful BIDDER from fulfilling all of their obligations under the contract.

No Bid shall be considered or accepted unless at the time the Bid is submitted to OWNER the same shall be accompanied by a cashier's check, a cash bond posted with the City Clerk, a certified check payable to Owner on some bank or trust company located in the State of Florida insured by the Federal Deposit Insurance Corporation, or Bid Bond, in an amount not less than **5% of the bidder's maximum possible award (base bid plus all add alternates)**. The Bid Bond shall be retained by Owner as liquidated damages if the successful Bidder fails to execute and deliver to Owner the unaltered Agreement, or fails to deliver the required Certificates of Insurance, all within ten (10) calendar days after receipt of the Notice of Award. Bid Bonds shall be executed by a corporate surety licensed under the laws of the State of Florida to execute such bonds, with conditions that the surety will, upon demand, forthwith make payment to Owner upon said bond.

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Attorneys-in-fact who sign BID BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to obtain the required insurance, PAYMENT BOND and PERFORMANCE BOND, execute the AGREEMENT and deliver to OWNER said executed AGREEMENT together with the required Certificate of Insurance and the PERFORMANCE BOND and PAYMENT BOND, within ten (10) calendar days after the date the NOTICE OF AWARD is delivered to the BIDDER; the required forms for such AGREEMENT being set forth in Section 00050, the required form for the PERFORMANCE BOND being set forth in Section 00060, the required form for the PAYMENT BOND being set forth in Section 00070 and the required form for the Certificate of Insurance being set forth in Section 00099. In case of failure of the successful BIDDER to execute and deliver to OWNER, within said ten(10) day period the required AGREEMENT, together with the required Certificates of Insurance, PERFORMANCE BOND and PAYMENT BOND, the OWNER may consider the BIDDER in default, in which case the entire amount of the BID DEPOSIT accompanying the BID shall be paid to the OWNER. The BID DEPOSIT shall be retained by Owner as liquidated damages if the successful Bidder fails to execute and deliver to Owner the unaltered Agreement or fails to deliver the required Performance and Payment Bonds or Certificate(s) of Insurance, all within ten (10) calendar days after receipt of the Notice of Award.

If the OWNER intends to accept the successful BIDDER'S BID and enter into the contract with them, the OWNER, within thirty (30) days (or such longer period of time the OWNER and successful BIDDER may mutually agree to in writing) of receipt of an acceptable PERFORMANCE BOND, PAYMENT BOND, Certificate(s) of Insurance, and AGREEMENT signed by the successful BIDDER to whom the AGREEMENT was awarded, shall sign the AGREEMENT and return to such party an executed duplicate of the AGREEMENT. BIDDER acknowledges and agrees that unless and until the OWNER executes the AGREEMENT and returns the executed copy to the BIDDER, no contract or agreement between the OWNER and BIDDER shall exist. Should the OWNER not execute the AGREEMENT within such period, the BIDDER shall provide OWNER an additional seven days written notice of BIDDER'S intent to withdraw its signed copy of the AGREEMENT. If OWNER fails to execute the AGREEMENT within such seven days, the AGREEMENT shall be deemed withdrawn and BIDDER shall be released from its BID as of the date of the written notice.

The OWNER or its agents may make such investigations as deemed necessary to determine the ability of each BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER and its agents all such information and data for this purpose as the OWNER or its agents 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 therein.

A conditional or qualified BID may be rejected by OWNER.

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The OWNER shall award the Contract to the lowest responsive and responsible BIDDER as determined by OWNER; provided, however, OWNER reserves the right to award the Contract to a BIDDER who is not the lowest BIDDER if OWNER determines in its reasonable discretion that the lowest bidder does not offer the reliability, quality of service, or product afforded by the other BIDDER. In the event OWNER awards the Contract to a BIDDER other than the lowest BIDDER, OWNER shall state the basis upon which the award is being made.

Each BIDDER may attach to its BID any information or documentation it believes is relevant to addressing the factors of reliability, quality of service and product, as such factors pertain to the WORK to be provided under the AGREEMENT to be awarded pursuant to this Information for Bidders. Any such information or documentation is to consist of no more than 10 pages, single sided, each page no larger than 8" x 11". OWNER reserves the right, either before or after BID opening, but prior to contract award, to request from any BIDDER such information or documentation addressing the factors of reliability, quality of service or product, as OWNER may determine is reasonably necessary to assist it in deciding which bid offers OWNER the better value. Further, each BIDDER by submitting its BID is deemed to have authorized OWNER to conduct such investigations as OWNER may determine are reasonably necessary to assist it in deciding which BID offers OWNER the better value. OWNER in making any decision as to which BID offers OWNER the better value may rely upon any such information or documentation provided by a BIDDER, and by submitting any such information or documentation, upon request from OWNER, the BIDDER will be deemed to have certified and warranted to OWNER the accuracy and correctness of any such information and documentation. Further, in making any decision as to which BID offers OWNER the better value, OWNER also may rely upon its own investigations or its own records and knowledge concerning the BIDDER, including the BIDDER's personnel, work product and prior work history. All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the WORK shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the AGREEMENT, PLANS, SPECIFICATIONS, and other CONTRACT DOCUMENTS, prior to submitting their BID. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

Further, the BIDDER agrees to abide by the requirements under Executive Order No. 11246, as amended, including specifically the provisions of the equal opportunity clause set forth in the GENERAL CONDITIONS or any Supplemental Conditions.

The successful BIDDER of each contract shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when required to do so by the OWNER.

END OF SECTION 00020

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**SECTION 00030  
BID PROPOSAL FORM**

This proposal of \_\_\_\_\_ (hereinafter called "BIDDER"), organized and existing under the laws of the State of \_\_\_\_\_, doing business as \_\_\_\_\_ (a corporation, a partnership or an individual), whose Florida contractor's license number is \_\_\_\_\_ hereby submitted to the CITY OF PANAMA CITY BEACH (hereinafter called "OWNER").

In compliance with the requirements of the Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID, each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under the CONTRACT DOCUMENTS within ten (10) calendar days after the NOTICE TO PROCEED to be issued by Owner in writing and achieve Substantial Completion of the WORK within 210 consecutive calendar days thereafter. Final Completion of the WORK shall be achieved by BIDDER within the calendar days specified in the General Conditions after the date of Substantial Completion.

BIDDER further agrees to pay as liquidated damages, the sum of \$500 per day for each consecutive calendar day that expires after the Contract Time until Substantial Completion of the WORK is achieved as provided in Section 15 of the General Conditions. BIDDER acknowledges receipt of the following:

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**ADDENDUM:**

Addendum No. \_\_\_\_\_

Addendum No. \_\_\_\_\_

Addendum No. \_\_\_\_\_

**BASE BID**

BIDDER agrees to perform all the WORK described in the CONTRACT DOCUMENTS for the following lump sum: \_\_\_\_\_.

The BIDDER proposes and agrees, if this Proposal is accepted, to contract with the OWNER in the required form of the Agreement, Section 00050, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the WORK in full and in accordance with the shown, noted, described and reasonably intended requirements of the CONTRACT DOCUMENTS according to the following schedule:

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**BID SCHEDULE**

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Cost</u>
<b>Base Bid Items</b>					
<b>1</b>	Mobilization/Demobilization <i>(Max 5% of sub-total bid)</i>	LS	1	\$	\$
<b>2</b>	Wiring, Conduit, Materials, etc. required for electrical scope of work	LS	1	\$	\$
<b>3</b>	Controllers, Interfaces, enclosures, etc. required for instrumentation and controls scope of work.	LS	1	\$	\$
<b>4</b>	All work, equipment, and materials not including in the preceding to construct the improvements in accordance with the contract requirements.	LS	1	\$	\$
<b>6</b>	Indemnification	LS	1	\$ 25.00	\$ 25.00
<b>7</b>	Record Drawings & O&M Manuals	LS	1	\$	
<b>8</b>	Testing Allowance	LS	1	\$ 10,000.00	\$ 10,000.00

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1. BIDS shall include sales tax and all other applicable taxes and fees. The OWNER may elect to utilize the Sales Tax Exemption Addendum (Section 00098) for material at its sole discretion.
2. BIDS shall be on the basis of a lump sum price, as noted above, and shall be the total compensation to be paid by OWNER for the complete WORK.
3. Bid unit prices and quantities, shall be applicable for any revisions to the WORK (either additions or omissions) including drilled shaft revisions. In addition, these unit prices and quantities shall be reflected in the Schedule of Values as specified in the General Conditions. All unit prices are understood to include all associated charges for layout, insurance, taxes, field office and supervision, overhead and profit, bonds and miscellaneous items.
4. The OWNER reserves the right to reject any and all bids received.
5. **Failure to insert a bid amount for any item in the Bid Schedule will be considered grounds for the OWNER to determine the BID is non-responsive.**
6. By submitting this BID, the BIDDER and the BID BOND surety, are deemed to have stipulated and agreed that any and all claims, demands, actions or suits whatsoever, arising under this BID and/or BID BONDS, shall be subjected to the sole and exclusive jurisdiction and venue of the Circuit Court of Bay County, Florida. The BIDDER and BID BOND surety do agree, by submittal of this BID, that the sole and exclusive jurisdiction and venue in said forum is proper and appropriate since performance of the underlying contract to be awarded is to be accomplished within Bay County, Florida.

Bidder's Certification

BIDDER certifies that it has thoroughly familiarized itself with and inspected the site and has read and is thoroughly familiar with the CONTRACT DOCUMENTS. Additional site investigation, if deemed necessary by the BIDDER, shall be performed prior to BID submittal at the BIDDER's sole expense. Bidder certifies that the BID submitted is complete and is sufficient for the Bidder to provide a fully operational and working system in accordance with the CONTRACT DOCUMENTS. Furthermore, BIDDER certifies its understanding that neither the OWNER, PROJECT REPRESENTATIVE, nor ENGINEER shall provide any labor, equipment or materials of any kind, which may be required for the performance of the WORK, unless otherwise specifically directed by OWNER. Likewise, BIDDER certifies that it shall provide all equipment, materials, labor and services necessary to complete the WORK in accordance with the CONTRACT DOCUMENTS whether or not such equipment, material, labor, or service is expressly identified. Such occurrences are deemed subsidiary obligations of the contract for which complete compensation is made under the Lump Sum. The failure or omission of any BIDDER to do any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to its BID.

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As required, the following documents are submitted with this Bid Proposal:

1. 00030 Bid Proposal Form
2. Bidders Qualification Form
3. 00040 Bid Bond
4. 00095 Drug Free Workplace
5. 00096 Trench Safety Act
6. 00097 Public Entity Crimes
7. 00098 Other Required Forms: Non-Collusion Affidavit
8. 00098 Other Required Forms: E-Verify Form
9. 00098 Other Required Forms: Conflict of Interest Statement
10. 00098 Other Required Forms: Litigation Statement
11. 00099 Certificate of Insurance Cover sheet
12. 00099 Certificate of Insurance Form
13. 00808 Sales Tax Exemption

CONTRACTOR:

\_\_\_\_\_

\_\_\_\_\_  
Address

\_\_\_\_\_

\_\_\_\_\_  
Phone Number

\_\_\_\_\_  
Date

[END OF SECTION 00030]

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SECTION 00040

BID BOND

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned,

\_\_\_\_\_, as Principal, and \_\_\_\_\_,

as Surety, are hereby held and firmly bound unto the City of Panama City Beach, as

OWNER, in the penal sum of \_\_\_\_\_

for the payment of which, will and truly be made, we hereby jointly and severally bind

ourselves, successors and assigns. Signed this \_\_\_\_ day of \_\_\_\_\_, 20\_\_.

The Condition of the above obligation is such that whereas the principal has submitted to the OWNER a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the construction of the WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT.

NOW THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver the Agreement in the form of contract as set forth in Section 00050 (properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform its obligations created by OWNER's acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.
- (c) NOW, THEREFORE, if the OWNER shall accept the BID of the Principal and the Principal shall execute and deliver to OWNER the required Agreement and within ten days after the date of a written Notice of Award in accordance with the terms of such BID, and within said ten days deliver to OWNER the

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required Certificates(s) of Insurance, together with the required Performance and Payment Bonds in an amount of 100% the total Contract Amount as specified in the Bidding Documents or Contract Documents with good and sufficient surety for the faithful performance of the Agreement and for the prompt payment of labor, materials and supplies furnished in the prosecution thereof or, in the event of the failure of the Principal to execute and deliver to OWNER such Agreement or to give such bond or bonds, and deliver to OWNER the required certificates of insurance, if the Principal shall pay to OWNER the fixed penal sum of **\$500.00** noted above as liquidated damages, and not as a penalty, as provided in the Instructions for Bidders, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may have to accept said BID; and Surety does hereby waive notice of any such extension.

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

\_\_\_\_\_  
Surety

By:

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.

[END OF SECTION 00040]

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**SECTION 00050  
AGREEMENT**

THIS AGREEMENT is made this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ by and between THE CITY OF PANAMA CITY BEACH, FLORIDA, (hereinafter called "OWNER") and \_\_\_\_\_, doing business as a \_\_\_\_\_ (an individual), or (a partnership), or (a corporation), having a business address of \_\_\_\_\_ (hereinafter called "CONTRACTOR") , for the performance of the Work (as that terms is defined below) in connection with the construction of **PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT**, to be located at 200 N Gulf Blvd, Panama City Beach, FL 32413 in accordance with the Drawings and Specifications prepared by INFRASTRUCTURE SOLUTION SERVICES, LLC the Engineer of Record (hereinafter called "Engineer") and all other Contract Documents hereafter specified.

OWNER and CONTRACTOR, for the consideration herein set forth, agree as follows:

1. The CONTRACTOR shall furnish, at its sole expense, all supervision, labor, equipment, tools, material, and supplies to properly and efficiently perform all of the work required under the Contract Documents and shall be solely responsible for the payment of all taxes, permits and license fees, labor fringe benefits, insurance and bond premiums, and all other expenses and costs required to complete such work in accordance with this Agreement (collectively the "Work"). CONTRACTOR'S employees and personnel shall be qualified and experienced to perform the portions of the Work to which they have been assigned. In performing the Work hereunder, CONTRACTOR shall be an independent contractor, maintaining control over and having sole responsibility for CONTRACTOR'S employees and other personnel. Neither CONTRACTOR, nor any of CONTRACTOR'S sub-contractors or sub-subcontractors, if any, nor any of their respective

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employees or personnel, shall be deemed servants, employees, or agents of OWNER.

2. The CONTRACTOR will commence the Work required by the Contract Documents within ten (10) calendar days after the date of the NOTICE TO PROCEED to be issued by OWNER in writing within 30 days from the date of this Agreement and will achieve Substantial Completion of the Work within **210 days** of the required commencement date, except to the extent the period for Substantial Completion is extended pursuant to the terms of the Contract Documents ("Contract Time"). Final Completion of the Work shall be achieved by CONTRACTOR within the time period set forth in Section 15.2 of Section 00100, General Conditions.
3. The CONTRACTOR agrees to pay the OWNER, as liquidated damages, the sum of \$500 each calendar day that expires after the Contract Time for Substantial Completion as more fully set forth in Section 15 of the General Conditions.
4. The CONTRACTOR agrees to perform all of the Work described in the Contract Documents and comply with the terms therein for the sum of \$\_\_\_\_\_ as shown in the BID SCHEDULE, included within the Bid Proposal Form, as said amount may be hereafter adjusted pursuant to the terms of the Contract Documents ("Contract Price").
5. The term "Contract Documents" means and includes the following documents, all of which are incorporated into this Agreement by this reference:

Section 00010 ADVERTISEMENT FOR BIDS

Section 00020 INFORMATION FOR BIDDERS

Section 00030 BID PROPOSAL FORM

Section 00040 BID BOND

Section 00050 AGREEMENT

Section 00060 PERFORMANCE BOND

Section 00070 PAYMENT BOND

Section 00080 NOTICE OF AWARD

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Section 00090 NOTICE TO PROCEED  
Section 00095 DRUG FREE WORKPLACE  
Section 00096 TRENCH SAFETY ACT  
Section 00097 PUBLIC ENTITY CRIMES  
Section 00098 OTHER REQUIRED FORMS  
Section 00099 CERTIFICATE OF INSURANCE COVER SHEET  
Section 00099 CERTIFICATE OF INSURANCE FORM  
Section 00100 GENERAL CONDITIONS  
Section 00800 SUPPLEMENTARY CONDITIONS  
Section 00808 SALES TAX EXEMPTION  
Section 01000 GENERAL REQUIREMENTS  
Section 01010 SUMMARY OF WORK  
Section 01020 ALLOWANCES  
Section 01026 MEASUREMENT AND PAYMENT  
Section 01030 SPECIAL PROJECT PROCEDURES  
Section 01040 PROJECT COORDINATION  
Section 01065 PERMITS AND FEES  
Section 01090 REFERENCE STANDARDS  
Section 01300 SUBMITTALS  
Section 01315 CONSTRUCTION SCHEDULE  
Section 01370 SCHEDULE OF VALUES  
Section 01380 CONSTRUCTION PHOTOGRAPHS  
Section 01505 MOBILIZATION  
Section 01600 MATERIALS AND EQUIPMENT  
Section 01605 PRODUCT SUBSTITUTIONS  
Section 01650 START-UP AND DEMONSTRATION  
Section 01700 CONTRACT CLOSEOUT  
Section 01710 CLEANING  
Section 01730 OPERATIONS & MAINTENANCE DATA  
Section 01740 WARRANTIES AND BONDS  
Section 17950 - TESTING, CALIBRATION, AND COMMISSIONING



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Section 17050 - PROCESS CONTROL AND INSTRUMENTATION  
SYSTEMS

Section 17100 - CONTROL STRATEGIES

Section 17720 - CONTROL SYSTEMS PROGRAMMABLE LOGIC  
CONTROLLERS

Section 17721 - CONTROL SYSTEMS HUMAN MACHINE INTERFACE  
(HMI)

Section 17733 - CONTROL SYSTEMS NETWORK MATERIALS AND  
EQUIPMENT

DRAWINGS prepared INFRASTRUCTURE SOLUTION SERVICES, LLC.  
dated **09/24/2021**.

SPECIFICATIONS prepared or issued by INFRASTRUCTURE SOLUTION  
SERVICES, LLC dated **09/22/2021**

ADDENDA

No. \_\_\_\_\_, dated \_\_\_\_\_, 20\_\_

No. \_\_\_\_\_, dated \_\_\_\_\_, 20\_\_

No. \_\_\_\_\_, dated \_\_\_\_\_, 20\_\_

No. \_\_\_\_\_, dated \_\_\_\_\_, 20\_\_

The Contract Documents also includes any written amendments to any of the above signed by the party to be bound by such amendment. The Contract Documents are sometimes referred to herein as the "Agreement".

6. The OWNER will pay the Contract Price to the CONTRACTOR in the manner and at such times as set forth in Contract Documents.
7. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.
8. This Agreement shall be governed by the laws of the State of Florida.

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9. All notices required or made pursuant to this Agreement shall be in writing and, unless otherwise required by the express terms of this Agreement, may be given either (i) by mailing same by United States mail with proper postage affixed thereto, certified, return receipt requested, or (ii) by sending same by Federal Express, Express Mail, Airborne, Emery, Purolator or other expedited mail or package delivery, or (iii) by hand delivery to the appropriate address as herein provided. Notices to OWNER required hereunder shall be directed to the following address:

If to Owner:

\_\_\_\_\_  
City of Panama City Beach  
\_\_\_\_\_  
17007 Panama City Beach Pkwy  
\_\_\_\_\_  
Panama City Beach, FL 32413  
ATTENTION: \_\_\_\_\_  
Drew Whitman, City Manager  
Fax No.: \_\_\_\_\_  
(850) 233-5108

If to Contractor:

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

Either party may change its above noted address by giving written notice to the other party in accordance with the requirements of this Section.

10. CONTRACTOR recognizes that OWNER is exempt from sales tax and may wish to generate sales tax savings for the Project. Accordingly, to the extent directed by and without additional charge to OWNER, CONTRACTOR shall comply with and fully implement the sales tax savings program as more fully described in the Sales Tax Exemption Addendum. If required by OWNER, the Sales Tax Exemption Addendum shall be made a part of the Contract Documents, the form of which is set forth in Section 00808.
11. The failure of OWNER to enforce at any time or for any period of time any one or more of the provisions of the Agreement shall not be construed to be

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and shall not be a continuing waiver of any such provision or provisions or of its right thereafter to enforce each and every such provision.

12. Each of the parties hereto agrees and represents that the Agreement comprises the full and entire agreement between the parties affecting the Work contemplated, and no other agreement or understanding of any nature concerning the same has been entered into or will be recognized, and that all negotiations, acts, work performed, or payments made prior to the execution hereof shall be deemed merged in, integrated and superseded by this Agreement.
13. Should any provision of the Agreement be determined by a court with jurisdiction to be unenforceable, such a determination shall not affect the validity or enforceability of any other section or part thereof.
14. Unless the context of this Agreement otherwise clearly requires, references to the plural include the singular, references to the singular include the plural. The term “including” is not limiting, and the terms “hereof”, “herein”, “hereunder”, and similar terms in this Agreement refer to this Agreement as a whole and not to any particular provision of this Agreement, unless stated otherwise. Additionally, the parties hereto acknowledge that they have carefully reviewed this Agreement and have been advised by counsel of their choosing with respect thereto, and that they understand its contents and agree that this Agreement shall not be construed more strongly against any party hereto, regardless of who is responsible for its preparation.
15. For this Project, OWNER has designated a Project Representative to assist OWNER with respect to the administration of this Agreement. The Project Representative to be utilized by OWNER for this Project, shall be Mr. Mark Shaeffer, PE – Utilities Director.
16. CONTRACTOR acknowledges and agrees that no interruption, interference, inefficiency, suspension or delay in the commencement or progress of the Work from any cause whatever, including those for which the OWNER, PROJECT REPRESENTATIVE, or ENGINEER may be responsible, in whole or in part,

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shall relieve CONTRACTOR of its duty to perform or give rise to any right to damages or additional compensation from OWNER. CONTRACTOR expressly acknowledges and agrees that it shall receive no damages for delay. CONTRACTOR'S sole remedy, if any, against OWNER will be the right to seek an extension to the Contract Time; provided, however, the granting of any such time extension shall not be a condition precedent to the aforementioned "No Damage For Delay" provision. This section shall expressly apply to claims for early completion, as well as to claims based on late completion. Notwithstanding the foregoing, if the Work is delayed due to the fault or neglect of OWNER or anyone for whom OWNER is liable, and such delays have a cumulative total of more than 90 calendar days, CONTRACTOR may make a claim for its actual and direct delay damages accruing after said 90 calendar days as provided in Section 00805 Supplemental Conditions, Contract Claims and Changes. Except as expressly set forth in this section, in no event shall OWNER be liable to CONTRACTOR whether in contract, warranty, tort (including negligence or strict liability) or otherwise for any acceleration, soft costs, lost profits, special, indirect, incidental, or consequential damages of any kind or nature whatsoever.

**17. INSURANCE - BASIC COVERAGES REQUIRED**

The CONTRACTOR shall procure and maintain the following described insurance on policies and with insurers acceptable to OWNER. Current Insurance Service Office (ISO) policies, forms, and endorsements or equivalents, or broader, shall be used where applicable.

These insurance requirements shall not limit the liability of the CONTRACTOR. The insurance coverages and limits required of CONTRACTOR under this Agreement are designed to meet the minimum requirements of OWNER and the OWNER does not represent these types or amounts of insurance to be sufficient or adequate to protect the CONTRACTOR'S interests or liabilities. CONTRACTOR alone shall be responsible to the sufficiency of its own insurance program.

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The CONTRACTOR and the CONTRACTOR'S subcontractors and sub-subcontractors shall be solely responsible for all of their property, including but not limited to any materials, temporary facilities, equipment and vehicles, and for obtaining adequate and appropriate insurance covering any damage or loss to such property. The CONTRACTOR and the CONTRACTOR'S sub-contractors and sub-subcontractors expressly waive any claim against OWNER arising out of or relating to any damage or loss of such property, even if such damage or loss is due to the fault or neglect of the OWNER or anyone for whom the OWNER is responsible. The CONTRACTOR is obligated to include, or cause to be included, provisions similar to this paragraph in all of the CONTRACTOR'S subcontracts and its subcontractors' contracts with their sub-subcontractors.

The CONTRACTOR'S deductibles/self-insured retention's shall be disclosed to OWNER and are subject to OWNER'S approval. They may be reduced or eliminated at the option of OWNER. The CONTRACTOR is responsible for the amount of any deductible or self-insured retention. Any deductible or retention applicable to any claim or loss shall be the responsibility of CONTRACTOR and shall not be greater than \$25,000, unless otherwise agreed to, in writing, by OWNER.

Insurance required of the CONTRACTOR or any other insurance of the CONTRACTOR shall be considered primary, and insurance of OWNER shall be considered excess, as may be applicable to claims or losses which arise out of the Hold Harmless, Payment on Behalf of OWNER, Insurance, Certificates of Insurance and any Additional Insurance provisions of this agreement, contract or lease.

**WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY INSURANCE  
COVERAGE**

The CONTRACTOR shall purchase and maintain workers' compensation and employers' liability insurance for all employees engaged in the Work, in accordance with the laws of the State of Florida, and, if applicable to the Work, shall

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purchase and maintain Federal Longshoremen's and Harbor Workers' Compensation Act Coverage. Limits of coverage shall not be less than:

\$1,000,000	Limit Each Accident
\$1,000,000	Limit Disease Aggregate
\$1,000,000	Limit Disease Each Employee

The CONTRACTOR shall also purchase any other coverage required by law for the benefit of employees.

The CONTRACTOR shall provide to OWNER an Affidavit stating that it meets all the requirements of Florida Statute 440.02 (15) (d).

**COMMERCIAL GENERAL LIABILITY COVERAGE**

CONTRACTOR shall purchase and maintain Commercial General Liability Insurance on a full occurrence form. Coverage shall include, but not be limited to, Premises and Operations, Personal Injury, Contractual for this Agreement, Independent Contractors, Broad Form Property Damage, Products and Completed Operation Liability Coverages and shall not exclude coverage for the "X" (Explosion), "C" (Collapse) and "U" (Underground) Property Damage Liability exposures. Limits of coverage shall not be less than:

Bodily Injury, Property Damage & Personal Injury Liability	\$1,000,000 Combined Single Limit Each Occurrence, and
	\$2,000,000 Aggregate Limit

The General Aggregate Limit shall be specifically applicable to this Project. The Completed Operations Liability Coverages must be maintained for a period of not less than three (3) years following OWNER'S final acceptance of the project. The CONTRACTOR shall add OWNER as an additional insured through the use of Insurance Service Office Endorsements No. CG 20.10.10.01 and No. CG 20.37.10.01 wording or equivalent, or broader, an executed copy of which shall

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be attached to or incorporated by reference on the Certificate of Insurance to be provided by CONTRACTOR pursuant to the requirements of the Contract Documents.

**BUSINESS AUTOMOBILE LIABILITY COVERAGE**

The CONTRACTOR shall purchase and maintain Business Automobile Liability Insurance as to ownership, maintenance, use, loading and unloading of all of CONTRACTOR'S owned, non-owned, leased, rented or hired vehicles with limits not less than:

Bodily Injury & Property Damage	\$1,000,000 Combined Single Limit Each Accident
---------------------------------	---

**EXCESS OR UMBRELLA LIABILITY COVERAGE**

CONTRACTOR shall purchase and maintain Excess Umbrella Liability Insurance or Excess Liability Insurance on a full occurrence form providing the same continuous coverages as required for the underlying Commercial General, Business Automobile and Employers' Liability Coverages with no gaps in continuity of coverages or limits with OWNER added by endorsement to the policy as an additional insured in the same manner as is required under the primary policies, and shall not be less than \$10,000,000, each occurrence and aggregate as required by OWNER.

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IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in two (2) copies each of which shall be deemed an original on the date first written above.

(SEAL)

OWNER:

CITY OF PANAMA CITY BEACH,  
FLORIDA

ATTEST:

BY: \_\_\_\_\_

\_\_\_\_\_  
City Clerk

NAME: \_\_\_\_\_  
(Please type)

TITLE: \_\_\_\_\_

\_\_\_\_\_  
City Attorney (as to form only)

CONTRACTOR:

ATTEST:

BY: \_\_\_\_\_

\_\_\_\_\_

NAME: \_\_\_\_\_  
(Please Type)

NAME \_\_\_\_\_  
(Please Type)

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

[END OF SECTION 00050]



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SECTION 00060

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

---

(Name of Contractor)

---

(Address of Contractor)

a \_\_\_\_\_, hereinafter called Principal and  
(Corporation, Partnership, or Individual)

---

(Name of Surety)

---

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto:

---

City of Panama City Beach

(Name of Owner)

---

17007 Panama City Beach Parkway, Panama City Beach, FL 32413

(Address of Owner)

hereinafter called OWNER in the total aggregate penal sum of \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_) in lawful money of the United States, for payment of which, we  
bind ourselves, our heirs, personal representatives, executors, administrators, succes-  
sors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that if the Principal performs its duties,  
all the undertakings, covenants, terms, and conditions of that certain Contract between  
the Principal and the OWNER, dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, a  
copy of which is hereto attached and made a part hereof for the construction of:

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---

“PROJECT NAME(s)”

during the original term thereof, and any extensions thereof which may be granted by the  
OWNER, with or without notice to the SURETY and during the guaranty period and if the  
PRINCIPAL shall satisfy all claims and demands incurred under such Contract, and shall  
fully indemnify and save harmless the OWNER from all costs and damages which it may

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suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the Contract Price more than twenty percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, or the CONTRACT DOCUMENTS, shall include any alteration, addition, extension or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the PRINCIPAL shall abridge the rights of OWNER hereunder. The OWNER is the only beneficiary hereunder.

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IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts,  
each one of which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_,  
20\_\_\_\_.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
(Principal) Secretary

(SEAL)

BY \_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_  
Witness as to Principal

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

\_\_\_\_\_

\_\_\_\_\_  
(Surety)

ATTEST:

\_\_\_\_\_  
Witness to Surety

BY \_\_\_\_\_  
Attorney-In-Fact

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

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

\_\_\_\_\_

\_\_\_\_\_

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NOTE: Date of BOND must not be prior to date of Contract.

Contractor's Surety shall use this form along with their personal documentation.

If CONTRACTOR is partnership, all partners should execute BOND.

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 where the Project is located.

[END OF SECTION 00060]

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ISS PROJECT NO. PCB003**

SECTION 00060

PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

---

(Name of Contractor)

---

(Address of Contractor)

a \_\_\_\_\_, hereinafter called Principal and  
(Corporation, Partnership, or Individual)

---

(Name of Surety)

---

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto:

---

City of Panama City Beach

(Name of Owner)

---

17007 Panama City Beach Parkway, Panama City Beach, FL 32413

(Address of Owner)

hereinafter called OWNER in the total aggregate penal sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) in lawful money of the United States, for payment of which, we bind ourselves, our heirs, personal representatives, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that if the Principal performs its duties, all the undertakings, covenants, terms, and conditions of that certain Contract between the Principal and the OWNER, dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of:

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---

“PROJECT NAME(s)”

during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the SURETY and during the guaranty period and if the PRINCIPAL shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may

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suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the Contract Price more than twenty percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, or the CONTRACT DOCUMENTS, shall include any alteration, addition, extension or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the PRINCIPAL shall abridge the rights of OWNER hereunder. The OWNER is the only beneficiary hereunder.

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**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
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IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
(Principal) Secretary

(SEAL)

BY \_\_\_\_\_

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

\_\_\_\_\_

\_\_\_\_\_  
Witness as to Principal

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

\_\_\_\_\_

\_\_\_\_\_  
(Surety)

ATTEST:

\_\_\_\_\_  
Witness to Surety

BY \_\_\_\_\_  
Attorney-In-Fact

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

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

\_\_\_\_\_

\_\_\_\_\_



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NOTE: Date of BOND must not be prior to date of Contract.  
Contractor's Surety shall use this form along with their personal documentation.

If CONTRACTOR is partnership, all partners should execute BOND.

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 where the Project is located.

[END OF SECTION 00060]

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SECTION 00070

PAYMENT BOND

KNOW ALL PERSONS BY THESE PRESENTS: that

---

(Name of Contractor)

---

(Address of Contractor)

a \_\_\_\_\_, hereinafter called Principal and  
(Corporation, Partnership, or Individual)

---

(Name of Surety)

---

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto:

---

City of Panama City Beach

(Name of Owner)

---

17007 Panama City Beach Parkway, Panama City Beach, Florida 32413

(Address of Owner)

hereinafter called OWNER, and unto all persons, firms and corporations who or which may furnish labor, or who furnish materials to perform as described under the Contract and to their successors and assigns in the total aggregate penal sum of \_\_\_\_\_ (\$\_\_\_\_\_) in lawful money of the United States, for the payment of which, we bind ourselves, our heirs, personal representatives, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that if the PRINCIPAL properly makes payment to all claimants, as defined in Section 255.05(1), Florida Statutes, supplying Principal with labor, materials or supplies, used directly or indirectly by the Principal in the prosecution of the WORK provided for under that certain contract between the Principal and the OWNER, dated the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of :

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
ISS PROJECT NO. PCB003**

**WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT.**

---

“PROJECT NAME(s)”

and any authorized extensions or modification thereof, including all amounts due for materials, lubricants, fuel, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR or SUPPLIER of any tier, and to any construction lien holder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to WORK to be performed thereunder or SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, every suit instituted upon the BOND shall be brought in a court of competent jurisdiction for the county or circuit in which the Contract was to be performed. Owner shall not be joined as a party in any such suit. The notice and time limits of Section 255.05, Florida Statutes, are incorporated herein.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the Contract Price more than twenty percent so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, or the CONTRACT DOCUMENTS shall include any change, alteration, addition, extension or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the rights of the OWNER hereunder.

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ISS PROJECT NO. PCB003

WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Principal

\_\_\_\_\_  
(Principal) Secretary

(SEAL)

BY \_\_\_\_\_

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

\_\_\_\_\_  
Witness as to Principal

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

\_\_\_\_\_  
(Surety)

ATTEST:

\_\_\_\_\_  
Witness as to Surety

BY \_\_\_\_\_  
Attorney-In-Fact

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

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

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
ISS PROJECT NO. PCB003**

NOTE: Date of BOND must not be prior to date of Contract.

If CONTRACTOR is partnership, all partners should execute BOND. Contractor's Surety shall use this form along with their personal documentation.

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 where the Project is located.

[END OF SECTION 00070]

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
ISS PROJECT NO. PCB003**

SECTION 00080

NOTICE OF AWARD

TO: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PROJECT DESCRIPTION:

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS  
IMPROVEMENT PROJECT**

The City of Panama City Beach ("City") has considered the BID submitted by you for the above described Project in response to its Advertisement for Bids dated \_\_\_\_\_, 20\_\_\_\_, and associated Information for Bidders.

You are hereby notified that your Bid in the amount of \$ \_\_\_\_\_ has been accepted by the City. Provided, however, nothing in this Notice or your delivery to the City of the Agreement executed by you (with the required Bonds and Certificates of Insurance) shall in any manner or way be deemed to create any contract between you and the City. No such contract shall be created unless and until the City signs the Agreement.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance Bond, Payment Bond, and Certificates of Insurance within ten (10) calendar days from the date of this Notice.

If you fail to execute said Agreement, together with the required Certificates of Insurance and Bonds, within ten (10) calendar days from the date of this Notice, City will be entitled to consider all your rights arising out of City's acceptance of your BID as abandoned and as a forfeiture of your Bid Deposit. The City will be entitled to all other rights and remedies as may be available to it at law.

You must return an acknowledged copy of this Notice of Award to the City, with the executed Agreement and required Certificates of Insurance and Bonds, within the above noted ten (10) calendar day period.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

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ISS PROJECT NO. PCB003

CITY OF PANAMA CITY BEACH  
Owner

By \_\_\_\_\_

Name: Drew Whitman

Title: City Manager

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged

By \_\_\_\_\_

This the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

Name \_\_\_\_\_

Title \_\_\_\_\_

[END OF SECTION 00080]

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
ISS PROJECT NO. PCB003**

SECTION 00090

NOTICE TO PROCEED

TO: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

PROJECT DESCRIPTION:

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS  
IMPROVEMENT PROJECT**

You are hereby notified to commence WORK in accordance with the Agreement dated \_\_\_\_\_, 20\_\_ on or before \_\_\_\_\_, 20\_\_, and you are to substantially complete the WORK within \_\_\_\_\_ consecutive calendar days thereafter. The date of Substantial Completion is therefore \_\_\_\_\_, 20\_\_. You are to achieve Final Completion within 210 days of achieving Substantial Completion. You must return and acknowledge a copy of this Notice to Proceed to the City within five (5) calendar days of your receipt of this Notice.

CITY OF PANAMA CITY BEACH

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

Name: Drew Whitman

Title: City Manager

**ACCEPTANCE OF NOTICE**

Receipt of the above Notice to Proceed is hereby acknowledged

By \_\_\_\_\_  
(Company Name)

This the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_

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

\_\_\_\_\_  
(Type or Print Name)

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

[END OF SECTION 00090]



**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
ISS PROJECT NO. PCB003**

**STATEMENT UNDER SECTION 287.087  
FLORIDA STATUTES, ON PREFERENCE TO BUSINESSES WITH  
DRUG-FREE WORKPLACE PROGRAMS**

IDENTICAL TIE BIDS: Preference shall be given to businesses with drug-free workplace programs. Whenever two or more BIDS which are equal with respect to price, quality and service are received by the OWNER for this PROJECT, a bid received from a BIDDER that certifies that it has implemented a drug-free workplace program shall be given preference in the award process. In order to have a drug-free workplace program, a business shall:

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Inform employees about the dangers of drug abuse in the workplace, the business' policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, and employee assistance programs, and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the commodities or contractual services that are under BID a copy of the statement specified in paragraph (1).
4. In the statement specified in paragraph (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 not 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 is such is available in the employee's community, by an 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.

\_\_\_\_\_  
BIDDER SIGNATURE

[END OF SECTION 00095]

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ISS PROJECT NO. PCB003**

SECTION 00097

SWORN STATEMENT UNDER 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 AND  
SUBMITTED WITH THE BID

1. This sworn statement is submitted to \_\_\_\_\_

by \_\_\_\_\_

For \_\_\_\_\_

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 Section 287.133 (1)(g), Florida Statutes, means a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity or with an agency or political subdivision of any other state or with the United States, including, but not limited to, any bid, proposal, reply, or contract for goods or services, any lease for real property, or any contract for the construction or repair of a public building or public work, involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy, or material misrepresentation.

I understand that "convicted" or "conviction" as defined in Section 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.

3. I understand that "affiliate" as defined in Section 2871.33 (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

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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.

4. I understand that a "person" as defined in Section 287.133 (1)(e), Florida Statute, means any natural person or any entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.
5. Based on information and belief, the statement which I have marked below is true in relation to the person submitting this sworn statement. [indicate which statement applies.]

\_\_\_\_\_ Neither the person submitting this sworn statement nor any affiliate of the person has been charged with and convicted of a public entity crime causing such person or affiliate to be placed on the convicted vendor list within the last thirty-six (36) months.

\_\_\_\_\_ The person submitting this sworn statement or an affiliate of the person has been charged with and convicted of a public entity crime causing such person or affiliate to be placed on the convicted vendor list within the last thirty-six (36) months.

\_\_\_\_\_ The person submitting this sworn statement or an affiliate of the person has been charged with and convicted of a public entity crime causing such person or affiliate to be placed on the convicted vendor list within the last thirty-six (36) months. However, it has been determined, pursuant to Section 287.133, Florida Statutes, that it was not in the public interest to place the person submitting this sworn statement or its affiliate on the convicted vendor list. [Attach a copy of the final order].

6. I understand by my execution of this document, I acknowledge that the person submitting this sworn statement has been informed by the City of Panama City Beach, of the terms of Section 287.133(2)(a) of the Florida Statutes which read as follows:

"A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity; may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals, or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity;

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and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017 for CATEGORY TWO for a period of 36 months following the date of being placed on the convicted vendor list."

7. I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR THE PUBLIC ENTITY IDENTIFIED IN PARAGRAPH 1 (ONE) ABOVE IS FOR THE PUBLIC ENTITY ONLY AND THAT THIS FORM IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR WHICH IT IS FILED. I ALSO UNDERSTAND THAT I AM REQUIRED TO INFORM THE PUBLIC ENTITY IMMEDIATELY OF ANY CHANGE IN THE INFORMATION CONTAINED IN THIS FORM.

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK.]

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

Print name: \_\_\_\_\_

Its: \_\_\_\_\_

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

Personally known \_\_\_\_\_ OR Produced identification \_\_\_\_\_

Notary Public- State of \_\_\_\_\_

My commission expires \_\_\_\_\_  
[printed, typed or stamped Commis-  
sioned Name of Notary Public]

[END OF SECTION 00097]

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SECTION 00098  
OTHER REQUIRED DOCUMENTS

**NON-COLLUSION  
AFFIDAVIT**

**STATE OF FLORIDA COUNTY OF \_\_\_\_\_** being, first duly sworn, deposes and says that he is of \_\_\_\_\_, the party making the foregoing Proposal or Bid; that such Bid is genuine and not collusive or sham; that said bidder is not financially interested in or otherwise affiliated in a business way with any other bidder on the same contract; that said bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any bidders or person, to put in a sham bid or that such other person shall refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the bid price or affiant or any other bidder, or to fix any overhead, profit or cost element of said bid price, or that of any other bidder, or to secure any advantage against the City of Panama City Beach, Florida, or any person or persons interested in the proposed contract; and that all statements contained in said proposal or bid are true; and further, that such bidder has not directly or indirectly submitted this bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof.

\_\_\_\_\_  
Affiant

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 2021.

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

\_\_\_\_\_  
Printed Name

OTHER REQUIRED FORMS

00098-1

**E-VERIFY FORM**

**PER FLORIDA STATUTE 448.095, CONTRACTORS AND SUBCONTRACTORS  
MUST REGISTER WITH AND USE THE E-VERIFY SYSTEM TO VERIFY THE WORK  
AUTHORIZATION STATUS OF ALL NEWLY HIRED EMPLOYEES.**

**THIS FORM MUST BE COMPLETED AND SUBMITTED WITH THE BID/PROPOSAL.  
FAILURE TO SUBMIT THIS FORM AS REQUIRED MAY DEEM YOUR SUBMITTAL  
NONRESPONSIVE.**

The affiant, by virtue of the signature below, certifies that:

1. The Contractor and its Subcontractors are aware of the requirements of Florida Statute 448.095.
2. The Contractor and its Subcontractors are registered with and using the E-Verify system to verify the work authorization status of newly hired employees.
3. The Contractor will not enter into a contract with any Subcontractor unless each party to the contract registers with and uses the E-Verify system.
4. The Subcontractor will provide the Contractor with an affidavit stating that the Subcontractor does not employ, contract with, or subcontract with unauthorized alien.
5. All employees hired by Contractor on or after January 1, 2021, have had their work authorization status verified through the E-Verify system.
6. The City may terminate this Contract on the good faith belief that the Contractor or its Subcontractors knowingly violated Florida Statutes 448.09(1) or 448.095(2)(c).
7. If this Contract is terminated pursuant to Florida Statute 448.095(2)(c), the Contractor may not be awarded a public contract for at least 1 year after the date on which this Contract was terminated.
8. The Contractor is liable for any additional cost incurred by the City as a result of the termination of this Contract.

\_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Name of Entity/Corporation

**STATE OF** \_\_\_\_\_  
**COUNTY** \_\_\_\_\_  
**OF** \_\_\_\_\_

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

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

\_\_\_\_\_  
Printed Name

NOTARY SEAL ABOVE



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OTHER REQUIRED FORMS

00098-2

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
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**CONFLICT OF INTEREST STATEMENT**

Check one:

To the best of our knowledge, the undersigned Respondent has no potential conflict of interest due to any other clients, contracts, or property interest for this project.

or

The undersigned Respondent, by attachment to this form, submits information which may be a potential conflict of interest due to other clients, contracts, or property interest for this project. This includes and requires disclosure of any officer, director, partner, proprietor, associate or agent of the Respondent who is also an officer or employee of the City or of its boards.

**LITIGATION STATEMENT**

Check One:

The undersigned Respondent has had no litigation and/or judgments entered against it by any local, state or federal entity and has had no litigation and/or judgments entered against such entities during the past ten (10) years.

The undersigned Respondent, by attachment to this form, submits a summary and disposition of individual cases of litigation and/or judgments entered by or against any local, state or federal entity, by any state or federal court, during the past ten (10) years.

COMPANY: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

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

Failure to check the appropriate blocks above may result in disqualification of your proposal. Likewise, failure to provide documentation of a possible conflict of interest, or a summary of past litigation and/or judgments, may result in disqualification of your proposal.

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OTHER REQUIRED FORMS

00098-3

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
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SECTION 00099

CERTIFICATE OF INSURANCE

**City of Panama City Beach, Florida**

**Instructions on Completing the City Certificate of Insurance**

The Florida Department of Insurance has approved the general form and substance of the City's Certificate of Insurance form for use in the State of Florida.

In order to prevent unnecessary, follow up work on the Certificate or delay in the start of your insured's active under its contract with the City, please follow these instructions:

1. Complete the City's Certificate of Insurance as required in your insured's contract with the City
2. Show the full name of your insured as shown in its contract with the City
3. Show the full names of the Insurance companies providing coverages
4. Under the General Liability section, show the coverages applicable by checking the appropriate boxes.
5. If required in your insured's contract with the City, the Specific General Aggregate Limit for the Certificate holder's project or locations must be included in the Commercial General Liability Policy and must be shown with a description of the project or location on the line beginning near the bottom of the Certificate titled "Specific Aggregate Liability".
6. Automobile Liability Coverage should be shown as applicable to "any auto" and "hired and non-owned autos" by checking the appropriate boxes
7. Indicate whether the Excess Liability is written on a "Claims Made" or "occurrence" form. If employers' Liability Coverage is not included, please indicate.
8. Included a brief description of the contract involving your Insured in the space provided under the Description of Operations
9. The liability policies must include the City of Panama City Beach as additional Insured
10. Complete the signature section, showing the mailing address, telephone number and fax number of the Authorized Representative's name under the signature. Facsimile signature is not acceptable, a manual signature of the Authorized Representative is required
11. If time is of the essence in submitting this document, you may send a facsimile transmittal; however, you must provide a cover sheet for the document stating the Agent's signature was manually provided and not a "stamped signature and you must follow-up by mailing the original document back to the Department indicated in the lower left corner of the Certificate.

(Example Attached)

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
ISS PROJECT NO. PCB003**

**CERTIFICATE OF LIABILITY INSURANCE**

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
	PHONE (A/C, No, Ext):	FAX (A/C, Not)
	E-MAIL ADDRESS:	
	INSURER(S) AFFORDING COVERAGE	NAIC #
INSURED	INSURER A :	
	INSURER B :	
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

**COVERAGES**                                  **CERTIFICATE NUMBER:**                                  **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
	<b>GENERAL LIABILITY</b>						EACH OCCURRENCE \$
	<input type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE      <input type="checkbox"/> OCCUR  GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC						DAMAGE TO RENTED PREMISES (Ea occurrence) \$ MED EXP (Any one person) \$ PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ PRODUCTS - COMP/OP AGG \$ \$
	<b>AUTOMOBILE LIABILITY</b>						COMBINED SINGLE LIMIT (Ea accident) \$ BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	<input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS      <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS               <input type="checkbox"/> NON-OWNED AUTOS  <input type="checkbox"/> UMBRELLA LIAB          <input type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB              <input type="checkbox"/> CLAIMS-MADE DED    RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
	<b>WORKERS COMPENSATION AND EMPLOYERS' LIABILITY</b> ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	<input type="checkbox"/> Y/N	N/A				<input type="checkbox"/> WC STATUTORY LIMITS <input type="checkbox"/> OTHER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$
	DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)						

<b>CERTIFICATE HOLDER</b>	<b>CANCELLATION</b>
City of Panama City Beach 17007 Panama City Beach Parkway Panama City Beach, FL 32413	SHOULD ANY OF THE ABOVE-DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.  AUTHORIZED REPRESENTATIVE

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
ISS PROJECT NO. PCB003**

SECTION 00100

GENERAL CONDITIONS

1. Definitions
2. Additional Instructions and Detail Drawings
3. Schedules, Reports and Records
4. Intent of the Contract Documents, Drawings and Specifications
5. Shop Drawings
6. Materials, Services, and Facilities Materials
7. Inspection and Testing
8. Substitutions
9. Patents
10. Surveys, Permits, Regulations, and Project Layout
11. Protection of Work, Property, Persons
12. Supervision by Contractor
13. Changes in the Work
14. Changes in Contract Price
15. Time for Completion and Liquidated Damages
16. Correction of Defective Work
17. Suspension of Work, Termination, and Delay
18. Payments to Contractor
19. Acceptance of Final Payment as Release
20. Contract Security
21. Assignments
22. Indemnification
23. Separate Contracts
24. Subcontracting
25. Engineer's Authority
26. Land and Right-of-Ways
27. Guarantee
28. Claims and Disputes
29. Taxes
30. Contract Time, Schedule of the Work, and Time Extensions
31. Use of Site
32. Temporary Facilities
33. Clean Up and Disposal of Waste
34. Warranty of Title
35. Ownership of Hidden Valuable Materials
36. As-Built Plans and Documents to be kept at the Site
37. Silence of Specifications
38. Gratuities
39. Audit and Access to Records
40. Equal Opportunity Requirements
41. Changed Conditions
42. Compliance with Laws
43. Public Entity Crimes
44. Insurance Requirements

**PCB22-13 ITB WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT  
ISS PROJECT NO. PCB003**

**1.0 DEFINITIONS**

- 1.1 Unless otherwise expressly noted, wherever used in the Contract Documents the following terms shall have the meanings indicated and shall be applicable to both the singular and plural thereof:
- 1.2 **ADDENDA** - Written or graphic instruments, issued by Owner or Engineer prior to the execution of the Agreement, which modify or interpret any of the Contract Documents by additions, deletions, clarifications, or corrections.
- 1.3 **BID** - The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
- 1.4 **BIDDER** - Any person, firm, or corporation submitting a Bid for the Work.
- 1.5 **BONDS** - Bid, Performance, and Payment Bonds and other instruments or surety, furnished by the Contractor and the Contractor's surety in accordance with the Contract Documents.
- 1.6 **CHANGE ORDER** - A written order to the Contractor issued in accordance with the procedures set forth in the Contract Documents, authorizing an addition, deletion, or revision in the Work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time.
- 1.7 **CONSTRUCTION CHANGE DIRECTIVE** – A Construction Change Directive is a written order prepared by the Engineer and signed by the Owner, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Price or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Agreement, order changes in the Work within the general scope of the Agreement consisting of additions, deletions or other revisions, the Contract Price and Contract Time being adjusted accordingly.
- 1.8 **CONTRACT DOCUMENTS** – Collectively the Agreement, Proposal Form, Payment Bond, Performance Bond, General Conditions, Supplemental Conditions, if any, Notice of Award, Notice to Proceed, Drug Free Workplace Program Statement, Trench Safety Act Certificate of Compliance, Public Entity Crimes Statement, Sales Tax Exemption Addendum, Certificate of Insurance, Release and Affidavit from Contractor, Release and Affidavit from Subcontractor, Application and Certificate for Payment, Certificate of Substantial Completion, Contract Change Order(s), Construction Change Directives, Field Orders, Drawings, Specifications and Addenda. The Contract Documents are sometimes referred to herein as the Agreement.
- 1.9 **CONTRACT PRICE** - The total compensation payable by Owner to Contractor under the terms and conditions of the Contract Documents.

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- 1.10 CONTRACT TIME - The total period of time beginning with the date of commencement of the Work as authorized by the City and ending on the required date for Substantial Completion of the Work. The Contract Time is set forth with more specificity in Section 2 of the Agreement.
- 1.11 CONTRACTOR - The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative.
- 1.12 CITY or OWNER – The City of Panama City Beach, Florida, acting through its City Council and Charter Officers.
- 1.13 DRAWINGS - The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.
- 1.14 ENGINEER - The person, firm or corporation named as such in the Agreement.
- 1.15 FIELD ORDER - A written order effecting a clarification or change in the Work not involving an adjustment in the Contract Price or an extension of the Contract Time, issued by Engineer or Owner to Contractor during construction.
- 1.16 NOTICE OF AWARD - The written notice of the acceptance of the Bid from the City to the successful Bidder.
- 1.17 NOTICE TO PROCEED - Written communication issued by the City to the Contractor authorizing it to proceed with the Work and establishing the date for commencement of the Work.
- 1.18 OWNER - Same as CITY; same as City of Panama City Beach, Florida.
- 1.19 PROJECT – The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the City or by separate contractors, and is formally known as the WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT.
- 1.20 PROJECT ADMINISTRATION MANUAL (sometimes referred to herein as the "MANUAL") – The City's manual of forms and standard administrative procedures regarding project administration. Contractor acknowledges and agrees it has received a copy of the current Manual and shall incorporate any modifications or updates issued by the City into its copy of the Manual to ensure the



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Manual is kept up to date.

- 1.21 **PROJECT REPRESENTATIVE** -The Project Representative shall be the City's representative with respect to the Project and may be a City employee or an outside consultant. The Project Representative shall have authority to transmit instructions, receive information, and interpret and define the City's policies and decisions with respect to the Work. However, except as may be otherwise expressly authorized in writing by the City, the Project Representative is not authorized on behalf of the City to issue any verbal or written orders or instructions to Contractor that would have the effect, or be interpreted to have the effect, of amending or modifying the terms or conditions of the Contract Documents or modifying or amending in any way whatever the: (1) scope or quality of Work to be performed and provided by Contractor as set forth in the Contract Document; (2) the time within which Contractor is obligated to complete the Work; or (3) the amount of compensation the City is obligated or committed to pay Contractor as set forth in the Contract Documents.
- 1.22 **SHOP DRAWINGS** - All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a Subcontractor, manufacturer, supplier or distributor, which illustrate how specific portions of the Work shall be fabricated or installed.
- 1.23 **SPECIFICATIONS** - The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.
- 1.24 **SUBCONTRACTOR** - An individual, firm, or corporation having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the site.
- 1.25 **SUBSTANTIAL COMPLETION** - That date certified by the Engineer when the Work or an Owner specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Work or the Owner specified part thereof can be utilized by Owner for the purposes for which it is intended.
- 1.26 **SUPPLEMENTAL CONDITIONS** - Modifications to the General Conditions required by Owner, set forth in the Section 00800 series of documents.
- 1.27 **SUPPLIER** - Any person or organization who supplies materials or equipment for the Work for or on behalf of Contractor, including those fabricated to a special design, but who does not perform labor at the site.
- 1.28 **WORK** - The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the

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Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

**2.0 ADDITIONAL INSTRUCTION AND DETAIL DRAWINGS**

2.1 From time to time, Contractor may be furnished additional instructions and detail drawings by the Engineer as necessary to permit Contractor to carry out the Work required by the Contract Documents.

2.2 Any such additional drawings and instructions supplied to Contractor shall be issued as a Field Order. The Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

**3.0 SCHEDULES, REPORTS AND RECORDS**

3.1 The Contractor shall submit to the City such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the Contract Documents for the Work to be performed.

3.2 Contractor shall prepare and provide its construction progress schedule ("Construction Schedule") prior to submitting its first Application for Payment, showing the order in which the Contractor proposes to carry on the Work, including dates at which the various parts of the Work will be started, estimated date of completion of each part and, as applicable, the dates at which special drawings will be required and dates for submission of Shop Drawings, the beginning of manufacture, the testing and the installation of materials, supplies and equipment. Further, the Construction Schedule shall not only include the overall progress schedule for the Work to be provided by Contractor hereunder, but also shall include reasonable time periods for Engineer's performance, as accepted by Engineer. The Construction Schedule and any other schedules required by the City hereunder shall be updated monthly. The Construction Schedule and all updates to it shall not exceed the time periods established in the Contract Documents and shall be subject to the City's and Engineer's review and comment. Contractor's submittal of a satisfactory Construction Schedule and updates thereto and the City's acceptance of same shall be a condition precedent to the City's obligation to pay Contractor; provided, however, the acceptance of any such schedule or update by Owner shall not be deemed an admission by Owner that such schedule or update is reasonable, accurate or correct.

3.3 The Contractor shall also submit a schedule of payments, for Owner's review and approval that the Contractor anticipates will be earned during the course of the Work.

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**4.0 INTENT OF THE CONTRACT DOCUMENTS, DRAWINGS AND SPECIFICATIONS**

4.1 It is the intent of the Contract Documents to describe a functionally complete Project (or portion thereof) to be constructed in accordance with the Contract Documents. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for in the Contract Documents. If the Contract Documents include words or terms that have a generally accepted technical or industry meaning, then such words or terms shall be interpreted to have such standard meaning unless otherwise expressly noted in the Contract Documents. Reference to standard specifications, manuals or codes of any technical society, organization or association or to the laws or regulations of any governmental authority having jurisdiction over the Project, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, law or regulation in affect at the time the Work is performed, except as may be otherwise specifically stated herein. Provided, however, in the event the standard specification, manual, code, law or regulation is changed after the Agreement has been executed by the parties, a Change Order shall be issued equitably adjusting the Contract Price and/or Contract Time to the extent such change materially impacts the Contract Time and/or Contract Price.

4.2 Contractor shall perform the Work consistent with the intent of the Drawings, Specifications, and other Contract Documents, and Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the Work in accordance with the Contract Documents and all incidental items necessary to complete the Work in an acceptable manner, ready for use, occupancy or operation by the City.

4.3 Drawings are intended to show general arrangements, design and extent of Work and are not intended to serve as shop drawings. Specifications are separated into divisions for convenience of reference only and shall not be interpreted as establishing divisions for the Work, trades, subcontracts or extent of any part of the Work. In the event of a discrepancy between or among the Drawings, Specifications or other Contract Document provisions, Contractor shall be required to comply with the provision which is the more restrictive or stringent requirement upon Contractor, as determined by the City.

4.4 If during the performance of the Work Contractor discovers a conflict, error or discrepancy in the Contract Documents, including the Drawings and Specifications, Contractor immediately shall report same to Engineer and Owner in writing, and before proceeding with the Work affected thereby, shall obtain a written interpretation or clarification from Engineer. Work done by the Contractor after discovery of such conflict, error, or discrepancy without such written interpretation or clarification from Engineer, shall be done at the Contractor's risk. Prior to

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commencing the Work, Contractor shall first take all necessary field measurements and verify the applicable field conditions. After taking such measurements and verifying such conditions, Contractor shall carefully compare such measurements and conditions with the requirements of the Contract Documents, taking into consideration all other relevant information known to Contractor, for the purpose of identifying and bringing to Engineer's and City's attention all conflicts or discrepancies with the Contract Documents. Contractor is solely responsible for verifying all field measurements and conditions.

4.5 Contractor shall comply with the City's standard forms and procedures as set forth in the City's Project Administration Manual relating to Project administration. To the extent there is no form or procedure for a particular matter, then Contractor shall comply with the form or procedure reasonably required by the City. Once a standard form has been executed by Contractor and Owner as necessary, the executed copy shall become part of the Contract Documents.

5.0 SHOP DRAWINGS

5.1 The Contractor shall provide shop drawings as may be necessary for the prosecution of the Work as required by the Contract Documents. The Engineer shall promptly review all shop drawings. The Engineer's approval of any shop drawing shall not release the Contractor from responsibility for deviations from the Contract Documents. Any shop drawing which deviates from the requirements of the Contract Documents must be first authorized by a Change Order.

5.2 When submitted for the Engineer's review, shop drawings shall bear the Contractor's certification that it has reviewed, checked and approved the shop drawings and that they are in conformance with the requirements of the Contract Documents.

5.3 Portions of the Work requiring a shop drawing or sample submission shall not begin until the shop drawing or submission has been approved by the Engineer. A copy of each approved shop drawing and each approved sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.

6.0 MATERIALS, SERVICES AND FACILITIES

6.1 It is understood that, except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete and deliver the Work within the Contract Time.

6.2 Materials and equipment shall be stored by Contractor to ensure the preservation

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of their quality and fitness for the Work. Stored materials and equipment to be incorporated in the Work shall be located so as to facilitate prompt inspection.

- 6.3 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used cleaned and conditioned as directed by the manufacturer.
- 6.4 Materials, supplies, and equipment shall be in accordance with samples submitted by the Contractor and approved by the Engineer.
- 6.5 Materials, supplies and equipment to be incorporated into the Work shall not be purchased by the Contractor or the Subcontractor subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest or lien is retained by the seller.

7.0 INSPECTION AND TESTING

- 7.1 All materials and equipment used in the construction of the Project shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the Contract Documents or required by applicable governmental law, rule or regulation.
- 7.2 The City, Engineer, their respective representatives, agents and employees and governmental agencies with jurisdiction over the Project shall have access at all times to the Work whether the Work is being performed on or off of the Project site, for their observation, inspection and testing. Contractor shall provide proper and safe conditions for such access, and also for any inspection or testing thereof. Contractor shall provide the City and Engineer with timely prior written notice (at least 48 hours) of the readiness of the Work for all required inspections, tests or approvals. In addition, authorized representatives and agents of any participating Federal or State agency shall be permitted to inspect all Work, materials, payrolls, personnel records, material invoices, and other relevant data and records.
- 7.3 The Contractor shall provide at the Contractor's expense all testing and inspection services required by the Contract Documents or any applicable governmental law, rule or regulation. Re-inspection and re-testing fees and costs of all testing failures shall be at the Contractor's expense.
- 7.4 If the Contract Documents or any applicable governmental law, rule, or regulation requires any portion of the Work to specifically be inspected, tested, or approved, Contractor shall assume full responsibility therefore, pay all costs in connection therewith and furnish the Engineer the required certificates of inspection, testing or approval. All inspections, tests or approvals shall be performed in a manner

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and by organizations acceptable to the City and Engineer.

- 7.5 Neither observations by Engineer or the City, nor inspections, tests or approvals by the Engineer or others shall relieve the Contractor from the obligations to perform the Work in accordance with the requirements of the Contract Documents.
- 7.6 If any Work is covered contrary to the written instruction of the Engineer, it must, if requested by the Engineer, be uncovered for the Engineer's observation and replaced at the Contractor's expense.
- 7.7 If any Work that is to be inspected, tested or approved pursuant to the Contract Documents or any applicable governmental law, rule or regulation is covered without such inspection, testing or approval having been satisfactorily obtained by Contractor and without obtaining the written concurrence from Engineer, Contractor shall uncover, expose or otherwise make available the Work for such observation, inspection or testing as directed by Engineer, and Contractor shall be responsible for all such costs of uncovering, exposing, observation, inspection, testing, and reconstruction.
- 7.8 If the Engineer considers it necessary or advisable that covered Work be inspected or tested by others that was not otherwise required to be tested or inspected by the terms of the Contract Documents or any applicable governmental law, rule or regulation, the Contractor, at the Engineer's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Engineer may require, that portion of the Work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such Work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such Work is not found to be defective, the Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate Change Order shall be issued.
- 8.0 SUBSTITUTIONS
- 8.1 Whenever a material, article, or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalogue numbers, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function may be considered. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance, quality, and function for those referred to in the Contract Documents by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance, quality and function to that specified, the Engineer may allow its substitution and use by the Contractor. If

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the Contractor based its bid on "or equal" products and the City and/or Engineer determine that one or more of the Contractor's proposed "or equal" products included in its bid fails to meet the requirements of the Contract Documents, Contractor may be required, at City's sole discretion, to provide products conforming with the requirements of the Contract Documents at no additional cost to the City per the City's direction.

- 8.2 If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall certify that the proposed substitute shall perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. Contractor shall also certify that the evaluation and acceptance of the proposed substitute will not prejudice Contractor's achievement of Substantial Completion of the Work within the Contract Time, whether or not acceptance of the substitute for use 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 the Project) to adapt the design to the proposed substitute and whether or not incorporation or use by the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service shall be indicated. Contractor shall also provide an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs for redesign and claims of other contractors affected by the resulting change, all of which shall be considered by Engineer in evaluating the proposed substitute. Engineer or Owner may require Contractor to furnish at Contractor's expense additional data about the proposed substitute. Further, Contractor shall reimburse Owner for the changes of Engineer and Engineer's consultants for evaluating each proposed substitute submitted after the effective date of the Agreement and all costs resulting from any delays in the Work while the substitute was undergoing review.

9.0 PATENTS

- 9.1 The Contractor shall pay all applicable royalties and license fees, and shall defend all suits or claims for infringement of any patent rights and save the City harmless from loss on account thereof, except that the City shall be responsible for any such loss when a particular process, design, or product of a particular manufacturer or manufacturers is specified. Provided, however, if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, the Contractor shall be responsible for such loss or claim unless the Contractor promptly gives such information in writing to the Engineer and City.

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**10.0 SURVEYS, PERMITS, REGULATIONS, AND PROJECT LAYOUT**

- 10.1 The City shall furnish all boundary surveys and establish all base lines for locating the principal component parts of the Work together with a suitable number of bench marks adjacent to the Work as shown in the Contract Documents. From the information provided by the City, unless otherwise specified in the Contract Documents, the Contractor shall develop and make all detail surveys needed for construction such as slope stakes, batten boards, stakes for pipe locations and other working points, lines, elevations and cut sheets.
- 10.2 The Contractor shall carefully preserve benchmarks, reference points and stakes. Contractor is solely responsible for maintaining all benchmarks, reference points, and stakes, and is solely responsible for any mistake that may be caused by their loss or disturbance. The Contractor shall be held responsible for all mistakes that may be caused by the loss or disturbance of any such benchmarks, reference points or stakes.
- 10.3 The Contractor shall engage for the performance of Project layout and control, a Professional Land Surveyor registered in the State of Florida to practice land surveying. Said surveyor must carry Professional Liability Insurance in the amount of at least one million dollars (\$1,000,000) per occurrence. The land surveyor employed for this Project must comply with the Minimum Technical Standards for Surveying and Mapping pursuant to Florida Statute 472.027.
- 10.4 Should the Contractor in the course of its Work find that the points, grades and levels which are shown upon the Drawings are not conformable to the physical conditions of the locality at the proposed work or structure, it shall immediately inform the Engineer of the discrepancy between actual physical conditions of the locality of the proposed work, and the points, grades and levels which are shown on the drawings. No claim shall be made by the Contractor against the City for compensation or damage by reasons of failure of the Engineer to represent upon the Drawings points, grades and levels conformable to the actual physical conditions of the locality of the proposed work.
- 10.5 All permits and licenses necessary for the prosecution of the Work shall be secured and paid for by the Contractor unless otherwise expressly noted in the Contract Documents. These shall include all building permits, burn permits, debris disposal permits, etc. All licenses, easements and variances for permanent structures or permanent changes in existing facilities shall be secured and paid for by the City, unless otherwise specified in the Contract Documents. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and governmental permits and approvals bearing on the conduct of the Work as drawn and specified. If the Contractor observes that the Contract Documents are at variance therewith, the Contractor shall promptly notify the Engineer and City in writing, and any necessary changes shall be adjusted as provided in Section 13 below.



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11.0 PROTECTION OF WORK, PROPERTY, AND PERSONS

- 11.1 The Contractor is responsible for the safety and protection of all persons and property on or about the Project site during the progress of the Work, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction. Further, it is Contractor's responsibility to protect from damage or loss all material and equipment to be incorporated into the Work whether in storage on or off the Project site. Contractor shall initiate, maintain and supervise all safety precautions and programs in connection with the Work and shall develop and implement, in accordance with the requirements of the Contract Documents, a safety plan for the Work. Contractor's safety plan shall include a hurricane protection plan. Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as the Work is completed and final acceptance of same by the City has occurred.
- 11.2 The Contractor will comply with all applicable codes, laws, ordinances, rules, regulations and orders of the City and any public body having jurisdiction over the Work, including the Occupational Safety and Health Administration (OSHA) and any State Safety and Health agency requirements and all of their safety codes, laws, ordinances, rules and regulations. The Contractor will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. Contractor shall notify owners of adjacent property and of any underground structures or improvements and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation or replacement of their property. The Contractor will remedy all damage, injury or loss to any property caused by the Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone of whose acts any of them be liable.
- 11.3 Barricades, Guards and Safety Provisions: To protect persons from injury and to avoid property damage, adequate barricades, construction signs, torches, red lanterns and guards shall be placed and maintained during progress of construction work and until it is safe for both pedestrians and vehicular traffic. Rules and regulations of local authorities regarding safety provisions shall be observed.
- 11.4 In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instructions or authorization from the Engineer or City, shall act to prevent threatened damage, injury or loss. The Contractor will give the Engineer prompt written notice of any such emergency and to the extent the emergency was not caused by the fault or neglect of Contractor or anyone for whom Contractor is responsible, a Change Order shall be issued covering the necessary and reasonable changes and deviations involved.

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- 11.5 At all times during the performance of the Work at the Project site, Contractor shall have designated, and located on a full time basis at the Project site, a qualified individual whose responsibility shall be to monitor and enforce Contractor's safety program at the Project site; such individual shall be deemed to be the Contractor's Project Superintendent. However, Contractor may designate by written notice to the City another individual, reasonably acceptable to the City, who shall be Contractor's safety representative at the Project site.
- 11.6 Alcohol, drugs and all illegal substances are strictly prohibited on the Project site and any City property. All employees of Contractor, as well as those of all Sub-contractors and those of any other person or entity for whom Contractor is legally liable (collectively referred to herein as "Employees"), shall not possess or be under the influence of any such substances while on the Project site or any City property. Further, employees shall not bring on to the Project site or any City property any gun, rifle or other firearm, or explosives of any kind. Provided, however, to the extent explosives are reasonably required with respect to the performance of the Work, Contractor shall strictly comply with the Contract Documents and any and all rules and regulations of Owner or of any applicable governmental agency as it relates to the storage, handling and use of such explosives.
- 12.0 SUPERVISION BY CONTRACTOR
- 12.1 The Contractor will supervise and direct the Work. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor will employ and maintain on the Project site on a full time basis a qualified superintendent acceptable to the City. The superintendent and his or her designees shall have full authority to act on behalf of the Contractor and all communications given to the superintendent or his or her designee shall be as binding as if given to the Contractor. The superintendent or his or her designee shall be present on the site at all times when any portion of the Work is being performed to ensure adequate supervision and coordination of the Work.
- 13.0 CHANGES IN THE WORK
- 13.1 The City may at any time during the progress of the Work, as the need arises and in its sole discretion, order changes within the general scope of the Work without invalidating the Agreement. Promptly after being notified of a change, but in no event more than fourteen (14) days after its receipt of such notification (unless the City has agreed in writing to a longer period of time), Contractor shall submit an itemized estimate of any cost or time increases or savings it foresees as a result of the change. Except in an emergency endangering life or property, no addition or changes to the Work shall be made except upon a properly issued

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Change Order, Construction Change Directive or Field Order. No officer, employee or agent of the City is authorized to direct any extra or changed work without a properly issued Change Order, Construction Change Directive, or Field Order.

- 13.2 All changes to the Work must be authorized by means of a written Change Order that is mutually agreed to by the City and Contractor or a Construction Change Directive issued by the City or a Field Order issued by the City or Engineer. If the change is to be accomplished through a Change Order, the Change Order, in the form set forth in the City's Project Administration Manual, shall be prepared by Contractor, reviewed by Engineer and the City, and executed promptly by the parties after an agreement is reached between Contractor and the City concerning the requested changes. Contractor shall promptly perform changes authorized by duly executed Change Orders. The Contract Price and Contract Time shall be adjusted in the Change Order in the manner as the City and Contractor shall mutually agree. The Change Order shall identify the changed work. Also, where the Contract Price is based upon unit prices, a Change Order may be used for work for which quantities have been altered from those shown in the bidding schedule, as well as decreases or increases in the quantities of installed units which are different than those shown in the bidding schedule because of final measurements. All changes must be recorded on an executed Change Order before they can be included in a monthly Application for Payment.
- 13.3 To the extent the Contract Price is based on unit prices, the City reserves the right to increase or decrease a unit price quantity as may be deemed reasonable or necessary in order to complete the Work contemplated by this Agreement.
- 13.4 If the City and Contractor are unable to agree on a Change Order for the requested change, Contractor shall, nevertheless, promptly perform the change as directed by the City in a written Construction Change Directive. In that event, the Contract Price and Contract Time shall be adjusted in the Construction Change Directive as determined by the City. If Contractor disagrees with the City's adjustment determination, Contractor must make a claim strictly in accordance with the terms of the Contract Documents or else be deemed to have waived any claim it might otherwise have had on that matter.
- 13.5 The City shall have the right to conduct an audit of Contractor's books and records, as well as those of its Subcontractors and Suppliers, to verify the accuracy of Contractor's estimates or claims with respect to Contractor's cost and time impacts associated with any Change Order or Construction Change Directive.
- 13.8 The Engineer or City at any time may direct Contractor to make changes to the Work by issuing a Field Order, so long as such changes do not require or result in any adjustment to the Contract Price or Contract Time, and are generally within the scope of the Work. Contractor shall proceed with the performance of any

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changes in the Work so ordered by the Engineer or City unless the Contractor believes that such Field Order entitles the Contractor to a change in the Contract Price or Contract Time, or both. In the event Contractor believes the Field Order requires a change to the Contract Price or Contract Time, it must provide written notice to the Engineer and City within five (5) business days of receipt of the Field Order and before starting with any changed Work. Failure to provide such notice waives Contractor's right to claim such work requires a change in the Contract Price or Contract Time. Once Contractor has provided timely written notice, it shall proceed as directed by City in writing, and thereafter shall file a claim in accordance with the procedures required herein.

**14.0 CHANGES IN CONTRACT PRICE**

14.1 The Contract Price may be changed only by a Change Order or Construction Change Directive issued in accordance with the terms of the Contract Documents. If the Change Order or Construction Change Directive provides for an adjustment to the Contract Price, the adjustment shall be based on one of the following methods: mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation; or unit prices stated in the Contract Documents or subsequently agreed upon; or cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or on a time and material basis.

14.2 In the event the Owner elects to proceed with changed work on a time and material basis, the following provisions shall apply:

14.2.1 For all labor, including a foreman in direct charge of the specified operations, the Contractor shall receive a sum equal to the current standard local rate of wages actually paid for every hour that the labor is actually engaged in such changed work, plus the actual cost of social security taxes, unemployment insurance, and workmen's compensation insurance based on the actual wages paid for such labor, to which cost shall be added an amount equal to ten percent (10%) thereof for all overhead and profit (including all general supervision and for furnishing and repairing small tools and ordinary equipment used in doing the changed work).

14.2.2 For all materials used, the Contractor shall receive the actual cost of such materials, including freight charges as shown by original receipted bills, to which cost shall be added an amount equal to ten percent (10%) thereof for all overhead and profit.

14.2.3 For any construction equipment or special equipment including fuel and lubricants therefor, required for the economical performance of the changed work, the Engineer shall allow the Contractor a rental

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price, to be agreed upon in writing before such work is begun, for every hour that such construction equipment or special equipment is actually operated on the work, which rental price shall include all overhead and profit. Such hourly rental price shall not exceed 1/176 part of the monthly rate stated for such equipment in the latest edition of the "Compilation of Rental Rates for Construction Equipment" by Associated Equipment Distributors.

14.2.4 Subcontractors are subject to the above and the Contractor mark-up for overhead and profit shall not exceed five percent (5%) of the amount due to the Subcontractor.

14.2.5 The Contractor shall keep and present, in such form as the Engineer may prescribe, an itemized accounting of all time and material costs, together with appropriate supporting data.

**15.0 TIME FOR COMPLETION AND LIQUIDATED DAMAGES**

15.1 Time is of the essence in the performance of the Work under this Agreement. The date of beginning and the time for completion of the Work are essential conditions of the Contract Documents. The required date of commencement of the Work shall be established in the Notice to Proceed to be issued by the City. As noted in the Agreement, Contractor shall commence the Work within ten (10) calendar days after the required date of commencement. Any Work performed by Contractor prior to the required date of commencement shall be at the sole risk of Contractor. The Notice to Proceed shall be issued within thirty (30) days of the execution of the Agreement by the City. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement of the City and Contractor. If the Notice to Proceed has not been issued within the thirty (30) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party by providing the City written notice of such termination, in which event such termination shall be deemed a termination for convenience of the City as set forth in Section 17.5 below. Provided, however, notwithstanding anything in the Contract Documents to the contrary, in the event of such termination pursuant to this Section 15.1, Contractor acknowledges and agrees that no payments will be due Contractor nor shall the City make any payments to Contractor for any Work that would have been authorized under the Agreement once executed by both parties.

15.2 The Contractor will proceed with the Work at such rate of progress to ensure Substantial Completion within the Contract Time. It is expressly understood and agreed, by and between the Contractor and the City, that the Contract Time for Substantial Completion of the Work is a reasonable period of time. The Con-

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struction Schedule shall include the date the Work must be substantially completed by Contractor and all interim milestones required by the City. Substantial Completion of the Work shall be achieved when the Work has been completed to the point where the City can occupy or utilize the Work for its intended purpose. The Engineer shall certify the date Substantial Completion of the Work is achieved. If the City has designated portions of the Work to be turned over to the City prior to Substantial Completion of the entire Work as provided in Section 15.3 below, the Engineer shall certify the date as to when Substantial Completion of such designated portions of the Work have been achieved. The entire Work shall be fully completed and ready for final acceptance by the City within 30 calendar days after Substantial Completion of the Work or thirty (30) days after Contractor's receipt of the punch list, whichever date occurs last.

15.2.1 Once the Contractor believes it has achieved Substantial Completion of the Work, it shall notify the City and Engineer in writing and request a substantial completion inspection. Concurrent with its delivery of such written notice, Contractor shall submit its initial punch list for the City's and Engineer's review. Any Work remaining to be completed or any defective work to be remedied shall be listed on the punch list. Once the substantial completion inspection has been made, Owner and Engineer shall modify the Contractor's initial punch list to include all items to be completed or repaired by Contractor in order to achieve final acceptance of the Work. Thereafter, the Engineer shall provide Contractor a copy of the final punch list. Such final punch list shall be in compliance with the Contract Documents and all applicable laws, including Section 218.735 of the Florida Statutes. Accordingly, if the Contract Price is less than \$10 million, Engineer shall provide the final punch list to Contractor within 30 calendar days after Contractor has achieved Substantial Completion. If the Contract Price is \$10 million or more, Engineer shall provide the final punch list to Contractor within 60 calendar days after Contractor has achieved Substantial Completion. Contractor acknowledges and agrees that the failure to include any corrective work or pending items not yet completed on the punch list does not alter the responsibility of Contractor to complete all the Work required under this Contract.

15.3 The City may take early occupancy of all or any portions of the Work, at the City's election, by designating in writing to Contractor the specific portions of the Work to be occupied and the date such occupancy shall commence. If any such specific early occupancy was not expressly identified in the bidding documents issued with respect to this Agreement (as they may have been modified by any applicable Addenda) and such early occupancy adversely impacts Contractor's cost or time of performance, Contractor shall be entitled to an equitable adjustment to the Contract Price and the Contract Time, all in accordance with the other terms and conditions of the Contract Documents.

15.4 The City and Contractor recognize that, since time is of the essence for this

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Agreement, the City will suffer financial loss if the Work is not substantially completed within the Contract Time, as said time may be adjusted as provided for herein. In such event, the total amount of the City's damages, will be difficult, if not impossible, to definitely ascertain and quantify, because this is a public construction project that will, when completed, benefit the public. It is hereby agreed that it is appropriate and fair that the City receive liquidated damages from Contractor, if Contractor fails to achieve Substantial Completion of the Work within the required Contract Time. Should Contractor fail to substantially complete the Work within the Contract Time, the City shall be entitled to assess, as liquidated damages, but not as a penalty, the amount for liquidated damages as specified in the Agreement for each calendar day thereafter until Substantial Completion is achieved. Contractor hereby expressly waives and relinquishes any right which it may have to seek to characterize the above noted liquidated damages as a penalty, which the parties agree represents a fair and reasonable estimate of the City's actual damages at the time of contracting if Contractor fails to achieve Substantial Completion of the Work within the Contract Time.

15.4.1 In the event the Work is not fully completed within 30 days from the date of Substantial Completion, the City reserves the right to assess against Contractor its actual damages incurred as a result of such delay by Contractor.

**16.0 CORRECTION OF DEFECTIVE WORK**

16.1 Work not conforming to the requirements of the Contract Documents shall be deemed defective Work. If required by the City or Engineer, the Contractor shall as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the defective Work has been rejected by the City or Engineer, remove it from the site and replace it with non-defective Work in accordance with the Contract Documents and without additional expense to the City. Further, Contractor shall bear the expense of making good all work of other contractors performing work on the Project destroyed or damaged by such removal or replacement. Contractor shall bear all direct, indirect and consequential costs of such correction or removal (including, but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby, and shall hold the City and Engineer harmless for same. Notwithstanding anything herein to the contrary, the City may determine, at its sole discretion, to accept defective Work. If such determination is rendered prior to final payment, a Change Order or Construction Change Directive shall be executed evidencing such acceptance of such defective Work, incorporating the necessary revisions in the Contract Documents and reflecting an appropriate decrease in the Contract Price. If the City accepts such defective Work after final payment, Contractor shall promptly pay the City an appropriate amount determined by the City to adequately compensate the City for its acceptance of the defective Work.

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16.2 If the Contractor does not take action to correct defective Work or to remove and replace rejected defective Work or if Contractor fails to comply with any of the provisions of the Contract Documents within ten (10) days after receipt of written notice from the City or Engineer, the City may correct and remedy any such deficiency at the expense of the Contractor. To the extent necessary to complete corrective and remedial action, the City may exclude Contractor from any or all of the Project site, take possession of all or any part of the Work, and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Project site and incorporate in the Work all materials and equipment stored at the Project site or for which the City has paid Contractor but which are stored elsewhere. Contractor shall allow the City, Engineer and their respective representatives, agents, and employees such access to the Project site as may be necessary to enable the City to exercise the rights and remedies under this Section. All direct, indirect and consequential costs of the City in exercising such rights and remedies shall be at Contractor's expense, and a Change Order or a Construction Change Directive shall be issued, incorporating the necessary revisions to the Contract Documents, including an appropriate decrease to the Contract Price. Such direct, indirect and consequential costs shall include, but not be limited to, fees and charges of engineers, architects, attorneys and other professionals, and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of Contractor's defective Work. Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the City of the City's rights and remedies hereunder.

17.0 SUSPENSION OF WORK, TERMINATION, AND DELAY

17.1 The City shall have the right to suspend the Work or any portion thereof for a period of not more than ninety (90) days or such additional time as agreed upon by the Contractor, upon giving Contractor written notice of such suspension to the Contractor. The City or Engineer shall fix the date on which Work shall be resumed. The Contractor will resume that Work on the date so fixed unless otherwise directed by the City. Provided Contractor strictly complies with the Change Order and Claims procedures set forth in the Contract Documents, Contractor will be entitled to a Change Order adjusting the Contract Price and Contract Time, as provided in the Contract Documents, to the extent attributable to any such suspension, unless said suspension is due to the fault or neglect of Contractor or anyone for whom Contractor is responsible.

17.2 If, through no act or fault of the Contractor, the Work is suspended for a period of more than ninety (90) days by the City or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days after it is submitted, or the City fails to pay the Contractor any undisputed amounts within thirty (30) days of its approval, then the Contractor



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may after ten (10) days from delivery of a written notice to the City and the Engineer and the City's failure to cure such default (or a maximum of sixty (60) days in the event the default cannot reasonably be cured within ten (10) days provided that the City commences to cure within ten (10) days and thereafter diligently and continuously pursues said cure) terminate the Agreement and recover from the City payment for all Work properly executed and reasonable termination expenses sustained. In addition, and in lieu of terminating the Agreement, if the Engineer has failed to act on a request for payment or if the City has failed to make any payment within the aforesaid thirty (30) day periods, the Contractor may upon ten (10) days written notice to the City and the Engineer stop the Work until paid all amounts then due, in which event and upon resumption of the Work, a Change Order shall be issued adjusting the Contract Price and Contract Time as provided in the Contract Documents.

- 17.3 Contractor shall be considered in material default of the Agreement and such default shall be considered cause for the City to terminate the Contractor's right to continue to perform under the Agreement, in whole or in part, as further set forth in this Section, if Contractor: (1) fails to begin the Work under the Contract Documents within the time specified herein; or (2) fails to properly and timely perform the Work as directed by the City or Engineer or as provided for in the approved Construction Schedule; or (3) performs the Work unsuitably or neglects or refuses to remove materials or to correct or replace such Work as may be rejected as unacceptable or unsuitable; or (4) discontinues the prosecution of the Work contrary to the requirements of the Agreement; or (5) fails to resume Work which has been suspended within a reasonable time after being notified to do so; or (6) becomes insolvent or is declared bankrupt, or commits any act of bankruptcy; or (7) allows any final judgment to stand against it unsatisfied for more than ten (10) days; or (8) makes an assignment for the benefit of creditors; or (9) fails to comply with any applicable codes, laws, ordinances, rules or regulations with respect to the Work; or (10) fails to supply sufficient skilled workmen or suitable materials or equipment; or (11) fails to promptly pay its Subcontractors and Suppliers; or (12) disregards the authority of the City or Engineer; or (12) materially breaches any other provision of the Contract Documents. In rendering its decision as to whether one of the causes under Section 17.3 exist which would permit the City to terminate the Agreement, the City shall be entitled to rely upon the determination of the Engineer concerning such matter.

17.3.1 In such event, and after giving the Contractor and its surety a minimum of ten (10) days from delivery of a written notice to cure any such default (or a maximum of sixty (60) days in the event the default cannot reasonably be cured within ten (10) days provided that Contractor commences to cure within ten (10) days and thereafter diligently and continuously pursues said cure), the City may at its option, and without releasing or waiving its rights and remedies against

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Contractor's sureties and without prejudice to any other right or remedy, terminate Contractor's right to proceed under the Agreement in whole or in part, and take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor, take assignments of any of Contractor's subcontracts and purchase orders that the City may designate, and finish the Work by whatever method the City in its sole discretion may deem expedient.

17.3.2 If Contractor's right to proceed under the Agreement is terminated, Contractor shall not be entitled to receive any further payment until the Work is finished. All monies expended and all of the costs, losses, damages and extra expenses, including all management, administrative and other overhead and other direct and indirect expenses (including Engineer and attorneys' fees) or damages incurred by the City incident to such completion (collectively "Completion Costs"), shall be deducted from the unpaid balance of the Contract Price. Upon the City's completion, if the unpaid balance of the Contract Price exceeds the Completion Costs, such excess shall be paid to the Contractor. If the Completion Costs exceed the unpaid balance of the Contract Price, Contractor shall pay promptly to the City on demand the full amount of such excess and interest thereon at a rate of 6% per annum until paid.

17.3.3 The liability of Contractor hereunder for Completion Costs shall extend to and include the full amount of any and all sums paid, expenses and losses incurred, damages sustained, and obligations assumed by the City in good faith under the belief that such payments or assumptions were necessary or required, in completing the Work and providing labor, materials, equipment, supplies, and other items therefor or re-letting the Work, and in settlement, discharge or compromise of any claims, demands, suits, and judgments pertaining to or arising out of the Work hereunder. Further, in the event the City has exercised its right to terminate due to Contractor's default, Contractor shall be prohibited from bidding or otherwise seeking additional work from the City in accordance with the City's then current debarment policy.

17.3.4 The City may deduct from any payment, any sum owed by the City to Contractor, either under this Agreement or any other agreement between the City and the Contractor. Further, a default by Contractor under any other agreement with the City shall be deemed a default under this Agreement and a default under this Agreement shall be deemed a default under any other agreement between the City and Contractor.

17.4 Where the Contractor's services have been so terminated by the City, said termination shall not affect any right of the City against the Contractor then existing or which may thereafter accrue. Any retention or payment of monies by the City due the Contractor will not release the Contractor from compliance with the Contract Documents. Further, if after notice of termination of Contractor's right to

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proceed pursuant to Section 17.3, it is determined for any reason that Contractor was not in default, or that its default was excusable, or that the City is not entitled to the remedies against Contractor provided herein, then such termination shall be deemed a termination for the City's convenience and Contractor's remedies against the City shall be the same as and limited to those afforded Contractor under Section 17.5 below.

- 17.5 The City shall have the right to terminate this Agreement without cause upon ten (10) days from delivery of a written notice to the Contractor. In the event of such termination for convenience, Contractor's sole and exclusive recovery against the City shall be limited to that portion of the Contract Price earned through the date of termination, together with any retainage withheld and reasonable termination expenses incurred, but Contractor shall not be entitled to any other or further recovery against the City, including, but not limited to, damages or any anticipated profit on portions of the Work not performed.

18.0 PAYMENT TO CONTRACTOR

- 18.1 At least ten (10) days before submitting the first Application for Payment, the Contractor shall submit to the City and Engineer a schedule of values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the City or Engineer may require. It is anticipated the schedule of values substantially will be based upon the Contractor's completed Bid Proposal Form, attached as Section 00030. This schedule, unless objected to by the City or Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment. On or before the 25th of each month, the Contractor will submit to the Engineer an Application for Payment filled out and signed by the Contractor covering the Work performed since the previous month's Application for Payment. The Application for Payment may also include the cost of such materials and equipment which are suitably stored either at or off the site to the extent such payment is approved by City as provided in Section 18.1.1 below. Invoices received after the 25th day of each month shall be considered for payment as part of the next month's Application for Payment. Contractor's Application for Payment shall be in such form and contain such detail and backup as the City reasonably may require.

18.1.1 If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or off the site, the Application for Payment shall also be accompanied by such supporting data, satisfactory to the City, as will establish the City's title to the material and equipment free and clear of all liens, charges, security interests and encumbrances, together with evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect City's interest therein, all of which shall be subject to City's satisfaction. City has the discretion whether or not to pay for such

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unincorporated materials.

- 18.1.2 The Engineer will, within ten (10) days after receipt of each Application for Payment, indicate in writing its recommendation as to that portion of the payment being requested by Contractor in the Application for Payment which Engineer believes is due and payable. The City shall pay Contractor that portion of the Application for Payment approved by Engineer and Owner within fifteen (15) days of the City's receipt of the Engineer's payment recommendation.
- 18.1.3 City shall retain an amount equal to 5% of the approved amount to be paid Contractor under each monthly Application for Payment. The retainage shall be accumulated and not released to Contractor until final payment is due. Provided, however, the City reserves the right, in its sole discretion, to reduce such retainage prior to final payment; but at no time shall the retainage be reduced to less than five percent (5%) prior to Contractor achieving Substantial Completion. Provided, further however, if at any time during this Agreement, and in the City's sole discretion, the City becomes dissatisfied with Contractor's performance or if Contractor is in default, the City shall have the right to reinstate the full amount of retainage at five percent (5%).
- 18.1.4 Monthly payments to Contractor shall in no way imply approval or acceptance of the Work.
- 18.1.5 Each Application for Payment shall be accompanied by a claim release and waiver in the form set forth in the City's Project Administration Manual from Contractor for all materials, labor, equipment, services and other bills associated with that portion of the Work payment is being requested in that Application for Payment. Further, each Application for Payment shall be accompanied by a claim release and waiver in the form set forth in the City's Project Administration Manual from all Subcontractors and Suppliers evidencing their payment in full through the previous month's Application for Payment. Also, each Application for Payment shall be accompanied by an updated Construction Schedule, a list inventorying all stored materials, a monthly progress status report, and any other document reasonably requested by City. The City shall not be required to make payment until and unless such releases, documents and information are furnished by Contractor. Further, if Contractor is withholding any portion of a payment to any Subcontractor or Supplier for any labor, services, or materials for which the City has paid Contractor, Contractor agrees to refund such money to the City upon demand by the City.
- 18.1.6 Engineer shall review each Application for Payment submitted by Contractor and shall make recommendations to the City as to the proper

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amounts, if any, which may be owed Contractor thereunder. Both Engineer and the City shall have the right to refuse to approve payment amounts, or portions thereof, requested by Contractor in an Application for Payment, or rescind any amount previously approved, and the City may withhold any payments otherwise due Contractor under this Agreement or any other agreement between the City and Contractor, to the extent it is reasonably necessary, to protect the City from any expense, cost or loss attributable to: (a) defective or deficient Work not properly remedied in accordance with the terms of the Contract Documents; (b) the filing or reasonable evidence indicating the probable filing of third party claims against the City attributable to the fault or neglect of Contractor; (c) Contractor's failure to make timely and proper payments to all Subcontractors and Suppliers; (d) reasonable evidence that the remaining Work cannot be completed for the unpaid Contract Price balance; (e) reasonable evidence indicating that the remaining Work cannot be completed within the remaining Contract Time; (f) Contractor's failure to satisfactorily prosecute the Work in accordance with the requirements of the Contract Documents; or (g) any other material breach of the requirements of the Contract Documents by Contractor. The City shall have the right, but not the obligation, to take any corrective action the City deems appropriate to cure any of the above noted items, at Contractor's expense, if such items are not cured by Contractor to the City's reasonable satisfaction within three (3) days after Contractor's receipt of written notice from the City.

- 18.1.7 Engineer or City may reject an Application for Payment, in whole or in part, submitted by Contractor if such Application for Payment is not submitted in strict accordance with the requirements of this Article 18. In such event, Engineer or City shall notify Contractor in writing within twenty (20) business days after receipt of such Application for Payment that such Application for Payment, or portion thereof, has been rejected and the reasons for such rejection. If Contractor resubmits a corrected Application for Payment correcting, in Engineer's and Owner's sole determination, the deficiency specified in the rejection notice, then City shall pay Contractor the corrected portion of the Application for Payment within ten business days after the date the corrected Application for Payment is received by City.
- 18.2 Prior to Substantial Completion, the City, with the approval of the Engineer, may use any completed or substantially completed portions of the Work. Such use shall not constitute an acceptance of such portions of the Work.
- 18.3 The City shall have the right to enter the Project site for the purposes of doing work not covered by the Contract Documents. This provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the Work, or the restoration of any damaged Work except such as may be caused by agents or employees of the City.

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- 18.4 Upon completion and acceptance of the Work, the Engineer shall issue a certificate attached to the final payment request that states the Work has been fully performed in accordance with the requirements of the Contract Documents and that Engineer recommends final payment in the amount reflected in the attached final payment request. The City shall make final payment to Contractor within thirty (30) days after the Work is finally accepted by the City, provided that Contractor first, and as an explicit condition precedent to the accrual of Contractor's right to final payment, shall have furnished the City with a properly executed and notarized final release in the form set forth in the City's Project Administration Manual, as well as, a duly executed copy of the surety's consent to final payment and such other documentation that may be required by the Contract Documents or the City.
- 18.5 Late payments shall accrue interest from the date payment was due until payment is received at the rate of six percent (6%) per annum.
- 18.6 No error or oversight in the making of payment or completion certificates shall relieve the Contractor from its obligation to do and complete the Work in accordance with the requirements of the Contract Documents.
- 19.0 ACCEPTANCE OF FINAL PAYMENT AS RELEASE
- 19.1 The acceptance by the Contractor of final payment shall be and shall operate as a full release and waiver of any and all claims by Contractor against the City arising out of this Agreement or otherwise relating to the Project, except those identified in writing by Contractor as unsettled in its final Application for Payment. Any payment, however, final or otherwise shall not release the Contractor or its sureties from any obligations under the Contract Documents or the Performance and Payment Bonds. Neither the acceptance of the Work nor payment by the City shall be deemed to be a waiver of the City's right to enforce any obligations of Contractor hereunder or to the recovery of damages for defective Work not discovered by the City or Engineer at the time of final inspection.
- 20.0 CONTRACT SECURITY
- 20.1 The Contractor shall within ten (10) days after the receipt of the Notice of Award and prior to the start of any Work furnish the City with a Performance Bond and a Payment Bond in penal sums equal to 100% of the amount of the Contract Price and in the forms attached as Sections 00060 and 00070. Such Bonds shall be executed by the Contractor and a corporate bonding company licensed to transact such business in the State of Florida and named on the current lists of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570 and approved by the City. The expense of these Bonds shall be borne by the Contractor. If at any time a surety on any

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such Bond is declared as bankrupt or loses its rights to do business in Florida or is removed from the list of Surety Companies accepted on Federal Bonds, Contractor shall within ten (10) days after notice from the City to do so, substitute an acceptable Bond (or Bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the City. The premiums on such replacement Bond shall be paid by the Contractor. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable Bond to the City.

- 20.2 The Contractor and its Surety, for value received, hereby stipulate and agree that any and all claims, demands, actions or suits whatsoever, arising under this Agreement and/or bonds, shall be subject to the sole and exclusive jurisdiction and venue of the appropriate state court in and for Bay County, Florida. The Contractor and its Surety do agree, by execution of these documents, that the sole and exclusive jurisdiction and venue in said forum is proper and appropriate since performance of the underlying contract for which these documents are executed is to be accomplished within Bay County, Florida.

21.0 ASSIGNMENTS

- 21.1 Contractor shall not assign this Agreement or any part thereof, without the prior consent in writing of the City, which consent shall be at City's sole discretion. If Contractor does, with City's written approval, assign this Agreement or any part thereof, Contractor shall not be released from any of its obligations or responsibilities under this Agreement.

22.0 INDEMNIFICATION AND HOLD HARMLESS

- 22.1 To the maximum extent permitted by Florida law, Contractor shall indemnify and hold harmless the City and its officers and employees from any and all liabilities, claims, damages, penalties, demands, judgments, actions, proceedings, losses or costs, including, but not limited to, reasonable attorneys' fees and paralegals' fees, whether resulting from any claimed breach of this Agreement by Contractor or from personal injury, property damage, direct or consequential damages, or economic loss, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor or anyone employed or utilized by the Contractor in the performance of this Agreement.
- 22.2 Contractor's obligation to indemnify and hold harmless under this Article 22 will survive the expiration or earlier termination of this Agreement until it is determined by final judgment that an action against the City or an indemnified party for the matter indemnified hereunder is fully and finally barred by the applicable statute of limitations.
- 22.3 The obligation of the Contractor under this Article 22 shall not extend to the liability

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of the Engineer, its agents or employees arising out of the preparation of approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications.

**23.0 SEPARATE CONTRACTS AND COOPERATION**

23.1 The City reserves the right to perform other work related to the Project at the site by the City's own forces, have other work performed by utility owners or let other direct contracts for work to be constructed at the same time, and in connection with, the Work included in this Agreement. The Contractor shall cooperate with all other contractors in such a manner, and to such extent, as best to facilitate the completion of the entire Project in the shortest time possible, subject to, at all times, the approval of the Engineer and Owner. It shall be the duty of each contractor to work with the other contractors, render such assistance, and to arrange its work in such a manner that shall allow the entire Project to be delivered complete and in the best possible condition. The Contractor shall afford other contractors and utility owners reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate the Work with theirs. If the proper execution or results of any part of the Contractor's Work depends upon the work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results.

23.2 If the performance of additional work by other contractors, utility owners, or the City is not noted in the Contract Documents prior to the execution of the Agreement, written notice thereof shall be given to the Contractor prior to starting any such additional work. If the Contractor believes that the performance of such undisclosed additional work by the City or others involves it in additional expense or entitles it to an extension of the Contract Time, the Contractor shall send written notice of that fact to the City and Engineer within seven (7) calendar days of being notified of the other work and the Contractor may make a claim thereof as provided in Sections 13 and 14. If Contractor fails to send the above required seven (7) calendar days' notice, Contractor will be deemed to have waived any rights it otherwise may have had to seek an extension to the Contract Time or adjustment to the Contract Price.

23.3 Contractor shall afford each utility owner and City's other contractors (or the City, if the City is performing the additional work with the City's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work and shall properly connect and coordinate its Work with theirs. Contractor shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall be responsible for all damage to the work of others caused by the performance of its Work. Further, Contractor shall not in any way cut or alter the work of others without first



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receiving the written consent of that other person and Engineer. If any part of Contractor's Work depends for proper execution or results upon the work of any other contractor or utility owner (or the City), Contractor shall inspect and promptly report to Engineer in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. Such report must be made within three (3) business days of the time Contractor first became aware of the delay, defect or deficiency. Contractor's failure to report within the allotted time will constitute an acceptance of the other work as fit and proper for integration with Contractor's Work, except for latent defects not discovered by Contractor.

23.4 The Contractor shall keep itself fully informed at all times regarding all details of the work of other contractors working at the site, and it shall be responsible for all delays that may result from its failure to install the Work in the proper manner and at the proper time.

23.5 The Contractor shall be responsible for coordinating the relocation of existing utilities (with the respective utility companies) as needed to construct the Project. Attention is called to the fact that Contractor is responsible for contacting all utility companies to obtain locations of all existing utilities or obstructions which it may encounter during construction. After location of utilities by the appropriate utility company, it is the Contractor's liability to protect all such utility lines, including service lines and appurtenances, and to replace at its own expense any which may be damaged by the Contractor's equipment or forces during construction of the Project. The City will pay fees charged by the utility company for relocating these utilities.

**24.0 SUBCONTRACTING**

24.1 Contractor shall review the design and shall determine how it desires to divide the sequence of construction activities. Contractor will determine the breakdown and composition of bid packages for award of subcontracts, based on the current Construction Schedule, and shall supply a copy of that breakdown and composition to the City and Engineer for their review and approval. The Contractor may utilize the services of specialty Subcontractors on those parts of the Work which, under normal contracting practices, are performed by specialty Subcontractors. Contractor shall be solely responsible for and have control over the Subcontractors.

24.2 Prior to submitting its first Application for Payment, Contractor shall submit to the Owner a list of the names, addresses, licensing information and phone numbers of the Subcontractors Contractor intends to use for each portion of the Work, as well as identifying in writing those portions of the Work it intends to perform with its own employees. The Contractor shall not use a Subcontractor or Supplier against whom the Owner has a reasonable objection. The list identifying each Subcontractor cannot be modified, changed, or amended without prior written approval

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from the Owner. Contractor shall continuously update that list, so that it remains current and accurate throughout the entire performance of the Work. Any and all work to be self-performed by Contractor must be approved in writing by the Owner in its sole discretion prior to commencement of such Work. The Contractor shall not award work to Subcontractor(s) in excess of fifty percent (50%) of the Contract Price, without prior written approval of the Owner..

- 24.3 The Contractor shall be fully responsible for and have control over the acts and omissions of its Subcontractors, and of persons either directly or indirectly employed by them, as the Contractor is for the acts and omissions of persons directly employed by it.
- 24.4 The Contractor shall cause appropriate provisions to be inserted in all Subcontracts relative to the work to bind Subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the work of Subcontractors and give the Contractor the same power to terminate any subcontract that the City may exercise over the Contractor under any provision of the Contract Documents. Further, each subcontract shall require that any claims by a Subcontractor for delay or additional cost must be submitted to Contractor within the time and in the manner in which Contractor must submit such claims to the City, and that failure to comply with such conditions for giving notice and submitting claims shall result in the waiver of such claims.
- 24.5 All subcontracts between Contractor and its Subcontractors shall be in writing and are subject to the Owner's approval. Further, all subcontracts shall (1) require each Subcontractor to be bound to Contractor to the same extent Contractor is bound to the City by the terms of the Contract Documents, as those terms may apply to the portion of the Work to be performed by the Subcontractor, (2) provide for the assignment of the subcontracts from Contractor to the City at the election of the City upon termination of Contractor, (3) provide that the City will be an additional indemnified party of the subcontract, (4) provide that the City will be an additional insured on all insurance policies required to be provided by the Subcontractor except workman's' compensation, (5) assign all warranties directly to the City, and (6) identify the City as an intended third-party beneficiary of the subcontract.
- 24.6 Nothing contained in this Agreement shall create any contractual relation between any Subcontractor or Supplier and the City. All subcontracts and purchase orders entered into by Contractor must be in writing, and upon demand from City, Contractor shall deliver to City a full and complete copy of any or all such subcontracts and purchase orders.
- 24.7 Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the Subcon-

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tractor will be bound. Each Subcontractor shall similarly make copies of such documents available to its sub-subcontractors.

24.8 The Contractor shall not use a Subcontractor or Supplier against whom the City has a reasonable objection and Contractor shall not be required to contract with anyone it reasonably objects to.

24.9 The City and Engineer are under no duty or obligation whatsoever to any Subcontractor, Supplier, laborer or other party to ensure that payments due and owing by the Contractor to any of them will be made. Such parties shall rely only on the Contractor's surety bonds for remedy of nonpayment by the Contractor.

**25.0 ENGINEER'S AUTHORITY**

25.1 The Engineer shall act as the City's representative during the construction period, shall decide questions which may arise as to quality and acceptability of materials furnished and Work performed, and shall interpret the intent of the Contract Documents in a fair and reasonable manner. The Engineer will make visits to the site and determine if the Work is proceeding in accordance with the Contract Documents.

25.2 The Contractor will be held strictly to the intent of the Contract Documents in regard to the quality of materials, workmanship, and execution of the Work. Inspections may be at the factory or fabrication plant of the source of material supply.

25.3 The Engineer and the City will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.

25.4 The Engineer shall promptly make decisions relative to interpretation of the Contract Documents.

25.5 Engineer has no authority, without City Council approval, to approve a Change Proposal, execute a Change Order, or otherwise agree to a change in the Contract Price or the Contract Terms..

**26.0 LAND AND RIGHT-OF-WAYS**

26.1 Prior to the issuance of the NOTICE TO PROCEED, the City shall obtain all land and rights-of-way necessary for carrying out and for the completion of the Work to be performed pursuant to the Contract Documents, unless otherwise noted in the Contract Documents.

26.2 The City shall provide to the Contractor information which delineates and describes the lands owned and rights-of-way acquired.

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26.3 The Contractor shall provide at its own expense and without liability to the City any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.

27.0 GUARANTEE

27.1 The Contractor warrants to the City and Engineer that materials and equipment furnished under the Agreement will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Contractor further warrants to the City that all materials and equipment furnished under the Contract Documents shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturers, fabricators, suppliers or processors except as otherwise provided for in the Contract Documents. Further, any special warranty to be provided will be in such form as is acceptable to the City and shall not include any exclusions, exceptions or modifications except to the extent approved by the City in its sole discretion. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear from normal usage. If required by the Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

27.2 Contractor expressly warrants to the City that it shall promptly correct, upon receipt of written notice from the City, any portion of the Work which is found to be defective or otherwise not in conformance with the requirements of the Contract Documents. The City will give notice of observed defects with reasonable promptness. Provided, however, in the event that any defective or non-conforming Work is determined by the City in its sole discretion to present an immediate threat to safety or security, the City shall be entitled to correct or replace such defective or non-conforming portions of the Work, and Contractor shall reimburse the City for all costs and expenses incurred by the City in correcting or replacing such Work. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the City may do so and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period. With respect to the correction or replacement of any defective or nonconforming Work, Contractor shall be liable for all damage to any part of the Work itself and to any adjacent property which is caused by such corrective or replacement work.

27.3 If, within one year after the date of final acceptance of the Work by the City, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract

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Documents, the Contractor shall correct it promptly after receipt of written notice from the City to do so unless the City has previously given the Contractor an express written acceptance of such condition. The City shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable period of time (not to exceed 10 days) after receipt of notice from the City or Engineer, the Owner may correct or replace it in accordance with Section 27.2 above. This one year correction period is in addition to all other rights and does not limit the time period the City can seek to have the defective Work corrected.

27.4 Contractor shall obtain and assign to the City all express warranties given to Contractor by any Subcontractors or by Suppliers.

**28.0 CLAIMS AND DISPUTES**

28.1 The term "Claim" as used herein shall mean any and all demands made by one party hereunder against the other party, whether such demand be for money, time or the assertion of any right or obligation that arises out of the Contract Documents.

28.2 Initial notice of Claims by Contractor shall be made in writing to the City and Engineer within seven (7) calendar days after the first day of the event giving rise to such Claim or such other time period as may be expressly provided in the Contract Documents. If Contractor fails to give such written notice within the required time period, Contractor shall be deemed to have waived the Claim. Written data supporting Contractor's claim shall be submitted to the City and Engineer within thirty (30) calendar days after the occurrence of the event, or such other time period as may be expressly provided in the Contract Documents, unless the City grants additional time in writing, or else Contractor shall be deemed to have waived the Claim.

28.3 Contractor shall proceed diligently with its performance as directed by the City, regardless of any pending Claim, unless otherwise agreed to by the City in writing. The City shall continue to make payments of all undisputed amounts in accordance with the Contract Documents during the pendency of any Claim.

28.4 Prior to the initiation of any action or proceeding permitted by this Agreement to resolve disputes between the parties, the parties shall make a good faith effort to resolve any such disputes by negotiation between the President or Vice-President for the Contractor and the City Manager. Failing resolution, and prior to the commencement of depositions in any litigation between the parties with respect to the Project, the parties shall attempt to resolve the dispute through mediation before an agreed-upon Circuit Court Mediator certified by the State of Florida. Should either party fail to submit to mediation as required hereunder, the other

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party may request a court of law to order mediation under Florida Statutes Section 44.102.

28.5 Any litigation between the City and Contractor (which term for the purposes of this Section shall include Contractor's surety), whether arising out of any Claim or arising out of the Agreement or any breach thereof, shall be brought, maintained and pursued solely and exclusively in the appropriate State courts of the State of Florida as set forth in Section 20.2. The City and Contractor each hereby waive and renounce any and all rights and options which they, or either of them, have or might have to bring or maintain any such litigation or action in the Federal Court system of the United States or in any United States Federal District Court. Venue of any such litigation between the City and Contractor shall lie and be only in the appropriate State courts in and for Bay County, Florida. Contractor consents and submits to the exclusive jurisdiction of any such court and agrees to accept service of process from the State of Florida in any matter to be submitted to any such court.

29.0 TAXES

29.1 The Contractor will pay all applicable sales, consumer, use and other similar taxes required by the laws of the place where the Work is performed.

30.0 CONTRACT TIME, SCHEDULE OF WORK AND TIME EXTENSIONS

30.1 Contractor shall diligently pursue the completion of the Work and coordinate the Work being done on the Project by its Subcontractors and Suppliers, as well as coordinating its Work with all work of others at the Project site, so that its Work or the work of others shall not be delayed or impaired by any act or omission by Contractor or anyone for whom Contractor is liable. All Work under this Agreement shall be arranged and be carried out in such a manner as to complete the Work on or before the required date of Substantial Completion. The Contractor must notify the City at the time of bidding if the chronology of the Work as shown or the subdivision of work will affect warranties or guarantees in any way. No such claims shall be allowed once the Work has begun.

30.2 Should Contractor be obstructed or delayed in the prosecution of or completion of the Work as a result of unforeseeable causes beyond the control of Contractor, and not due to its fault or neglect, including but not restricted to acts of God or of the public enemy, acts of government, fires, floods, epidemics, quarantine regulation, strikes, lockouts, unusually severe weather conditions by comparison with the ten-year Bay County, Florida average not reasonably anticipatable (to the extent Contractor was unable to perform any portion of the Work that was on the critical path of the approved Construction Schedule during those inclement weather days), Contractor shall notify Owner and Engineer in writing within seven (7) calendar

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days after the commencement of such delay, stating the cause or causes thereof, or be deemed to have waived any right which Contractor may have had to request a time extension.

30.3 The Contractor is required to furnish adequate manpower at the Project to complete the Work within the Contract Time and in accordance with the Construction Schedule. Should payment of premium time, bonuses, or the like be necessary to attract sufficient manpower for the Project, such extra labor costs shall be borne by the Contractor without additional compensation from the City. Further, should the Contractor's Work, through no fault of the Engineer, the City, or City's other contractors, fail to progress in accordance with the Construction Schedule, and if, in the opinion of the Engineer, the Work cannot be substantially completed within the Contract Time, or if deemed necessary to protect this or adjoining work from damage, the Contractor shall work such additional time over the established hours of work, but excluding Holidays, as required to meet the schedule time without additional expense to the City. In such event, Contractor shall reimburse City for any additional costs incurred by the City associated with such overtime, including any additional costs of the Engineer.

30.4 When so ordered in writing by the Engineer or City, whether to advance the date of Substantial Completion, or for any other reason for the City's benefit, the Contractor shall work overtime and or additional shifts. If the order for such acceleration is not the result of Contractor being behind the approved Construction Schedule, Contractor shall be entitled to a Change Order increasing the Contract Price by its actual net premium costs of such overtime and or shifts so ordered and so worked, including insurance and taxes applicable thereto, (without other overhead or profit). Such costs and expenses shall be subject to audit by the City.

30.5 When any period of time is referenced by days herein, it shall be computed to exclude the first day 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 recognized by the City as a legal holiday, such day shall be omitted from the computation, and the last day shall become the next succeeding day which is not a Saturday, Sunday or legal holiday. The term "business day" as used herein shall mean all days of the week excluding Saturdays, Sundays and all legal holidays observed by the City.

**31.0 USE OF SITE**

31.1 The Contractor shall confine its use of the site for storage of materials, erection of temporary facilities and parking of vehicles to areas within its Agreement limits as directed by the Engineer. The Contractor shall not unnecessarily encumber the site at any time.

31.2 Contractor acknowledges that areas of the site in which Work under this Agreement may be performed may be used by other contractors for storage of materials,

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erection of temporary facilities and parking of vehicles. Areas used by other contractors will be vacated, as directed by the Engineer to permit Work under this Agreement, provided reasonable notice is given requesting such, all in accordance with the approved Construction Schedule.

31.3 No signs or advertisements shall be displayed on the site or building except with the written consent of the City.

**32.0 TEMPORARY FACILITIES**

32.1 The Contractor shall provide electric power and water as it may require for its construction purposes, and shall pay all costs incurred. At completion of the Work, all temporary facilities shall be removed from the site. Upon Substantial Completion of the Work, Contractor shall cause all permanent utilities to be utilized by the City that were in Contractor's name during construction of the Project to be transferred over to the City's name.

32.2 The Contractor shall provide sanitary facilities for its workmen at all times. Sanitary facilities shall be of an approved chemical type with regular servicing and appropriately screened from public view, as approved by the Engineer and all applicable health authorities.

**33.0 CLEAN UP AND DISPOSAL OF WASTE MATERIALS AND HAZARDOUS MATERIALS**

33.1 No burial of waste materials will be permitted on the site. The Contractor shall at all times keep the site free from accumulations of waste material or debris caused by its operations and shall immediately remove same when necessary or required by the Engineer or the City. If Contractor fails to keep the Project site clean, the City has the right, after providing a twenty-four (24) hour written notice, to perform any required clean up and to back charge Contractor for the costs of such clean up. At the completion of the Work, and before final inspection and acceptance of the Work, Contractor shall clean ditches, shape shoulders and restore all disturbed areas, including street crossings, grass plots, regrassing if necessary, to as good condition as existed before Work started, and remove all debris, rubbish and waste materials from and about the Project site, as well as all of Contractor's (and its Subcontractors') tools, appliances, construction equipment and machinery and surface materials, and shall leave the Project site clean and ready for occupancy by the City. Any existing surface or subsurface improvements, including, but not limited to, pavements, curbs, sidewalks, pipes, utilities, footings, structures, trees and shrubbery, not indicated in the Contract Documents to be removed or altered, shall be protected by Contractor from damage during the prosecution of the Work. Any such improvements so damaged shall be restored by Contractor to condition at least equal to that existing at the time of Contractor's commencement of the Work



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33.2 If Contractor encounters on the Project site any materials reasonably believed by Contractor to be petroleum or petroleum related products or other hazardous or toxic substances which have not been rendered harmless, Contractor immediately shall (i) stop Work in the area affected and (ii) report the condition to the City in writing. If the Work is so stopped and hazardous material is found, the Work in the affected area shall not thereafter be resumed except by Change Order. Any such Change Order shall include, but not be limited to, an equitable adjustment to the Contract Time and Contract Price as appropriate and in accordance with the terms of the Contract Documents. If no hazardous material is found after the Work is stopped, no Change Order is required to resume the Work in the affected area. Further, if the hazardous material was generated or caused by Contractor or anyone for whom Contractor is responsible, or if Contractor failed to stop Work or give the written notice required above, no Change Order will be required for an adjustment in the Contract Time or Contract Price and Contractor shall indemnify the City and hold the City harmless for any costs incurred by the City with respect to such hazardous material generated or caused by Contractor or anyone for whom it is responsible or any increased costs incurred by City as a result of Contractor's failure to stop Work or give the required written notice.

34.0 WARRANTY OF TITLE

34.1 No material, supplies or equipment for the Work shall be purchased by the Contractor subject to any chattel mortgage or under a conditional sale or other agreement by which a lien or an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants good title to all materials, supplies and equipment installed or incorporated in the Work and title to all such items shall pass to the City upon its incorporation into the Work or payment, whichever occurs first. Contractor shall, at all times, keep the site, together with all improvements and appurtenances constructed or placed thereon by it, free from any claims, liens or charges and further agrees that neither Contractor nor any person, firm, or corporation furnishing any material or labor for any Work covered by this Agreement shall have any right to a lien upon the Work, site or any improvements or appurtenances thereon. The Contractor shall not at any time suffer or permit any lien, attachment, or other encumbrances under the law of Florida or otherwise by any person or persons whomsoever to remain on file with the City against any money due or to become due for any work done or materials furnished under the Agreement or by reason of any other claim or demand against the Contractor. Such lien, attachment, or other encumbrance, until it is removed, shall preclude any and all claims or demands for any payment to Contractor under virtue of this Agreement.

35.0 OWNERSHIP OF HIDDEN VALUABLE MATERIALS

35.1 All items having any apparent historical or archaeological interest or treasure or valuable materials discovered during any construction activities shall be carefully

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preserved and reported immediately to the City for determination of appropriate actions to be taken. Any increases to Contractor's time or cost of performance due to historical or archaeological items discovered on the site shall entitle Contractor to a Change Order equitably adjusting the Contract Time and the Contract Price as appropriate and in accordance with the terms of the Contract Documents. Notwithstanding anything in the Contract Documents to the contrary, Contractor shall have no claim or entitlement to any such historical or archaeological interest or treasure or other valuable materials discovered, and all such items shall remain the property of the City.

**36.0 AS-BUILT PLANS and DOCUMENTS TO BE KEPT AT THE SITE**

36.1 Before final inspection the Contractor shall turn over to the Engineer a set of drawings showing field changes and actual installed conditions. CONTRACTOR shall provide to the ENGINEER two (2) hard copies and one (1) electronic copy of the as-built plans in AutoCAD 2019. The plans shall be certified by a P.L.S. registered in the State of Florida.

36.2 Contractor shall maintain at the Project site or such other place as may be expressly approved in writing by Owner, originals or copies of, on a current basis, all Project files and records, including, but not limited to, the following administrative records: Subcontracts and Purchase Orders; Subcontractor Licenses; Shop Drawing Submittal/Approval Logs; Equipment Purchase/Delivery Logs; Contract Drawings and Specifications with Addenda; Warranties and Guarantees; Cost Accounting Records; Payment Request Records; Meeting Minutes; Insurance Certificates and Bonds; Contract Changes; Permits; Material Purchase Delivery Logs; Technical Standards; Design Handbooks; "As-Built" Marked Prints; Operating & Maintenance Instruction; Daily Progress Reports; Monthly Progress Reports; Correspondence Files; Transmittal Records; Inspection Reports; Bid/Award Information; Bid Analysis and Negotiations; Punch Lists; and a Construction Schedule (including all updates). The Project files and records shall be available at all times to the City and Engineer or their designees for reference, review or copying.

**37.0 SILENCE OF SPECIFICATIONS**

37.1 To the extent the Work involves utility construction, the apparent silence of the Contract Documents as to any details or the omission from them of a detailed description concerning any point shall be regarded as meaning that such portion of the Work shall be performed in accordance with the latest edition of the Florida Administrative Code.

**38.0 GRATUITIES**

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38.1 If the City finds after a notice and hearing that the Contractor, or any of the Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts or otherwise) to any official, employee, or agent of the City, the State, or other officials in an attempt to secure this Agreement or favorable treatment in awarding, amending, or making any determinations related to the performance of this Agreement, the City may, by written notice to the Contractor, terminate this Agreement for Contractor default. The City may also pursue other rights and remedies that the law or this Agreement provides.

38.2 In the event this Agreement is terminated as provided in Section 38.1, the City may pursue the same remedies against the Contractor as it could pursue in the event of a breach of the Agreement by the Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, the City may pursue exemplary damages in an amount (as determined by the City) which shall be not less than three nor more than ten times the costs the Contractor incurs in providing any such gratuities to any such official, agent or employee of the City.

**39.0 AUDIT AND ACCESS TO RECORDS**

39.1 Contractor shall keep all records and supporting documentation which concern or relate to the Work hereunder for a minimum of three (3) years from the date of termination of this Agreement or the date the Project is completed, whichever is later or such longer period of time as may be required by law. Contractor shall require all of its Subcontractors to likewise retain all of their Project records and supporting documentation. The City, and any duly authorized agents or representatives of the City, shall be provided access to all such records and supporting documentation at any and all times during normal business hours upon request by the City. Contractor shall make all such Project records and supporting documentation available in Bay County, Florida. Further, the City, and any duly authorized agents or representatives of the City, shall have the right to audit, inspect and copy all of Contractor's and any Subcontractor's Project records and documentation as often as they deem necessary and Contractor shall cooperate in any audit, inspection, or copying of the documents. These access, inspection, copying and auditing rights shall survive the termination of this Agreement.

**40.0 EQUAL OPPORTUNITY REQUIREMENTS**

40.1 For all contracts in excess of \$10,000, the Contractor shall comply with Executive Order 11246, entitled "Equal Employment Opportunity", as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR Part 60).

40.2 The Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obliga-

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tions required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographic area where the Agreement is to be performed.

**41.0 CHANGED CONDITIONS**

41.1 Notwithstanding anything in the Contract Documents to the contrary, if conditions are encountered at the Project site which are (i) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (ii) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, and which reasonably should not have been discovered by Contractor as part of its scope of site investigative services required pursuant to the terms of the Contract Documents, then Contractor shall provide the City with prompt written notice thereof before conditions are disturbed and in no event later than seven (7) calendar days after first observance of such conditions. The City and Engineer shall promptly investigate such conditions and, if they differ materially and cause an increase or decrease in Contractor's cost of, or time required for, performance of any part of the Work, the City will acknowledge and agree to an equitable adjustment to the Contract Price or Contract Time, or both, for such Work. If the City determines that the conditions at the site are not materially different from those indicated in the Contract Documents or not of an unusual nature or should have been discovered by Contractor as part of its investigative services, and that no change in the terms of the Agreement is justified, the City shall so notify Contractor in writing, stating its reasons. Claims by Contractor in opposition to such determination by the City must be made within seven (7) calendar days after Contractor's receipt of the City's written determination notice. If the City and Contractor cannot agree on an adjustment to the Contract Price or Contract Time, the dispute resolution procedure set forth in the Contract Documents shall be complied with by the parties.

**42.0 COMPLIANCE WITH LAWS**

42.1 Contractor agrees to comply, at its own expense, with all federal, state and local laws, codes, statutes, ordinances, rules, administrative orders, regulations and requirements applicable to the Project, including but not limited to those dealing with safety (including, but not limited to, the Trench Safety Act, Chapter 553, Florida Statutes). An executed copy of Contractor's Trench Safety Act Certificate of Compliance (the form of which is attached hereto as Section 00096) has been delivered to City with the Contractor's Bid Proposal Form. If Contractor observes that the Contract Documents are at variance therewith, it shall promptly notify the City and

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Engineer in writing. Contractor has provided a separate line item in its Bid identifying the cost of compliance with the applicable trench safety standards set forth in the Trench Safety Act.

**43.0 PUBLIC ENTITY CRIMES**

- 43.1 By its execution of the Agreement and the Contractor's Public Entities Crime Statement, in the form set forth in Section 00097). Contractor acknowledges that it has been informed by the City of and warrants that it is in compliance with the terms of Section 287.133(2)(a) of the Florida Statutes which reads as follows:

"A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity in excess of the threshold amount provided in s. 287.017 for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list."

**44.0 INSURANCE**

- 44.1 During the term of this Agreement, Contractor shall provide, pay for, and maintain, with companies satisfactory to the City, the types and limits of insurance required by the Contract Documents. All insurance shall be from responsible companies eligible to do business in the State of Florida. Simultaneously with the execution and delivery of this Agreement by Contractor, Contractor shall deliver to the City the properly completed and executed Certificate of Insurance, in the form set forth in Section 00099 along with any other properly completed and executed Certificates of Insurance that may be necessary, evidencing the fact that Contractor has acquired and put in place the insurance coverages and limits required herein. In addition, certified, true and exact copies of all insurance policies required shall be provided to the City, on a timely basis, if requested by the City. These Certificates and policies shall contain provisions that at least thirty (30) calendar days advanced written notice by registered or certified mail shall be given the City of any cancellation, intent not to renew, or any policy change that would result in a reduction in the policies' coverages, except in the application of the Aggregate Limits Provisions. The renewal of any insurance required to be maintained by Contractor hereunder shall be by a renewal Certificate of Insurance in the same form as was required for the original Certificate of Insurance, which renewal Certificate of Insurance shall be delivered to City at least ten (10) calendar days prior to expiration of current coverages so that there shall be no interruption in the Work due to lack of proof of insurance coverages required of Contractor under this Agreement.

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- 44.2 Contractor shall also notify the City, in the same manner required in Section 44.1 above, within two (2) calendar days after Contractor's receipt, of any notices of expiration, cancellation, non-renewal or material change in coverages or limits received by Contractor from its insurer, and nothing contained herein shall relieve Contractor of this requirement to provide notice. In the event of a reduction in the aggregate limit of any policy to be provided by it hereunder, Contractor shall immediately take steps to have the aggregate limit reinstated to the full extent permitted under such policy. If, at any time, City requests a written statement from an insurance company as to any impairment to any aggregate limit of any policy to be provided by it hereunder, Contractor shall promptly authorize and cause to be delivered such statement to City. All insurance coverages of Contractor shall be primary to any insurance or self-insurance program carried by the City applicable to this Agreement. Any such self-insurance programs or coverages shall not be contributory with any insurance required of the Contractor under the terms of this Agreement. All insurance policies, other than the Workers Compensation policy and the Surveyor's Professional Liability policy, provided by Contractor to meet the requirements of this Agreement shall name the City as an additional insured through the use of ISO Endorsement No. CG 20.10.10.01 and No. CG 20.37.10.01 wording, as to the operations of Contractor under the Contract Documents and shall also provide the Severability of Interest provision (also referred to as the Separation of Insureds provision). Companies issuing the insurance policy or policies shall have no recourse against the City for payment of premiums or assessments for any deductibles which all are at the sole responsibility and risk of Contractor.
- 44.3 All insurance policies to be provided by Contractor pursuant to the terms hereof shall be performable in Bay County, Florida and must expressly state that the insurance company will accept service of process in Bay County, Florida and that the exclusive venue and exclusive jurisdiction for any action concerning any matter under those policies shall be in the appropriate state court situated in Bay County, Florida.
- 44.4 The acceptance by the City of any Certificate of Insurance pursuant to the terms of this Agreement evidencing the insurance coverages and limits required hereunder does not constitute approval or agreement by the City that the insurance requirements have been met or that the insurance policies shown on the Certificates of Insurance are in compliance with the requirements of this Agreement.
- 44.5 Before starting and until completion of all Work required hereunder, Contractor shall procure and maintain insurance of the types and to the limits specified in the Contract Documents. Contractor shall require each of its Subcontractors to procure and maintain, until the completion of that Subcontractor's work or services, insurance of the types and to the limits specified in the Contract Documents, unless such insurance requirement for the Subcontractor is expressly waived or modified

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in writing by the City. Contractor shall not enter or otherwise occupy the Project site or commence any Work to be performed under this Agreement at the Site or any other property of the City until all insurance required hereunder has been obtained by Contractor and such proof of insurance, as the same is required under this Agreement, has been delivered to City. Contractor shall require all property insurance policies related to the Work and secured and maintained by Contractor and its Subcontractors to include provisions providing that each of their insurance companies shall waive all rights of recovery, under subrogation or otherwise, against the City and any of its separate contractors and the agents, employees and subcontractors of any of them.

- 44.6 Should at any time Contractor or any of its Subcontractors not maintain the insurance coverages required in this Agreement, the City may terminate this Agreement for Contractor default or at its sole discretion shall be authorized to purchase such coverages and charge Contractor for such coverages purchased, to include a fifteen percent (15%) administrative fee. If Contractor fails to reimburse the City for such costs within thirty (30) calendar days after demand, the City has the right to offset those costs from any amount due Contractor under this Agreement. The City shall be under no obligation to purchase such insurance, nor shall it be responsible for the coverages purchased or the insurance company/companies used. The decision of the City to purchase such insurance coverages shall in no way be construed to be a waiver of any of its rights under this Agreement. If the City exercises its option to purchase such required coverages, the coverages shall not be cancelled by Contractor and shall stay in force until the normal expiration date according to the terms and conditions of the insurance policy.
- 44.7 As may be required by City from time to time, the status of any insurance aggregate limits are to be confirmed in writing by the respective insurance companies. The amounts and types of insurance Contractor shall comply with all of the requirements of this Section 44 unless otherwise agreed to, in writing, by City.

[END OF SECTION 00100]

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SECTION 00110

MISCELLANEOUS REQUIREMENTS

1. COORDINATION OF WORK

The Contractor shall submit a construction schedule to the Owner/Owner/Engineer for all work to be accomplished under the contract along with an anticipated schedule of payments he will earn during the course of the construction. Said schedule shall be submitted to the Owner/Owner/Engineer following Contractor's receipt of Notice of Award, but prior to issuance of Notice to Proceed.

2. SUBMITTAL DATA

The Contractor shall be required to submit an electronic PDF file to the Owner/Engineer of pertinent information, shop drawings and literature on all materials and items of equipment to be installed in conjunction with these specifications. Before ordering or installing any of the equipment or materials, the Contractor shall have one copy of submittal data on each item approved by the Owner/Engineer in writing and returned to him.

3. AS-BUILT RECORDS

A complete set of as-built records shall be kept by the Contractor. The as-built plans shall meet the City's Minimum Technical Standards for Utility As-Built (see Drawing Details). These records shall show all items of construction and equipment which differ in size, shape or location from those shown on the contract drawings. All new valve installations shall be referenced to three (3) permanent points. The piping shall be measured from easily identifiable, permanent, existing structures. These records shall be kept up-to-date daily. They may be kept on a marked set of contract drawings for this purpose, or in any other form which is approved prior to the beginning of the work. Record drawings shall include elevations of the new piping every 100 feet and the location of all fittings. In addition, the information provided in the boring log table referenced to the project stationing and indicating the direction of the pull phase in the construction drawings shall also be maintained and provided for all directional drill installations. Record drawings shall be submitted in the format required by the City's Minimum Technical Standards for Utility As-Built (see Drawing Details).

4. OPERATION AND MAINTENANCE MANUALS

The Contractor shall furnish the Owner/Engineer complete, indexed sets of literature in searchable PDF format giving the following information:

- a. Clear and concise instructions for operation, adjustment, and lubrication

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and other maintenance of the equipment. These instructions shall include a complete lubrication chart.

- b. A list of all parts of the equipment, with catalog numbers and other data necessary for ordering replacement parts.
- c. Such instruction and parts lists shall have been prepared specifically for the model and type of equipment furnished and shall not refer to other models and types of similar equipment.
- d. A complete compendium of all shop drawings submittals for this project in searchable pdf format shall be provided as an appendix to the Operation and Maintenance Manual.

**5. INSPECTIONS REQUIRED BY CONTRACTOR**

The following is a list of the minimum general items for which the Contractor is to give the Owner/Engineer a minimum of 48 hours' notice prior to performing the work:

- 1) Directional drill or bored and jacked piping installation.
- 2) Placement of concrete.
- 3) Any major tie-ins or valve placements prior to backfill.
- 4) Hydrostatic tests of pressure pipework.
- 5) Process operational tests.
- 6) Start-up.
- 7) Final clean-up of sites.

The Contractor shall verify that the hereinbefore mentioned items are ready to be inspected and/or tested prior to notifying the Owner/Engineer. Following notification, the Owner/Engineer will then make the necessary trip to witness the test or inspection. If the inspection is not ready to be made or the required testing fails to meet specifications, then the Contractor shall pay all costs associated with that inspection trip. These costs shall include time spent by the Owner/Engineer and/or inspector and the direct expenses (i.e. mileage, etc.) associated with the failing inspection. Only the test in which the system passes will be included in the general inspection of the job for the Owner.

**6. COORDINATION WITH OTHERS**

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Contractor shall coordinate his work with the Plant Operation Staff. ~~other contractors that may be working with in the affected portion of the right of way and neighboring properties performing other work.~~ The Contractor shall make the necessary connections and adjustments as required to complete the Work.

**7. SUBSTANTIAL COMPLETION**

For the purposes of this contract, the following requirements must be met before any portion of the work is considered to be substantially complete:

1. All work is complete with the exception of minor completion.
2. All testing performed with satisfactory results meeting the specified criteria.
3. All connections are complete and electrical gear and associated components are in a state of readiness to serve pending release for service by the jurisdictional regulatory agencies or authority.
4. All repair and coating systems have been properly cured.
5. All data specified in the Contract Documents have been delivered to the Owner.
6. All instructions have been provided to the designated Owner's representative(s) in accordance with the Contract Documents.
7. All training has been completed.

END OF SECTION 00110

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**SECTION 00120**

**BASIS OF PAYMENT**

**1. APPLICATION FOR PAYMENT**

The Contractor shall submit an application for payment, no more frequent than monthly, to the Owner/Engineer for review and approval upon partial completion of the project before the Contractor will be compensated for the work performed during that period. The application shall include an updated project schedule and will invoice work completed as detailed in the Contractor's Proposal. The schedule can be submitted as a hard copy with the pay application or as a PDF file. Pay applications will not be approved without approval of the project schedule. Final payment in full will be made when work is completed to the satisfaction of the Owner, and the Owner/Engineer, when it has been shown that the Contractor has discharged all obligations of this Contract (Release of Liens) and when all punch list items have been corrected. Application for payment will be made on the standard AIA form, or type of form approved by the Owner.

**END OF SECTION 00120**

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**SECTION 00800 – SUPPLEMENTARY CONDITIONS**

**PART 1 - GENERAL**

**1.1 CLAIM PERIOD**

- A. No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this Contract.

**1.2 REGULAR WORKING HOURS**

- A. Regular working hours are defined as up to forty hours per week with a maximum of ten hours per day, Monday through Friday, beginning no earlier than 7:00 A.M. and ending no later than 5:00 P.M., excluding holidays. Any work beyond ten hours per day or forty hours per week shall be considered overtime. The Contractor shall not work on holidays. The Contract Time shall not be extended due to holidays falling within the Contract Time. Whenever the Contractor is performing any part of the Work, with the exception of equipment maintenance and cleanup, inspection by Owner's representative will be required. Requests to perform the Work at times other than during regular working hours must be submitted in writing to the Project Representative, at least 48 hours prior to any proposed weekend work or scheduled extended workweeks, to give the Owner ample time to arrange for representation and/or inspection during those periods. Periodic unscheduled overtime on weekdays will be permitted provided that two hours' notice is provided to and acknowledged in writing by the Project Representative prior to the end of the regular working day. Maintenance of the Contractor's equipment and cleanup may be performed during hours other than regular working hours.
- B. Contractor shall reimburse the Owner for additional engineering and/or inspection costs incurred as a result of overtime work in excess of the regular working hours. At Owner's option, overtime costs may either be deducted from the Contractor's monthly payment request or deducted from the Contractor's retention prior to release of final payment.
- C. Engineering/Inspection costs shall be calculated at the following rates:
  - 1. Field Representative \$95/hour
  - 2. Engineer \$165/hour
  - 3. Project Manager \$210/hour

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**1.3 DEFECTIVE WORK**

- A. The Contractor shall not be entitled to an extension of the Contract Time or increase in the Contract Price for correcting or removing defective work.

**1.4 CORRECTIVE WORK**

- A. Where defective or nonconforming Work (including damage to other work resulting therefrom) has been corrected, removed or replaced pursuant to the Contractor's obligations under the Contract Documents including Articles 16.0 and 27.0 of the General Conditions, the correction period set forth in Article 27.0 of the General Conditions 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 and accepted by the Owner.

**1.5 STORED EQUIPMENT AND MATERIALS**

- A. The Contractor shall furnish evidence that payment received on the basis of materials and equipment, not incorporated and suitably stored, has in fact been paid to the respective supplier(s) within sixty (60) days of the Application of Payment on which the material/equipment first appeared. Failure to procure said evidence of payment shall result in the withdrawal of previous approval(s) and removal of the related equipment and materials from the Application of Payment.

**1.6 SUBSTANTIAL COMPLETION**

- A. In addition to the other terms and conditions set forth in the Contract Documents, the Work will not be considered substantially complete unless and until Contractor has completed each of the following to the satisfaction of the Owner:
  1. All components of the Work have been installed, tested and approved.
  2. All repair and coating systems have been properly cured.
  3. All data specified in the Contract Documents have been delivered to the Owner.
  4. All instructions have been provided to the Project Representative in accordance with the Contract Documents.
  5. All training to be provided by Contractor pursuant to the terms of the Contract Documents has been completed.

END OF SECTION 00800



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**SECTION 000808  
SALES TAX EXEMPTION ADDENDUM**

1. Contractor and City entered into a contract dated \_\_\_\_\_, (the “Contract”) for the performance of the WORK described therein, to which an executed copy of this Sales Tax Exemption Addendum (“Addendum”) shall be attached thereto and incorporated therein.
2. Contractor and City desire to enter into an arrangement whereby certain purchases under the Contract can be made through the City as a means of taking advantage of the City’s status of being exempt from sales and use taxes.
3. The City is exempt from sales and use taxes. As such it is exempt from the payment of sales and use tax on purchases of building materials or equipment necessary for the performance of work under construction contracts, provided the City determines it is to its best interest to do so, and provided the purchase of such building materials and equipment are handled in the manner hereinafter described.
4. The City has determined it is in its best interest to provide the opportunity to eliminate the payments of sales tax for building materials or equipment to be used in the construction of this project, and notifies the Contractor of its intent to do so.

**TERMS AND CONDITIONS**

1. The parties intend by this Addendum to comply with the procedures and elements described in Florida Department of Revenue Technical Assistance Advisements 01A-003 (January 8, 2001) and 00A-083 (December 21, 2000), and any conflict or ambiguity in this Addendum shall be resolved in favor of meeting the elements necessary to make tax exempt the purchases contemplated by this Addendum.
2. The City shall, at its sole discretion, have the option to purchase directly from the supplier or vendor, any building materials or equipment included in the Contractor’s bid for the Contract. Contractor shall, from time to time submit, update and keep current, for consideration by the City, a list of all building materials and equipment to be purchased, organized by supplier or vendor. Such list shall include a brief description of the building materials and equipment and the name and address of the supplier or vendor. Suppliers or vendors reasonably anticipated to furnish building materials and equipment (including with an aggregate purchase value of less than \$15,000 need not be listed. Contractor’s initial list is attached hereto and incorporated herein. Building materials and equipment not required for the performance of the Contract shall not be purchased under this Addendum. The City reserves the right to delete or add items from this Addendum when it is in the City’s best interest.
3. The City will be liable for the payment of all purchases properly made hereunder.

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4. Contractor shall notify all suppliers or vendors not to make sales to the Contractor under this Addendum.
5. For each purchase approved by the City to be made under this Addendum, the Contractor shall furnish the City in writing information sufficient for the City to issue to the supplier its City purchase order for the requested building materials or equipment which shall include as an attachment the City's Certificate of Exemption. Suppliers and vendors will render statements for materials purchased to the City in care of the Contractor. After receiving and inspecting the materials when they arrive at the job site, verifying that all necessary documentation accompanies the delivery and conforms with the purchase order, Contractor will forward the invoices to the City's duly authorized representative for approval, processing and delivery to the City for payment. The City will process the invoices and issue payment directly to the supplier or vendor. Contractor will keep and furnish to the City all such records, summaries, reports of purchase orders and invoices, and reports of the status and use of goods handled under this Addendum, as the City may reasonably require.
6. The Contract provides that Contractor will perform the work under the Contract for the Contract Price in the amount of \$[\_\_\_\_\_], as may be amended from time to time as provided in the Contract. Said amount, as amended, due Contractor under the Contract shall be reduced by the sum of all amounts paid by the City for materials and equipment purchased under this Addendum, including any shipping, handling, insurance or other, similar charges paid by the City, and all of the savings of sales and use tax on the purchase of such items.
7. The Contractor shall submit his proposal for base bid and proposals for each Alternate with the inclusion of all required taxes including applicable sales and use tax, the same as if tax were to be paid in the normal manner. Any sales and use tax savings will be effected during the performance of the Contract.
8. Contractor shall immediately notify all subcontractors and material and equipment suppliers of the City's intent to reduce the construction cost of the Project by the purchase of building materials and equipment in the manner herein described and the Contractor shall not withhold his consent to the arrangement.
9. Administrative costs incurred by the Contractor with this Addendum shall be considered to be included in the Total Lump Sum Bid amount for the Work. No addition shall be added to the Contract Price because of the service provided by the Contractor in the purchase of building materials and equipment by the City.
10. All sales and use tax savings on the purchase of building materials and equipment shall be credited to the City and the amount of the Contract Price shall be reduced by the full amount of savings which result from the omission of payment of sales

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and use tax.

11. By virtue of its payment of material and equipment invoices, the City further intends to benefit from any discounts offered for timely payment to the extent of one-half of the discount offered, the remaining one-half to accrue to the Contractor as an incentive for the Contractor to process invoices well within the discount period. The Contractor shall pay any late penalties caused by its failure to facilitate the processing of invoices within the allotted time.
12. The Contractor, notwithstanding the terms and conditions of this Addendum, shall select, describe, obtain approvals, submit samples, coordinate, process, prepare shop drawings, pursue, receive, inspect, store, protect and guarantee the same as would have been the case if the tax saving procedures were not implemented.
13. The Contractor as bailee shall have the obligation of receiving, inspecting, storing and safekeeping all goods and materials purchased on behalf of the City pursuant to this Addendum. Further, the Contractor shall be responsible for the cost of replacing or repairing any goods or materials lost, stolen, damaged or destroyed while in the Contractor's possession or control as bailee, as well as processing all warranty claims for defective goods and materials to the same extent as if such goods had been Contractor-supplied or purchased in the name of the Contractor.
14. Contractor shall maintain separate accounting records for all transactions carried out under the authority granted to it under this Addendum. Such records shall be open to the City or its authorized agent during normal business hours of Contractor.
15. The City will take both legal and equitable title to the building materials and equipment received from the vendor when delivery is made by the vendor at the Project site. Without waiving or releasing Contractor from its obligations under paragraph 13 above, as equitable and legal owner of the materials and equipment purchased under this Addendum, the City shall bear the risk of loss thereto and shall have the insurable interest therein. Therefore, unless already provided for under the terms of the Contract Documents, Contractor shall cause the City to be insured or named as an additional insured as its interest may appear against any loss or damage to such goods to the extent of their full insurable value. All such insurance shall be in such form and through such companies as may be reasonably acceptable to City and Contractor shall provide City certificates thereof requiring each insurer to provide the City ten (10) days written notice in advance of cancellation or modification of coverage. Pursuant to the terms of the Contract Documents, the City will reimburse the Contractor for any additional premium amounts paid solely for such insurances against loss or damage.
16. Contractor shall be fully responsible for all matters relating to the procurement of materials and equipment covered by this Addendum, including but not limited to,

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overseeing that the correct materials and the correct amounts are received timely with appropriate warranties; for inspecting and receiving the goods; and for unloading, handling and storing the materials until installed. Contractor shall inspect the materials when they arrive at the Project site, verify that all necessary documentation accompanies the delivery and conforms with the City's purchase order, and forward the invoice to the City for payment if the goods are conforming and acceptable. Contractor shall verify that the materials conform to Drawings and Specifications and determine before installation that such materials are not defective. Contractor shall manage and enforce the warranties on all materials and equipment covered by this Addendum. Contractor shall be responsible to the City for its failure to fully and timely perform its obligations under this paragraph, and this Addendum generally.

17. When title to the materials and equipment covered by this Addendum passes to the City prior to being incorporated into the Work, the Contractor's possession of the goods is a bailment until such time as each of such goods is returned to the City by being incorporated into the Work.
18. The City shall not be liable for delays in the Work caused by delays in delivery of or defects in the goods covered by this Addendum, nor shall such delays or defects excuse Contractor in whole or in part from its obligation to timely perform the Contract.
19. In the event Contractor objects to the payment of any invoice for goods covered by this Addendum, Contractor shall at no additional cost to the City, provide all assistance, records and testimony necessary or convenient for the City to resolve the supplier's claim for payment.
20. This Addendum and the authority granted to Contractor hereunder may be revoked by the City at any time upon verbal or written notice to Contractor at its offices located at \_\_\_\_\_, during normal business hours.

[END OF SECTION 00808]

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SECTION 00966

EQUAL EMPLOYMENT OPPORTUNITY

INSTRUCTIONS:

This certification is required pursuant to executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clauses; and, if so, whether it has filed all compliance due under applicable instructions.

Where the certification indicates that the contractor has not filed a compliance report due under applicable instructions, such contractor shall be required to submit a compliance report before the owner approves the subcontract or permits work to begin under the subcontract.

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CONTRACTORS CERTIFICATION

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NAME AND ADDRESS OF CONTRACTOR (Include Zip Code)

1. Bidder has participated in previous contract subject to the Equal Opportunity Clause.  
a. Yes  b. No
2. Compliance reports were required to be filed in connection with such contract or contractor.  
a. Yes  b. No
3. Bidder has filed all compliance reports due under applicable instructions, including SF-100.  
a. Yes  b. No
4. Have you ever been or are being considered for sanction due to violation Executive Order 11246, as amended?  
a. Yes  b. No

NAME AND TITLE OF SIGNER (Please type): \_\_\_\_\_

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
DATE

[END OF SECTION 00966]

## SECTION 01000 GENERAL REQUIREMENTS

### PART 1 - GENERAL

#### 1.1. SCOPE AND INTENT

- A. The project consists of the improvements to the generator automatic transfer switch, generator controls, and all other incidentals and appurtenances necessary to complete the work in accordance with the Contract Documents.
- B. Work included:
  - 1.) The Contractor shall furnish all supervision, labor, materials, power, light, heat, fuel, water, tools, appliances, equipment, supplies, and means of construction necessary for proper performance and completion the work. Contractor shall obtain and pay for all required permits. Contractor shall perform and complete the work in the manner best estimated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Owner, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. Contractor shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.
  - 2.) The cost of incidental work described in these General Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made therefor.
  - 3.) The Contractor shall provide and maintain such modern materials, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his workmanship, materials and equipment, prior acceptance of the Engineer notwithstanding.
- C. Public Utility installations and Structures:
  - 1.) Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, vaults, manholes and all other appurtenances and facilities pertaining thereto whether owned or controlled by the Owner, other governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage, water or other public or private property which may be affected by the work shall be deemed included hereunder.

- 2.) The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. This data is not guaranteed as to their completeness or accuracy, and it is the responsibility of the Contractor to make investigations to fully understand the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.
- 3.) The Contractor shall protect all public utility installations and structures from damage during the Work. Access across any buried public utility installation or structure shall be made only in such locations and by means accepted by the Engineer. The Contractor shall so arrange his operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at no additional expense to Owner or Engineer. All existing public utilities damaged by the Contractor which are shown on the Drawings or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as directed by the Engineer. No separate payment shall be made for such protection or repairs to public utility installations or structures.
- 4.) Public utility installations or structures owned or controlled by the Owner or other governmental body which are shown on the Drawings to be removed, re-located, replaced or rebuilt by the Contractor shall be considered as a part of the general cost of doing the Work and shall be included in the prices bid for the various Contract items. No separate payment shall be made therefor.
- 5.) Where public utility installations or structures owned or controlled by the Owner or other governmental body are encountered during the course of the Work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the Engineer, removal, relocation, replacement or re-building is necessary to complete the Work under this Contract, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be paid for as extra work as provided in the Agreement.
- 6.) The Contractor shall, at all times in performance of the Work, employ accepted methods and exercise reasonable care and skill so as to avoid unnecessary de-lay, injury, damage or destruction of public utility installations and structures; and shall, at all times in the performance of the Work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.

- 7.) The Contractor shall give written notice to Owner, other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight (48) hours in advance of breaking ground in any area or on any unit of the Work. In accordance with Florida Statute 556, the Contractor shall also call Florida State One Call of Florida, Inc., (also called Sunshine State One Call Center) at least 48 hours prior to excavating in any public rights-of-way. Their telephone number is (800) 432-4770.
- 8.) The maintenance, repair, removal, relocation or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the owners of such utilities.
- 9.) The Contractor shall make provisions to avoid impacting existing facilities operation or maintenance activities. If an impact is anticipated, the Contractor shall propose a means to maintain existing activities, subject to approval by the Owner. The Owner will not be responsible for any costs associated with such proposed modification.

## 1.2. DRAWINGS AND PROJECT MANUAL

- A. Drawings: When obtaining data and information from the Drawings, figures shall be used in preference to scaled dimensions, and large-scale drawings in preference to small scale drawings.
- B. Copies Furnished to Contractor: After the Contract has been executed, the Contractor will be furnished up to five (5) complete sets of plans and five (5) copies of the Project Manual (Contract Requirements and Specifications) and all addenda.
- C. Supplementary Drawings:
  - 1.) When, in the opinion of the Engineer, it becomes necessary to explain more fully the work to be done or to illustrate the Work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the Engineer and the Contractor will be furnished up to five (5) sheets and one (1) reproducible copy of any revised specifications.
  - 2.) The Supplementary Drawings shall be binding upon the Contractor with the same force as the Drawings. Where such Supplementary Drawings require either less or more than the estimated quantities of work, credit to the Owner or compensation therefor to the Contractor shall be subject to the terms of the Agreement.
- D. Contractor to Check Drawings and Data:
  - 1.) The Contractor shall verify all dimensions, quantities and details shown on the Drawings, Supplementary Drawings, schedules, Specifications, or other data received from the Engineer, and shall notify him of all errors, omissions, conflicts, and discrepancies found therein. Failure to



discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at no additional expense to Owner or Engineer. Contractor will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the Engineer, should such errors or omissions be discovered.

- 2.) All schedules are given for the convenience of the Owner and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract and additional work claimed by Contractor.

E. Specifications:

- 1.) The Technical Specifications consist of three parts: General, Products and Execution. The General Section contains General Requirements which govern the work. Products and Execution modify and supplement these by detailed requirements for the work and shall always govern whenever there appears to be a conflict.

F. Intent:

- 1.) All work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the Work, is required and shall be performed by the Contractor as though it were specifically delineated or described.
- 2.) The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

### 1.3. MATERIALS AND EQUIPMENT

A. Manufacturer:

- 1.) The names of proposed manufacturers, material suppliers, and dealers who are to furnish materials, fixtures, equipment, appliances, or other fittings shall be submitted to the Engineer for acceptance, prior to construction, to afford proper investigation and checking. No manufacturer will be accepted for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. Contractor shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified

and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

- 2.) All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract and will not impose any liability on the Owner or Engineer.
  - 3.) Any two or more pieces of material or equipment of the same kind, type, or classification, and being used for identical types of service, shall be made by the same manufacturer.
- B. Delivery:
- 1.) The Contractor shall deliver materials to the site in ample quantities to ensure the most speedy and uninterrupted progress of the work so as to complete the work within the allotted time. However, the Contractor shall not store materials on-site for more than ninety (90) days before installation or store equipment for more than thirty (30) days before installation. This will not supersede more stringent requirements noted elsewhere in the Contract Documents.
  - 2.) The Contractor shall also coordinate deliveries in order to avoid delay in, or impede, the progress of the work of any related Contractor.
  - 3.) All materials and equipment shall be properly stored on site in accordance with these specifications and the manufacturer's recommendations. Items stored improperly will be refused for installation.
- C. Tools and Accessories:
- 1.) The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete new and unused set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain or repair the equipment. Such tools and appliances shall be furnished in accepted painted steel cases, properly labeled, and equipped with good grade cylinder locks and duplicate keys.
  - 2.) Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place, and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight, and principal rate data.
- D. Service of Manufacturer's Engineer:
- 1.) The Contract prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation, the equipment in conformity with the Contract Documents.

- 2.) Prior to the equipment being placed in permanent operation by the Owner, such engineer or superintendent shall make all adjustments and tests required by the Engineer to prove that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the Owner in the proper operation and maintenance of such equipment.

#### 1.4. INSPECTION AND TESTING

##### A. General:

- 1.) For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Two (2) originally executed and five copies of the reports shall be submitted, and authoritative certification thereof shall be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.
- 2.) If, in the making of any test of any material or equipment, it is ascertained by the Engineer that the material or equipment does not comply with the Contract Documents, the Contractor will be notified thereof and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the Owner or Engineer.
- 3.) Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.
- 4.) The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the Owner executes final acceptance of the work.

##### B. Costs:

- 1.) The cost of preliminary shop and field tests of equipment and certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the Contract price.
- 2.) Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the Owner for compliance. The Contractor is responsible for providing sufficient information to allow Engineer to determine that the item of material or equipment proposed is equivalent to that specifically named and an acceptable substitute therefor. If in the sole discretion of the Engi-

neer, tests of the proposed substitute items are necessary for Engineer's review, the substitute items will be tested by the Contractor at no additional cost to the Owner.

C. Inspection of Materials:

- 1.) The Contractor shall give notice in writing to the Engineer, sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the Engineer will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or Engineer will notify the Contractor that the inspection will be made at a point other than the point of manufacture.
- 2.) The Contractor must comply with these provisions before shipping any material-al. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

D. Certificate of Manufacture:

- 1.) The Contractor shall furnish to Engineer authoritative evidence in the form of Certificate of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents.
- 2.) These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product to be provided by the manufacturer. Two (2) original and five (5) copies are to be provided to the Engineer.

E. Shop Tests:

- 1.) Testing for pressure, duty, capacity, rating, efficiency, performance, function or special requirements which are specified shall be tested in the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents.
- 2.) No such equipment or materials shall be shipped to the Work site until the Engineer notifies the Contractor, in writing, that the results of such tests are acceptable.
- 3.) Two (2) signed original and five (5) copies of the manufacturer's actual test data and interpreted results thereof, accompanied by two (2) signed original and five (5) copies of a certificate of authenticity sworn to by a responsible official of the manufacturing company and/or independent laboratory, shall be forwarded to the Engineer for acceptance.

- 4.) The cost of shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.
  - F. Final Inspection: During such final inspections, the Work shall be clean and functional. In no case will the final estimate be prepared until the Contractor has complied with all requirements set forth and the Engineer and Owner have made their final inspection of the entire Work and are satisfied that the entire Work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.
- 1.5. TEMPORARY STRUCTURES
- A. Temporary Fences: If, during the course of the Work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall provide a suitable temporary fence at no additional cost to Owner or Engineer.
  - B. Responsibility for Temporary Structures: In executing the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance or operation and will indemnify and hold harmless the Owner and Engineer from all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.
- 1.6. ACCIDENT PREVENTION
- A. Precautions shall be exercised at all times for the protection of person and property. The safety provisions of applicable laws, building and construction codes shall be observed.
  - B. The Contractor shall comply with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596), and under Hours and Safety Standards Act Section 107 of the contract Work. Hours and Safety Standards Act (PL 91-54), except where state and local safety standards exceed the federal requirements and except where state safety standards have been approved by the Secretary of Labor in accordance with provisions of the Occupational Safety and Health Act, shall be complied with.
  - C. First Aid: The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall always provide ready access thereto when men are employed on the Work.
- 1.7. LINES AND GRADES
- A. Grade:
    - 1.) All work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as provided by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

- 2.) The Owner will provide available information regarding benchmarks and base line controlling points on the drawings. Reference marks for lines and grades as the work progresses will be located by Contractor to cause as little inconvenience to the prosecution of the Work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. The Contractor shall remove any obstructions placed contrary to this provision.
- B. Surveys:
- 1.) The Contractor shall furnish and maintain, at no additional expense to Owner or Engineer, stakes, temporary benchmarks, and other such materials.
  - 2.) The Contractor shall check such reference marks by such means as he may deemed necessary and, before using them, shall provide written notification to Engineer's regarding presumed inaccuracies.
  - 3.) The Contractor shall, at no additional expense to Owner or Engineer, establish all working or construction lines and grades as required from the reference marks made available by the Owner, and shall be solely responsible for the accuracy thereof.
- C. Safeguarding Marks:
- 1.) The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the Work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly in-stalled due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.
  - 2.) The Contractor shall safeguard all existing property corners, monuments, and marks adjacent to but not related to the Work, whether known or discovered, and shall bear the cost of reestablishing them in identical manner if disturbed or destroyed.
- 1.8. ADJACENT STRUCTURES AND LANDSCAPING
- A. Responsibility:
- 1.) The Contractor shall also be entirely responsible and liable for all damage or in-jury as a result of Contractor's operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the Work.
  - 2.) The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Drawings, and the removal, relocation and reconstruction of such items called for on the Drawings or specified shall be included in the various Contract Items and no separate payments will be

- made therefore.
- 3.) Contractor is expressly advised that the protection of buildings, structures, tanks, pipelines, etc. and related work adjacent and in the vicinity of his operations, wherever they may be, is solely their responsibility.
  - 4.) Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the Work shall be performed by and be the responsibility of the Contractor.
  - 5.) Contractor shall, before starting operations, make an examination of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the Owner and Engineer. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be provided to the Owner. See also Section 01850.
  - 6.) Prior to the beginning of any excavations the Contractor shall advise the Owner of all structures on which Contractor intends to perform work or which performance of the Work will affect.
- B. Protection of Trees: All trees and shrubs shall be adequately protected by the Contractor with boxes and in accordance with ordinances governing the protection of trees. Excavated materials shall be placed so as not to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or Contractor's employees shall be replaced by Contractor with new stock of similar size and age, at its proper season and at the sole expense of the Contractor.
- C. Lawn Areas: Lawn areas shall be left in as good condition as before the starting of the Work. Where sod is to be removed, it shall be carefully removed, and later replaced, or the area where sod has been removed shall be restored with new sod. The price of such work shall have been included in the Bid Total.
- D. Restoration of Fences:
- 1.) Any fence, or part thereof, that is damaged or removed during the course of the Work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the Work.
  - 2.) The manner in which the fence is repaired or replaced, and the materials used in such work shall be subject to the acceptance of the Owner and Engineer.
  - 3.) The cost of all labor, materials, equipment, and work for the replace-

ment or re-pair of any fence shall be deemed included in the appropriate Contract Item or items, or if no specific item is provided therefor, as part of the overhead cost of the work, and no additional payment will be made therefor.

#### 1.9. PROTECTION OF WORK AND PUBLIC

##### A. Barriers and Lights:

- 1.) During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers and lights as will effectually prevent accidents.
- 2.) The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and flagmen at all places where the Work causes obstructions to the normal traffic or constitutes in any way a hazard to the public.

##### B. Noise:

- 1.) The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing equipment shall be equipped with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers. The Contractor shall construct sound barriers as necessary to eliminate noise.
- 2.) In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.
- 3.) Noise levels shall be as specified in per applicable local ordinances, unless otherwise specified within the contract documents.
- 4.) If the proper and efficient prosecution of the Work requires operations during the night, the written permission of the Owner shall be obtained before starting such items of the Work.

C. Access to Public Services: Neither the materials excavated, nor the materials or equipment used in the construction of the Work shall be so placed as to prevent free access to all fire hydrants, valves, or manholes.

D. Dust Prevention: The Contractor shall prevent dust nuisance from Contractor's operations or from traffic by keeping the roads and/or construction areas dampened with water at all times.

#### 1.10. CUTTING AND PATCHING

- A. The Contractor shall do all cutting, fitting or patching of the Work that may be re-quired to make the several parts thereof join and coordinate in a manner satisfactory to the Engineer and in accordance with the Drawings and Specifications.
- B. The work must be done by competent workmen skilled in the trade re-quired by the restoration.



## 1.11. CLEANING

### A. During Construction:

- 1.) During construction, the Contractor shall, at all times, keep the site of the Work and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the Owner or Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable.
- 2.) The Contractor shall remove from the site all of Contractor's surplus materials and temporary structures when no further need therefore develops. Contractor shall be responsible and liable for all spillage and incur all associated costs including, but not limited to, costs related to repair and maintenance resulting from damages thereof, and fines that may be levied as a result of citations given by State or local regulatory agencies.

**B. Final Cleaning:**

- 1.) At the conclusion of the Work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly removed, and shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances to a facility permitted to manage these materials.
- 2.) The Contractor shall thoroughly clean all equipment and materials installed and shall deliver such materials and equipment undamaged in a bright, clean, polished, and new operating condition.

**1.12. MISCELLANEOUS****A. Protection Against Siltation and Bank Erosion:**

- 1.) The Contractor shall arrange Contractor's operations and construct erosion control devices to minimize siltation and bank erosion on construction sites and on existing or proposed water course and drainage channels.
- 2.) The Contractor, at no additional expense to Owner or Engineer, shall remove any siltation deposits and correct any erosion problems as directed by the Engineer which results from Contractor's construction operations.

**B. Protection of Wetland Areas:**

- 1.) The Contractor shall properly dispose of all surplus material, including soil, in accordance with local, state, and federal regulations and with Owner's instruction.
- 2.) Under no circumstances shall surplus material be disposed of in wetland areas as defined by the Florida Department of Environmental Protection.

**C. Existing Facilities:** The work shall be so conducted to maintain existing traffic lanes in operation, except in accordance with the approved temporary MOT plan.

**D. Use of Chemicals:** All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfection, polymer, reactant, or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions. Contractor shall obtain written approval from Owner prior to use of chemicals.

**E. Cooperation with Other Contractors and Forces:**

- 1.) During progress of work under this Contract, it may be necessary for other contractors and persons employed by the Owner to work in or about the project.
- 2.) The Owner reserves the right to put such other contractors to work and

to afford such access to the work area to be performed at times as the Owner deems proper.

- 3.) The Contractor shall not impede or interfere with the work of such other contractors engaged in or about the Work and shall so arrange and conduct the work that such other contractors may complete their work at the earliest date possible.
- F. Construction shall be conducted and shall result in construction of the improvements of this project in full accordance with the conditions of the permits granted for the project.

#### 1.13. PRE-EXISTING CONDITIONS

- A. The Contractor shall conduct a pre-existing conditions survey of each of the existing structures and other areas that are to remain during the Work. The survey shall establish the state of the property before construction as a basis for any claims of damage that may occur. See also Section 01850.

#### 1.14. NOTICES

- A. In conformance with the requirements of the General Conditions all notices or other papers required to be delivered by the Contractor to the Owner, except the bids, shall be delivered to 17007 Panama City Beach Parkway, Panama City Beach, FL 32413.

#### 1.15. COORDINATION OF PLANS, SPECIFICATIONS AND SPECIAL PROVISIONS

- A. In case of discrepancy, the most stringent condition will govern from approved City of Panama City Beach approved specifications, standards, or codes or the project plans or specifications. Computed dimensions shall govern over scaled dimensions. NOTE: CONTRACTOR MUST BE AWARE THAT SOME SECTION(S) OR SUBSECTION(S) DO NOT SPECIFICALLY APPLY TO THIS PROJECT.

#### 1.16. LAYING OUT THE WORK

- A. Prior to commencement of construction the Engineer will have established vertical and horizontal controls throughout the work site which the Contractor shall use in setting out the work. The Contractor shall be responsible for establishing all lines and grades together with all reference points as required by the various trades for all work under this Contract. All required layout shall be done using competent and experienced personnel under the supervision of a Land Surveyor registered in the State of Florida.
- B. The Contractor shall provide all labor and instruments and stakes, templates, and other materials necessary for marking and maintaining all lines and grades. The lines and grades shall be subject to any checking the Owner or Engineer may decide necessary.
- C. No separate cost item is provided for laying out the work; the cost of which

shall be included in the unit price for items in the Proposal.

#### 1.17. PRE-BID AND PRECONSTRUCTION CONFERENCES

- A. A pre-bid conference will be held to assist interested contractors in submitting proper bids. At this time, all questions concerning the contract documents will be addressed. All prospective bidders are strongly encouraged to attend.
- B. A preconstruction conference will be held with the awarded Contractor to establish procedures and to obtain working understanding among the parties concerning the project.

#### 1.18. PERMITS AND LICENSES

- A. Before starting the work, the Contractor shall obtain and possess all required licenses and permits.

#### 1.19. OBSTRUCTIONS

- A. All water pipes, storm drains, force mains, gas or other pipe, telephone or power cables or conduits, and all other buried or unburied obstructions, whether or not shown, shall be temporarily removed from, or supported across pipeline and other excavations. Before disconnecting any pipes or cables, the Contractor shall obtain permission from their owner, or shall make suitable arrangements for their disconnection by their owner. The Contractor shall be responsible for any damage to any such pipes, conduits, or cables, and shall restore them to service promptly as soon as the work has progressed past the point involved. Approximate locations of known water, sanitary, drainage, power, and telephone installations along the route of new pipelines or in the vicinity of new work are shown but must be verified in the field by the Contractor. The Contractor shall uncover these pipes, ducts, cables, etc., carefully, by hand, prior to installing new piping. Any discrepancies or differences found shall be brought to the attention of the Owner in order that necessary changes may be made to permit installation of new pipe.

#### 1.20. DAMAGE TO EXISTING STRUCTURES AND UTILITIES

- A. The Contractor shall be responsible for and make good all damage to pavement, side-walks, pedways, buildings, telephone or other cables, water pipes, sanitary pipes, or other structures which may be encountered, whether or not shown on the drawings.
- B. Information shown on the Drawings as to the location of the existing utilities has been prepared from the most reliable data available to the Engineer. This information is not guaranteed, however, and it shall be this Contractor's responsibility to determine the location, character, and depth of any existing utilities. They shall assist the utility companies, by every means possible, to determine said locations. Extreme caution shall be exercised to eliminate any possibility of any damage to utilities resulting from their activities.

**PART 2 - PRODUCTS<sup>1</sup>**

**PART 3 - EXECUTION<sup>2</sup>**

**END OF SECTION 01000 GENERAL REQUIREMENTS**

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1 PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
2 PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

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## SECTION 01010 SUMMARY OF WORK

### PART 1 - GENERAL

#### 1.1. LOCATION OF WORK

- A. All of the work of this Contract is located at a site within the City of Panama City Beach at the address of 200 N Gulf Blvd, Panama City Beach, FL 32413. This parcel is owned by the City of Panama City Beach and is the active site know as Panama City Beach Wastewater Treatment Facility #1.

#### 1.2. SCOPE OF WORK

- A. The Contractor shall furnish all supervision, project management, labor, materials, equipment, tools, services, and incidentals to complete all work required by these Specifications and as shown on the Drawings.
- B. The Contractor shall perform the work complete, in-place, and ready for continuous service, and shall include testing, permits, and cleanup and restoration required during this construction.
- C. All materials, equipment, skills, tools and labor which is reasonably and properly inferable and necessary for the proper completion of the work in a substantial manner and in compliance with the requirements stated or implied by these Specifications or Drawings shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the Contract Documents or not.
- D. The Contractor shall comply with all municipal, county, state, federal, and other codes which are applicable to the proposed construction work.

#### 1.3. DESCRIPTION OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and construct the improvements to the Panama City Beach WWTF #1 Generator and ATS Systems, in its entirety as shown on the Drawings and specified herein.
- B. The work includes improvements to, but is not necessarily limited to, the following major items of Work:



Item of Work	Scope of Improvements
Generator Automatic Transfer Switch Improvements	<p>The City of Panama City Beach (the City) Wastewater Treatment Facility (WWTF) generators and switch gear control system consisting of programmable logic controllers (PLC) and human machine interface (HMI) touch panels have proprietary password protected logic and configuration that prevents the City from modifying or easily maintaining the system. This situation has resulted in higher-than-expected service fees by the generator manufacturer. The City would like to replace the existing switch gear control system with a system that the City can easily modify and maintain.</p>
Generator Controls Improvements	<p>The tasks in this scope of services are the improvements to the generator control system and switch gear control system and the integration of these systems. This system shall integrate controls for all four (4) generators at the City's WWTF.</p>

1.4. WORK SEQUENCE

- A. Perform work to ensure completion of the work in the contract time. Completion dates of the various stages shall be in accordance with the Specification Section 01315 and approved construction schedule submitted by the Contractor.
- B. Substantial Completion: To satisfy the definition of substantial completion, all work required to place the plant in operation shall be constructed complete, field tested and fully operational including Owner training, subject to Engineer's approval:
- C. Final Completion: The last stage of construction shall be final construction and shall include the final remaining items subject to Engineer's approval as well as all items listed in Section 01700, Contract Closeout.

1.5. CONSTRUCTION AREAS

- A. Contractor shall limit his use of the construction areas for Work and for storage, to allow for:

- 1.) Work by other Contractors.
  - 2.) Owner use.
  - 3.) Public use.
- B. Coordinate use of work site.
- 1.) Assume full responsibility for the protection and safekeeping of Products under this Contract, stored on the site.
  - 2.) Move any stored Products, under Contractor's control which interfere with operations of the Owner or separate Contractor.
  - 3.) Obtain and pay for the use of additional storage or work areas needed for operations.
- C. Off-site storage facilities shall be as approved by the Engineer, at no additional cost to the Owner.
- D. Contractor shall at all times conduct his operations as to insure the least inconvenience to the general public.

#### 1.6. PLANS AND SPECIFICATIONS

- A. The Technical Specifications consist of three parts: General, Products, and Execution. The General Section contains General Requirements which govern the work. Products and Execution modify and supplement these by detailed requirements of the work and shall always govern whenever there appears to be a conflict.
- B. Intent: All work called for in the Specifications applicable to this Contract, but not shown on the Plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Plans or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.
- C. The inclusion of the General Requirements (or work specified elsewhere) in the General part of the Specifications is only for the convenience of the Contractor and shall not be interpreted as a complete list of related Specification Sections.

#### 1.7. OWNER OCCUPANCY

- A. Owner shall have full access to and use of all existing wastewater collection, pumping and treatment facilities, and potable and irrigation mains during the entire period of construction for the conduct of his normal operations.

Cooperate with Engineer and Owner's On-Site Representative in all construction operations to minimize conflict and to facilitate Owner usage.

- B. The treatment facility must remain in continuous operation and maintain in compliance with all regulatory requirements at all times and under all conditions.

#### 1.8. PARTIAL OWNER OCCUPANCY

- A. The Contractor shall schedule his operations for completion of portions of the Work, as designated, for the Owner's occupancy prior to Substantial Completion of the entire Work.

### **PART 2 - PRODUCTS<sup>1</sup>**

### **PART 3 - EXECUTION<sup>2</sup>**

## **END OF SECTION 01010 SUMMARY OF WORK**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

## SECTION 01020 ALLOWANCES

### PART 1 - GENERAL

#### 1.1. DESCRIPTION

- A. Definition and Explanations: Certain requirements of the work related to each allowance are shown and specified in the Contract Documents. The allowance has been established in lieu of additional requirements for that work, and further requirement thereof (if any) will be issued by Change Order.
  - 1.) Testing and Laboratory Services: Allowance to cover cost of project field testing fees at the plant site. This allowance will be used and controlled by the Owner to attain and meet testing requirements of the project.
  - 2.) Vibration Monitoring: Allowance to cover the cost of field monitoring the vibration from construction activities as specified by the contract documents.

### PART 2 - PRODUCTS

#### 2.1. SCHEDULE OF ALLOWANCES

- A. General: The following allowance amounts are included in the Total Lump Sum Bid price, for the corresponding units of work as described:
  - Testing and Laboratory Services:  
\$10,000

### PART 3 - EXECUTION

#### 3.1. PAYMENT OF ALLOWANCES

- A. The Contractor shall maintain records for claims on this section.
- B. Any portion of the allowance not used by the Contractor shall be deducted from the final contract price of the project.

## END OF SECTION 01020 ALLOWANCES

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## SECTION 01026 MEASUREMENT AND PAYMENT

### PART 1 - GENERAL

#### 1.1. RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.2. SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
  - 1.) Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 2.) Division 1 Section "Closeout Procedures" for administrative requirements governing project closeout.

#### 1.3. DEFINITIONS

Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### 1.4. SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
  - 1.) Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
    - (i) Application for Payment forms with Continuation Sheets.
    - (ii) Submittals Schedule.
    - (iii) Contractor's Construction Schedule.
  - 2.) Submit the Schedule of Values to Engineer at earliest possible date but no later than within seventy-two (72) hours of the effective date of this contract.
- B. Format and Content: Use the bid form and/or specifications table of contents as a guide to establish line items for the Schedule of Values.
- C. Identification: Include the following Project identification on the Schedule of Values:
  - (i) Project name and location.
  - (ii) Name of Engineer and Engineer's project number.

- (iii) Contractor's name and address.
    - (iv) Date of submittal.
  - 2.) Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports.
  - 3.) Round amounts to nearest whole dollar; total shall equal the Contract Sum.
  - 4.) Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - (i) Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
  - 5.) Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - 6.) Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
  - 7.) Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
- D. Schedule of Values Form: Use form provided at the end of this Section for Schedule of Values. Contractor may use their own form provided such form is approved by both the Owner and Engineer.
- E. The quantities shown for unit price bid items represent in-place installed quantities. Additional payment will not be allowed for waste materials, compaction/expansion, etc. or any quantities in excess of in-place quantities shown within the Contract, unless the Contract is amended to include additional work.
- 1.5. APPLICATIONS FOR PAYMENT
- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.
    - 1.) Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
  - B. Payment Application Times: Progress payments shall be submitted to Engineer by the 15th day of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
  - C. Payment Application Forms: Use form provided at the end of this Section for Applications for Payment. Contractor may use their own form provided



such form is approved by both the Owner and Engineer.

- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.
  - 1.) Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
  - 2.) Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Engineer. One copy shall include waivers of lien and similar attachments if required.
  - 1.) Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  - 1.) Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2.) When an application shows completion of an item, submit final or full waivers.
  - 3.) Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4.) Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1.) Schedule of Values.
  - 2.) Contractor's Construction Schedule (preliminary if not final).
  - 3.) Submittals Schedule (preliminary if not final).
  - 4.) Certificates of insurance and insurance policies.
  - 5.) Performance and payment bonds.
- H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
  - 1.) Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the

**Contract Sum.**

- I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
  - 1.) Evidence of completion of Project closeout requirements.
  - 2.) Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  - 3.) Updated final statement, accounting for final changes to the Contract Sum.
  - 4.) Evidence that claims have been settled.
  - 5.) Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  - 6.) Final, liquidated damages settlement statement.

**PART 2 - PRODUCTS<sup>1</sup>****PART 3 - EXECUTION****3.1. BID ITEMS SUMMARY**

- A. The scope of this section defines the items included in each bid item in the Bid Form/Schedule of these Specifications for the WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT. Payment will be made based on the specified items included in the description in this section for each bid item.
- B. The Contractor's attention is called to the fact that the quotations for the various items of work are intended to establish a total price for completing the work in its entirety. Should the Contractor feel that the cost for any item of work has not been established by the Bid Schedule or Payment Items, the Contractor shall include the cost for that work in some other applicable bid item, so that the proposal for the project reflects the Contractor's total price for completing the work in its entirety.
- C. All contract prices included in the Bid Form section will be full compensation for all supervision, labor, materials, tools, equipment and incidentals necessary to complete the construction as shown on the Drawings and/or as specified in the Contract Documents to be performed under this contract. Payment for all items listed in the Schedule of Values will constitute full compensation for all work shown and/or specified to be performed under

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION

this project.

- D. The quantities shown for unit price bid items represent in-place installed quantities. Additional payment will not be allowed for waste materials, compaction/expansion, etc. or any quantities in excess of in-place quantities shown within the Contract, unless the Contract is amended to include additional work.

### 3.2. BASE BID ITEMS

#### A. Total Base Bid (Items 1 - 18)

Total compensation and payment to be made for all work required to complete the construction as shown on the Drawings and/or specified in the Contract Documents for the WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT..

#### B. Bid Item No. 1 – Mobilization/Demobilization

- 1.) Payment for the mobilization and demobilization shall be limited to twenty-five (25) percent at the first payment application and at least ten (10) percent at the final pay application. The remaining sixty (65) percent shall be divided among the pay applications following the initial pay application.
  - (i) Price for this item shall not exceed five (5) percent of the total base bid contract price. This item is a lump sum.

#### C. Bid Item No. 2 – Wiring, Conduit, Materials, Etc.

- 1.) This bid item includes all labor, materials, and equipment required for the installation of wiring, conduit, and any other electrical materials or equipment not already covered by another bid item required to perform the electrical scope of work items described in the contract documents. This item is a lump sum.

#### D. Bid Item No. 3 – Controllers, Interfaces, Enclosures, Etc.

- 1.) This bid item includes all labor, materials, and equipment required for the installation of controllers, interfaces, enclosures, and any other instrumentation and controls materials or equipment not already covered by another bid item required to perform the instrumentation and controls scope of work items described in the contract documents. This item is a lump sum.

#### E. Bid Item No. 4 – All Other Work Not Previously Described.

- 1.) This bid item includes all labor, materials, and equipment required for the installation of scope of work items not already covered by another bid item required to perform the work items described in the contract documents. This item is a lump sum.

F. Bid Item No. 5 – Bonds & Insurances

- 1.) Payment for the Bonds and Insurance shall be limited to seventy (70) percent at the first payment application and the remaining thirty (30) percent will be payable at the final months partial payment application.
  - (i) Price for this item shall not exceed one (1) percent of the total base bid contract price. This item is a lump sum.

G. Bid Item No. 6 – Indemnification

- 1.) This bid item includes a lump sum indemnification amount of \$25.00.

H. Bid Item No. 7 – Record Drawings and O&M Manuals

- I. These bid items include all work, equipment, and materials associated and required for the performance of constructions surveying, production of record drawings per standards, and the production or furnishment of Operations and Maintenance manuals required by the project.
  - (i) Price for this item shall not exceed one and a half (1.5) percent of the total base bid contract price. This item is a lump sum.

J. Bid Item No. 8 – Testing Allowance

- 1.) This bid item includes all labor, materials, and equipment required for testing required to perform the work items described in the contract documents. This item is a lump sum of \$10,000.00.

K. Bid Item No. 8 – Miscellaneous Changes Requested by Owner

- 1.) This bid item includes all labor, materials, and equipment required for any miscellaneous changes to the scope of work requested by the owner that will be required to perform the work items described in the contract documents and modified by the request. This item is a lump sum of \$50,000.00.

3.3. SCHEDULE OF VALUES FORM

- A. On following page:

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

Pay Application No. \_\_\_\_\_

Item #	Description	Value	Change Order Value	Previous Value	Completed This Period		Completed To Date		Balance Remaining
					Value	%	Value	%	
<b>Totals (Page 1)</b>									

SCHEDULE OF VALUES FORM (CONTINUED)

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

Pay Application No. \_\_\_\_\_

Item #	Description	Value	Change Order Value	Previous Value	Completed This Period		Completed To Date		Balance Remaining
					Value	%	Value	%	
<b>Totals (Page 2)</b>									
<b>Totals (from Page 1)</b>									
<b>Totals</b>									

APPLICATION AND CERTIFICATE FOR PAYMENT

APPLICATIONS MUST BE SUBMITTED ON EJCDC FORM C-620 OR AIA  
DOCUMENT G-703

**END OF SECTION 01026 MEASUREMENT AND PAYMENT**

## SECTION 01030 SPECIAL PROJECT PROCEDURES

### PART 1 - GENERAL

#### 1.1. WORKSMANSHIP, MATERIAL, AND EQUIPMENT

- A. When a particular product is specified or called for, it is intended and shall be understood that the proposal tendered by the Contractor included those products in his bid. The alternate product or products submitted by the Contractor shall meet the requirements of the specifications and shall, in all respects, be equal to the products specified by name herein.
- B. All apparatus, mechanism, equipment, machinery, and manufactured articles for incorporation into the Work shall be the new and unused standard products of recognized reputable Manufacturers.
- C. Contractor must provide for the disposal of excess excavated material.

#### 1.2. RESPONSIBILITY OF CONTRACTOR

- A. The Contractor shall be responsible for the entire Work determined by the Drawings, Specifications and Contract from the date of the starting of the Work until it is accepted as evidence of approval of the Completion Certificate by the Owner. Contractor shall be responsible for removals, renewals, and replacements due to action of the elements and all other causes except as otherwise provided in the Specifications. The Contractor shall keep the Contract under his own control, and it shall be his responsibility to see that the Work is properly supervised and carried on faithfully and efficiently. The Contractor shall supervise the work personally or shall have a competent, English-speaking superintendent or representative, who shall be on the site of the project at all working hours, and who shall be fully authorized by the Contractor to direct the performance of the work and to make arrangements for all necessary materials, equipment and labor without delay.
- B. Renewals or repairs necessitated because of defective materials or workmanship, or due to action of the elements or other natural causes, including fire and flood, prior to the acceptance as determined by the Completion Certificate, as appropriate, shall be done anew in accordance with the Contract and Specifications at the expense of the Contractor.

#### 1.3. PROVISIONS FOR CONTROL OF EROSION

- A. Sufficient precautions shall be taken during construction to minimize the run-off of polluting substances such as silt, clay, fuels, oils, bitumen, calcium chloride, or other polluting materials harmful to humans, fish, or other life, into the supplies and surface waters of the state. Control measures must be adequate to assure that turbidity in the receiving water will not be increased more than 10 nephelometric turbidity units (NTUs), or as otherwise required by the state or other controlling body, in water used for public water supply



or fish unless limits have been established for the particular water. In surface water used for other purposes, the turbidity must not exceed 25 NTU unless otherwise permitted. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.

- B. Erosion evident within the limits of construction shall be the responsibility of the Contractor during the full term of the contract and for the full two (2) year guarantee period. Areas subject to erosion during this time shall be fully restored to original or design conditions (as applicable) within 10 days of notice to the Contractor.

#### 1.4. ON-SITE STORAGE

The Contractor's attention is invited to special storage requirements and possible charges for noncompliance of on-site storage requirements for materials and equipment as specified in Section 01600.

#### 1.5. HURRICANE PREPAREDNESS PLAN

- A. Within 30 days of the date of Notice to Proceed, the Contractor shall submit to the Engineer and Owner a Hurricane Preparedness Plan. The plan should outline the necessary measures which the Contractor proposes to perform at no additional cost to the Owner in case of a tropical storm or hurricane warning. Such measures shall be in accordance with local and state requirements.
- B. In the event of a declared tropical storm or hurricane warning issued by the National Weather Service within 100 miles of the project site, Contractor will, and will cause Subcontractors to carefully protect the Work and materials against damage or injury from the weather. If, in the opinion of Engineer, any portion of Work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or Subcontractors to so protect the Work, such Work and materials shall be removed and replaced at the expense of Contractor.

#### 1.6. WARRANTIES

- A. Unless specified otherwise in the Contract Documents, all equipment supplied under these Specifications shall be warranted by the Contractor and the equipment Manufacturers for a period of one (1) year. Warranty period shall commence on the date of final acceptance by the Owner.
- B. The equipment shall be warranted to be free from defects in workmanship, design, and materials. If any part of the equipment should fail during the warranty period, it shall be replaced in the machine(s) and the unit(s) restored to service at no expense to the Owner.
- C. The Manufacturer's warranty period shall run concurrently with the Contractor's warranty or guarantee period. No exception to this provision shall be allowed. The Contractor shall be responsible for obtaining equipment warranties in accordance with Section 01740 from each of the respective supplier or Manufacturers for all the equipment specified. The form of warranty

is included at the end of this section.

#### 1.7. UTILITY CROSSINGS

- A. It is intended that wherever existing utilities such as water, chemical, electrical or other service lines must be crossed, deflection of the pipe within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings.
- B. However, when in the opinion of the Owner or Engineer this procedure is not feasible, Contactor may employ fittings for a utility crossing as directed by the Engineer.

#### 1.8. CONSTRUCTION CONDITIONS AND SUBSURFACE INVESTIGATION

- A. The Contractor shall strictly adhere to the specific requirements of the governmental unit(s) or agency(ies) having jurisdiction over the work. Wherever there is a difference in the requirements of a jurisdictional body and these Specifications, the more stringent shall apply.
- B. The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the nature and location of the work, the conformation of the ground, the character and quality of the substrata, the types and quantity of materials to be encountered, the nature of the groundwater conditions, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions and all other matters which can in any way affect the work under this contract. The Contractor is to pay special attention to the requirement to protect nearby gopher tortoise habitat, if applicable. The prices established for the work to be done will reflect all costs pertaining to the work. Any claims for extras based on substrata, groundwater table, and other such conditions will not be allowed.

#### 1.9. PUBLIC NUISANCE

- A. The Contractor shall not create a public nuisance including but not limited to encroachment on adjacent lands, flooding of adjacent lands, excessive noise, or unnecessary and avoidable impacts to motorists, bicyclists, and pedestrians utilizing streets, driveways and parking lots in and adjacent to the project. The Contractor is advised to review and comply with all of the special vehicle and pedestrian MOT requirements for this project.
- B. If the Contractor requires the use of adjacent lands, a temporary easement or written contract with the property owner must first be negotiated, secured, paid for, and obtained by the Contractor. This requirement applies to work areas and to lay down, staging, and temporary storage or office areas.
- C. Dewatering activities and any other construction process or method which produces ground water or storm water runoff from the project site shall be conducted in a manner which prevents flooding of adjacent lands. All excess water from any source shall be directed to appropriate drainage systems capable of accommodating the excess flows.

- D. Sound levels measured by the Owner shall not exceed 55 dBA 7 PM to 7 AM or 65 dBA 7 AM to 7 PM. This sound level is to be measured at the Owner's property line. It is the obligation of the Contractor to achieve these limits through proper construction equipment selection, temporary sound attenuation barriers, or other acceptable means. Sound levels in excess of these values are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the Engineer or Owner due to excessive noise shall not relieve the Contractor of the other portions of this specification including, but not limited to contract time and contract price.
- E. In establishing Maintenance of Traffic Plans, work task schedules, and construction methods, the Contractor must fully consider minimizing impacts to motorists and pedestrians. At no time shall methods, procedures or schedules be approved or employed which will create undue hardship to the library patrons or other members of the public using the access streets, sidewalks, or parking lots. Work stoppage by the Engineer or Owner due to unnecessary public impacts shall not relieve the Contractor of the other portions of this specification including, but not limited to contract time and contract price.
- F. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

#### 1.10. SUSPENSION OF WORK DUE TO WEATHER

During inclement weather, all work which might be damaged or rendered inferior by such weather conditions shall be suspended. The orders and decisions of the Engineer as to suspensions shall be final and binding. The ability to issue such an order shall not be interpreted as a requirement to do so. During suspension of the work from any cause, the work shall be suitably covered and protected so as to preserve it from injury by the weather or otherwise; and, if the Engineer shall so direct, the rubbish and surplus materials shall be removed.

#### 1.11. RELOCATIONS

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

#### 1.12. SALVAGE

Any existing equipment or material, including but not limited to, valves, pipes, fittings, couplings, etc., which is removed or replaced as a result of construction under this project may be designated as salvage by the Engineer or Owner and if so, shall be excavated, if necessary and delivered, to the Owner at a location directed by the Owner, at the Contractor's expense. All such salvage shall be

at the Owner's discretion. Items refused by the Owner shall become the property of or shall be properly disposed of by the Contractor.

#### 1.13. PERMITS

Upon notice of award, the Contractor shall immediately apply for all applicable permits not previously obtained by the Owner to do the work from the appropriate governmental agency or agencies. (See also Section 01065.) No work shall commence until all applicable permits have been obtained and copies delivered to the Engineer. Except as provided elsewhere in these Contract Documents, the costs for obtaining all permits shall be borne by the Contractor.

#### 1.14. NOTIFICATION OF WORK ON EXISTING FACILITIES

Before commencing work on any of the existing structures or equipment, the Contractor shall notify the Engineer, in writing, at least 10 calendar days in advance of the date he proposes to commence such work.

#### 1.15. PUMPING

- A. The Contractor shall be responsible for all pumping necessary to prevent flotation of any part of the existing structure of proposed structures during construction operations.
- B. The Contractor shall, for the duration of the contract pump out water and wastewater which may seep or leak into the excavations or structures under the Contractor control. Galleries and other operating areas shall be kept dry at all times. The extent of pumping required in tank, channels, and other non-operating areas will be determined by the Engineer. Discharges shall be in conformance with applicable regulations and permits.

#### 1.16. EASEMENT FOR WORK ON PRIVATE PROPERTY

- A. The Contractor shall maintain his construction operations within the presently existing property boundaries, road rights-of-way, and established easements throughout the project. In the event that the Contractor deems it necessary or advisable to operate beyond the limits of the existing property boundaries, rights-of-way or established easements, Contractor shall be responsible for making special agreements with the affected property owners. The Owner will not secure easements for additional working room.
- B. The Contractor shall maintain construction operations within the presently existing property boundaries, road rights-of-way, and established easements throughout the project. In the event that the Contractor deems it necessary or advisable to operate beyond the limits of the existing property boundaries, rights-of-way or established easements, Contractor shall be responsible for making special agreements with the affected property owners. Immediately after an award of contract is made, the Contractor shall submit to the Owner a listing of those areas in which Contractor deems it to be necessary to work outside of the prescribed areas. The listing shall be subject to the approval of the Owner and as construction areas are secured, copies of all written agreements shall be placed on file with the Owner and

Engineer.

#### 1.17. CLAIMS FOR PROPERTY DAMAGE

Upon notification by the Owner or Engineer, the Contractor shall investigate each claim for property damage and shall file, within ten (10) days of such notification, a statement with Owner and Engineer setting forth all facts and details relative to such claim.

#### 1.18. EXISTING UNDERGROUND PIPING, STRUCTURES AND UTILITIES

The locations of existing underground utilities are from information obtained from the respective utility companies and other sources. The locations are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping to be encountered. It is the Contractor's responsibility to contact the state-sponsored central locate center and/or local existing utilities at least 48 hours prior to planned digging, if applicable.

#### 1.19. CLEAN-UP AND DUST CONTROL

At all times during the prosecution of the work, the Contractor shall maintain sufficient forces to clean up and control dust. Control of blowing litter or dust caused by any re-grading or other task by the Contractor shall be the responsibility of the Contractor.

#### 1.20. CONNECTIONS TO EXISTING SYSTEMS

The Contractor shall perform all work necessary to locate, excavate and prepare for connections to the terminus of the existing systems all as shown on the Drawings or where directed by the Engineer. The cost of this work and for the actual connection of the existing mains shall be included in the bid for the project and shall not result in any additional cost to the Owner.

#### 1.21. COORDINATION OF WORK

- A. The Contractor shall afford other contractors and the Owner reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work and shall properly connect and coordinate the Work with such other work. The Contractor shall coordinate his Work with the Owner and other contractors to store apparatus, materials, supplies and equipment in such orderly fashion at the site of the Work as will not unduly interfere with the progress of the Work or the work of any other contractors.
- B. If the execution or result of any part of the Work depends upon any work of the Owner or of any separate contractor, the Contractor shall, prior to proceeding with the Work, inspect and promptly report to the Owner in writing any apparent discrepancies or defects in such work of the Owner or of any separate contractor that render it unsuitable for the proper execution or result of any part of the Work.

- C. Failure of the Contractor to so inspect and report shall constitute an acceptance of the Owner's or separate contractor's work as fit and proper to receive the Work.
- D. Should the Contractor cause damage to the work or property of the Owner or of any separate contractor on the Project, or to other work on the Site, or delay or interfere with the Owner's work on ongoing operations or facilities or adjacent facilities or said separate contractor's work, the Contractor shall be liable for the same; and, in the case of another contractor, the Contractor shall attempt to settle said claim with such other contractor prior to such other contractor's institution of litigation or other proceedings against the Contractor.
- E. If such separate contractor sues the Owner on account of any damage, delay or interference caused or alleged to have been so caused by the Contractor, the Owner shall notify the Contractor, who shall defend the Owner in such proceedings at the Contractor's expense. If any judgment or award is entered against the Owner, the Contractor shall satisfy the same and shall reimburse the Owner for all damages, expenses, attorney's fees, and other costs which the Owner incurs as a result thereof.
- F. Should a separate contractor cause damage to the Work or to the property of the Contractor or cause delay or interference with the Contractor's performance of the Work, the Contractor shall present directly to said separate contractor any claims it may have as a result of such damage, delay or interference (with an information copy to the Owner) and shall attempt to settle its claim against said separate contractor prior to the institution of litigation or other proceedings against said separate contractor.
- G. In no event shall the Contractor seek to recover from the Owner or the Engineer, and the Contractor hereby represents to the Owner and the Engineer that it will not seek to recover from them, or either of them, any costs, expenses, (including, but not limited to, attorney's fees) or losses of profit incurred by the Contractor as a result of any damage to the Work or property of the Contractor or any delay or interference caused or allegedly caused by any separate contractor.
- H. Any difference or conflict which may arise between the Contractor and other contractors who may be performing work in behalf of the Owner, or between the Contractor and workmen of the Owner in regard to their work shall be adjusted and determined by the Engineer. If the work of the Contractor is delayed because of any acts of omissions of any other contractor of the Owner, the Contractor shall on that account have no claim against the Owner other than for an extension of time.

#### 1.22. OWNER OCCUPANCY AND OPERATION OF COMPLETED FACILITIES

It is assumed that portions of the Work will be completed prior to completion of the entire Work. Upon completion of construction in each individual facility, including testing, the Contractor will notify the Owner and Engineer of the portion

of the project that is complete. If the Owner at its sole discretion, desires to accept the individual facility, the Contractor will be issued a dated certification of completion and acceptance for each individual facility. The Owner will assume ownership and begin operation of the individual facility on that date the guarantee period shall commence on that date. The Owner has the option of not accepting any individual completed facility, but accepting the entire Work or any portion as a whole when it is completed and tested. The Contractor will not be entitled to an adjustment to the contract time or price if occupancy of facilities the Contractor certifies as complete adversely impacts the Contractor's cost or time of performance.

#### 1.23. DAILY REPORTS

- A. The Contractor shall submit daily reports of construction activities, including non-work days. The reports shall include:
  - 1.) Manpower, number of persons by craft
  - 2.) Equipment on the project
  - 3.) Major deliveries
  - 4.) Planned and expected work activities with references to the CPM schedule activities number
  - 5.) New problems and
  - 6.) Other pertinent information
- B. A similar report shall be submitted for/by each subcontractor
- C. The report shall be submitted to the Engineer's Field Office within two (2) days of the respective report date. Each report shall be signed by the Contractor's project superintendent or project manager.
- D. Information provided on the daily report shall not constitute notice of delay or any other notice required by the Contract Documents. Proper notice shall be as required therein.

#### 1.24. EMERGENCIES

- A. The Contractor shall at all times after regular working hours, including weekends and holidays, maintain a telephone where a Contractor's authorized representative can be reached on an emergency basis. The Contractor shall be prepared to act to correct conditions on the site deemed to constitute an emergency by either the Owner, his agent, the Engineer, or local authorities and the Contractor is obligated to act to prevent threatened damage, injury or loss without special instructions from the Owner or Engineer. The Contractor shall give the Engineer prompt written notice of all significant changes in the work or deviations from the Contract Documents caused thereby. If a condition on the site requires attention after working hours, either the Owner, agent, Engineer, or local Authority shall call the Contractor or his representative at the emergency telephone number, identify himself

and describe the emergency condition. The Contractor is expected to dispatch personnel and equipment to adequately institute corrective measures within two (2) hours. If for some reason the Contractor or his agent cannot be reached at the emergency number after a reasonable time (2-hour), the Owner shall have the right to immediately initiate corrective measures, and the cost shall be borne by the Contractor.

- B. In the event that the Contractor fails to maintain safe job conditions and traffic conditions, including, but not limited to, trench settlement and hazardous storage of backfill or construction materials, the Owner, after failure of the Contractor to commence substantial steps at the job site to rectify the situation within two (2) hours of the time the Contractor has been notified of the unsafe condition, may hire guards, take such precautions, make such repairs and take any other steps which the Owner or the Owners' agent in its discretion, considers necessary to protect the property, persons, or the Owner. The cost of any of these precautions, guards, or steps shall be deducted from the payments due the Contractor, and the Contractor will be billed for these services, work and material at prevailing rates.

#### 1.25. FINAL GUARANTEE

- A. All work shall be guaranteed by the Contractor for a period of one (1) year from and after the date of acceptance of the work by the Owner.
- B. If, within the guarantee period, repairs or changes are required in connection with guaranteed work, which, in the opinion of the Engineer, is rendered necessary as the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract, the Contractor shall, promptly upon receipt of notice from the Owner and without expense to the Owner, do the following:
  - 1.) Place in satisfactory condition in every particular all of such guaranteed work and correct all defects therein.
  - 2.) Make good all damage to the building or site, or equipment or piping or contents thereof, which, in the opinion of the Engineer, is the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the contract.
  - 3.) Make good any work or material, or the equipment and contents of building, structure or site disturbed in fulfilling any such guarantee.
- C. If the Contractor, after notice, fails within ten days to proceed to comply with the terms of this guarantee, the Owner may have the defects corrected, and the Contractor and his surety shall be liable for all expense incurred, provided, however, that in case of an emergency where, in the opinion of the Owner, delay would cause loss or damage, repairs may be started without notice being given to the Contractor and the Contractor shall pay the cost thereof.
- D. All special guarantees or warranties applicable to specific parts of the work as may be stipulated in the Contract Specifications or other papers forming



a part of this Contract shall be subject to the terms of this paragraph during the first year of life of each such guarantee. All special guarantees and manufacturers' warranties shall be assembled by the Contractor and delivered to the Engineer, along with a summary list thereof, before the acceptance of the work.

#### 1.26. RIGHTS IN AND USE OF MATERIALS FOUND ON THE WORK

The Contractor, with the approval of the Engineer, may use on the project such stone, gravel, sand, or other material determined suitable by the Engineer, as may be found in the excavation and will be paid both for the excavation of such materials at the corresponding Contract unit price and for the pay item for which the excavated material is used. Contractor shall replace at his own expense with other acceptable material all of that portion of the excavation materials so removed and used which was needed for use in the embankments, backfills, approaches, or otherwise. No charge for the materials so used will be made against the Contractor.

### **PART 2 - PRODUCTS<sup>1</sup>**

### **PART 3 - EXECUTION<sup>2</sup>**

## **END OF SECTION 01030 SPECIAL PROJECT PROCEDURES**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

## SECTION 01040 PROJECT COORDINATION

### **PART 1 - GENERAL**

#### 1.1. SUMMARY

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
  - 1.) Coordination.
  - 2.) Administrative and supervisory personnel.
  - 3.) General installation provisions.
  - 4.) Cleaning and protection.
- B. Progress meetings and coordination meetings are included in Section "Project Meetings".
- C. Requirements for the Contractor's Construction Schedule are included in Section "Submittals".

#### 1.2. COORDINATION

- A. Coordination: Coordinate construction activities included under various Sections of these Specifications and Contract Documents to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications and Contract Documents that are dependent upon each other for proper installation, connection, and operation.
  - 1.) Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
  - 2.) Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
  - 3.) Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1.) Preparation of schedules.
  - 2.) Installation and removal of temporary facilities.
  - 3.) Delivery and processing of submittals.

- 4.) Progress meetings.
  - 5.) Project Close-out activities.
- 1.3. SUBMITTALS
- A. Comply with requirements contained in Section "Submittals."
    - 1.) Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.
    - 2.) Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

## **PART 2 - PRODUCTS<sup>1</sup>**

## **PART 3 - EXECUTION**

### **3.1. GENERAL INSTALLATION PROVISIONS**

- A. Inspection of Conditions: Require the Contractor and/or Subcontractor of each major component to inspect the conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Recheck measurements and dimensions, before starting each installation.
- E. Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- F. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

### **3.2. CLEANING AND PROTECTION**

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place.
- B. Clean and maintain completed construction as frequently as necessary

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION

through the remainder of the construction period.

**END OF SECTION 01040 PROJECT COORDINATION**

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## SECTION 01065 PERMITS AND FEES

### PART 1 - GENERAL

#### 1.1. DESCRIPTION

- A. Unless otherwise specified, the Contractor shall obtain and pay for all permits and licenses related to his work, including but not limited to,
  - 1.) City of Panama City Beach Building Department, except as otherwise provided herein.
- B. Permits by Contractor: The Contractor shall be responsible for acquiring and complying with all provisions of construction related permits with the following agencies:
  - 1.) City of Panama City Beach Building Permit
  - 2.) City of Panama City Beach Electrical Permit
- C. Local Permits: The Contractor shall apply and obtain all other applicable local permits for the construction effort. Payment for such permits, shall be identified by the governing agency after the permit has been applied for, and this amount shall be made known to the Owner for prompt payment by the Owner. This requirement may also include the following tasks to be performed by the Contractor:
  - 1.) Pre-stamped and addressed post cards for mailing to subcontractors.
  - 2.) Acknowledgment of Applicant Responsibility.
  - 3.) Evidence of certification as a Class I or Class II Contractor (State).
  - 4.) Copy of Worker's Compensation Certificate of Insurance.
  - 5.) Owners authorization.
- D. Work shall be conducted and shall result in construction of the requirements of this project in full accordance with the conditions of the permits granted for the project.

### PART 2 - PRODUCTS<sup>1</sup>

### PART 3 - EXECUTION<sup>2</sup>

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

**END OF SECTION 01065 PERMITS AND FEES**

## SECTION 01090 REFERENCE STANDARDS

### PART 1 - GENERAL

#### 1.1. GENERAL

- A. Titles of Sections and Paragraphs: Titles and subtitles accompanying specification sections and paragraphs are for convenience and reference only and do not form a part of the Specifications.
- B. Applicable Publications: Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is indicated, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Contract is advertised for Bids shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth in the Specifications or shown on the Drawings will be waived because of any provision of or omission from said standards or requirements.
- C. Specialists, Assignments: In certain instances, specification text requires (or implies) that specific work is to be assigned to specialists or expert entities who must be engaged to perform that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the work; also, they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of WORK is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of Contract requirements remains with the Contractor.

#### 1.2. REFERENCE SPECIFICATIONS, CODES, AND STANDARDS



- A. The Contractor shall construct the work in accordance with the Contract Documents and the referenced portions of those referenced codes, standards, and specifications.
- B. References to "Building Code" or "Florida Building Code" shall mean Florida Building Code of the International Conference of Building Officials (ICBO), as amended by the local jurisdiction. Similarly, references to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or "Uniform Fire Code," shall mean Uniform Mechanical Code, Uniform Plumbing Code and Uniform Fire Code of the International Association of Plumbing and Mechanical Officials (IAPMO) as amended by the local jurisdiction. "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA). The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the WORK is advertised for Bids shall apply to the WORK herein, including all addenda, modifications, amendments, or other lawful changes thereto.
- C. In case of conflict between codes, reference standards, drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and direction prior to ordering or providing any materials or furnishing labor. The Contractor shall bid for the most stringent requirements.
- D. References to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.
- E. References to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

### 1.3. REGULATIONS RELATED TO HAZARDOUS MATERIALS

- A. The Contractor shall be responsible that all WORK included in the Contract

Documents, regardless if indicated or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other federal, state, and local regulations governing the storage and conveyance of hazardous materials, including petroleum products.

- B. Where no specific regulations exist and the OWNER has not waived the requirement in writing, chemical, hazardous, and petroleum product piping and storage in underground lo-cations shall be double containment piping and tanks or be installed in separate concrete trenches and vaults with an approved lining that cannot be penetrated by the chemicals.

## **PART 2 - PRODUCTS<sup>1</sup>**

## **PART 3 - EXECUTION<sup>2</sup>**

### **END OF SECTION 01090 REFERENCE STANDARDS**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

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## SECTION 01300 SUBMITTALS

### PART 1 - GENERAL

#### 1.1. REQUIREMENTS INCLUDED

- A. The Contractor shall submit to the Engineer for review such working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this Section called data), and material samples (hereinafter in this Section called samples) as are required for the proper control of work, including but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.
- B. The Contractor shall note that there are specific submittal requirements in other sections of these Specifications.
- C. The Contractor is to maintain an accurate updated submittal log and shall bring this log to each scheduled progress meeting with the Owner and the Engineer. This log should include the following items:
  - 1.) Submittal-Description and File Number assigned.
  - 2.) Date to Engineer.
  - 3.) Date returned to Contractor (from Engineer).
  - 4.) Status of Submittal
    - (i) Approved
    - (ii) Approved as Noted
    - (iii) Approved as Noted & Confirm
    - (iv) Revise & Resubmit
    - (v) Rejected
    - (vi) Comments Attached
  - 5.) Date of Resubmittal and Return (as applicable).
  - 6.) Date material released (for fabrication).
  - 7.) Projected date of fabrication.
  - 8.) Projected date of delivery to site.
  - 9.) Status of O&M submittal

#### 1.2. SHOP DRAWINGS

- A. When used in the Contract Documents, the term "shop drawings" shall be considered to mean Contractor 's plans for material and equipment which become an integral part of the Project. These drawings shall be complete

and detailed. Shop drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, bills of material, wiring and control diagrams, and inspection and test reports including performance curves and certifications as applicable to the Work.

- B. All details on shop drawings submitted for approval shall show clearly the elevations of the various parts to the main members and lines of the structure and/or equipment, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the shop drawings before being submitted for approval.
- C. See Shop Drawing Schedule requirements in subparagraph 1.7 CONTRACTOR'S RESPONSIBILITY.

### 1.3. PRODUCT DATA

- A. Product data as specified in individual sections, include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, Manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing storage instructions, and printed product warranties, as applicable to the work.

### 1.4. WORKING DRAWINGS

- A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and falsework; for underpinning; and for such other work as may be required for construction but does not become an integral part of the Project.
- B. Working drawings shall be signed and sealed by a registered Professional Engineer, currently licensed to practice in the State and shall convey, or be accompanied by, calculations or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the Engineer. Such review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor; the Owner and Engineer shall have no responsibility therefor.

### 1.5. SAMPLES

- A. The Contractor shall furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples

shall be delivered to the Engineer as specified or requested and in quantities and sizes as specified. A minimum of two samples of each item shall be submitted unless otherwise specified. The Contractor shall pre-pay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until approved by the Engineer.

- B. Samples specified in individual sections, include, but are not necessarily limited to, physical examples of the work such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols, and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the Work.
- C. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples. The Contractor shall enclose a copy of this letter with the shipment and send a copy of this letter to the Engineer. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.
- D. Approved samples not destroyed in testing shall be sent to the Engineer or stored at the site of the work. Materials and equipment incorporated in work shall match the approved samples. Samples which fail testing or are not approved will be returned to the Contractor at his expense, if so, requested at time of submission.

#### 1.6. SUBMITTAL REQUIREMENTS

- A. The Contractor shall review, approve, and submit, with reasonable promptness and in such sequence as shown on the Shop Drawing Submittal Schedule so as to cause no delay in the Contract Work or in the Work of the Owner or any separate contractor, all shop drawings, product data, working drawings and samples required by the Contract Documents.
- B. The Contractor shall submit electronically one digital copy of the submittal in pdf version of all shop drawings for the Engineer to review, of which the Engineer will retain digital and physical printed sets.
- C. All submittals shall be made directly to the Engineer.
- D. Shop drawings, product data, working drawings and samples shall be furnished with the following information:
  - 1.) Number and title of the drawing.
  - 2.) Date of drawing or revision.
  - 3.) Name of project building or facility.
  - 4.) Name of contractor, subcontractor, and manufacturer submitting drawing.
  - 5.) Clear identification of contents, location of the work, and the sheet numbers and specification section where the product is found in the contract

- drawings.
- 6.) Contractor Certification Statement.
  - 7.) Submittal Number.
    - (i) Submittals shall be numbered as 00-# where the sequential number of the submittal is listed first and the revision or resubmittal is listed after the dash. For example, submittal number three, resubmittal 2 would be listed as submittal 3-2.
  - 8.) Contract Drawing Number Reference.
- E. In accordance with subparagraph 1.7 A, each shop drawing, working drawing, sample, and catalog data submitted by the Contractor shall have affixed to it the following Certification Statement, signed by the Contractor:
- 1.) "Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data and I have checked and coordinated each item with other applicable approved shop drawings and all Contractor requirements."
- F. All items specified are not necessarily intended to be a manufacturer's standard product. Variations from specified items will be considered on an "or equal" basis. If submittals show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal and on the shop drawings along with notification of his intent to seek contract adjustment. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed. Variations submitted but not described may be cause for rejection. Any variations initiated by the Contractor will not be considered as an addition to the scope of work unless specifically noted and then approved as such in writing by the Engineer.
- G. Data on materials and equipment shall include materials and equipment lists giving, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, material, size, finish, and all other pertinent data.
- H. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name, and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained. In addition, a maintenance and lubrication schedule for each piece of equipment shall be submitted as specified in Section 01730.
- I. All Manufacturers or equipment suppliers who propose to furnish equipment or products under Divisions 11, 13, 14, 15 and 16 shall submit an installation

list to the Engineer along with the required shop drawings. The installation list shall include all installations where identical equipment has been installed and has been in operation for a period of at least one (1) year.

J. The Contractor shall use the color "green" to make his remarks on the Submittals. Only the Engineer will utilize the color "red" in marking submittals.

K. Facsimiles or copies of facsimiles will not be accepted for review.

#### 1.7. CONTRACTOR'S RESPONSIBILITY

A. It is the duty of the Contractor to check, and coordinate with the work of all trades, all drawings, data, schedules and samples prepared by or for him before submitting them to the Engineer for review. Each and every copy of any drawing or data sheet larger than 11"x17" shall bear Contractor's stamp showing that they have been so checked and approved. Drawings or data sheets 11"x17" and smaller shall be bound together in an orderly fashion and bear the Contractor's stamp on the cover sheet. The cover sheet shall fully describe the packaged data and include a list of all sheet numbers within the package. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor, without review at the Engineer's option, for conformance with this requirement.

B. The Contractor shall review shop drawings, product data, and samples prior to submission to determine and verify the following:

1.) Field measurements.

2.) Field construction criteria.

3.) Manufacturer's catalog numbers and similar data.

4.) Conformance with Specifications.

5.) Shop drawings shall indicate any deviations in the submittal from the requirements of the Contract Documents.

C. At a time decided upon at the preconstruction meeting the Contractor shall furnish the Engineer a Shop Drawing schedule fixing the respective dates for the initial submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall be provided as a separate entity and indicate those submittals that are critical to the progress schedule. The Contractor shall prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit complete and acceptable submittals sufficiently in advance of the Work.



- D. The Contractor shall not begin any work affected by a submittal returned not approved. Before starting this work, all revisions must be corrected by the Contractor. After resubmittal they will be reviewed and returned to him by the Engineer. If approved or approved as noted, then the Contractor may begin this work. Any corrections made to the shop drawings are to be followed without exception.
  - E. The Contractor shall submit to the Engineer all shop drawings and data sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for review from the time the Engineer receives them. No less than thirty (30) calendar days will be required for major equipment that requires review by more than one (1) Engineering discipline.
  - F. The Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of work prior to the review and approval by Engineer of the necessary shop drawings.
  - G. All shop drawings, product data, working drawings and samples submitted by subcontractors for approval shall be sent directly to the Contractor for checking. The Contractor shall be responsible for their submission according to the approved shop drawing schedule so as to prevent delays in delivery of materials and project completion.
  - H. The Contractor shall check all subcontractor's shop drawings, product data, working drawings and samples regarding measurements, size of members, materials, and details to satisfy himself that they are in conformance to the Contract Documents. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractors for correction before submission to the Engineer.
  - I. Requests for Information (RFI) shall be submitted on a standard form provided by the Engineer. RFIs shall indicate their importance to the timely completion of the project. RFIs will be processed as a shop drawing unless there is an urgent need for immediate response.
- 1.8. ENGINEER'S REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES
- A. The Engineer's review is for general conformance with the design concept and contract drawings. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract plans and specifications or from departures therefrom. The Contractor remains responsibility for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
  - B. The review of shop drawings, data, and samples will be general. They shall not be construed:
    - 1.) As permitting any departure from the Contract requirements;

- 2.) As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;
  - 3.) As approving departures from details furnished by the Engineer, except as otherwise provided herein.
- C. If the shop drawings, data or samples as submitted describe variations per subparagraph (1.6F), and show a departure from the Contract requirements which Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Engineer may return the reviewed drawings without noting an exception.
- D. Submittals will be returned to the Contractor under one of the following:
- 1.) "APPROVED" is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment and/or material for manufacture.
  - 2.) "APPROVED AS NOTED" is assigned when notations or comments have been made on the submittal pointing out minor discrepancies as compared with the Contract Documents. Re-submittal is not necessary prior to release for manufacturing.
  - 3.) "APPROVED AS NOTED & CONFIRM" is assigned when notations or comments have been made on the submittal pointing out minor discrepancies as compared with the Contract Documents. Re-submittal is not necessary prior to release for manufacturing once written confirmation of the requested changes has been made to the engineer.
  - 4.) "REVISE & RESUBMIT." This combination of codes is assigned when the submittal is in noncompliance with the Contract Documents and must be corrected and the entire package resubmitted. This code generally means that the equipment or material cannot be released for manufacture unless the Contractor takes full responsibility for providing the submitted items in accordance with Contract Documents.
  - 5.) "REJECTED" is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the Contract Documents.
  - 6.) "COMMENTS ATTACHED" is assigned when there are additional comments, the submittal is reviews and files as information only, or if further explanation is needed for the submittal status.
- E. Re-submittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Engineer on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor.

The Contractor shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the Engineer.

- F. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least seven (7) working days prior to release for manufacture.
- G. The Engineer will review a submittal a maximum of two (2) times after which cost of review will be borne by the Contractor. The cost of Engineering shall be equal to the Engineer 's charges to the Owner under the terms of the Engineer's agreement with the Owner.
- H. When the shop drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.
- I. Partial submittals may not be reviewed. The Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered "Rejected" until resubmitted. The Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

#### 1.9. PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

- A. If specifically required in other sections of these Specifications, the Contractor shall submit a P.E. Certification for each item required, in the form attached to this Section, completely filled in and stamped.

#### 1.10. FINAL COMBINED SUBMITTAL OF DIGITAL VERSION OF SHOP DRAWING SUBMITTALS

- A. At the completion of the project, a searchable digital version of all shop drawing submittals and review forms in pdf format shall be compiled and provided to the Engineer as an appendix to the Operation and Maintenance Manual as required in Section 01730 - Operation and Maintenance Data. Should no component of the construction necessitate an Operation and Maintenance Manual, the compendium of submittals in digital form shall be submitted as a final shop drawing submittal for review by the Engineer.

## **PART 4 - PRODUCTS<sup>1</sup>**

## **PART 5 - EXECUTION<sup>2</sup>**

### **END OF SECTION 01300 SUBMITTALS**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

## SECTION 01315 CONSTRUCTION SCHEDULE

### PART 1 - GENERAL

#### 1.1. DESCRIPTION

- A. Prepare and provide the projected construction schedule, updated monthly, for the duration of the project. All schedules and all updates must be prepared using Microsoft Office Project, latest edition. Other scheduling software programs may be used, but only if their products are fully compatible with and can be directly imported into Microsoft Office Project. It shall be the Contractor's responsibility to ensure compatibility. Schedules prepared by other means that cannot be imported by the Owner without modification will be rejected.
- B. Within ten (10) calendar days of the Notice to Proceed, the Contractor shall submit a Summarized Milestone Schedule to the Owner and Engineer for approval. The Contractor shall revise the schedule as necessary to gain Owner and Engineer approval. Within 14 calendar days of the Owner's and Engineer's approval of the Summarized Milestone Schedule, the Contractor shall submit the Detailed Project Task Schedule. The Contractor shall similarly revise this schedule as needed to gain Owner and Engineer approval. Once approved, this schedule will be the baseline from which all construction activities will be measured.
- C. No Periodic Pay Estimates will be accepted until both the Summarized Milestone Schedule and the corresponding Detailed Project Task Schedule updates are approved by the Owner and Engineer.
- D. Coordination:
  1. It will be the responsibility of the Contractor to coordinate schedules of its own and its subcontractor's schedules as well as construction efforts by others as directed by the Owner or Engineer.
  2. Schedules are subject to concurrence by the Owner and Engineer with regards to activity description, logic, sequence, duration and resources required.

#### 1.2. FORM OF SCHEDULES

- A. Contractor shall prepare and provide the following construction schedules in the Microsoft Office Project default Gantt Chart view, with project tasks on the left side of the view and horizontal graphical bars corresponding to the task durations on the right side of the view
  - 1.) Summarized Milestone Schedule: Submit a Microsoft Office Project schedule broken down by the major project areas. Required critical path elements will be subject to Owner's and Engineer's concurrence.

- 2.) Detailed Project Task Schedule: Construction schedule and subsequent monthly updates must indicate critical path elements, detailed project tasks and links between dependent tasks, including the duration of each task.

### 1.3. CONTENT OF SCHEDULES

#### A. Provide complete sequence of construction by activity.

- 1.) Shop Drawings, product data and samples, submittal dates and dates approved copies will be required, etc., should be indicated.
- 2.) Product procurement, fabrication duration, shipping dates and on-site availability should be indicated. Contractor will prepare format which shall include names of subcontractors; description of material; manufacturers and vendors with address, phone number and person to contact, order number, shop drawings and samples status, manufacturing lead time, shipping dates, proposed delivery date, format of shipping, date material is required and commitments from manufacturers or vendors on their letterhead.
- 3.) Dates for beginning and completion of each element or task of construction.
- 4.) Decision dates for selection of finishes and products.
- 5.) Restraints reflecting impact of related work.
- 6.) Activities as directed by the Owner or Engineer when required to interface activities performed by the Owner or other Contractors.
- 7.) Detailed sub-schedule and special area schedules as directed by the Owner or Engineer to define critical areas of work.
- 8.) The Engineer shall receive and review updates from the Contractor each month indicating the ACTUAL work status or more/less often when directed to do so by the Engineer.
  - (i) Schedule submission shall be made with the Periodic Pay Estimate. See also Section 01027.
  - (ii) If the Contractor does not gain Owner and Engineer approval of any schedule update, the following Periodic Pay Estimate will not be considered until such approval is obtained.

### 1.4. CONTRACTOR'S RESPONSIBILITIES

- A. Coordinate the scheduled work of all its subcontractors.
- B. Incorporate the work of all subcontractors into the construction schedules.
- C. Provide schedule update information of all subcontractors.
- D. Maintain a management organization to fulfill the requirements of this Section.

- E. Attend and participate in scheduling meetings as may be requested by the Owner or Engineer.

#### 1.5. SCHEDULE MAINTENANCE PROCEDURES

- A. At or before the Pre-Construction Meeting, provide a preliminary summary bar chart schedule for the major breakdown activities outlined in the Bid Proposal. Critical path items will be discussed using this preliminary schedule at the Pre-Construction Meeting.
- B. Summarized Milestone Schedule: Within 10 calendar days of Notice to Proceed, the Contractor shall provide the following to the Owner and Engineer:
  - 1.) A Summarized Milestone Schedule, prepared in Microsoft Office Project Gantt Chart format, identifying the major areas of the Project. The Summarized Milestone Schedule shall, as a minimum, identify all established milestones specified in the Contract Documents and agreed to at the Pre-Construction Meeting, to constitute one complete program for the entire work.
  - 2.) The Summarized Milestone Schedule shall be used for the life of the Contract to delineate the interdependence and order of construction of the project Work areas. Also, it shall be employed as a framework for developing the Detailed Project Task Schedule described below.
  - 3.) The Owner reserves the right to reject any submitted schedule by the Contractor, if, in the view of the Owner, said schedule reflects unreasonable assumptions on the part of the Contractor, its subcontractors or Owner's other Contractors. The Contractor shall be responsible for re-submitting within five (5) working days the actual reflection of current and projected status.
  - 4.) This schedule shall include an overall project duration consistent with the specified contract time and the date of the official Notice to Proceed. Schedules with any but the specified contract duration period will not be accepted.
  - 5.) The schedule shall include a minimum of 30 days of float due to inclement weather or other delays normally associated with construction work of this nature.
- C. Detailed Project Task Schedule: Within 14 calendar days of Owner's and Engineer's approval of the Summarized Milestone Schedule, the Contractor shall provide the following:
  - 1.) A Detailed Project Task Schedule shall be prepared in Microsoft Office Project Gantt Chart format. The Detailed Project Task Schedule shall identify the work, by task and duration, to be performed in order to support the critical path milestones agreed to. It shall also identify links between dependent tasks, indicating the expected duration of each.

- 2.) The Detailed Project Task Schedule shall be utilized to monitor progress and shall, therefore, be maintained throughout the duration of the Project.
- 3.) Activities represented on the Detailed Project Task Schedule shall dovetail the Summarized Milestone Schedule so as to constitute one complete program for the whole of the project.
- 4.) The Contractor shall provide a detailed successor/predecessor report, in a format acceptable to the Engineer, sorted by major project area. This report shall also include the duration of each activity and logic relationship.

#### D. Schedule Updating

- 1.) Show all changes which have occurred since the previous update and submittal. Provide the following update information:
  - (i) Progress of each activity.
  - (ii) Completion dates.
  - (iii) Activities modified.
  - (iv) Revision of schedule restraints.
  - (v) Revision in duration to any activities.
- 2.) With each schedule update provide a Narrative Report, including:
  - (i) Discussion of problem areas, including current and anticipated delay factors and their impact on the schedule.
  - (ii) Corrective action taken or proposed and its effect or intended effect on schedule.
  - (iii) Detailed description of revisions to schedule.

#### 1.6. SUBMITTALS

- A. Submit to both the Owner and the Engineer one electronic file copy, via e-mail attachment or CD, of the Summarized Milestone Schedule within 10 days after Notice to Proceed.
- B. Submit to both the Owner and the Engineer one electronic file copy, via e-mail attachment or CD, of the Detailed Project Task Schedule within 14 calendar days of approval of the Summarized Milestone Schedule.
- C. Each month, (along with the signed original copies of the monthly Periodic Pay Estimate), submit one printed copy of the previous Detailed Project Task Schedule, with annotations showing status and changes, and one printed copy of the Detailed Project Task Schedule updated for the close of that month to indicate the planned schedule for the next period. In addition, besides the printed copy, provide to both the Owner and the Engineer one electronic file copy of the updated Detailed Project Task Schedule via e-mail attachment or by CD.

- D. Along with the updated schedule, submit:
- 1.)A Narrative Report explaining modifications.

**PART 2 - PRODUCTS<sup>1</sup>**

**PART 3 - EXECUTION<sup>2</sup>**

**END OF SECTION 01310 CONSTRUCTION SCHEDULE**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION



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## SECTION 01370 SCHEDULE OF VALUES

### PART 1 - GENERAL

#### 1.1. REQUIREMENTS INCLUDED

- A. The Contractor shall submit to the Engineer a detailed Schedule of Values allocated to the various portions of the work, within 72 hours after of Notice to Proceed.
- B. Upon request of the Engineer, the Contractor shall support the individual values with data which will substantiate their correctness.
- C. The Schedule of Values shall be used by the Owner only as the basis for preparing the Contractor's Applications for Payment, called a Periodic Pay Estimate.

#### 1.2. RELATED REQUIREMENTS

- A. Conditions of the Contract.
- B. Request for Payment.

#### 1.3. FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Contractor's standard forms and automated printout will be considered for approval by Engineer upon Contractor's request. Identify schedule with:
  - 1.) Title of Project and location.
  - 2.) Project number.
  - 3.) Name and address of Contractor.
  - 4.) Contract designation.
  - 5.) Date of submission.
- B. Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction.
- C. The schedule of values must be consistent with the bid form as listed in specifications section 00030.
- D. Follow the table of contents for the Contract Document as the format for listing component items for structures.
- E. Identify each line item with the number and title of the respective major section of the specification.
- F. For each line item, list sub-values of major products or operations under item.
- G. The sum of all values listed in the schedule shall equal the total Contract Sum.

**1.4. SUB SCHEDULE OF UNIT MATERIAL VALUES**

- A. Submit a sub-schedule of unit costs and quantities for products on which progress payments will be requested for stored products.
- B. The form of submittal shall parallel that of the Schedule of Values with each item identified the same as the line item in the Schedule of Values.
- C. The unit quantity for bulk materials shall include an allowance for normal waste.
- D. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

**PART 2 - PRODUCTS<sup>1</sup>****PART 3 - EXECUTION<sup>2</sup>****END OF SECTION 01370 SCHEDULE OF VALUES**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

## SECTION 01380 CONSTRUCTION PHOTOGRAPHS

### PART 1 - GENERAL

#### 1.1. SCOPE OF WORK

- A. Scope of Work: The Contractor shall employ a competent, professional photographer to take construction record digital photographs periodically during the course of the Work, as specified herein.
- B. The purpose of the Construction Photographs is to document Work progress and specific Work tasks, especially those which will be buried or covered after the Work is completed. It is also to provide a pictorial file record of the finished facilities and improvements.
- C. The separate specifications for pre-construction color audio-video recording are listed in and shall be in accordance with Section 01390 of these Contract Documents. The purpose of this video preconstruction survey is to establish a basis for defense against claims for damage to property of the Owner and all other potentially impacted parties

#### 1.2. PHOTOGRAPHY REQUIRED

- A. Digital photographic images taken in conformance with this Section shall be furnished to the Engineer with each pay request, or every month if no pay request is initiated in a month.
- B. Digital still and aerial photography images of general area shots of the grounds and vicinity of Work areas shall be made prior to commencing any Work on any property or roadway. Once Work has begun, digital and aerial images and an associated descriptive, written log covering each of the major stages or events of construction related to Work performed that month shall be provided in the manner specified herein.
- C. Digital Still Views and Quantities Required:
  - 1.) Four (4) images from different perspectives or zoom setting of one (1) view of each pre-existing condition of an area where Work is to begin, up to a limit of ten such shots per month.
  - 2.) Four (4) images from different perspectives or zoom settings of one (1) view of each activity as directed by the Engineer, up to a limit of ten activities photographed per month.
  - 3.) Four (4) images from different perspectives or zoom settings of five (5) views of the overall project site for the new Work, each month, as directed by the Engineer.
  - 4.) Provide to Owner, Engineer, and Contractor photo prints and image files of all digital photo still views taken each month as described below.
- D. Digital Aerial Views and Quantities Required:

- 1.) Two (2) images from different perspectives or zoom settings of three (3) views of aerial photographs of the site prior to Work being performed.
  - 2.) Two (2) images from different perspectives or zoom settings of three (3) views of aerial photographs of the site taken every 90 days during the project.
  - 3.) Two (2) images from different perspectives or zoom settings of three (3) views of aerial photographs of the site upon final completion of the project.
  - 4.) Provide to Owner, Engineer, and Contractor prints and image files of all digital preliminary aerial views taken as described below.
- E. Photography products must be of professional quality as specified in the following. Digital images and photographic prints, which are deemed unsatisfactory, will be rejected and retakes will be required.
- F. Digital Image Format:
- 1.) Complete copies of all digital image files in JPEG (JPG) format, corresponding to required photographs, must be provided to Owner with the monthly pay request.
  - 2.) Copies of digital image files shall be supplied each month to the Owner and Engineer on a Portable Storage Device complying with the requirements specified herein.
- G. Costs of Photography: The Contractor shall pay all associated costs for specified digital photography, prints and framing. Parties requiring additional photography or prints will pay photographer directly.

## **PART 2 - PRODUCTS**

### **2.1. DIGITAL PHOTOGRAPHY EQUIPMENT**

- A. Camera Options for Work Site Photography:
- 1.) Digital SLR camera with minimum 10-megapixel capability.
  - 2.) Cameras with higher megapixel capability are acceptable, but Work site images must be produced with camera image quality settings selected to comply with these specifications.
  - 3.) Digital Images:
    - (i) Nominal image size: 3264 x 2448 pixels
    - (ii) Minimal compression ratio, minimal noise.
    - (iii) ISO Speed: Maximum 100, unless a flash or large aperture lens is properly employed.
- B. Camera Options for Aerial Photography:

- 1.) Digital SLR or other type still camera with minimum 24-megapixel capability.
  - 2.) Cameras with higher megapixel capability are acceptable, but aerial images must be produced with camera image quality settings selected to comply with these specifications.
  - 3.) Digital Images:
    - (i) Nominal image size: 6016 x 4000 pixels
    - (ii) Minimal compression ratio, minimal noise.
- C. Accessories:
- 1.) Lenses must be provided and used for correct application.
  - 2.) Flash units must be employed as appropriate to properly capture images.
  - 3.) Tripods, monopods, image stabilization or other aids must be used for long zoom images to prevent image blur.
  - 4.) The use of proper lens hoods (shades) and lens filters are required depending upon subject location, direction, and temperature of natural or artificial light, and where contrast emphasis is required to adequately capture the image.
  - 5.) Flash memory cards must be employed which meet the camera manufacturer's requirements. Such cards must have the capability of recording the image file at sufficient speed and be of sufficient size to not limit image quality.

## 2.2. IMAGE FILE STORAGE AND DELIVERY

- A. Digital Image Portable Storage and Delivery Media
- 1.) Contractor shall acquire and provide Portable Storage Devices suitable for the requirements of this Section.
  - 2.) A minimum of two (2) devices shall be provided.
  - 3.) Portable Storage Devices shall be of the following performance requirements:
    - (i) Each such device shall be supplied with a high-speed USB cable supporting USB 3.0 transfer.
    - (ii) Storage at a minimum 1 TB of data
    - (iii) Shockproof to IP68 (MIL-STD-810G 516.6)
    - (iv) Dustproof to IP6X Grade
    - (v) Waterproof to IP68 Grade to 2M of submergence for 60 seconds
- B. Disposition and Use of Portable Storage Devices
- 1.) One device shall be supplied for use by the Owner and Engineer each

month. The second device shall be used by the Contractor during the following monthly period to store and protect all digital images being made for the period. When the new Portable Storage Device is provided the next month, the former will be returned to the Contractor for use. The two Portable Storage Devices will be rotated monthly until the end of the project.

- 2.) All Portable Storage Devices shall be retained by the Contractor when the Work is completed and accepted.

### 2.3. IMAGE LOG

- A. Prepare a written log in tabular form identifying and describing all images recorded each month. The written log shall be provided at the same time as the image file submissions. At a minimum, each log shall provide:
  - 1.) Number clearly corresponding to image file number.
  - 2.) Month of record, corresponding to pay request period.
  - 3.) Date each image was made.
  - 4.) General location of each image, utilizing the Structure Table numbering plan defined in the Proposed Site Plan provided on the drawings. If the image is related to infrastructure connecting two or more buildings or structures, use all Building/Structure Numbers appropriate.
  - 5.) Written description of what each image depicts.
- B. Submit logs electronically on forms acceptable to Owner and Engineer.
- C. Provide clarifications, if requested, for image descriptions.
- D. Include logs each month with submission of image files.

### 2.4. PRINTS

- A. Type of Print:
  - 1.) Paper: Single weight, full color print paper.
  - 2.) Finish: Smooth surface, matte finish.
  - 3.) Size: 8-inch x 10-inch for preliminary aerial photos; 20-inch x 24-inch for selected aerial photos to be mounted.
- B. Identify each print on back, listing:
  - 1.) Name of project
  - 2.) Description and orientation of view
  - 3.) Date and time of exposure
  - 4.) Name and address of photographer
  - 5.) Photographer's numbered identification of exposure
- C. Aerial Photographs: Each aerial photograph shall be scaled to picture the

plant site within no less than 80 percent of the print total area. Each selected enlarged aerial print shall be provided mounted within a black metal frame, non-glare glass front, behind a minimum 2-inch-wide, two-tone, double beveled mat.

## **PART 3 - EXECUTION**

### **3.1. TECHNIQUE**

#### **A. Factual Presentation**

- 1.) Select only views that provide correct, representative perspective
- 2.) Use fixed scale in image view if required to present dimensional records
- 3.) Avoid oblique or foreshortened viewing angles that cause image distortion

#### **B. Correct exposure and focus.**

- 1.) High resolution and sharpness
- 2.) Maximum depth-of-field
- 3.) Minimum distortion
- 4.) Free from shadow or other nearby obstructions

#### **C. Accurate Metadata Information.**

- 1.) Ensure all camera equipment is set to record the accurate date and time of each image, as captured in the metadata portion of the image file. Reset time for all periods of Eastern Daylight Savings Time.

#### **D. Site Progress Photography.**

- 1.) Use image stabilization, tripods, or monopods to ensure image clarity.
- 2.) Choose best angle for available lighting.
- 3.) Use flash-fill when warranted.

#### **E. Aerial Project Photography**

- 1.) Utilize suitable airplane, helicopter, or commercial drone for photography platform. All such equipment must be licensed and approved by appropriate jurisdictions.
- 2.) Obtain images from various perspectives.
- 3.) Conduct aerial photography only when atmospheric conditions are the best for the platform employed.

### **3.2. VIEWS REQUIRED**

- A. Photograph from locations to adequately illustrate condition of construction and state of progress.
- B. At successive periods of photography, take at least one photograph from



the same overall view as previously photographed.

- C. Consult with the Engineer at each period of photography for instructions concerning views required.

### 3.3. DELIVERY OF PRINTS/IMAGES

- A. Deliver images and/or prints to the Owner and Engineer as specified to accompany each monthly Pay Estimate.
- B. Distribution of digital images and preliminary aerial prints shall be as follows:
  - 1.) Owner (one set, updated monthly)
  - 2.) Engineer (one set, updated monthly)
  - 3.) Project record files (one set to be stored by Contractor until the end of the project, which may be retained by the Contractor, if desired.)

**END OF SECTION 01380 CONSTRUCTION PHOTOGRAPHS**

## SECTION 01505 MOBILIZATION

### PART 1 - GENERAL

#### 1.1. DEFINITION AND SCOPE INITION

- A. As required for the proper performance and completion of the Work, mobilization shall include, but not be limited to, the following principal items:
- 1.) Move onto the site all Contractor's plant and equipment required for the first month's operation.
  - 2.) Install temporary construction power, wiring, and lighting facilities.
  - 3.) Establish a fire protection plan and safety program.
  - 4.) Secure construction water supply.
  - 5.) Provide on-site sanitary facilities and potable water facilities.
  - 6.) Arrange for and erect Contractor's work and storage yard and employee's parking facilities.
  - 7.) Submit all required insurance certificates and bonds.
  - 8.) Obtain all required permits.
  - 9.) Post all OSHA, FDEP, Department of Labor, and all other required notices.
  - 10.) Have Contractor's project manager and/or superintendent at the job site full time.
  - 11.) Submit a detailed construction schedule acceptable to the Engineer and Owner.
  - 12.) Submit cash flow in tabular and graphic form to the Engineer and Owner.
  - 13.) Submit a finalized Schedule of Values of the Work in the Owner's approved format.
  - 14.) Submit a hurricane preparedness plan acceptable to the Engineer and the Owner.
  - 15.) Establishing control points on project site and performing bench run through reference points as described in Section 01050.

#### 1.2. PAYMENT FOR MOBILIZATION

- A. The Contractor's attention is directed to the condition that no payment for mobilization, or any part thereof, will be approved for payment under the Agreement until all mobilization items listed above have been completed as specified.

**PART 2 - PRODUCTS<sup>1</sup>**

**PART 3 - EXECUTION<sup>2</sup>**

**END OF SECTION 01505 MOBILIZATION**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THE SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

## SECTION 01600 MATERIALS AND EQUIPMENT

### PART 1 - GENERAL

#### 1.1. DESCRIPTION

- A. Scope of Work: Material and equipment incorporated into the Work:
- 1.) Conform to applicable specifications and standards.
  - 2.) Comply with size, make, type and quality specified, or as specifically approved in writing by Engineer.
  - 3.) Manufactured and fabricated products:
    - (i) Design, fabricate and assemble in accordance with the best engineering and shop practices.
    - (ii) Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
    - (iii) Two or more items of the same kind shall be identical, and shall be produced by the same manufacturer.
    - (iv) Products shall be suitable for service conditions.
    - (v) Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing by the Engineer.
  - 4.) Do not use material or equipment for any purpose other than that for which it is designed or is specified.

#### 1.2. APPROVAL OF MATERIALS

- A. Only new materials and equipment shall be incorporated in the work. All materials and equipment furnished by Contractor shall be subject to the inspection and approval of the Owner. No material shall be delivered to the work without prior approval of the Engineer, with the consent of the Owner. See also Section 01300.
- B. The Contractor shall submit to the Engineer data relating to materials and equipment proposed to be furnished for the work in accordance with Section 01300. Such data shall be in sufficient detail to enable the Engineer to identify the particular product and to form an opinion as to its conformity to the specifications.
- C. Facilities and labor for handling and inspection of all materials and equipment shall be furnished by the Contractor. Either prior to beginning or during progress of the work, Contractor shall submit samples of materials for such special tests as may be necessary to demonstrate that they conform to the specifications. Such samples shall be furnished, stored, packed and shipped as directed by the supplier at Contractor's expense. Except as otherwise noted, Contractor shall make arrangements for and pay for the tests.

- D. Contractor shall submit data and samples sufficiently early to permit consideration and approval before materials are necessary for incorporation in the work. Any delay of approval resulting from Contractor's failure to submit samples or data promptly shall not be used as a basis of claim against Owner or Engineer.
- E. In order to demonstrate the proficiency of workers or to facilitate the choice among several textures, types, finishes and surfaces, Contractor shall provide such samples of workmanship or finish as may be required.
- F. The materials and equipment used on the work shall correspond to the approved samples or other data.

### 1.3. SUBSTITUTIONS AND PRODUCT OPTIONS

- A. The substitution requirements of this Section are in addition to the requirements of the General Conditions and Supplementary Conditions.
- B. The intent of these Specifications is to provide the Owner with a quality product without discouraging competitive bidding. Substitutions may be submitted and will be evaluated in accordance with Section 01605.

### 1.4. MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, Contractor shall obtain and distribute copies of such instructions to parties involved in the installation, including five copies to Engineer.
  - 1.) Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions and in conformity with specified requirements.
  - 1.) Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.
  - 2.) Do not proceed with work without clear instructions.
- C. Perform work in accordance with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

### 1.5. TRANSPORTATION AND HANDLING

- A. Arrange deliveries of products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site.
  - 1.) Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
  - 2.) Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.

- B. Provide equipment and personnel to handle products by manufacturer's approved methods to prevent soiling or damage to products or packaging.

#### 1.6. STORAGE AND PROTECTION

- A. The Contractor shall furnish a covered, weather-protected storage structure providing a clean, dry, noncorrosive environment for all mechanical equipment, valves, architectural items, electrical and instrumentation equipment, and special equipment to be incorporated into this project. Storage of equipment shall be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including connection of heaters, placing of storage lubricants in equipment, etc. Corroded, damaged or deteriorated equipment and parts shall be replaced before acceptance of the project. Equipment and materials not properly stored will not be included in a payment estimate.
- B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.
  - 1.) Store products subject to damage by the elements in weathertight enclosures, such as buildings or trailers which have a concrete or wooden floor, a roof and fully closed walls on all sides.
  - 2.) Maintain temperature and humidity within the ranges required by manufacturer's instructions, (e.g., especially for electrical and instrumentation equipment).
  - 3.) Protect mechanical and electrical equipment from being contaminated by dust, dirt and moisture.
  - 4.) Store fabricated products above the ground, on blocking or skids, and prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings, but provide adequate ventilation to avoid condensation.
  - 5.) Provide heated storage space for material which would be damaged by freezing.
  - 6.) Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
  - 7.) Prior to the installation of equipment, it shall be stored at locations designated and approved by the Engineer.
- C. All materials and equipment to be incorporated in the work shall be handled and stored by Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.
- D. Cement, sand and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural and miscellaneous steel, and reinforcing steel shall be stored off the ground or otherwise to

prevent accumulations of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete beams shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking and spalling to a minimum.

- E. All materials which, in the opinion of Engineer, have become so damaged as to be unfit for the use intended or specified shall be promptly removed from the site of the work, and Contractor shall receive no compensation for the damaged material or its removal.
- F. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
- G. Protection After Installation: Provide substantial coverings as necessary to protect installed products from damage from traffic, dust, weather and subsequent construction operations. Remove covering when no longer needed.
- H. The Contractor shall be responsible for all material, equipment and supplies sold and delivered to Owner under this Contract until final inspection of the work and acceptance thereof by Owner. In the event any such material, equipment and supplies are lost, stolen, damaged or destroyed prior to final inspection and acceptance, Contractor shall replace same without additional cost to Owner.
- I. Should Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within seven days after written notice to do so has been given, Owner retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering and any other costs associated with making the necessary corrections.

#### 1.7. SPECIAL TOOLS

- A. Manufacturers of equipment and machinery shall furnish any special tools, (including grease guns or other special lubricating devices), required for normal adjustment, operations and maintenance, together with instructions for their use. Contractor shall preserve and deliver to Owner these tools and instructions in good order no later than upon achievement of Substantial Completion.

#### 1.8. STORAGE AND HANDLING OF EQUIPMENT ON SITE

- A. Attention shall be given to the storage and handling of equipment on site. As a minimum, the procedure outlined below shall be followed:

- 1.) Equipment shall not be shipped until approved by Engineer and Owner. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from Engineer. Equipment shipped to the site shall be stored in accordance with Paragraph 1.06, herein.
  - 2.) All equipment having moving parts, such as gears, electric motors, etc., and/or instruments shall be stored in a temperature and humidity-controlled building approved by Engineer, until such time as the equipment is to be installed.
  - 3.) All equipment shall be stored fully lubricated with oil, grease, etc., unless otherwise instructed by the manufacturer.
  - 4.) Manufacturer's storage instructions shall be carefully studied by Contractor and reviewed with Engineer by the Contractor. These storage instructions shall be carefully followed and a written record of this kept by the Contractor.
  - 5.) Moving parts shall be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal-to-metal "welding" or seizing. Upon installation of the equipment, Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
  - 6.) Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. Mechanical equipment to be used in the work, if stored for longer than ninety (90) days, shall have the bearings cleaned, flushed and lubricated prior to testing and startup, at no extra cost to Owner.
- 1.9. SPARE PARTS
- A. Spare parts for certain equipment have been specified in the pertinent sections of the Specifications, or are common to the component as specified by the manufacturer. Contractor shall collect and store all spare parts so required in an area to be designated by Owner. In addition, Contractor shall furnish Engineer an inventory listing all spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost.
  - B. All spare parts shall be properly packaged and shall be labeled on the part itself and on the exterior of any packaging.

## **PART 2 - PRODUCTS<sup>1</sup>**

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<sup>1</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION



**PART 3 - EXECUTION2**

**END OF SECTION 01600 MATERIALS AND EQUIPMENT**

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2 PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

## SECTION 01600 PRODUCT SUBSTITUTIONS

### PART 1 - GENERAL

#### 1.1. RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.

#### 1.2. DESCRIPTION OF REQUIREMENTS

- A. Definitions: "Products" is defined to include purchased items for incorporation into the work, regardless of whether specially purchased for project or taken from Contractor's stock of previously purchased products. "Materials", is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, installed or applied to form units of work. "Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, etc.). Definitions in this paragraph are not intended to negate the meaning of other terms used in contract documents, including "specialties," "systems," "structure," finishes," "accessories," "furnishings," "special construction," and similar terms, which are self-explanatory and have recognized meanings in the construction industry.
- B. Substitutions: The requirements for substitutions do not apply to specified Contractor options on products and construction methods. Revisions to contract documents, where requested by Owner, or Engineer, are "changes" not "substitutions." Requested substitutions during bidding period, which have been accepted prior to Contract Date, are included in contract documents and are not subject to requirements for substitutions as specified herein. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders, except as provided in contract documents are considered requests for "substitutions," and are subject to requirements hereof.

#### 1.3. QUALITY ASSURANCE

- A. Source Limitations: To the greatest extent possible for each unit of work, provide products, materials or equipment of a singular generic kind and from a single source.
- B. Compatibility of Options: Where more than one choice is available as options for Contractor's selection of a product or material, select an option which is compatible with other products and materials already selected (which may have been from among options for those other products and materials). Total compatibility among options is not assured by limitations

within contract documents but must be provided by Contractor. Compatibility is a basic general requirement of product/material sections.

#### 1.4. PRODUCTS LISTED

- A. Within 30 days after award of Contract, submit to Engineer six (6) copies of complete list of major products which are proposed for installation.
- B. Tabulate products by specification section number and title.
- C. For products specified only by reference standards, list for each such product:
  - 1.) Name and address of manufacturer.
  - 2.) Trade name.
  - 3.) Model or catalogue designation.
  - 4.) Manufacturer's data:
  - 5.) Reference standards.
  - 6.) Performance test data.

#### 1.5. CONTRACTOR'S OPTIONS

- A. For products specified only by reference standard, select product meeting that standard, by any manufacturer.
- B. For products specified by naming several products or manufacturers, select any one of those products and manufacturers named which complies with Specifications.
- C. For products specified by naming only one or more products or manufacturers and stating "or equal", select one of those named products or manufacturers. After award of the Contract, submit a request as for substitutions, for any product or manufacturer which is not specifically named.
- D. For products specified by naming only one product and manufacturer, there is no option, and no substitution will be allowed.

#### 1.6. SUBSTITUTION SUBMITTALS

- A. Requests for Substitutions: Submit three (3) copies, fully identified for product or method being replaced by substitutions, including related specification section and drawing number(s), and fully documented to show compliance with requirements for substitutions. Include product data/drawings, description of methods, samples where applicable, Contractor's detailed comparison of significant qualities between specified item and proposed substitutions, statement of effect on construction time and coordination with other affected work, cost information or proposal, and Contractor's statement to the effect that proposed substitution will result in overall work equal-to-or better- than work originally indicated.
- B. Within a period of 30 days after award of Contract, Engineer will consider formal requests from the Contractor for substitution of products in place of

those specified:

- 1.) After the end of that period, the request will be considered only in case of product unavailability or other conditions beyond the control of the Contract Documents.
- C. Submit a separate request for each substitution. Support each request with:
- 1.) Complete data substantiating compliance of the proposed substitution. Support each request with:
    - (i) Product identification, including manufacturer's name and address.
    - (ii) Manufacturer's literature; identify:
      - (a) Product description.
      - (b) Reference standards.
      - (c) Performance and test data.
    - (iii) Samples, as applicable.
    - (iv) Name and address of similar projects on which product has been used, and the date of each installation.
  - 2.) Itemized comparison of the proposed substitution with product specified; list significant variations.
  - 3.) Data relating to changes in the construction schedule.
  - 4.) Any effect of the substitution on separate contracts.
  - 5.) List of changes required in other work or products.
  - 6.) Accurate cost data comparing proposed substitution with product specified.
  - 7.) Designation of required license fees or royalties.
  - 8.) Designation of availability of maintenance services and sources of replacement materials.
- D. Substitutions will not be considered for acceptance when:
- 1.) They are indicated or implied on Shop Drawings or product data submittals without a formal request from Contractor.
  - 2.) They are requested by anyone other than Contractor.
  - 3.) Submitted without data relating to changes in construction schedule.
  - 4.) Any effect of substitution on separate contracts is not included.
  - 5.) A list of changes required in other work or products is not included.
  - 6.) Accurate cost data comparing proposed substitution with product specified is not included.
  - 7.) Designation of required license fees or royalties is not included.

- 8.) Designation of availability of maintenance services, sources of replacement materials is not included.
  - 9.) Acceptance will require substantial revision of Contract Documents.
  - E. Substitute products shall not be ordered or installed without written acceptance of Engineer.
  - F. Engineer will determine the acceptability of proposed substitutions. Contractor shall pay all costs associated with Engineer's review.
- 1.7. CONTRACTOR'S REPRESENTATION
- A. In making formal request for substitution, the Contractor represents that:
    - 1.) The proposed product has been investigated and determined that it is equal to or superior in all respects to that specified.
    - 2.) The same warranties or bonds shall be provided for substitution as for product specified.
    - 3.) The installation of accepted changes shall be incorporated as may be required for the Work to be complete in all respects.
    - 4.) Any claims for additional costs caused by substitution are waived.
    - 5.) All costs, resulting under separate contracts, which result from the substitution, are the responsibility of the Contractor.
    - 6.) Any and all Engineering costs for redesign or revision of the Contract Documents shall be the responsibility of the Contractor.
    - 7.) Cost data is complete and includes related costs under his contract, but not:
      - (i) Costs under separate contracts.
      - (ii) Engineer's costs of redesign or revision of Contract Documents.
- 1.8. ENGINEER DUTIES
- A. Review Contractor's requests for substitutions with reasonable promptness.
  - B. Notify Contractor in writing of decision to accept or reject requested substitution.
- 1.9. PRODUCT DELIVERY-STORAGE-HANDLING
- A. General: Deliver, handle and store products in accordance with manufacturer's recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Control delivery schedules to minimize long-term storage of products at site and overcrowding of construction spaces. In particular, provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss.
- 1.10. WARRANTIES (GUARANTEES)

- A. **Coincidental Product Warranty:** A warranty which is not specifically required by contract documents (other than as specified in this section) but which is available on a product incorporated into the work, by virtue of the fact that manufacturer of product has published warranty in connection with purchases and uses of product without regard for specific applications except as otherwise limited by terms of warranty.
- B. Refer to individual sections of Division 2 through 16 for the determination of units of work which are required to be specifically or individually warranted, and for the specific requirements and terms of those warranties (or guarantees).
- C. **General Limitations:** It is recognized that specific warranties are intended primarily to protect Owner against failure of the work to perform as required, and against deficient, defective and faulty materials and workmanship, regardless of sources. Except as otherwise indicated, specific warranties do not cover failures in the work which results from:
  - 1.) Unusual and abnormal phenomena of the elements.
  - 2.) The Owner's misuse, maltreatment or improper maintenance of the work.
  - 3.) Vandalism after time of substantial completion.
  - 4.) Insurrection of acts of aggression including war.
- D. **Related Damages and Losses:** In connection with Contractor's correction of warranted work which has failed, remove and replace other work of project which has been damaged as a result of such failure, or must be removed and replaced to provide access for correction of warranted work.
- E. **Reinstatement of Warranty Period:** Except as otherwise indicated, when product warranty has failed and has been corrected by replacement or restoration, reinstate warranty by written endorsement for the following time period, starting on date of acceptance of replaced or restored work.
- F. A period of time equal to original warranty period of time.
- G. **Replacement Cost, Obligations:** Except as otherwise indicated, costs of replacing or restoring failing warranted units or products is Contractor's obligation, without regard for whether Owner has already benefited from use through a portion of anticipated useful service lives.

## **PART 2 - PRODUCTS**

### **2.1. GENERAL PRODUCT COMPLIANCES**

- A. **General:** The compliance requirements, for individual products as indicated in contract documents, are multiple in nature and may include generic, descriptive, proprietary, performance, prescriptive, compliance with standards, compliances with codes, conformance with graphic details and other

similar forms and methods of indicating requirements, all of which must be complied with. Also "allowances" and similar provisions of contract documents will have a bearing on selection process.

- B. Procedures for Selecting Products: Contractor's options for selecting products are limited by contract document requirements, and governing regulations, and are not controlled by industry traditions or procedures experienced by Contractor on previous construction project. Required procedures include, but are not necessarily limited to, the following for various indicated methods of specifying:
- 1.) Single Product/Manufacturer Name: Provide product indicated, except advise Engineer before proceeding, where known that named product is not a feasible or acceptable selection.
  - 2.) Two or More Product/Manufacturer Names: Provide one of the named products, at Contractor's option, but excluding products which do not comply with requirements. Do not provide or offer to provide an unnamed product, except where none of named products comply with requirements or are a feasible selection; advise Engineer before proceeding.
  - 3.) "Or Equal": Where named products in specifications text are accompanied by the term "or equal," or other language of similar effect, comply with those contract document provisions concerning "substitutions" for obtaining Engineer's approval (by change order) to provide an unnamed product.
  - 4.) "Approved Equal": The use of this phrase shall mean that in lieu of the product called for in the Specifications, the Contractor may submit to the Engineer another product for consideration. The Engineer must receive a package that details the product for consideration at least two (2) weeks (14 days) prior to the receipt of Bids. Only the Contractor wishing to use another product may submit that product for review. If approval is given, the Engineer will notify the Contractor in writing. Any modifications necessary, including piping, electrical, structural, etc. that may be required, will be the responsibility of the Contractor.
  - 5.) "Named," except as otherwise indicated, is defined to mean manufacturer's name for product, as recorded in published product literature, of latest issue as of date of contract documents. Refer to requests to use products of a later (or earlier) model to Engineer for acceptance before proceeding.
  - 6.) Standards, Codes and Regulations: Where only compliance with an imposed standard, code or regulation is required, selection from among products which comply with requirements including those standards, codes and regulations, is Contractor's option.
  - 7.) Performance Requirements: Provide products which comply with spe-

cific performances indicated, and which are recommended by manufacturer (in published product literature or by individual certification) for application indicated. Overall performance of a product is implied where product is specified with only certain specific performance requirements.

- 8.) Prescriptive Requirements: Provide products which have been produced in accordance with prescriptive requirements, using specified ingredients and components, and complying with specified requirements for mixing, fabricating, curing, finishing, testing and similar operations in manufacturing process.

## 2.2. SUBSTITUTIONS

- A. Conditions: Contractor's request for substitution will be received and considered when extensive revisions to contract documents are not required and changes are in keeping with general intent of contract documents; when timely, fully documented and properly submitted; and when one or more of the following conditions is satisfied, all as judged by Engineer. Otherwise, request will be returned without action except to record noncompliance with these requirements:
  - 1.) Where request is directly related to an "or equal" clause or other language of same effect in contract documents. Where "or approved equal" is not specified, no other material or article may be substituted.
  - 2.) Where required product, material or method cannot be provided within Contract Time, but not as a result of Contractor's failure to pursue the work promptly to coordinate various activities properly.
  - 3.) Where required product, material or method cannot be provided in a manner which is compatible with other materials of the work, or cannot be properly coordinated, therewith, or cannot be warranted as required, or cannot be used without adversely affecting Owner's insurance coverage on completed work, or will encounter other substantial non-compliances which are not possible to otherwise overcome except by making requested substitution, which Contractor thereby certifies to overcome such non-compatibility, non-coordination, non-warranty, non-insurability or other non-compliance as claimed.
  - 4.) Where required product, material or method cannot receive required approval by a governing authority and requested substitution can be so approved.
  - 5.) Where substantial advantage is offered Owner, in terms of cost, time, energy conservation or other valuable considerations, after deducting offsetting responsibilities, Owner may be required to bear, including additional compensation to Engineer for redesign and evaluation services, increased cost of other work by Owner or separate contractors, and similar considerations.
- B. Work-Related Submittals: Contractor's submittal of, and Engineer's acceptance of shop drawings, product data or samples which indicated work



not complying with requirements of contract documents, does not constitute an acceptable and valid request for, nor approval of, a substitution.

### 2.3. GENERAL PRODUCT REQUIREMENTS

- A. General: Provide products which comply with requirements, and which are undamaged and unused at time of installation, and which are complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for intended use and effect.
- B. Standard Products: Where available, provide standard products of types which have been produced and used previously and successfully on other projects and in similar applications.
- C. Continued Availability: Where additional amounts of a product, by nature of its application, are likely to be needed by Owner at a later date for maintenance and repair or replacement work, provide a standard, domestically produced product which is likely to be available to Owner at such later date.
- D. Equipment Nameplates: Provide permanent nameplate on each item of service connected or power operated equipment. Indicate manufacturer, product name, model number, serial number, capacity, speed, ratings and similar essential operating data.

## PART 3 - EXECUTION<sup>1</sup>

### END OF SECTION 01600 PRODUCT SUBSTITUTIONS

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<sup>1</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

## SECTION 01650 START-UP AND DEMONSTRATION

### PART 1 - GENERAL

#### 1.1. DESCRIPTION

Scope of Work: Provide material, personnel, and testing or measuring equipment as needed and as specified herein to perform the required start-up and demonstration tests of appropriate equipment and systems.

### PART 2 - PRODUCTS<sup>1</sup>

### PART 3 - EXECUTION

#### 3.1. PRELIMINARY MATTERS AND FIELD TESTS

- A. Start-up Certification: Prior to system start-up, successfully complete all the field testing required of the individual components of the work. Submit six (6) copies of CHECK-OUT Memos for each individual component, signed by Contractor, Sub-contractor, and the manufacturer's representative. A sample CHECK-OUT MEMO form is provided at the end of this section. All copies shall be provided with the respective copies of the Operation and Maintenance Manual. This form shall be completed and submitted before Instruction in Operation to Owner or a request for initiating any final inspection(s).
- B. Demonstrate to the Engineer that all temporary jumpers and/or bypass works have been removed and that all of the components are operating under their own controls as designated.
- C. Coordinates start up activities with the Engineer and Owner prior to commencing system start-up.

#### 3.2. START-UP TESTS

- A. Confirm that all equipment is properly energized, that the valves are set to their normal operating condition and that the flow path through the new work is unobstructed.
- B. Slowly fill each hydrostatic structure in the process flow stream with water.
- C. Initiate start-up and training in accordance with and with the use of the plant operation and maintenance manuals.
- D. Observe the component operation and make adjustments as necessary to optimize the performance of the Work.
- E. The start-up tests will be conducted for seven (7) consecutive days. The Work must operate successfully during the seven-day testing period in the

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION

manner intended. If the Work does not operate successfully, or if the start-up is interrupted due to problems, the problems will be corrected, and the test will start over from day one. During the start-up tests, instruct designated plant operating personnel in the function and operation of the Work.

- F. Coordinate with Owner for any adjustments desired or operational problems requiring debugging.
- G. Make adjustments, as necessary.

### 3.3. DEMONSTRATION TESTS

- A. After all Work components have been constructed, field tested and started-up in accordance with the individual specifications and manufacturer requirements, perform the Demonstration Tests in the presence of the Engineer and the Owner. The demonstration shall be held upon completion of all systems at a date to be agreed upon in writing by the Owner or his representative.
- B. During the demonstration test, operate the Work and cause various operational circumstances to occur. As a minimum, these circumstances will include average and peak flows, random equipment or process failures, tank overflows, surcharges, and interlocks. Demonstrate the essential features of the equipment and its relationship to other equipment. Prior to the Demonstration test, the Contractor shall submit two (2) copies of a detailed schedule of operational circumstances to describe the proposed test procedures for approval of completeness. These approved procedures will then be used as the agenda at the demonstration. Coordination of the test schedule will be accomplished through the Engineer.
- C. The Demonstration Test procedures shall follow the example test procedure form provided at the end of this section. Provide similar test procedure forms for each section of the work to cover all aspects and features specified. The test procedures may be broken down into specific areas as follows:
  - 1.) Pumping System & SCADA Interface
  - 2.) Debris Baskets, Hoists, & Hatches
  - 3.) Generator & ATS
  - 4.) All Valving & Metering
- D. Acceptability of the Work's performance will be based on the Work performing as specified, under these actual and simulated operating conditions as defined in the Contract Documents. The intent of the Demonstration Tests is for the Contractor to demonstrate to the Owner and the Engineer that the Work will function as a complete and operable system under normal as well as emergency operating conditions and is ready for acceptance.
- E. Demonstrate the essential features of the whole system as it applies to the

Work, including the mechanical equipment, piping, structures, finishes, controls, instrumentation, power distribution and lighting systems. Use the approved procedures and circumstances to demonstrate the system. Any minor deficiencies found shall be noted and included on a punch list attached to the Certificate of Completed Demonstration. The system shall be demonstrated only once, after completion of start-up tests. If circumstances arise that interrupt the test procedures (such as weather, unforeseen process problems, or problems caused by the Contractor whether or not the problems are the fault of the Contractor, etc.), then the test shall be terminated and rescheduled to a later date after the problem is corrected. The test shall be run in its entirety if so, directed by the Engineer.

- F. Certificate of Completed Demonstration: Submit ten (10) copies of the CERTIFICATE OF COMPLETED DEMONSTRATION for the work, signed by the Contractor, Sub-contractor, Engineer, and Owner and insert one copy in each Operation and Maintenance Manual. A sample CERTIFICATE OF COMPLETED DEMONSTRATION form is provided at the end of this section.

MANUFACTURERS CHECKOUT CERTIFICATION

OWNER: City of Panama City Beach, Florida No. Copies 6

ENGINEER: Infrastructure Solution Services No. Copies 1  
Date \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_ No. Copies \_\_\_\_\_ Check-out

FIELD: \_\_\_\_\_ No. Copies 1 Memo No. \_\_\_\_\_

OWNER: \_\_\_\_\_ No. Copies 1

PROJECT NAME: WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT.

PROJECT \_\_\_\_\_ NUMBER: \_\_\_\_\_

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

DRAWING \_\_\_\_\_ NO: \_\_\_\_\_

LOCATION: WWTF #1

SPECIFICATION SECTION: \_\_\_\_\_

OWNER: City of Panama City Beach, FL

OTHER: \_\_\_\_\_

NAME OF EQUIPMENT CHECKED: \_\_\_\_\_

NAME OF MANUFACTURER OF EQUIPMENT: \_\_\_\_\_

- 1.) The equipment furnished by us has been checked on the job by us. We have reviewed (where applicable) the performance verification information submitted to us by the Contractor.
- 2.) The equipment is properly installed, except for items noted below. \*
- 3.) The equipment is operating satisfactorily, except for items noted below. \*

- 4.) The written operating and maintenance information (where applicable) has been presented to the Contractor and gone over with him in detail. Five (5) copies of all applicable operating and maintenance information and parts lists have been furnished to him for insertion in each of the Operation and Maintenance Manuals.

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

Name of Manufacturer's Rep.

Name of General Contractor

Address and Phone No. of Rep.

Authorized Signature/Title/Date

Signature/Title/Person Making Check

Name of Subcontractor

Date Checked

Authorized Signature/Title/Date

\* Manufacturer's Representative Notations: Exceptions noted at time of check were:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Manufacturer's Representative to note any limitations on adequacy of related equipment that directly affects operation, performance or function of equipment checked. (No comment presented herein will indicate complete adequacy of related systems or equipment):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### CERTIFICATE OF COMPLETED DEMONSTRATION

OWNER: City of Panama City Beach, Florida No. Copies 6

ENGINEER: Infrastructure Solution Services No. Copies 1  
 Date \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_ No. Copies \_\_\_\_\_ Check-out

FIELD: \_\_\_\_\_ No. Copies 1 Memo No. \_\_\_\_\_

OWNER: \_\_\_\_\_ No. Copies 1

PROJECT NAME: WWTF #1 GENERATOR CONTROL & ATS IMPROVEMENT PROJECT.

PROJECT \_\_\_\_\_ NUMBER: \_\_\_\_\_

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

OTHER: \_\_\_\_\_

**NOTE TO CONTRACTOR:**

Submit five (5) copies of all information listed below for checking in order to receive approval at least one week before scheduled demonstration of the Work. After all information has been approved by the Engineer, give the Owner a Demonstration of Completed Systems as specified and have the Owner sign five copies of this form. After this has been done, a written request for a final inspection of the system shall be made.

**MEMORANDUM:**

This certificate is for the information of all concerned that the Owner has been given a Demonstration of Completed Systems on the work covered under this Specification Section. This conference consisted of the system operation, a tour on which all major items of equipment were explained and demonstrated, and the following items were given to the Owner:

(a) Owner's copy of Operation and Maintenance Manual for equipment or systems specified under this section containing approved submittal sheets on all items, including the following:

- (1) Maintenance information published by manufacturer on equipment items.

- (2) Printed warranties by manufacturers on equipment items.
- (3) Performance verification information as recorded by the Contractor.
- (4) Check-out Memo's on equipment by manufacturer's representative.
- (5) Written operating instructions on any specialized items.
- (6) Explanation of guarantees and warranties on the system.
  
- (b) Prints showing actual "As-Built" conditions.
  
- (c) A demonstration of the System in Operation and of the maintenance procedures which will be required. Minor deficiencies to be corrected which were noted in the demonstration are attached, along with a copy of the actual test procedures performed.

\_\_\_\_\_  
\_\_\_\_\_  
(Name of Contractor)

By:  
\_\_\_\_\_  
\_\_\_\_\_  
(Authorized Signature, Title & Date)

\_\_\_\_\_  
\_\_\_\_\_  
(Name of Subcontractor)

By:  
\_\_\_\_\_  
\_\_\_\_\_  
(Authorized Signature, Title & Date)

Operations and Maintenance Manual, Instruction Prints, Demonstration & Instruction in Operation Received:



\_\_\_\_\_  
(Name of Owner)

By: \_\_\_\_\_  
(Authorized Signature, Title & Date)

\_\_\_\_\_

By: \_\_\_\_\_  
(Authorized Signature, Title & Date)

**END OF SECTION 01650 START-UP AND DEMONSTRATION**

## SECTION 01700 CONTRACT CLOSEOUT

### PART 1 - GENERAL

#### 1.1. DESCRIPTION

- A. Scope of Work: Comply with requirements stated in the General Conditions and Requirements of the Contract and in specifications for administrative procedures in closing out the Work.

#### 1.2. SUBSTANTIAL COMPLETION

- A. Subject to the definition of "Substantial Completion" in the General Conditions, the work may not be considered substantially complete unless the punch list items that re-main, as identified by the Engineer and Owner, can be completed within thirty (30) days. All painting, finishes, fencing, cleanup, final grading, grassing and planting shall have been completed and ready for inspection before Substantial Completion is approved. Also, all building occupancy certificates shall have been obtained. After (or concurrent with) the Demonstration Tests, with any minor deficiencies noted, the Contractor wishing to consider the Work substantially complete, shall submit to the Engineer:
  - 1.) A written notice that the Work is substantially complete.
  - 2.) A list of items to be completed or corrected and explanations thereof.
- B. Within a reasonable time after receipt of such notice, the Engineer will make an inspection, if necessary, to determine the status of completion.
- C. Should Engineer determine that the Work is not substantially complete:
  - 1.) The Engineer will promptly notify Contractor in writing, giving the reasons there-fore.
  - 2.) Contractor shall remedy the deficiencies in the Work and send a second written notice of Substantial Completion to Engineer.
  - 3.) Engineer will reinspect the Work.
- D. When Engineer finds that the Work is substantially complete, he will:
  - 1.) Prepare a tentative Certificate of Substantial Completion on form provided herein (see Section 00830), with a tentative list of items to be completed or corrected before final inspection.
- E. After consideration of any objections made by the Owner as provided in the General Conditions of the Contract, the Engineer will execute the Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

#### 1.3. FINAL INSPECTION AFTER COMPLETION

- A. When Contractor considers the Work is complete with all minor deficiencies

completed or corrected, he shall submit written certification that:

- 1.) Contract Document requirements have been met.
  - 2.) Work has been inspected for compliance with Contract Documents.
  - 3.) Work has been completed in accordance with Contract Documents.
  - 4.) Equipment and systems have been tested in the presence of Owner's representative and are operational.
  - 5.) All minor deficiencies have been corrected or completed and the Work is ready for final inspection.
  - 6.) All operation and maintenance manuals have been submitted and are acceptable.
  - 7.) Project as-built documents are complete and submitted to the Engineer.
  - 8.) Transfer of all spares and expendables has been made to the Owner with a full accounting of the quantities and amounts due.
- B. Engineer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should Engineer consider that the Work is incomplete or defective:
- 1.) Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
  - 2.) Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to Engineer that the Work is complete.
  - 3.) Engineer will reinspect the Work.
- D. When the Engineer finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.
- 1.4. REINSPECTION FEES
- A. Should the Engineer perform re-inspections due to failure of the Work to comply with the claims of status of completion made by Contractor:
- 1.) Owner will compensate the Engineer for such additional services.
  - 2.) Owner will deduct the amount of such compensation from the final payment to the Contractor.
- 1.5. CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER
- A. Evidence of compliance with requirements of governing authorities.
  - B. Project Documents: To requirements of Section 01720.
  - C. Operating and Maintenance Data, Instructions to Owner's Personnel: To requirements of Section 01730.
  - D. Spare Parts and Maintenance Materials: To requirements of the General

Conditions and the Technical Sections of the Specifications.

- E. Evidence of Payment and Release of Liens: To requirements of the General and Special Conditions.
- F. Certificate of Insurance for Products and Completed Operations.

#### 1.6. FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the Engineer.
- B. Statement shall reflect all adjustments to the Contract Sum:
  - 1.) The original Contract Sum.
  - 2.) Additions and deductions resulting from:
    - (i) Previous change orders or written amendment.
    - (ii) Allowances
    - (iii) Unit prices
    - (iv) Deductions for uncorrected work
    - (v) Penalties and bonuses
    - (vi) Deductions for liquidated damages
    - (vii) Deductions for reinspection payments
    - (viii) Other adjustments
  - 3.) Total Contract Sum, as adjusted.
  - 4.) Previous payments.
  - 5.) Sum remaining due.
  - 6.) Evidence of transfer of inventory for all spares, and expendables used to return and supply the full specified amounts and quantities due.
- C. Engineer will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.
- D. Submit Maintenance Bond to Owner.

#### 1.7. FINAL PERIODIC PAY ESTIMATE

- A. Contractor shall submit the executed final Periodic Pay Estimate in accordance with procedures and requirements stated in the Conditions of the Contract.

## **PART 2 - PRODUCTS1**

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1 PART 2 OF SECTION NOT USED IN SPECIFICATION

**PART 3 - EXECUTION2**

**END OF SECTION 01700 CONTRACT CLOSEOUT**

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2 PART 3 OF SECTION NOT USED IN SPECIFICATION

## SECTION 01710 CLEANING

### PART 1 - GENERAL

#### 1.1. DESCRIPTION

- A. Maintain job site, surrounding areas, and all public or private properties free from im-properly stored materials, accumulations of waste, debris, and rubbish caused by operations.
- B. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery, surplus materials, and clean all sight-exposed surfaces. Leave job site clean and ready for occupancy and operation.

#### 1.2. PRODUCTS

##### A. MATERIALS

- 1.) Use only cleaning materials recommended by manufacturer of materials of surface to be cleaned.
  - (i) Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

#### 1.3. EXECUTION

##### A. CLEANING - GENERAL

- 1.) Cleaning and Disposal:
  - (i) Conduct cleaning and disposal operations in accord with legal requirements.
  - (ii) Do not burn or bury rubbish and waste materials on job site. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in either storm or sanitary drains.
- 2.) Burning:

Burning of the trees, shrubs, bushes, etc., cleared on the project site will not be allowed within the project site unless prior approval is obtained from the appropriate governmental authorities and the Owner or the Engineer. All approved burning shall be completed with the use of an air curtain.
- 3.) Hazards Control:
  - (i) Store volatile wastes in covered metal containers, and remove from premises daily.
  - (ii) Prevent accumulation of wastes which create hazardous conditions.
  - (iii) Provide adequate ventilation during use of volatile or noxious substances.

##### B. CLEAN-UP DURING CONSTRUCTION

- 1.) Perform routine cleaning to ensure job site, premises, private properties and adjacent properties and rights-of-way are maintained free from accumulations of waste materials and rubbish.
- 2.) During Construction:
  - (i) During construction, the Contractor shall, at all times, keep the site of the Work and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the Owner or Engineer, such material, debris, or rubbish constitutes a nuisance or is objectionable.
  - (ii) The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops. Contractor shall be re-sponsible and liable for all spillage and incur all associated costs including, but not limited to, costs related to repair and maintenance resulting from damages thereof, and fines that may be levied as a result of citations given by State or local regulatory agencies.
  - (iii) Wet down dry materials and rubbish to lay and control dust.
  - (iv) At reasonable intervals during progress of Work, clean job site and public properties, and dispose of waste materials, debris and rubbish.
  - (v) Provide dump containers on job site and pay for regular collection of waste materials, debris and rubbish.
  - (vi) Remove waste materials, debris and rubbish from job site, premises, adjacent and public properties and legally dispose of at public or private dumping areas.
  - (vii) Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from height.
  - (viii) Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

#### C. FINAL CLEANING

- 1.) In preparation for Substantial Completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
  - (i) At the conclusion of the Work, all erection tools, temporary structures and excess materials belonging to the Contractor shall be promptly removed, and Contractor shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances to a facility permitted to manage these materials.
  - (ii) The Contractor shall thoroughly clean all equipment and materials installed and shall deliver such materials and equipment undamaged

in a bright, clean, polished and new operating condition.

- (iii) Remove grease, dust, dirt, stains, labels, furniture, fingerprints, and other foreign materials, from sight-exposed interior and exterior finished surfaces.
- (iv) Clean and polish all factory finished surfaces such as plastic laminate, plated metals, stainless steel, and factory baked-on enamel or other painted surfaces.
- (v) Repair, patch and touch-up marred surfaces to specified finish, and to match adjacent surfaces as appropriate.
- (vi) Broom clean paved surfaces; rake clean other surfaces of grounds.
- (vii) Owner will assume responsibility for cleaning as of time designated on Certificate of Substantial Completion for Owner's acceptance of project or portion thereof.

**D. GENERAL REQUIREMENTS**

If the Contractor fails to comply with the requirements of this Article, in the opinion of the Owner or the Engineer, the Owner shall perform the necessary clean-up and deduct the cost of work from the monies due or to become due to said Contractor.

**PART 2 - PRODUCTS<sup>1</sup>**

**PART 3 - EXECUTION<sup>2</sup>**

**END OF SECTION 01710 CLEANING**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION



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## SECTION 01730 OPERATIONS AND MAINTENANCE DATA

### PART 1 - GENERAL

#### 1.1. DESCRIPTION

##### A. Scope of Work:

- 1.) Compile product data and related information appropriate for Owner's maintenance and operation only of products furnished by the Contractor under this Contract.
- 2.) Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Contract Documents.
- 3.) Instruct Owner's personnel in maintenance of products and in operation of equipment and systems.

#### 1.2. QUALITY ASSURANCE

##### A. Preparation of data shall be done by personnel:

- 1.) Trained and experienced in maintenance and operation of described products.
- 2.) Familiar with requirements of this Section.
- 3.) Skilled as a technical writer to the extent required to communicate essential data.
- 4.) Skilled as draftsman competent to prepare required drawings.

#### 1.3. FORM OF SUBMITTALS

##### A. Prepare data in form of an instructional manual for use by Owner's personnel.

##### B. Format:

- 1.) Size: 8 1/2-inches x 11 inches.
- 2.) Paper: 20 pounds minimum, white, for typed pages.
- 3.) Text: Manufacturer's printed data, or neatly typewritten.
- 4.) Drawings:
  - (i) Provide reinforced punched binder tab, bind in with text.
  - (ii) Reduce larger drawings and fold to size of text pages but not larger than 11 inches x 17 inches.
- 5.) Provide fly-leaf for each separate product, or each piece of operating equipment.
  - (i) Provide typed description of products and major component parts of equipment.

- (ii) Provide indexed tabs.
- 6.) Cover:
- (i) Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS".
  - (ii) Title of Project.
  - (iii) Identity of separate structure, as applicable.
  - (iv) Identity of general subject matter covered in the manual.
- C. Binders:
- 1.) Commercial quality three O-ring or D-ring binders with durable and cleanable plastic or vinyl covers provided with slip-pockets for typed or printed title pages.
  - 2.) Maximum post width: 2 inches.
  - 3.) When multiple binders are used, correlate the data into related consistent groupings.
- 1.4. CONTENT OF MANUAL
- A. Provide neatly typewritten table of contents for each volume, arranged in systematic order.
- 1.) Contractor, name of responsible principal, address, and telephone number.
  - 2.) A list of each product required to be included, indexed to content of the volume.
  - 3.) List, with each product, name, address, and telephone number of:
    - (i) Subcontractor or installer, manufacturer and supplier name, address, and telephone number.
    - (ii) A list of each product required to be included, indexed to content of the volume.
    - (iii) Identify area of responsibility of each.
    - (iv) Local source of supply for parts and replacement name, address, and telephone number.
    - (v) Identify each product-by-product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
- 1.) Include only those sheets which are pertinent to the specific product.
  - 2.) Annotate each sheet to:
    - (i) Clearly identify specific product or part installed.
    - (ii) Clearly identify data applicable to installation.

- (iii) Delete references to inapplicable information.
  - 3.) Operation and maintenance information as herein specified.
  - 4.) As-built shop drawings as submitted and approved with all corrections made for each product.
- C. Drawings:
- 1.) Supplement product data with drawings as necessary to clearly illustrate:
    - (i) Relations of component parts of equipment and systems.
    - (ii) Control and flow diagrams.
    - (iii) Coordinate drawings with information in Project Documents to assure correct illustration of completed installation.
  - 2.) Do not use Project As-built Documents as maintenance drawings.
- D. Written text, as required to supplement product data for the particular installation:
- 1.) Organize in consistent format under separate headings for different procedures.
  - 2.) Provide logical sequence of instructions of each procedure.
- E. Copy of each warranty, bond and service contract issued.
- 1.) Provide information sheet for Owner's personnel, give:
    - (i) Proper procedures in event of failure.
    - (ii) Instances which might affect validity of warranties or bonds.
- 1.5. MANUAL FOR MATERIALS AND FINISHES
- A. Submit six copies of complete manual in final form.
  - B. Content: for applied materials and finishes:
    - 1.) Manufacturer's data, giving full information on products.
      - (i) Catalog number, size, composition.
      - (ii) Color and texture designations.
      - (iii) Information required for reordering special manufactured products.
    - 2.) Instructions for care and maintenance.
      - (i) Manufacturer's recommendation for types of cleaning agents and methods.
      - (ii) Cautions against cleaning agents and methods which are detrimental to product.
      - (iii) Recommend schedule for cleaning and maintenance.
  - C. Content, for moisture protection and weather-exposed products:

- 1.) Manufacturer's data, giving full information on products.
    - (i) Applicable standards.
    - (ii) Chemical composition.
    - (iii) Details of installation.
    - (iv) Instructions for inspection, maintenance, and repair.
  - D. Additional requirements for maintenance data: Respective sections of Specifications.
- 1.6. MANUAL FOR EQUIPMENT AND SYSTEMS
- A. Submit six copies of complete manual in final form.
  - B. Content, for each unit of equipment and system, as appropriate:
    - 1.) Description of unit and component parts.
      - (i) Function, normal operating characteristics, and limiting conditions.
      - (ii) Performance curves, engineering data and tests.
      - (iii) Complete nomenclature and commercial number of replaceable parts.
      - (iv) Summary of information listed on equipment and motor data plates.
    - 2.) Operating procedures:
      - (i) Start-up, break-in, routine, and normal operating instructions.
      - (ii) Regulation, control, stopping, shut-down and emergency instructions.
      - (iii) Summer and winter operating instructions.
      - (iv) Special operating instructions.
    - 3.) Maintenance procedures:
      - (i) Routine operations.
      - (ii) Guide to "trouble-shooting".
      - (iii) Disassembly, repair and reassembly.
      - (iv) Alignment, adjusting and checking.
    - 4.) Servicing and lubrication required.
    - 5.) Manufacturer's printed operating and maintenance instructions.
    - 6.) Description of sequence of operation by control manufacturer.
    - 7.) Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
      - (i) Predicted life of parts subject to wear.
      - (ii) Items recommended to be stocked as spare parts.

- 8.) As-installed control diagrams by controls manufacturer.
  - 9.) Each Contractor's coordination drawings.
  - 10.) Charts of valve tag numbers, with location and function of each valve.
  - 11.) List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
  - 12.) Other data as required under pertinent sections of specifications.
  - 13.) Approved as-built shop drawings with all corrections made, and a copy of the warranty statement, check-out memo, and demonstration test procedures and certification.
- C. Content, for each electric and electronic system, as appropriate:
- 1.) Description of system and component parts.
    - (i) Function, normal operating characteristics, and limiting conditions.
    - (ii) Performance curves, engineering data and tests.
    - (iii) Complete nomenclature and commercial number of replaceable parts.
  - 2.) Circuit directories of panelboards.
    - (i) Electrical service
    - (ii) Controls
    - (iii) As installed, color coded wiring diagrams.
  - 3.) Operating procedures:
    - (i) Routine and normal operating instructions.
    - (ii) Sequences required.
    - (iii) Special operating instructions.
  - 4.) Maintenance procedures:
    - (i) Routine operations.
    - (ii) Guide to "trouble-shooting".
    - (iii) Disassembly, repair and reassembly.
    - (iv) Adjustment and checking.
  - 5.) Manufacturer's printed operating and maintenance instructions.
  - 6.) List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
  - 7.) Other data as required under pertinent sections of specifications.
- D. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

- E. Additional requirements for operating and maintenance data: Respective sections of Specifications.

#### 1.7. SUBMITTAL SCHEDULE

- A. Submit two copies of preliminary draft of proposed formats and outlines of contents of Operation and Maintenance Manuals within 90 days after Notice to Proceed. Sets of ex-ample O&M manuals are available for examination upon request.
- B. Submit two copies of completed data in preliminary form no later than 20 days following Engineer's review of the last shop drawing of a product and/or other submittal specified under Section 01340, but no later than delivery of equipment. One copy will be re-turned with comments to be incorporated into the final copies and the other copy will be retained on-site for use in any early training.
- C. Submit six (6) copies of approved manual in final form directly to the offices of the Engineer, within 10 days after the reviewed copy or last item of the reviewed copy is re-turned.
- D. Provide six (6) copies of addenda to the operation and maintenance manuals as applicable and certificates as specified within 30 days after final inspection.
- E. Provide copies of the above documents in a searchable digital format to the office of the engineer via electronic file transfer or portable storage device.

#### 1.8. INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to demonstration test, fully instruct Owner's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment, and systems.
- B. Operating and maintenance manual shall constitute the basis of instruction. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

## **PART 2 - PRODUCTS<sup>1</sup>**

## **PART 3 - EXECUTION<sup>2</sup>**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION

<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

**END OF SECTION 01730 OPERATIONS AND MAINTNANCE DATA**

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## SECTION 01740 - WARRANTIES AND BONDS

### PART 1 - GENERAL

#### 1.1. DESCRIPTION

##### A. Scope of Work:

- 1.) Compile specified warranties and bonds, as required by the Contract Documents.
- 2.) Co-execute submittals when so specified.
- 3.) Review submittals to verify compliance with Contract Documents.
- 4.) Submit to Engineer for review and transmittal to Owner.

#### 1.2. SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two each.

C. Table of Contents: Neatly typed or printed, in an orderly sequence. Provide complete information for each item:

- 1.) Product or work item.
- 2.) Firm, with name of principal, address, and telephone number.
- 3.) Scope.
- 4.) Date of beginning of warranty, bond or service and maintenance contract.
- 5.) Duration of warranty, bond, or service maintenance contract.
- 6.) Information for Owner's personnel: Instances which might affect the validity or warranty or bond.
- 7.) Contractor, name of responsible principal, address, and telephone number.

#### 1.3. FORM OF SUBMITTALS

A. Prepare in duplicate packets and a searchable digital format.

B. Format:

- 1.) Size 8 1/2-inches x 11 inches, punch sheets for standard three-post binder. Fold larger sheets to fit into binders.
- 2.) Cover:
  - (i) Identify each packet with typed or printed title "WARRANTIES AND BONDS".

- (ii) Title of Project.
  - (iii) Name of Contractor.
- C. Binders: Commercial quality, three-ring binder, with durable and cleanable plastic or vinyl covers and maximum ring size of two inches.

#### 1.4. WARRANTY SUBMITTALS REQUIREMENTS

- A. For all material, submit a warranty from the product manufacturer. The manufacturer's warranty period shall be concurrent with Contractor's for two (2) years, unless otherwise specified, commencing at the time of final acceptance by Owner.
- B. The Contractor shall be responsible for obtaining certificates for material warranty for all major items which list for more than \$1,000. The Engineer reserves the right to request warranties for material not classified as major. The Contractor shall still warrant material not considered to be "major" in the Contractor's two-year warranty period even though certificates of warranty may not be required.
- C. In the event that the material manufacturer or supplier is unwilling to provide a two-year warranty commencing at the time of Owner acceptance, the Contractor shall obtain from the manufacturer a three (3) year warranty commencing at the time of equipment delivery to the job site. This three-year warranty from the manufacturer shall not relieve Contractor of the two-year warranty starting at the time of Owner acceptance of the equipment.
- D. Owner shall incur no labor or equipment shipping cost during the guarantee period.
- E. Guarantee shall cover all necessary labor, and materials resulting from faulty or inadequate design, improper assembly or erection, defective workmanship and materials, leakage, breakage or other failure of all equipment and components furnished by Manufacturer.

**PART 2 - PRODUCTS<sup>1</sup>**

**PART 3 - EXECUTION<sup>2</sup>**

**END OF SECTION 01740 - WARRANTIES AND BONDS**

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<sup>1</sup> PART 2 OF SECTION NOT USED IN THIS SPECIFICATION  
<sup>2</sup> PART 3 OF SECTION NOT USED IN THIS SPECIFICATION

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## SECTION 17050 COMMON WORK RESULTS FOR PROCESS CONTROL AND INSTRUMENTATION SYSTEMS

### PART 1 - GENERAL

#### 1.1. SUMMARY

- A. Section includes:
  - 1.) General requirements applicable to all Process Control and Instrumentation Work.
  - 2.) General requirements for process control and instrumentation submittals.
- B. Related sections:
  - 1.) Document 00100 - General Conditions.
  - 2.) Document 00800 - Supplementary Conditions.
  - 3.) Section 17100 - Control Strategies.
  - 4.) Section 17720 - Control Systems: Programmable Logic Controllers.
  - 5.) Section 17721 - Control Systems: Human Machine Interface (HMI)
  - 6.) Section 17733 - Control Systems: Network Materials and Equipment
  - 7.) Section 17950 - Testing, Calibration, and Commissioning.
- C. Interfaces to equipment, instruments, and other components:
  - 1.) Drawings, Specifications, and overall design are based on preliminary information furnished by various equipment manufacturers, which identify a minimum scope of supply from the manufacturers. This information pertains to, but is not limited to, instruments, control devices, electrical equipment, packaged mechanical systems, and control equipment provided with mechanical systems.
  - 2.) Provide all material and labor needed to install the actual equipment furnished, include all costs to add any additional instruments, wiring, control system inputs/outputs, controls, interlocks, electrical hardware etc., which may be necessary to make a complete, functional installation based on the actual equipment furnished:
    - (i) Make all changes necessary to meet the manufacturer's wiring requirements.
  - 3.) Submit all such changes and additions to the Engineer for acceptance.
  - 4.) Review the complete set of Drawings and Specifications in order to ensure that all items related to the instrumentation and control systems are completely accounted for. Include any items indicated on the Drawings.

- (i) If a conflict between Drawings and Specifications is discovered, refer conflict to the Engineer as soon as possible for resolution.
- D. All instrumentation, and control equipment and systems for the entire project to comply with the requirements specified in the Instrumentation and Control Specifications, whether referenced in the individual Equipment Specifications or not:
- 1.) The requirements of the Instrumentation and Control Specifications apply to all Instrumentation and Control Work specified in other Specifications, including HVAC controls, packaged mechanical systems, LCPs, VCPs, etc.
  - 2.) Inform all vendors supplying instrumentation, control systems, panels, and/or equipment of the requirements of the Instrumentation and Control Specifications.
  - 3.) The Owner is not responsible for any additional costs due to the failure of the Contractor to notify all subcontractors and suppliers of the Instrumentation and Control Specifications' requirements.
- E. Contract Documents:
- 1.) General:
    - (i) The Drawings and Specifications are complementary and are to be used together in order to fully describe the Work.
  - 2.) Specifications:
    - (i) Documents 00100 and 00800 of the Contract Documents govern the Work.
    - (ii) These requirements are in addition to all General Requirements.
  - 3.) Contract Drawings:
    - (i) The Instrumentation and Control Drawings show in a diagrammatic manner, the desired locations, and arrangements of the components of the Instrumentation Work. Follow the Drawings as closely as possible, use professional judgment and coordinate with the other trades to secure the best possible installation, use the entire Drawing set for construction purposes.
    - (ii) Locations of equipment, control devices, instruments, boxes, panels, etc. are approximate only, exercise professional judgment in executing the Work to ensure the best possible installation:
      - (a) The equipment locations and dimensions indicated on the Drawings and elevations are approximate. Use the shop drawings to determine the proper layout, foundation, and pad requirements, etc. for final installation. Coordinate with all subcontractors and supplies to ensure that all instrumentation and control equip-

ment is compatible with other equipment and space requirements. Make changes required to accommodate differences in equipment dimensions.

- (b) The Contractor has the freedom to select any of the named manufacturers as identified in the individual Specifications; however, the Engineer has designed the spatial equipment layout based upon a single manufacturer and has not confirmed that every named manufacturer's equipment fits in the allotted space. It is the Contractor's responsibility to ensure that the equipment being furnished fits within the defined space.

(iii) Installation details:

- (a) The Contract Drawings include installation details showing means and methods for installing instrumentation and control equipment. For cases where typical details are not provided or compatible with an installed location, develop installation details that are necessary for completing the Work, and submit these details for review by the Engineer.

(iv) Schematic diagrams:

- (a) All controls are shown de-energized.
- (b) Schematic diagrams show control function only. Incorporate other necessary functions for proper operation and protection of the system.
- (c) Add slave relays, where required, to provide all necessary contacts for the control system or where needed to function as interposing relays for control voltage coordination, equipment coordination, or control system voltage drop considerations.
- (d) Mount all devices shown on motor controller schematic diagrams in the controller compartment enclosure, unless otherwise noted or indicated.
- (e) Control schematics are to be used as a guide in conjunction with the descriptive operating sequences indicated on the Drawings or in the Specifications. Combine all information and furnish a coordinated and fully functional control system.

F. Alternates/Alternatives:

- 1.) Substitute item provisions as specified in Document 00100.

G. Changes and change orders:

- 1.) As specified in Document 00100.

## 1.2. REFERENCES

A. Code compliance:

- 1.) The following codes and standards are hereby incorporated into this Section:
  - (i) American National Standards Institute (ANSI).
  - (ii) American Petroleum Institute (API):
    - (a) RP 550 - Manual on Installation of Refinery Instruments and Control Systems; Part II-Process Stream Analyzers; Section 5-Oxygen Analyzers.
    - (b) RP 551 - Process Measurement Instrumentation.
  - (iii) International Organization for Standardization (ISO):
    - (a) 9001 - Quality Management Systems - Requirements.
  - (iv) International Society of Automation (ISA):
    - (a) 5.1 - Instrumentation Symbols and Identification.
    - (b) 5.4 - Instrument Loop Diagrams.
    - (c) 20 - Specification Forms for Process Measurement and Control Instruments, Primary Elements, and Control Valves.
  - (v) National Electrical Manufacturers Association (NEMA):
    - (a) 250 - Enclosures for Electrical Equipment (1000 V Maximum).
  - (vi) National Fire Protection Association (NFPA).
  - (vii) National Institute of Standards and Technology (NIST).
  - (viii) Underwriters Laboratories, Inc. (UL):
    - (a) 508 - Standard of Safety for Industrial Control Equipment.
    - (b) 508A - Standard of Safety for Industrial Control Panels.
- B. Compliance with Laws and Regulations:
  - 1.) As specified in Document 00100.

### 1.3. DEFINITIONS

- A. Definitions of terms and other electrical and instrumentation considerations in accordance with:
  - 1.) Factory Mutual (FM).
  - 2.) International Electrotechnical Commission (IEC).
  - 3.) Institute of Electrical and Electronics Engineers (IEEE).
  - 4.) International Society of Automation (ISA).
  - 5.) International Organization for Standardization (ISO).
  - 6.) National Electrical Code (NEC).
  - 7.) National Electrical Manufacturers Association (NEMA).



- 8.) International Electrical Testing Association (NETA).
  - 9.) National Fire Protection Association (NFPA).
  - 10.) National Institute of Standards and Technology (NIST).
  - 11.) Underwriters Laboratories (UL).
- B. Specific definitions:
- 1.) Control circuit: Any circuit operating at 120 volts alternating current (VAC) or direct current (VDC) or less, whose principal purpose is the conveyance of information (including performing logic) and not the conveyance of energy for the operation of an electrically powered device.
  - 2.) Panel: An instrument support system that may be a flat surface, a partial enclosure, or a complete enclosure for instruments and other devices used in process control systems.
  - 3.) Power circuit: Any circuit operating at 90 volts (AC or DC) or more, whose principal purpose is the conveyance of energy for the operation of an electrically powered device.
  - 4.) Signal circuit: Any circuit operating at less than 50 VAC or VDC, which conveys analog information or digital communications information.
  - 5.) Digital bus: A communication network, such as PROFIBUS, Foundation Fieldbus, or DeviceNet, allowing instruments and devices to transmit data, control functions and diagnostic information.
  - 6.) 2-Wire transmitter (loop powered): A transmitter that derives its operating power supply from the signal transmission circuit and requires no separate power supply connections. As used in this Section, 2-wire transmitter refers to a transmitter that provides a signal such as 4 to 20 mA 24VDC regulation of a signal in a series circuit with an external 24 VDC driving potential:
    - (i) Fieldbus communications signal or both.
  - 7.) Powered transmitters: A transmitter that requires a separate power source (120 VAC, 240 VAC, etc.) in order for the transmitter to develop its signal. As used in this Section, the produced signal may be a 4 to 20 mA 24VDC signal, a digital bus communications signal or both.
  - 8.) System supplier - As specified in ICSC Qualifications in the Quality Assurance article of this Section.
  - 9.) Modifications: Changing, extending, interfacing to, removing or altering an existing circuit.
- C. NEMA:
- 1.) Type 1 enclosure in accordance with NEMA 250.
  - 2.) Type 2 enclosure in accordance with NEMA 250.
  - 3.) Type 3 enclosure in accordance with NEMA 250.

- 4.) Type 3R enclosure in accordance with NEMA 250.
  - 5.) Type 3S enclosure in accordance with NEMA 250.
  - 6.) Type 3X enclosure in accordance with NEMA 250.
  - 7.) Type 3RX enclosure in accordance with NEMA 250.
  - 8.) Type 3SX enclosure in accordance with NEMA 250.
  - 9.) Type 4 enclosure in accordance with NEMA 250.
  - 10.) Type 4X enclosure in accordance with NEMA 250.
  - 11.) Type 5 enclosure in accordance with NEMA 250.
  - 12.) Type 6 enclosure in accordance with NEMA 250.
  - 13.) Type 6P enclosure in accordance with NEMA 250.
  - 14.) Type 12 enclosure in accordance with NEMA 250.
  - 15.) Type 12K enclosure in accordance with NEMA 250.
  - 16.) Type 13 enclosure in accordance with NEMA 250.
- D. Acronym definitions:
- 1.) CCS: The PCS central computer system (CCS) consisting of computers and software. The personal computer-based hardware and software system that includes the operator interface, data storage, data retrieval, archiving, alarming, historian, reports, trending, and other higher level control system software and functions.
  - 2.) DPDT: Double-pole, double-throw.
  - 3.) ES: Enterprise system: Computer based communications or data sharing system utilized for non-process control functions such as E-mail, sharing files, creating documents, etc.
  - 4.) FAT: Factory acceptance test also known as Source Test.
  - 5.) HART: Highway addressable remote transducer.
  - 6.) HOA: Hand-Off-Auto control function that is totally PLC based. In the Hand mode, equipment is started or stopped, valves are opened or closed through operator direction under the control of the PLC software. In the Auto mode, equipment is started or stopped and valves are opened or closed through a control algorithm within the PLC software. In the Off mode, the equipment is prohibited from responding from the PLC control.
  - 7.) HMI: Human machine interface is a software application that presents information to an operator or user about the state of a process, and to accept and implement the operators control instructions. Typically information is displayed in a graphical format.

- 8.) ICSC: Instrumentation and control system contractor: who specializes in the design, construction, fabrication, software development, installation, testing, and commissioning of industrial instrumentation and control systems.
- 9.) IJB: Instrument junction boxes: A panel designed with cord sets to easily remove, replace or relocate instrument signals.
- 10.) I/O: Input/Output.
- 11.) IP: Internet protocol or ingress protection.
- 12.) LCP: Local control panel: Operator interface panel that may contain an HMI, pilot type control devices, operator interface devices, control relays, etc. and does not contain a PLC or RIO.
- 13.) LAN: Local area network: A control or communications network that is limited to the physical boundaries of the facility.
- 14.) LOI: Local Operator Interface is an operator interface device consisting of an alphanumeric or graphic display with operator input functionality. The LOI is typically a flat panel type of display mounted on the front of an enclosure with either a touch screen or tactile button interface.
- 15.) LOR: Local-Off-Remote control function. In the Remote mode, equipment is started or stopped, and valves are opened or closed through the PLC based upon the selection of the HOA. In the Local mode, equipment is started or stopped, valves are opened or closed based upon hardwired control circuits completely independent of the PLC with minimum interlocks and permissive conditions. In the Off mode, the equipment is prohibited from responding to any control commands.
- 16.) NJB: Network junction box. An enclosure that contains multiple access points to various networks within the facility. Networks could be Ethernet, Ethernet/IP, Fieldbus, RIO etc.
- 17.) P&ID: Process and instrumentation diagram.
- 18.) PC: Personal computer.
- 19.) PCIS: Process control and instrumentation system: Includes the entire instrumentation system, the entire control system, and all of the Work specified in the Instrumentation and Control Specifications and depicted on the Instrumentation Drawings. This includes all the PCS and instruments and networking components, etc.
- 20.) PCM: Process control module: An enclosure containing any of the following devices: PLC, RTU, or RIO.
- 21.) PCS: Process Control System: A general name for the computerized system that gathers and processes data from equipment and sensors and applies operational controls to the process equipment. It includes the PLCs and/or RIOS, LOIs, HMIs, both LCPs, VCPs and all data management systems accessible to staff.

- 22.) PJB: Power junction box: An enclosure with terminal blocks that distribute power to multiple instruments.
- 23.) PLC: Programmable logic controller.
- 24.) RIO: Remote I/O device for the PLC consisting of remote I/O racks, or remote I/O blocks.
- 25.) RTU: Remote telemetry unit: A controller typically consisting of a PLC, and a means for remote communications. The remote communications devices typically are radios, modems, etc.
- 26.) SCADA: Supervisory control and data acquisition system: A general name for the computerized system that gathers and processes data from sensors and equipment located outside of the facility, such as wells, lift stations, metering stations etc.
- 27.) SPDT: Single-pole, double-throw.
- 28.) SPST: Single-pole, single-throw.
- 29.) UPS: Uninterruptible power supply.
- 30.) VCP: Vendor control panel: Control panels that are furnished with particular equipment by a vendor other than the ICSC. These panels may contain PLCs, RIO, LOI, HMI, etc.
- 31.) WAN: Wide area network: A control or communications network that extends beyond the physical boundaries of the facility.

#### 1.4. SYSTEM DESCRIPTION

##### A. General requirements:

- 1.) The Work includes everything necessary for and incidental to executing and completing the instrumentation and control system work indicated on the Drawings and specified in the Specifications and reasonably inferable there from including but not limited to:
  - (i) Preparing hardware submittals for field instrumentation.
  - (ii) Design, develop, and draft loop drawings, control panel designs, and all other drawing submittals specified in the Instrumentation and Control Specifications.
  - (iii) Prepare the test plan, the training plan, and the spare parts submittals.
  - (iv) Procure all hardware.
  - (v) Provide all PCS system hardware.
  - (vi) Provide all PCS system software.
  - (vii) Fabricate panels.
  - (viii) Perform factory tests on panels.

- (ix) Perform bench calibration and verify calibration after installation.
  - (x) Oversee and certify installation of the PCS system.
  - (xi) Oversee, document, and certify system.
  - (xii) Installation Testing.
  - (xiii) Oversee and document Functional Testing.
  - (xiv) Conduct the Process Operational Period and the Instrumentation and Controls Process Performance Testing.
  - (xv) Prepare operation and maintenance manuals.
  - (xvi) Conduct training classes.
  - (xvii) Integrate the PCS with instrumentation and control devices provided under other sections.
  - (xviii) Provide Record Drawings associated with Instruments and equipment:
    - (a) As specified in the Contract Documents.
    - (b) For Owner furnished items.
    - (c) For interfaces with existing equipment.
  - (xix) Resolve signal, power, or functional incompatibilities between the PCS and interfacing devices.
  - (xx) Perform all required corrective and preventative maintenance.
- 2.) It is the intent of these Specifications that the entire electrical power, instrumentation, and control system be complete and operable. Provide all necessary material and labor for the complete system from source of power to final utilization equipment, including all connections, testing, calibration of all equipment furnished by others, as well as equipment furnished by the Contractor, whether or not specifically mentioned but which are necessary for successful operation.
- 3.) Provide the complete operating PCS to perform the specified monitoring, communications, alarm, control, and display in accordance with the PCS requirements.
- 4.) Coordinate all aspects of the Work between all subcontractors and suppliers before bidding to ensure that all costs associated with a complete installation are included. The Owner is not responsible for any change orders due to lack of coordination of the Work between the Contractor and other subcontractors or suppliers.
- 5.) Furnish detailed, complete, and thorough operations and maintenance documentation, including but not limited to operations manuals, maintenance manuals, as-built wiring drawings, training manuals, as-built software documentation, and all other documentation required to operate, modify, and maintain all parts of the PCS.

- 6.) Where demolition is indicated on the Drawings, the contractor is responsible for disconnecting equipment electrical connections and rendering the equipment safe. The contractor is responsible for physically removing all instrumentation to be demolished and return it either to the Owner or dispose of it as directed by the Owner's representative. The contractor shall be responsible for any program modifications needed based on the demolition of the equipment, both for the loops directly and indirectly affected.
  - 7.) Portions of this Project involve installation in existing facilities and interfaces to existing circuits, power systems, controls, and equipment.
    - (i) Perform and document comprehensive and detailed field investigations of existing conditions (circuits, power systems, controls, equipment, etc.) before performing any Work.
    - (ii) Provide and document interface with, modifications to, upgrade, or replacement of existing circuits, power systems, controls, and equipment.
  - 8.) Revise in a manner as directed by the Engineer all I/O and addressing that the Engineer determines to be unacceptable as a result of a lack of Contractor coordination between Contract Documents and all suppliers.
  - 9.) Defective Work:
    - (i) As specified in Document 00100.
- B. Existing system:
- 1.) The purpose of this project is to replace and upgrade the existing control system associated with the emergency generator and switch gear. The current control system is based on Modicon Momentum PLCs, Telemecanique Advantys PLCs and a Siemens SIMATIC touch screen with Modbus Plus and Ethernet communication protocol.
  - 2.) The selected contractor shall review the existing control system to confirm the existing drawings match the existing wiring. The client does have existing drawings for this control system that will be made available.
  - 3.) The selected contractor shall confirm the proposed system architecture will be acceptable and will provide the desired level of control and monitoring the client expects and based on their understanding of the system and general accepted practices for switch gear and generator control systems.
  - 4.) The client does not have access to the existing control logic however, the client does have O&M manual which does provide control descriptions and examples of the existing graphic screens that will be made available.

- 5.) The existing IO are as follows:
- (i) PLC\_01 – Digital Inputs
    - (a) Generator 1 Breaker Closed
    - (b) Generator 1 Breaker Overcurrent Trip
    - (c) Generator 1 Breaker Connected
    - (d) Generator 1 Engine Running
    - (e) Generator 1 Line Breaker Closed
    - (f) Generator 1 Protective Relay Trip
    - (g) Generator 1 25C Okay
    - (h) Generator 1 Protective Relay Self-Check Alarm
    - (i) Generator 1 Engine Control Switch Off
    - (j) Generator 1 Engine Control Switch – Auto
    - (k) Generator 1 Engine Control – Run Open
    - (l) Generator 1 Engine Control – Run Closed
  - (ii) PLC\_11 – Analog Outputs
    - (a) Generator 1 Speed Adjust
    - (b) Generator 1 Voltage Adjust
  - (iii) PLC\_11 – Digital Outputs
    - (a) Generator 1 Breaker Close
    - (b) Generator 1 Breaker Open
    - (c) Generator 1 Engine Start
    - (d) Generator 1 Engine Shutdown
    - (e) Generator 1 Engine Reset
  - (iv) PLC\_2 – Digital Inputs
    - (a) Generator 2 Breaker Closed
    - (b) Generator 2 Breaker Overcurrent Trip
    - (c) Generator 2 Breaker Connected
    - (d) Generator 2 Engine Running
    - (e) Generator 2 Line Breaker Closed
    - (f) Generator 2 Protective Relay Trip
    - (g) Generator 2 25C Okay
    - (h) Generator 2 Protective Relay Self-Check Alarm
    - (i) Generator 2 Engine Control Switch Off

- (j) Generator 2 Engine Control Switch – Auto
- (k) Generator 2 Engine Control – Run Open
- (l) Generator 2 Engine Control – Run Closed
- (v) PLC\_12 – Analog Outputs
  - (a) Generator 2 Speed Adjust
  - (b) Generator 2 Voltage Adjust
- (vi) PLC\_12 – Digital Outputs
  - (a) Generator 2 Breaker Close
  - (b) Generator 2 Breaker Open
  - (c) Generator 2 Engine Start
  - (d) Generator 2 Engine Shutdown
  - (e) Generator 2 Engine Reset
- (vii) PLC\_03 – Digital Inputs
  - (a) Generator 3 Breaker Closed
  - (b) Generator 3 Breaker Overcurrent Trip
  - (c) Generator 3 Breaker Connected
  - (d) Generator 3 Engine Running
  - (e) Generator 3 Line Breaker Closed
  - (f) Generator 3 Protective Relay Trip
  - (g) Generator 3 25C Okay
  - (h) Generator 3 Protective Relay Self-Check Alarm
  - (i) Generator 3 Engine Control Switch Off
  - (j) Generator 3 Engine Control Switch – Auto
  - (k) Generator 3 Engine Control – Run Open
  - (l) Generator 3 Engine Control – Run Closed
- (viii) PLC\_13 – Analog Outputs
  - (a) Generator 3 Speed Adjust
  - (b) Generator 3 Voltage Adjust
- (ix) PLC\_13 – Digital Outputs
  - (a) Generator 3 Breaker Close
  - (b) Generator 3 Breaker Open
  - (c) Generator 3 Engine Start
  - (d) Generator 3 Engine Shutdown



- (e) Generator 3 Engine Reset
- (x) PLC\_04 – Digital Inputs
  - (a) Generator 4 Breaker Closed
  - (b) Generator 4 Breaker Overcurrent Trip
  - (c) Generator 4 Breaker Connected
  - (d) Generator 4 Engine Running
  - (e) Generator 4 Line Breaker Closed
  - (f) Generator 4 Protective Relay Trip
  - (g) Generator 4 25C Okay
  - (h) Generator 4 Protective Relay Self-Check Alarm
  - (i) Generator 4 Engine Control Switch Off
  - (j) Generator 4 Engine Control Switch – Auto
  - (k) Generator 4 Engine Control – Run Open
  - (l) Generator 4 Engine Control – Run Closed
- (xi) PLC\_14 – Analog Outputs
  - (a) Generator 4 Speed Adjust
  - (b) Generator 4 Voltage Adjust
- (xii) PLC\_14 – Digital Outputs
  - (a) Generator 4 Breaker Close
  - (b) Generator 4 Breaker Open
  - (c) Generator 4 Engine Start
  - (d) Generator 4 Engine Shutdown
  - (e) Generator 4 Engine Reset
- (xiii) PLC\_09 – Digital Inputs
  - (a) Utility 1 Breaker Closed
  - (b) Utility 1 Breaker Alarm
  - (c) Utility 1 Breaker 1 Connected
  - (d) Utility 1 Breaker 1 Buss Ground Fault Alarm
  - (e) Feeder 1 Breaker Closed
  - (f) Feeder 1 Breaker Overcurrent Trip
  - (g) Feeder 1 Breaker Connected
  - (h) Feeder 2 Breaker Closed
  - (i) Feeder 2 Breaker Overcurrent Trip

- (j) Feeder 2 Breaker Connected
  - (k) Feeder 3 Breaker Closed
  - (l) Feeder 3 Breaker Overcurrent Trip
  - (m) Feeder 3 Breaker Connected
  - (n) Feeder 4 Breaker Closed
  - (o) Feeder 4 Breaker Overcurrent Trip
  - (p) Feeder 4 Breaker Connected
  - (q) Feeder 5 Breaker Closed
  - (r) Feeder 5 Breaker Overcurrent Trip
  - (s) Feeder 5 Breaker Connected
  - (t) Feeder 6 Breaker Closed
  - (u) Feeder 6 Breaker Overcurrent Trip
  - (v) Feeder 6 Breaker Connected
- (xiv) PLC\_19 – Digital Outputs
- (a) Utility 1 Breaker Close
  - (b) Utility 1 Breaker Trip
  - (c) Feeder 1 Breaker Close
  - (d) Feeder 1 Breaker Open
  - (e) Feeder 2 Breaker Close
  - (f) Feeder 2 Breaker Open
  - (g) Feeder 3 Breaker Close
  - (h) Feeder 3 Breaker Open
  - (i) Feeder 4 Breaker Close
  - (j) Feeder 4 Breaker Open
  - (k) Feeder 5 Breaker Close
  - (l) Feeder 5 Breaker Open
  - (m) Feeder 6 Breaker Close
  - (n) Feeder 6 Breaker Open
- (xv) PLC\_29 – Digital Inputs
- (a) Utility 2 Breaker Closed
  - (b) Utility 2 Breaker Alarm
  - (c) Utility 2 Breaker Connected
  - (d) Utility 2 Breaker Bus Ground Fault Alarm

- (e) Feeder 15 Breaker Closed
  - (f) Feeder 15 Breaker Overcurrent Trip
  - (g) Feeder 15 Breaker Connected
  - (h) Feeder 16 Breaker Closed
  - (i) Feeder 16 Breaker Overcurrent Trip
  - (j) Feeder 16 Breaker Connected
  - (k) Feeder 17 Breaker Closed
  - (l) Feeder 17 Breaker Overcurrent Trip
  - (m) Feeder 17 Breaker Connected
  - (n) Feeder 18 Breaker Closed
  - (o) Feeder 18 Breaker Overcurrent Trip
  - (p) Feeder 18 Breaker Connected
  - (q) Feeder 19 Breaker Closed
  - (r) Feeder 19 Breaker Overcurrent Trip
  - (s) Feeder 19 Breaker Connected
  - (t) Feeder 20 Breaker Closed
  - (u) Feeder 20 Breaker Overcurrent Trip
  - (v) Feeder 20 Breaker Connected
- (xvi) PLC\_39 – Digital Outputs
- (a) Utility 2 Breaker Close
  - (b) Utility 2 Breaker Trip
  - (c) Feeder 15 Breaker Close
  - (d) Feeder 15 Breaker Trip
  - (e) Feeder 16 Breaker Close
  - (f) Feeder 16 Breaker Trip
  - (g) Feeder 17 Breaker Close
  - (h) Feeder 17 Breaker Trip
  - (i) Feeder 18 Breaker Close
  - (j) Feeder 18 Breaker Trip
  - (k) Feeder 19 Breaker Close
  - (l) Feeder 19 Breaker Trip
  - (m) Feeder 20 Breaker Close
  - (n) Feeder 20 Breaker Trip

- (xvii) PLC\_49 – Digital Inputs
  - (a) Tie Breaker Close
  - (b) Tie Breaker Alarm
  - (c) Tie Breaker Connected
  - (d) Tie Breaker 25C OK
  - (e) Feeder 7 Breaker Closed
  - (f) Feeder 8 Breaker Closed
  - (g) Feeder 9 Breaker Closed
  - (h) Feeder 10 Breaker Closed
  - (i) Feeder 11 Breaker Closed
  - (j) Feeder 12 Breaker Closed
  - (k) Feeder 13 Breaker Closed
  - (l) Feeder 14 Breaker Closed
- (xviii) PLC\_49 – Digital Outputs
  - (a) Tie Breaker Close
  - (b) Tie Breaker Trip
- (xix) PLC\_10 – Digital Inputs
  - (a) Horn Silence
  - (b) Lamp Test
  - (c) Synch Across Tie
  - (d) System Control Switch – Auto
  - (e) Emergency Stop MCC Building 2
  - (f) Emergency Stop Solids Building
  - (g) Emergency Stop MCC Building 3
  - (h) Emergency Stop RAS/WAS #1
  - (i) Emergency Stop MCC Building 4
  - (j) Emergency Stop RAS/WAS #2
  - (k) Station Battery High Voltage Alarm
  - (l) Station Battery Low Voltage Alarm
  - (m) Station Battery Charger Failure
  - (n) Emergency Stop MCC Building 7
  - (o) On Generator Battery's
- (xx) PLC\_10 – Digital Outputs

- (a) Load Shed Relay #1
  - (b) Load Shed Relay #2
  - (c) System Alarm
  - (d) Horn Relay
  - (e) PLC Running
  - (xxi) PLC\_20 – Digital Outputs
    - (a) Emergency Mode LT
    - (b) System Test LT
    - (c) System Not in Auto LT
    - (d) Station Battery Low Voltage LT
    - (e) Load Shed LT
    - (f) PLC/CPU Battery Low LT
    - (g) PLC Communication Loss LT
    - (h) Utility 1 Power Available LT
    - (i) Utility 2 Power Available LT
- C. New system:
- 1.) The new control system shall be based on Allen-Bradley Compact-Logix PLCs with Ethernet and Modbus communications protocol and an Allen-Bradley PanelView Plus.
  - 2.) This project shall include the following:
    - (i) Demolition
    - (ii) Installation
    - (iii) PLC Programming (Studio 5000, current version)
    - (iv) HMI Configuration (Factory Talk ME, current version)
    - (v) System Startup and Checkout
    - (vi) System Training
    - (vii) System Record Drawings (AutoCAD Format)
    - (viii) System Operations and Maintenance Manuals (Word Format)
- D. Operating facility:
- 1.) Portions of this existing facility must remain fully functional throughout the entire construction period. In consideration of this requirement, comply with the following guidelines:

- (i) All outages must be of minimal duration and fully coordinated and agreed to by the Owner. Adjust the construction to meet the requirements of the Owner.
  - (ii) As weather and facility demand conditions dictate, re-adjust the construction schedule to meet the demands placed upon Owner by its users.
  - (iii) Where portions of the Work are in existing facilities and require interface to existing circuits, power systems, controls and equipment, perform comprehensive and detailed field investigations of existing conditions. Determine all information necessary to document, interface with, modify, upgrade, or replace existing circuits, power systems, controls, and equipment.
- 2.) According to individual circumstances and in compliance with the Drawings, extend or replace conduit and cable connections from existing locations.
  - 3.) Where shown or specified, replace existing field instruments with new.
  - 4.) The Contractor is responsible for the integrity and measurement accuracy of the new system. However, any defect found in existing equipment is the responsibility of the Owner.
  - 5.) The standards of documentation, instrument tagging, cable and conductor termination, terminal identification and labeling that apply to the new installation apply equally to the existing installation.

## 1.5. SUBMITTALS

### A. General:

- 1.) Instruct all equipment suppliers of submittals and operation and maintenance manuals of the requirements in this Section.
- 2.) Furnish the submittals required by each section in the Instrumentation Specifications.
- 3.) Adhere to the existing wiring numbering scheme throughout the Project:
  - (i) Uniquely number each wire.
  - (ii) Wire numbers must appear on all Equipment Drawings.
- 4.) Use equipment and instrument tags, as indicated on the Drawings, for all submittals.

### B. Submittal organization:

- 1.) First page:
  - (i) Specification section reference.
  - (ii) Name and telephone number of individual who reviewed submittal before delivery to Engineer.

- (iii) Name and telephone number of individual who is primarily responsible for the development of the submittal.
- (iv) Comments.
- (v) Contractor's review certification statement and signature.

2.) Next pages:

- (i) Provide confirmation of specification compliance in a tabular form that individually lists each specification section, paragraph, and sub-paragraphs and unequivocally states compliance with said requirement or takes exception to the requirement and lists the reason for said exception and offers alternative means for compliance.
- (ii) Include a response in writing to each of the Engineer's comments or questions for submittal packages which are re-submitted:
  - (a) In the order that the comments or questions were presented throughout the submittal.
  - (b) Referenced by index section and page number on which the comment appeared.
  - (c) Acceptable responses to Engineer's comments are either:
    - 1. Engineer's comment or change is accepted and appropriate changes are made.
    - 2. Explain why comment is not accepted or requested change is not made.
    - 3. Explain how requirement will be satisfied in lieu of comment or change requested by Engineer.
  - (d) Any re-submittal, which does not contain responses to the Engineer's previous comments shall be returned for Revision and Re-submittal.
  - (e) No further review by the Engineer will be performed until a response for previous comments has been received.

3.) Remaining pages:

- (i) Actual submittal data:
  - (a) Organize submittals in exactly the same order as the items are referenced, listed, and/or organized in the specification section.
  - (b) For submittals that cover multiple devices used in different areas under the same specification section, the submittal for the individual devices must list the area where the device is intended to be used.]

C. Submittal requirements:

- 1.) Furnish submittals that are fully indexed with a tabbed divider for every component.
- 2.) Sequentially number pages within the tabbed sections. Submittals and operation and maintenance manuals that are not fully indexed and tabbed with sequentially numbered pages, or are otherwise unacceptable, will be returned without review.
- 3.) Furnish submittals in the following general order, each in a separate bound set:
  - (i) Schedule of Values.
  - (ii) Product Data.
  - (iii) After Engineer acceptance of the Product Data, submit the Project Shop Drawing submittals.
  - (iv) Loop Description Submittal.
  - (v) The Process Control Hardware and Software Submittal including, control system software, programming, and screens.
  - (vi) Testing, Calibration and Process Start-up procedures.
  - (vii) Operation and Maintenance Data.
  - (viii) Training Submittals.
  - (ix) Record Documents.
- 4.) Edit all submittals and operation and maintenance manuals so that the submittal specifically applies to only the equipment furnished.
  - (i) Neatly cross out all extraneous text, options, models, etc. that do not apply to the equipment being furnished, so that the information remaining is only applicable to the equipment being furnished.
- 5.) Submit copies of shop drawings, and product data:
  - (i) Show dimensions, construction details, wiring diagrams, controls, manufacturers, catalog numbers, and all other pertinent details.
- 6.) Where submittals are required, provide a separate submittal for each specification section. In order to expedite construction, the Contractor may make more than 1 submittal per specification section, but a single submittal may not cover more than 1 specification section:
  - (i) The only exception to this requirement is when 1 specification section covers the requirements for a component of equipment specified in another section. (For example, circuit breakers are a component of switchgear. The switchgear submittal must also contain data for the associated circuit breakers, even though they are covered in a different specification section.)
- 7.) Exceptions to Specifications and Drawings:



- (i) Include a list of proposed exceptions to the Specifications and Drawings along with a detailed explanation of each.
  - (ii) If there is insufficient explanation for the exception or deviation, the submittal will be returned requiring revision and re-submittal.
  - (iii) Acceptance of any exception is at the sole discretion of the Engineer.
    - (a) Provide all items (materials, features, functions, performance, etc.) required by the Contract Documents that are not accepted as exceptions.
  - (iv) Replace all items that do not meet the requirements of the Contract Documents, which were not previously accepted as exceptions, even if the submittals contained information indicating the failure to meet the requirements.
- D. Submittal preparation:
- 1.) During the period of preparation of submittals, the Contractor shall have direct, informal liaison between with the Engineer for exchange of technical information. As a result of this liaison, certain minor refinements and revisions may be authorized informally by the Engineer, which do not alter the scope of Work or cause increase or decrease in the Contract price or times. During this informal exchange, no oral statement by the Engineer shall be construed to give formal approval of any component or method, nor shall any statement be construed to grant exception to, or variation from, these Contract Documents.
  - 2.) In these Contract Documents, some items of Work are represented schematically, and are designated for the most part by numbers, as derived from criteria in ISA-5.1:
    - (i) Employ the nomenclature and numbers designated in this Section and indicated on the Drawings exclusively throughout shop drawings, data sheets, and similar submittals.
    - (ii) Replace any other symbols, designations, and nomenclature unique to a manufacturer's, suppliers, or subcontractor's standard methods with those identified in this Section and indicated on the Drawings.
- E. Specific submittal requirements:
- 1.) Shop drawings:
    - (i) Required for materials and equipment listed in this and other sections.
    - (ii) Furnish sufficient information to evaluate the suitability of the proposed material or equipment for the intended use, and for compliance with these Specifications.

- (iii) Shop drawings requirements:
  - (a) Front, side, and, rear elevations, and top and bottom views, showing all dimensions.
  - (b) Locations of conduit entrances and access plates.
  - (c) Component layout and identification.
  - (d) Schematic and wiring diagrams with wire numbers and terminal identification.
  - (e) Connection diagrams, terminal diagrams, internal wiring diagrams, conductor size, etc.
  - (f) Anchoring method and leveling criteria, including manufacturer's recommendations for the Project site seismic criteria.
  - (g) Weight.
  - (h) Finish.
  - (i) Nameplates:
    - 1. As indicated in the Drawings.
  - (j) Temperature limitations, as applicable.
- (iv) Adhere to existing wiring numbering scheme throughout the Project:
  - (a) Uniquely number each wire.
- (v) Wire numbers must appear on all equipment drawings.
- (vi) Organize the shop drawing submittals for inclusion in the Operation and Maintenance Manuals:
  - (a) Furnish the initial shop drawing submittal bound in one or more standard size, 3-ring, D-ring, loose leaf, vinyl plastic, hard cover binders suitable for bookshelf storage.
  - (b) Binder ring size: 2 inches.
- (vii) Include the letterhead and/or title block of the firm responsible for the preparation of all shop drawings. Include the following information in the title block, as a minimum:
  - (a) The firm's registered business name.
  - (b) Firm's physical address, email address, and phone number.
  - (c) Owner's name.
  - (d) Project name and location.
  - (e) Drawing name.
  - (f) Revision level.
  - (g) Personnel responsible for the content of the drawing.

- (h) Date.
- (viii) The work includes modifications to existing circuits:
  - (a) Clearly show all modifications to existing circuits.
  - (b) In addition, show all existing unmodified wiring to clearly depict the functionality and electrical characteristics of the complete modified circuits.
- 2.) Product data:
  - (i) Submitted for non-custom manufactured material listed in this and other sections and shown on shop drawings.
  - (ii) Include:
    - (a) Catalog cuts.
    - (b) Bulletins.
    - (c) Brochures.
    - (d) Quality photocopies of applicable pages from these documents.
    - (e) Identify on the data sheets the Project name, applicable specification section, and paragraph.
    - (f) Identify model number and options for the actual equipment being furnished.
    - (g) Neatly cross out options that do not apply or equipment not intended to be supplied.
  - (iii) Use equipment and instrument tags as depicted on the P&IDs for all submittals.
  - (iv) Adhere to wiring numbering scheme outlined in Section 16075 throughout the Project:
    - (a) Uniquely number each wire per the Specifications.
  - (v) Wire numbers must appear on all equipment drawings.
- 3.) Detailed sequence of operation for all equipment or systems.
- 4.) Operation and maintenance manuals:
  - (i) Submit preliminary sets of these manuals to the Engineer for review of format and content:
    - (a) Engineer will return 1 set with comments.
    - (b) Revise and/or amend as required and submit the requisite number of copies to the Engineer 15 days before Functional Testing of the systems.
  - (ii) Incorporate changes that occur during process start-up and submit as part of the final manuals.

- (iii) Provide comprehensive information on all systems and components to enable operation, service, maintenance, and repair.
- (iv) Include Record Documents and the accepted shop drawing submittals, modified for conditions encountered in the field during the work.
- (v) Include signed results from Functional Testing and Process Operational Period.
- (vi) Provide installation, connection, operating, calibration, setpoints (e.g., pressure, pump control, time delays, etc.), adjustment, test, troubleshooting, maintenance, and overhaul instructions in complete detail.
- (vii) Provide exploded or other detailed views of all instruments, assemblies, and accessory components together with complete parts lists and ordering instructions.
- (viii) Spare parts list:
  - (a) Include a priced list of recommended spare parts for all the equipment furnished under this Contract:
    - 1. Include recommended quantities sufficient to maintain the furnished system for a period of 5 years.
  - (b) Annotate the list to indicate which items, if any and quantity are furnished as part of this Contract.
- (ix) Provide the name, address, and phone number of manufacturer and manufacturer's local service representative of these parts.
- (x) Additional operation and maintenance manual requirements:
  - (a) Completely index manuals with a tab for each section:
    - 1. Each section containing applicable data for each piece of equipment, system, or topic covered.
    - 2. Assemble manuals using the accepted shop drawings, and include, the following types of data:
      - a. Complete set of 11-inch by 17-inch drawings of equipment.
      - b. Complete set of 11-inch by 17-inch drawings of the control system.
      - c. Complete set of control schematics.
      - d. Complete parts list for all equipment being provided.
      - e. Catalog data for all products or equipment furnished.
- (xi) Operational Manual:

- (a) Prepare and provide a simplified version of the standard manufacturer's HMI software and system operations manual that includes basic instructions in the application of the system as required for operators in day-to-day operations.
- (xii) Control System Software Record Documents:
  - (a) Include complete documentation of all the software programs provided for the entire control and PCS system, including:
    - 1. Listings of all application software on both hard copy and DVD-ROM.
    - 2. Database, both hard copy and DVD-ROM.
    - 3. Communication protocols.
    - 4. All documentation necessary to maintain, troubleshoot, modify, or update the software system.
  - (xiii) Organize the operation and maintenance manuals for each process in the following manner:
    - (a) Section A - Process and Instrumentation Diagrams.
    - (b) Section B - Control Descriptions.
    - (c) Section C - Loop Drawings.
    - (d) Section D - Instrument Summary.
    - (e) Section E - Instrument Data Sheets and Brochures.
    - (f) Section F - Sizing Calculations.
    - (g) Section G - Instrumentation Installation Details.
    - (h) Section H - Test Results.
    - (i) Section I - Operational Manual.
    - (j) Section J - Spare Parts List.
    - (k) Section K - Control System Software.
- 5.) Material and equipment schedules:
  - (i) Furnish a complete schedule and/or matrix of all materials, equipment, apparatus, and luminaries that are proposed for use:
    - (a) Include sizes, names of manufacturers, catalog numbers, and such other information required to identify the items.
- 6.) Itemized instrument summary:
  - (i) Submit a hard copy of the instrument summary.
  - (ii) List all of the key attributes of each instrument including:
    - (a) Tag number.

- (b) Manufacturer.
  - (c) Model number.
  - (d) Service.
  - (e) Area location.
  - (f) Calibrated range.
  - (g) Loop drawing number.
  - (iii) Associated LCP, VCP, PCM, or PLC.
- 7.) Instrument data sheets and cut sheets:
- (i) Furnish fully completed data sheets, both electronically in Microsoft Word or Excel and in hardcopy, for each instrument and component according to ISA-20 Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves. The data sheets provided with the instrument specifications are preliminary and are not complete. They are provided to assist with the completion of final instrument data sheets. Additional data sheets may be required. Include the following information on the data sheet:
    - (a) Component functional description specified in this Section and indicated on the Drawings.
    - (b) Manufacturers model number or other product designation.
    - (c) Tag number specified in this Section and indicated on the Drawings.
    - (d) System or loop of which the component is a part.
    - (e) Location or assembly at which the component is to be installed.
    - (f) Input and output characteristics.
    - (g) Scale range with units and multiplier.
    - (h) Requirements for electric supply.
    - (i) Requirements for air supply.
    - (j) Power consumption.
    - (k) Response timing.
    - (l) Materials of construction and of component parts that are in contact with, or otherwise exposed to, process media, and or corrosive ambient air.
    - (m) Special requirements or features, such as specifications for ambient operating conditions.
    - (n) Features and options that are furnished.

- (ii) Provide a technical brochure or bulletin (“cut sheet”) for each instrument on the project. Submit with the corresponding data sheets:
    - (a) Where the same make and model of instrument is used in 2 or more applications on the project, and the process applications are nearly identical, and the materials, features and options are identical submit one brochure or bulletin for the set of identical instruments.
    - (b) Include a list of tag numbers for which it applies with each brochure or bulletin.
    - (c) Furnish technical product brochures that are complete enough to verify conformance with all Contract Document requirements, and to reflect only those features supplied with the device.
    - (d) Cross out models, features, options, or accessories that are not being provided.
    - (e) Clearly mark and identify special options and features.
  - (iii) Organization: Index the data sheets and brochures in the submittal by systems or loops.
- 8.) Control panel hardware submittal:
- (i) Submit the following in 1 submittal package.
  - (ii) Complete and detailed bills of materials:
    - (a) Including quantity, description, manufacturer, and part number for each assembly or component for each control panel.
    - (b) Include all items within an enclosure.
  - (iii) Complete grounding requirements for each system component including any requirements for PLCs, process LANs, and Control System equipment.
  - (iv) Requirements for physical separation between control system components and 120 VAC, 480 VAC, and medium voltage power cables.
  - (v) UPS and battery load calculations to show that the backup capacity and time meet the specified requirements.
  - (vi) Provide a data sheet for each control system component together with a technical product brochure or bulletin, which include:
    - (a) The manufacturer's model number or other identifying product designation.
    - (b) Tag and loop number.
    - (c) System to which it belongs.
    - (d) Site to which it applies.

- (e) Input and output characteristics.
  - (f) Requirements for electric power.
  - (g) Device ambient operating requirements.
  - (h) Materials of construction.
- 9.) Schedule of values:
- (i) In addition to completing all items referred to in the schedule of values, submit per unit instrument and labor costs used in developing the final bid for the PCS system, for the express purpose of pricing and cost justification for any proposed change orders. It is the responsibility of the ICSC subcontractor to prove to the Engineer's satisfaction that said per unit costs were used in the development of the final Bid amount.
- 10.) Installation recommendations:
- (i) Submit the manufacturer's printed recommendations for installation of instrumentation equipment.
- 11.) Training submittals:
- (i) Develop and submit for review a general training plan for approval by Owner within 14 calendar days from Notice to Proceed. Include complete descriptions of all planned training classes, a preliminary training schedule, a list of all proposed instructors along with resumes, examples of proposed training manuals, and a description of any special training tools to be used (simulators, self-paced modules, personal computer-based training, etc.).
  - (ii) The Engineer will review the general training plan. Special emphasis will be placed on review of the qualifications of the proposed instructors and the timing of the individual courses to maximize their effectiveness. If, in the opinion of the Engineer, the proposed instructors are not sufficiently qualified to conduct the specified training courses, or lack experience, where required, on the specific configuration of the system, provide more qualified instructors.
  - (iii) The general training plan and schedule shall be updated by the Contractor at the beginning of each Phase and approved by the Owner a minimum of 30 days prior to commencement of training.
  - (iv) Training course plan submittals:
    - (a) For each training course or other training activity, submit a detailed, complete outline and agenda for each lesson.
    - (b) Describe any student pre-requisites for the course or training activity.
    - (c) Provide an updated schedule for all sessions of the course, including dates, times, durations, and locations.



- (d) Submit training materials.
  - (v) Incorporate all submittal review comments into the course.
  - (vi) Do not conduct training courses before review and acceptance of the Course Plan submittal for the course.
- 12.) Project Record documents:
- (i) Record Drawing requirements:
    - (a) Provide Project Record Drawing of all Instrumentation Drawings.
    - (b) Update Record Drawings weekly.
    - (c) Record Drawings must be fully updated as a condition of the monthly progress payments.
    - (d) Clearly and neatly show all changes including the following:
      - 1. All existing pipe, conduit, wire, instruments or other structures encountered or uncovered during construction.
  - (ii) Shop drawings:
    - (a) General:
      - 1. Coordinate all aspects of the Work so that a complete, instrumentation, computer, and control system for the facility is supported by accurate shop and record drawings:
        - a. Clearly show every wire, circuit, and terminal provided under this contract on one or more submitted wiring diagrams.
      - 2. Show all interfaces between any of the following: instruments, vendor control panels, motor control centers, motor starters, variable speed drives, control valves, flow meters, chemical feeders and other equipment related to the PCS.
      - 3. Generate all drawings developed for this project utilizing AutoCAD by Auto Desk Version 2012 or later:
        - a. Furnish on CD-ROM disks containing the following for each drawing:
          - i. Original CAD files in DWG format.
          - ii. PDF version.
        - b. Provide hard copies on 11 inch by 17 inch plain bond paper.
      - 4. Upon completion of the Work, update all shop drawings to indicate the final as-built configuration of the systems:

- a. Should an error be found in a shop drawing during installation or process start-up of equipment, note the correction, including any field changes found necessary, on the drawing and submit the corrections in the Record Documents.
  - b. Update, check, and revise all wiring drawings and other submitted drawings and documents to show final installed conditions.
  - c. Provide as-built shop drawings for all instrumentation equipment on 11 inch by 17-inch using plain bond paper.
  - d. Provide electronic copies of these documents on CD-ROM disks in AutoCAD DWG 2010 format or later and Adobe PDF format. Size all drawings to be readable and legible on 11 inch by 17-inch media.
5. Submittal Documents:
- a. Provide an interim submittal of Record Documents after the PCS system Functional Testing.
  - b. Submit final Record Documents before Substantial Completion or earlier if so specified in Section 01782 or the General Requirements.
6. Review and Corrections:
- a. Correct any Record Documents or other documents found to be incomplete, not accurate, of poor quality, or containing errors.
  - b. Promptly correct and re-submit Record Documents returned for correction.
- (b) Furnish written information prepared specifically for this Project using Microsoft Word.doc and Adobe.pdf formats and printed on 8.5-inch by 11-inch plain bond paper:
1. Provide electronic copies of these documents on CD-ROM disks.
- (iii) Review and corrections:
- (a) Correct any record documents or other documents found to be incomplete, not accurate, of poor quality, or containing errors.
  - (b) Promptly correct and re-submit record documents returned for correction.
- 13.) Instrument Installation Drawings:
- (i) Submit, instrument installation, mounting, and anchoring details for all components and assemblies, including access requirements and conduit connection or entry details.

- (ii) Furnish for each instrument a dedicated 8 1/2-inch by 11-inch installation detail that pertains to the specific instrument by tag number.
  - (iii) For each detail, provide certification and the hard copies, by the instrument manufacturer, that the proposed installation is in accordance with the instrument manufacturer's recommendations and is fully warrantable.
  - (iv) For each detail, provide, as a minimum, the following contents:
    - (a) Necessary sections and elevation views required to define instrument location by referencing tank, building or equipment names and numbers, and geographical qualities such as north, south, east, west, basement, first floor, etc.
    - (b) Ambient temperature and humidity where the instrument is to be installed.
    - (c) Corrosive qualities of the environment where the instrument is to be installed.
    - (d) Hazardous rating of the environment where the instrument is to be installed.
    - (e) Process line pipe or tank size, service and material.
    - (f) Process tap elevation and location.
    - (g) Upstream and downstream straight pipe lengths between instrument installation and pipe fittings and valves.
    - (h) Routing of tubing and identification of supports.
    - (i) Mounting brackets, stands, anchoring devices, and sun shades.
    - (j) Conduit entry size, number, location, and delineation between power and signal.
    - (k) NEMA ratings of enclosures and all components.
    - (l) Clearances required for instrument servicing.
    - (m) List itemizing all manufacturer makes, model numbers, quantities, lengths required, and materials of each item required to support the implementation of the detail.
- 14.) Control Panel Drawings:
- (i) Layout Drawings:
    - (a) Submit panel, enclosure, console, furniture, and cabinet layout drawings for all items provided.
    - (b) As a minimum, include the following information:
      - 1. To scale front, side, and plan views.

2. Dimensions.
  3. Interior and exterior arrangements.
  4. Mounting information, including conduit entrance location.
  5. Finish data.
  6. Tag number and functional name of items mounted in and on each panel, console, and cabinet.
  7. Nameplate legend including text, letter size, materials and colors.
- (ii) Wiring and Piping Diagrams:
- (a) Submit panel wiring and piping diagrams for every panel that contains wiring and/or piping.
  - (b) Include the following information:
    1. Name of panel.
    2. Wiring and piping sizes and types.
    3. Terminal strip numbers.
    4. Wire tags and labels.
    5. Functional name and manufacturer's designation for items to which wiring and piping are connected.
    6. Electrical control schematics in accordance with ANSI standards.
- (iii) Installation drawings:
- (a) Provide site-specific installation drawings for all control equipment panels, including dimensions.
  - (b) Provide scaled drawings and show the position of the equipment at its intended installation location.
  - (c) Show the placement of all equipment being provided under this Contract and its spatial relationship to all other equipment located in the abutting and adjoining areas.
  - (d) Show all required access and clearances associated with the equipment with a statement of compliance to manufacturer's recommendations, NEC, and other applicable codes.
- 15.) Schematic Diagrams:
- (i) Submit schematic diagrams for all electrical equipment in ladder diagram format.
  - (ii) Include device and field connection terminal numbers on all schematic diagrams.

- (iii) Incorporate equipment manufacturer's shop drawing information into the schematic diagrams in order to document the entire control system.
- 16.) Control System Diagram:
- (i) Submit a complete set of control system diagrams including the following information:
    - (a) All PLCs, workstations, printers, communication devices, and communication links:
      - 1. Show all PLCs with their current I/O allocation, and future I/O allocation, current plus spares provided, and maximum potential I/O based on available slots.
    - (b) All cables required for communication requirements.
    - (c) Show each component fully annotated with conduit size and number associated with the power source.
- 17.) Instrumentation and Control System Contractor Statement of Qualifications:
- (i) Submit statement of qualifications of the proposed ICSC in accordance with subsequent requirements of this Section.
- 18.) Control Descriptions:
- (i) Provide a detailed functional description of the operation of the equipment, signals, and controls as shown on the P&IDs:
    - (a) Include all functions depicted or described in the Contract Documents.
    - (b) Include within the Control Description content:
      - 1. All specific requirements.
      - 2. All common requirements that pertain in general to all loops.
      - 3. Listing all ranges, setpoints, timers, values, counter values, etc.
- 19.) Commissioning and Process Start-up Submittals:
- (i) Inform the Owner and or Engineer of the day, date, and time for a scheduled test at least 15 calendar days before the test takes place to allow the Owner and or Engineer sufficient time to plan travel to the test site.
  - (ii) General testing submittal requirements are specified in this Section.
  - (iii) Test Procedure Submittals:
    - (a) Submit the proposed procedures to be followed during tests of the PCS and its components in 2 parts:

1. Preliminary Submittal: Outline of the specific proposed tests and examples of proposed forms and checklists.
  2. Detailed Submittal: After successful review of the Preliminary Submittal, submit the proposed detailed test procedures, forms, and checklists. Include a statement of test objectives with the test procedures.
- (iv) Provide certified and witnessed test and calibration checklists for each of the following tests:
- (a) Source Testing:
    1. Also called Factory Acceptance Tests (FAT):
    2. Submit completed Manufacturer's Certificate of Source Testing as specified in Section 01756.
  - (b) Functional Testing:
    1. Loop Validation Tests:
      - a. Loop Validation Certifications:
        - i. Complete field device loop tests have been successfully completed for all individual instruments, all separate analog control networks, all valves, all VCPs, all motors, all local operator interface panels, all motor control centers, etc..
    2. Calibration, adjustment, and test details for all components and systems.
    3. Programming.
    4. Submit completed Manufacturer's Certificate of Installation and Functionality Compliance.
  - (c) Process Operational Period.
- 20.) Test reports:
- (i) Include the following:
    - (a) A description of the test.
    - (b) List of equipment used.
    - (c) Name of the person conducting the test.
    - (d) Date and time the test was conducted.
    - (e) All raw data collected.
    - (f) Calculated results.
    - (g) Each report signed by the person responsible for the test.

- (ii) Additional requirements for commissioning and process start-up reports are specified in Section 17950.

#### 1.6. QUALITY ASSURANCE

- A. Manufacture instruments at facilities certified to the quality standards of ISO 9001.
- B. ICSC qualifications:
  - 1.) General information on the proposing company:
    - (i) Document that the ICSC company has been actively involved in the instrumentation, PLC based control systems, business for a minimum of five years and has adequate facilities, organization structure, manpower and technical and managerial expertise to properly perform the Work as specified in these Specifications.
  - 2.) Document that the ICSC has a qualified permanent service facility:
    - (i) Said facility shall be staffed with permanent employees and equipped with the tools and test equipment necessary to calibrate, test, and process start-up all of the instrumentation, control, telemetry, SCADA and control systems hardware and software furnished under this Contract, including remote diagnostic capability.
    - (ii) Document in-house resource of permanent personnel experienced in the design and programming of equipment and systems as specified in these Specifications.
    - (iii) Document the existence of a training program staffed by qualified instructors, to provide proper training in the operation and maintenance of equipment as specified in these Specifications.
    - (iv) Document that the firm is a recognized or certified "system integrator partner" or similar designation for the control software and PLC system being supplied for this Project.
  - 3.) Similar project experience of the company:
    - (i) Provide proof of experience with switch gear and generator control projects. .
    - (ii) Provide a list of at least 3 successfully completed projects for a water and/or wastewater system of similar scope and complexity in which the proposing firm used components the same as those intended for use on this Project. The proposing firm must have performed, for each listed project, system engineering, system fabrication and installation, documentation (including schematic, wiring and panel assembly drawings), software configuration and documentation, field testing, calibration and process start-up, operator instruction and maintenance training. In addition, provide the following information for each project:

- (a) Name of plant or system owner, contact name, and current telephone number. Design engineer's name, address, and telephone number. Failure to provide current contact information may result in the listed project being disqualified for use in meeting the minimum requirements for prequalification.
  - (b) Manufacturer and model number(s) of the PLC based control system and the computer-based SCADA system used for both hardware and software.
  - (c) Brief description of the system.
  - (d) Approximate number of input and output signals: analog, digital, and fieldbus.
  - (e) Brief application software description.
  - (f) Contracted cost of the system, separate by base amount and any change orders for the completed projects.
  - (g) Duration of the project and date of completion.
- 4.) Information on the proposed Project team members:
- (i) Provide the name and resume of the individual persons who will be responsible for each of the following:
    - (a) Office engineering and management of this Project.
    - (b) Lead for software configuration/programming.
    - (c) Individual who will be responsible for the hardware and hardware interface design.
    - (d) Individual who will be responsible for field testing, calibration, process start-up.
    - (e) Individual who will be responsible for operator training.
  - (ii) All of these individuals must be permanent employees of the proposing firm.
- 5.) Determination of the proposed ICSC qualifications is at the sole discretion of the Engineer.
- C. ICSC:
- 1.) The Contractor is responsible for the implementation of the PCIS and the integration of the system with other required instrumentation, control devices and software.
  - 2.) The ICSC assumes full responsibility, to perform all work to select, furnish, install, program, test, calibrate, and place into operation all instrumentation, controls, telemetry equipment, control panels, and control system, for a complete, integrated and functional PCIS system.



- 3.) Due to the complexities associated with the interfacing of numerous control system devices, it is the intent of these Specifications that the ICSC be responsible for the integration of the PCIS with existing devices and devices provided under the Contract Documents with the objective of providing a completely integrated control system.

#### 1.7. DELIVERY, STORAGE, AND HANDLING

- A. Store all equipment and materials delivered to the job site in a location that will not interfere with the construction or the Owner's operations.
- B. Shipping precautions:
  - 1.) After completion of shop assembly, successful Source Test, pack all equipment, cabinets, panels, and consoles in protective crates and enclose in heavy-duty polyethylene envelopes or secured sheeting to provide complete protection from damage, dust, and moisture.
  - 2.) Place dehumidifiers when required, inside the polyethylene coverings.
  - 3.) Skid-mount the equipment for final transport.
  - 4.) Provide lifting rings for moving without removing protective covering.
  - 5.) Display boxed weight on shipping tags together with instructions for unloading, transporting, storing, and handling at the job site.
- C. Special instructions:
  - 1.) Securely attach special instructions for proper field handling, storage, and installation to each piece of equipment before packaging and shipment.
- D. Tagging:
  - 1.) Tag each component and/or instrument to identify its location, instrument tag number, and function in the system.
  - 2.) Firmly attach a permanent tag indelibly machine marked with the instrument tag number, as given in the tabulation, on each piece of equipment constituting the PCS.
  - 3.) Tag instruments immediately upon receipt in the field.
  - 4.) Prominently display identification on the outside of the package.
  - 5.) Utilize the Tag and Loop Number identifications shown on the P&IDs.
- E. Delivery and inspection:
  - 1.) Deliver products in undamaged condition, in manufacturer's original container or packaging with identifying labels intact and legible. Include date of manufacture on label.

#### 1.8. PROJECT OR SITE CONDITIONS

- A. Site conditions:

- 1.) Provide a PCS, including all equipment, raceways and any other components required for a complete installation that meets the environmental conditions for the Site as specified in the General Requirements and below.
  - 2.) Seismic classification:
    - (i) NA
  - 3.) Wind:
    - (i) NA
  - 4.) Altitude, temperature and humidity:
    - (i) Provide all equipment and instrumentation fully rated for continuous operation at this altitude, temperature and humidity conditions with no additional derating factors applied.
    - (ii) Provide additional temperature conditioning equipment to maintain all equipment and instrumentation in non-conditioned spaces or outdoors subject to these ambient temperatures 10 degrees Fahrenheit above the minimum operating temperature and 10 degrees Fahrenheit below maximum operating temperature as determined by the equipment manufacturer's guidelines:
      - (a) Provide all power wiring for these devices (e.g., heaters, fans, etc.), whether or not indicated on the Drawings.
  - 5.) Area classifications:
    - (i) NA
  - 6.) Site security:
    - (i) Abide by all security and safety rules concerning the Work on the Site.
- 1.9. SEQUENCING
- A. General:
    - 1.) Testing requirements are specified in Sections 17950 and other sections.
  - B. Submit proposed ICSC statement of qualifications:
    - 1.) The ICSC must be accepted by the Engineer before any other Work commences.
  - C. Pre-submittal conferences:
    - 1.) Before producing any submittals, schedule a pre-submittal conference for the purposes of reviewing the entire project, equipment, control philosophy, schedules, and submittal requirements.

- 2.) The Contractor, instrumentation and control subcontractor, electrical subcontractor, and all manufacturers furnishing major pieces of equipment must attend, including but not limited to:
  - (i) Vendor control panels.
  - (ii) Switchgear.
  - (iii) Engine generators.
- D. System configuration meetings:
  - 1.) Review the system configuration, the system database, control schemes, displays, report formats, etc. with the Engineer and Owner on at least 3 occasions during development.
  - 2.) Preliminary meeting: Before configuration work is begun. The ICSC must bring to this meeting example of displays, display symbols, reports, etc. to show the capabilities of the system software.
  - 3.) Intermediate review meeting: Held after the initial database is entered and typical screens and reports have been entered.
  - 4.) Final review meeting: Held after initial completion of all configuration work. This final meeting may not be held in conjunction with the Source Test. Make final format revisions after this review.
  - 5.) Additional requirements as specified in Sections 17100, 17761 and 17762.
  - 6.) Preliminary meeting: Meet before configuration work is begun on any PLCs programmed by the Contractor (including those provided through subcontractors and suppliers). Contractor shall provide a list of each PLC and other programmable devices that will interface to the rest of the control system, including make, model, and a description of the interface; provide contact information for each individual responsible for programming each said PLC and device; and provide a listing of the submittals that will contain HMI/LOI interface information with a schedule for when each submittal will be provided.
  - 7.) Intermediate review meeting: Held after approximately one-half of the interface submittals identified in the Pre-submittal Conferences paragraph above have been submitted. Individuals responsible for programming PLCs and other programmable devices supplied by Contractor shall attend this meeting. Meet to discuss all control system interface submittals and their requirements.
  - 8.) Vendor Equipment Meetings: Facilitate a meeting with each equipment supplier (including HVAC) who is providing equipment with a PLC and/or LOI. Meeting discussion point will include the following at a minimum:
    - (i) Tag Naming Conventions.

- (ii) PLC to PLC global data mapping.
  - (iii) All PLCs to HMI tags mapping.
  - (iv) LOI screen colors and navigation.
  - (v) Interlock and Permissive definitions.
  - (vi) Communication Methods.
  - (vii) Standard code blocks for common control functionality.
  - (viii) Alarms – clearing, formats, colors and status.
- 9.) Final review meeting: Held after all HMI/LOI interface submittals have been submitted. Meet to discuss HMI/LOI interface submittals and requirements.
- 10.) Additional requirements as specified in Section 17100.
- E. Installation testing:
- 1.) Commence after acceptance of all training, wire test, calibration tests, and loop validation tests, and all inspections have demonstrated that the PCIS complies with all Contract requirements.
  - 2.) Acceptance of the PCIS Installation testing must be provided in writing by the Owner before the performance testing may begin.
- F. Functional testing:
- 1.) Representatives from each of the following groups shall be in attendance during the functional Testing: Programmer, System Supplier  
Commence after acceptance of all training, wire test, calibration tests, and loop validation tests, and all inspections have demonstrated that the PCIS complies with all Contract requirements.
  - 2.) Loop validation test.
  - 3.) As specified in Section 17950.
    - (i) Notify the Owner of scheduled tests a minimum of 21 days before the estimated completion date of installation and wiring of the PCIS.
    - (ii) Complete testing a minimum of 5 days before the pre-commissioning phase of the project.
- G. Provide all special tools and spare parts, as specified in the Maintenance paragraph of this Section, before Process Operational Period commences, suitably wrapped and identified.
- H. Process Operational Period:
- 1.) Upon completion of the Process Operational Period, conduct a Instrumentation and Controls Process Performance Test as a condition for Project final completion.

#### 1.10. SCHEDULING (NOT USED)

#### 1.11. WARRANTY

- A. Provide additional warranty as specified in the individual Instrumentation and Control Specifications that extends beyond the Correction Period, as specified in Document 00700 and 00800.

#### 1.12. SYSTEM PROCESS START-UP

- A. Replace or modify equipment, software, and materials that do not achieve design requirements after installation in order to attain compliance with the design requirements:
  - 1.) Following replacement or modification, retest the system and perform additional testing to place the complete system in satisfactory operation and obtain compliance acceptance from the Engineer.

#### 1.13. OWNER'S INSTRUCTIONS (NOT USED)

#### 1.14. MAINTENANCE

- A. Before Substantial Completion, perform all maintenance activities required by the Contract Documents including any calibrations, final adjustments, component replacements or other routine service required before placing equipment or systems in service.
- B. Furnish all spare parts as required by the Contract Documents.
- C. Provide additional spare parts specified in other sections of the Instrumentation and Control Specifications.
- D. Submit all special tools and spare parts, suitably wrapped and identified, before Process Operational Period commences.

### **PART 2 - PRODUCTS**

#### 2.1. MANUFACTURERS

- A. Provide similar items from a single manufacturer throughout the PCIS portion of the Project.
- B. Allowable manufacturers are specified in individual instrument and equipment specifications.

#### 2.2. EXISTING PRODUCTS (NOT USED)

#### 2.3. MATERIALS

- A. Furnish all materials under this Contract that are new, free from defects, and standard products produced by manufacturers regularly engaged in the production of these devices and that bear all approvals and labels as required by the Specifications.
- B. Provide materials complying with the applicable industrial standard as specified in the Contract Documents.

## 2.4. MANUFACTURED UNITS (NOT USED)

## 2.5. EQUIPMENT (NOT USED)

## 2.6. COMPONENTS

- A. Furnish all meters, instruments, and other components that are the most recent field proven models marketed by their manufacturers at the time of submittal of the shop drawings unless otherwise specified to match existing equipment.
- B. Unless otherwise specified, furnish individual instruments that have a minimum accuracy of within 0.5 percent of full scale and a minimum repeatability of within 0.25 percent of full scale.
- C. Signal transmission:
  - 1.) Analog signals:
    - (i) Furnish analog measurements and control signals that vary in direct linear proportion to the measured variable, unless otherwise indicated.
    - (ii) Furnish electrical analog signals outside control panels that are 4 to 20 milliamperes 24 VDC, except as indicated.
    - (iii) Analog signals within enclosures may be 1 to 5 VDC.
    - (iv) Electrically or optically isolate all analog signals from other signals.
    - (v) Furnish regulated analog signals that are not affected by changes in supply voltage or load resistance within the unit's rating.
    - (vi) Maintain the total 4 to 20 milliamperes loop impedance to 10 percent below the published value at the loop operating voltage.
    - (vii) Where necessary, reduce loop impedance by providing current-to-current (I/I) isolation amplifiers for signal re-transmission.
  - 2.) Pneumatic Signals:
    - (i) All pneumatic signals: 3 to 15 pounds per square inch gauge.
  - 3.) Discrete input Signals:
    - (i) As indicated in the controller hardware specification.
  - 4.) Discrete output signals:
    - (i) Dry contacts or TRIAC outputs (with express written approval by the Engineer) as needed to coordinate with the field device.
    - (ii) Provide external terminal block mounted fuse with blown fuse indication for all discrete outputs.
    - (iii) Provide interposing relays for all discrete outputs for voltage and/or current compatibilities.

- (iv) Provide interposing relays as required for functionality of the control circuit.
- 5.) Signal Performance and Design Criteria:
- (i) Stability:
    - (a) After Control have taken corrective action, oscillation of the final control element shall not exceed 2 cycles per minute or a magnitude of motion of 0.5 percent of full travel.
  - (ii) Response:
    - (a) Any change in setpoint or controlled variable shall produce a corrective change in position of the final control element and stabilized within 30 seconds.
  - (iii) Agreement:
    - (a) Setpoint indication of controlled variable and measured indication of controlled variable shall agree within 3 percent of full scale over a 6:1 operating range.
  - (iv) Repeatability:
    - (a) For any repeated magnitude of control signal, from either an increasing or decreasing direction, the final control element shall take a repeated position within 0.5 percent of full travel regardless of force required to position the final element.
  - (v) Sensitivity:
    - (a) Controls shall respond to a setpoint deviations and measured variable deviations within 1.0 percent of full scale.
  - (vi) Performance:
    - (a) All instruments and control devices shall perform in accordance with the manufacturers' specifications.
- D. Discrete circuit configuration:
- 1.) Configure discrete control circuits to fail safe, on loss of continuity or loss of power.
  - 2.) Alarm contacts: Fail to the alarm condition.
  - 3.) Control contacts fail to the inoperative condition unless otherwise indicated on the Drawings.
- E. Grounding:
- 1.) Provide control panels with a signal ground bus, isolated from the power ground bus:
    - (i) Provide multiple panels in one location with a common point for signal ground bus connection to ground.

- 2.) Ground single point ground shields and measurement loops at the source panel external terminals, unless otherwise noted, by bonding to the control panel signal ground bus.
- 3.) Provide isolating amplifiers within control panels for field equipment possessing a grounded input or output, except when the panel circuit is galvanically isolated.

## 2.7. ACCESSORIES

- A. Provide flow conditioning devices or other required accessories if necessary to meet the accuracy requirements in the Contract Documents.
- B. Nameplates:
  - 1.) Provide a nameplate for each controller, instrument transducer, instrument power supply, solenoid, or any other control device located either in the field or within panels.
  - 2.) All nameplates shall be of identical style, color, and material throughout the facility.
  - 3.) Device nameplates shall include:
    - (i) Designations as indicated on the Drawings and identified on the Process and Instrumentation Drawings.
      - (a) Device tag and loop number ID (e.g. FIT-60.011).
      - (b) PLC ID (e.g. PLC-11).
      - (c) Power information (e.g. PCM-11, 120VAC).
    - (ii) White lettering on a black background, laminated plastic.
  - 4.) All instruments shall be equipped with Type 316 stainless steel nameplate with the instrument tag stamped in 3/8-inch letters and connected to the instrument using Type 316 stainless steel wire.

## 2.8. MIXES (NOT USED)

## 2.9. FABRICATION (NOT USED)

## 2.10. FINISHES (NOT USED)

## 2.11. SOURCE QUALITY CONTROL

- A. Provide all equipment that is new, free from defects, and standard products produced by manufacturers regularly engaged in the production of these products that bear all approvals and labels as required by the Specifications.
- B. Arrange with all manufacturers of the equipment and fabricators of panels and cabinets, to allow the Owner and Engineer to inspect and witness the testing of the equipment at the site of fabrication:
  - 1.) Equipment includes the cabinets, special control systems, flow measuring devices, and other pertinent systems and devices.



- C. Source Test is specified in Section 17950.

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

- A. The ICSC is required to attend a pre-bid conference and examine the premises completely before bidding. It is the ICSC's responsibility to be fully familiar with the existing conditions and local requirements and regulations.
- B. Review the existing Site conditions and examine all shop drawings for the various items of equipment in order to determine exact routing and final terminations for all wiring and cables.
- C. Provide a complete instrumentation and control system:
  - 1.) Install all extra conduits, cables, and interfaces as may be necessary to provide a complete and operating electrical, and process control and instrumentation system.

### **3.2. PREPARATION (NOT USED)**

### **3.3. INSTALLATION**

- A. Equipment locations indicated on the Drawings may change due to variations in equipment size or minor changes made by others during construction:
  - 1.) Verify all dimensions as indicated on the Drawings:
    - (i) Actual field conditions govern all final installed locations, distances, and levels.
  - 2.) Review all information indicated on the Drawings, including architectural, structural, mechanical, instrumentation, and the accepted electrical, instrumentation, and mechanical shop drawings, and coordinate Work as necessary to adjust to all conditions that arise due to such changes.
  - 3.) Make minor changes in location of equipment before rough in, as directed by the Owner or Engineer.
- B. Perform all related Electrical Work in accordance with the applicable sections of the Electrical Specifications.
- C. The PCIS configurations are diagrammatic:
  - 1.) The locations of equipment are approximate unless dimensioned.
  - 2.) Where Project conditions require, make reasonable changes in locations and arrangements.
- D. Cable and conductor termination:
  - 1.) Terminate all cables and conductors on terminal blocks.
  - 2.) Terminal block enclosures:

- (i) Suitable for the area classification as specified in Section 16050.

3.4. ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.5. REPAIR/RESTORATION (NOT USED)

3.6. RE-INSTALLATION (NOT USED)

3.7. COMMISSIONING AND PROCESS START-UP

A. Owner Training:

- 1.) Demonstration requirements are specified in Section 17950.

- 2.) General:

- (i) Provide system maintenance and operator training courses for all the instrumentation and control systems furnished.
- (ii) Conduct all training at the Project Site unless another location is accepted by the Engineer and Owner:
  - (a) Include instruction on the use of all maintenance equipment and special tools provided under the Contract.
- (iii) Tailor training classes to the specific needs of the class participants:
  - (a) Develop separate courses for operators, maintenance staff, and supervisors:
    - 1. The specific categories and number of personnel in each category are identified below.
  - (b) Furnish training courses that are a combination of classroom and hands-on training:
    - 1. To the greatest extent possible, utilize components from the Owner's PCS system.
    - 2. Limit classes that include extensive hands-on activities to a maximum of 5 students per class.
  - (c) Present the minimum number of sessions, specified in Table 17050-3.10-T1, for each course in order to satisfy class size restrictions and limitations scheduling Owner staff.
  - (d) Furnish additional sessions if required to accommodate the total number of personnel identified for each course.
- (iv) Schedule individual training classes:
  - (a) Coordinate with the Owner at least 3 weeks before the start of the class:

- (b) Schedule training classes Monday - Friday between [7:30] AM and [3:30] PM.
- (c) Each individual daily training session, travel time excluded:
  - 1. Minimum duration of 4 hours.
  - 2. Maximum duration of 7 hours.
  - 3. Breaks scheduled at least every 90 minutes and [1] hour for lunch.
- (d) Complete training for maintenance personnel 90 days before Process Operational Period.
- (e) Complete operator training classes before process start-up of the control system software, or any part of it:
  - 1. As specified in the Sequencing article of this Section.
- (f) Schedule follow-up training classes after the PCS start-up on a schedule determined by the Owner.
- (v) Instructor qualifications:
  - (a) Highly qualified training instructors for technical training with demonstrated expertise in not only control system functionality but also professional training techniques:
    - 1. Instructor qualifications are subject to the approval of the Engineer.
  - (b) Furnish training instructors thoroughly familiar with the PCIS system, who are members of the implementation team.
  - (c) One of the individuals conducting the PCIS training course must be the same individual responsible for the majority of the programming that was performed for the instrumentation and control system.
- 3.) Training manuals and materials:
  - (i) Furnish training manuals and other materials for training courses.
  - (ii) Manuals are to be professionally written to present the course material in a format that is easy to comprehend.
  - (iii) The manuals are to serve as teaching aids during presentation of the training classes.
  - (iv) Manuals are to serve as reference material after the training has been completed.

Table 1			
Course Title	Minimum Course Length (hours per session)	Personnel (Estimated Number of Students)	Minimum Number of Sessions
Operator Training - Basic	16	10	2
Operator Training - Advanced	8	5	1
PLC Hardware	8	4	1
PLC Software	16	6	1
LOI Hardware and Software	8	5	1
Network Equipment	4	4	1
Follow-up Training	8	5	1

- 4.) Training course requirements:
  - (i) System overview training:
    - (a) Furnish a training course that gives the Owner’s supervisory level personnel an overview of the new Contractor-provided elements of the PCIS system. Focus on the overall functional aspects of each new elements of the control system.
  - (ii) Operator training:
    - (a) Furnish training courses that instruct system operators in the efficient operation of Contractor-provided aspects of the PCIS that include not only the general operation of each control system but also the operation of specific system features.
  - (iii) PLC hardware training:
    - (a) Furnish training on PLC hardware and on related components, including battery backup equipment, UPSs, LOI hardware, control circuits, and analog circuits.
    - (b) Furnish training on PLC hardware principles, product features, proper installation, operation, troubleshooting, and maintenance.
    - (c) PLC training may be provided by manufacturer’s certified trainers.
  - (iv) PLC software training:

- (a) Furnish training on PLC software.
- (b) Two types of training are required, basic and project-specific:
  - 1. Basic PLC software training covers the principles of PLC programming and the specific features and function of the PLC products used on this Project, provided by one of the PLC manufacturer's certified trainers.
  - 2. Project-specific PLC software training covers the programming conventions, new standardized software modules, specific control strategy programs, and documentation created for the Work performed under this Contract. This training includes the specific knowledge needed to modify, expand, duplicate, troubleshoot, and repair the PLC programs provided under this Contract, provided by a qualified member of the ICSC who is thoroughly familiar with the delivered system, and is one of the senior programmers who programmed the PLCs for this Project.
- (v) LOI hardware and software training:
  - (a) Provide the following:
    - 1. Overview of hardware and firmware, including starting, stopping, and PLC interface.
    - 2. Configuration of tag database.
    - 3. Creating, editing, and saving display screens.
    - 4. Troubleshooting.
- (vi) Network equipment training:
  - (a) Furnish basic training on all network hardware, switch and router configuration and software, and network monitoring software.
  - (b) Include a detailed description and explanation of the installed network architecture, media, and functions.
  - (c) Furnish an overview of the function and operation of each piece of network equipment.
  - (d) Furnish training on network maintenance troubleshooting and repair.
  - (e) Furnish training on how to install spare or off-line backup equipment.
- (vii) Follow-up training:
  - (a) Provide a series of on-site follow-up training classes beginning after process start-up of the SCADA/PCIS system. The intent for

these classes is to provide the Owner's personnel the opportunity for a review and "refresher" of the training topics and material after they have had some experience using the system.

- (b) Mutually schedule and develop the content of these classes with the Owner no later than 1 month before the beginning of the first session:
  - 1. Schedule at the Owner's discretion on non-consecutive days spaced out over the process start-up and warranty period.

5.) Recording training sessions:

- (i) Record all training.
- (ii) [Provide pre-recorded audio-visual presentations][Produce audio-visual presentations by recording the actual training sessions of the Owner's personnel].
- (iii) Furnish digital video disk (DVD) format.
- (iv) These disks become the property of the Owner and cover, in detail, the training for the specific hardware and software of all the systems provided for the Project.
- (v) Provide all the necessary cameras and recording equipment.

3.8. FIELD QUALITY CONTROL

A. Inspection:

- 1.) Allow for inspection of PCIS installation.
- 2.) Provide any assistance necessary to support inspection activities.
- 3.) Engineer inspections may include, but are not limited to, the following:
  - (i) Inspect equipment and materials for physical damage.
  - (ii) Inspect installation for compliance with Drawings and Specifications.
  - (iii) Inspect installation for obstructions and adequate clearances around equipment.
  - (iv) Inspect equipment installation for proper leveling, alignment, anchorage, and assembly.
  - (v) Inspect equipment nameplate data to verify compliance with design requirements.
  - (vi) Inspect cable terminations.
  - (vii) Inspect/witness instrument calibrations/verifications.
- 4.) Inspection activities conducted during construction do not satisfy inspection requirements specified in Section 17950.

**B. Installation supervision:**

- 1.) Ensure that the entire PCIS is installed in a proper and satisfactory manner. At a minimum, the ICSC shall provide the following services:
  - (i) Installation resources:
    - (a) Coordinate with the Contractor regarding installation requirements of the Contract Documents.
  - (ii) Provide technical assistance to installation personnel by telephone:
    - (a) Furnish installation personnel with at least one copy of the accepted submittals, including all installation details.
  - (iii) Periodic inspections during the construction period.
  - (iv) A complete check of the completed installation to ensure that it is in conformance with the requirements of the equipment manufacturer and the Contract Documents.
  - (v) Field verify accuracy and calibration of all instruments.

**3.9. ADJUSTING**

- A. Make all revisions necessary to the control system software, as directed by the Engineer.
  - 1.) It is understood that the Contractor knows and agrees that changes will be required in the control system software during the Source Testing, Functional Testing, Process Operational Period, Process Start-up and during the Project Correction Period.

**3.10. CLEANING**

- A. Vacuum clean all control panels and enclosures before process start-up and again after final completion of the project.
- B. Clean all panel surfaces.
- C. Return to new condition any scratches and/or defects.
- D. Wipe all instrument faces and enclosures clean.
- E. Leave wiring in panels, manholes, boxes, and other locations in a neat, clean, and organized manner:
  - 1.) Neatly coil and label all spare wiring lengths.
  - 2.) Shorten, re-terminate, and re-label excessive spare wire and cable lengths, as determined by the Engineer.
- F. As specified in other sections of the Contract Documents.

**3.11. PROTECTION**

- A. Protect all Work from damage or degradation until date of Substantial Completion.

3.12. SCHEDULES (NOT USED)

**END OF SECTION 17050 COMMON WORK RESULTS FOR PROCESS CONTROL  
AND INSTRUMENTATION SYSTEMS**



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## SECTION 17100 CONTROL STRATEGIES

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section includes:
  - 1. Contractor-developed loop description submittal requirements.
  - 2. General programming requirements.
  - 3. Common control functions:
    - a. General control and monitoring functions to be provided throughout the PCIS system.
      - 1) These requirements apply to all systems, and supplement the information indicated on the Drawings and provided in the existing O&M manual.
- A. Related sections:
  - 1. Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

#### 1.02 REFERENCES

- A. As specified in Section 17050.

#### 1.03 DEFINITIONS

- A. As specified in Section 17050.
- B. Hardwired control: Control circuitry that does not utilize software to initiate functionality.
- C. Hardwired interlocks: A safety or protective feature that will interrupt operation of the equipment in all operating modes with no required operator intervention.
- D. Software interlocks: A safety or protective feature that will interrupt operation of the equipment when the PLC has control.
- E. Slew rate: Rate of change in respect to time.
- F. Clamp: Imposed upper and lower limits on setpoints to eliminate entries outside the allowable control parameters.
- G. Watchdog timer: Timers imposed to test components such as discrete I/O to verify the health of the card.

#### 1.04 SYSTEM DESCRIPTION (NOT USED)

#### 1.05 SUBMITTALS

- A. As specified in Section 17050.

- 1.06 QUALITY ASSURANCE (NOT USED)
- 1.07 DELIVERY, STORAGE, AND HANDLING (NOT USED)
- 1.08 PROJECT OR SITE CONDITIONS (NOT USED)
- 1.09 SEQUENCING (NOT USED)
- 1.10 SCHEDULING (NOT USED)
- 1.11 WARRANTY
  - A. As specified in Section 17050.
- 1.12 SYSTEM START-UP (NOT USED)
- 1.13 OWNER'S INSTRUCTIONS (NOT USED)
- 1.14 COMMISSIONING (NOT USED)
- 1.15 MAINTENANCE (NOT USED)

## **PART 2 PRODUCTS**

- 2.01 MANUFACTURERS (NOT USED)
- 2.02 EXISTING PRODUCTS (NOT USED)
- 2.03 MATERIALS (NOT USED)
- 2.04 MANUFACTURED UNITS (NOT USED)
- 2.05 EQUIPMENT (NOT USED)
- 2.06 COMPONENTS (NOT USED)
- 2.07 ACCESSORIES (NOT USED)
- 2.08 MIXES (NOT USED)
- 2.09 FABRICATION (NOT USED)
- 2.10 FINISHES (NOT USED)
- 2.11 SOURCE QUALITY CONTROL (NOT USED)

## **PART 3 EXECUTION**

- 3.01 EXAMINATION (NOT USED)
- 3.02 PREPARATION (NOT USED)
- 3.03 INSTALLATION (NOT USED)
- 3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION
  - A. As specified in Section 17050.
  - B. General programming requirements:

1. Use variable names or aliases derived from tag and loop identification on the P&IDs for all process values.
  - a. Unless otherwise noted, utilize floating-point format for all PLC algorithms and calculations.
  - b. Provide PLC logic to convert raw input values into engineering units in a floating-point format.
2. Store all adjustable parameters in the PLC, and configure so that an operator with sufficient security access can change the parameters from the LOI or HMI. Update and display the current value at all locations, regardless of where the last change was made.
3. Program slew rates for all setpoints to limit the effect of updated setpoints on the process:
  - a. Provide for control setpoints and manual speed and position selections.
  - b. Store new setpoints in one register, and gradually ramp the actual setpoint register at the slew rate until it reaches the new value.
  - c. Provide operator access to change slew rates from the HMI.
4. Saved setpoints:
  - a. Provide an operator selection to save all setpoint values.
  - b. Furnish 1 or more screens at the HMI that display the initial values for all setpoints defined during start-up and the value for each setpoint the last time they were saved.
  - c. Provide an operator selection to restore all setpoints to the initial start-up value.
  - d. Provide an operator selection to restore all setpoints to the last saved value.
5. Store a copy of all adjustable parameters and accumulated and integrated totals in PCS:
  - a. Upon re-loading of the PLC program, re-load these values to the PLC from PCS.
6. Calculated values:
  - a. Program calculations such that division by zero errors cannot occur.
  - b. Prevent calculations from generating values that exceed the limits of the equipment or data type structures (integers) internal to the PLC.
  - c. Configure counting functions (start counts and operation counts) to allow a minimum of 10,000 counts, and to roll-over to zero at an even decimal interval (1 followed by 4 or more zeros).

- d. Configure integrating functions to accurately accumulate the maximum rate from the instrument/equipment (totalizers, run time meters) for 30 years.
7. Timers:
    - a. Provide programmable settling and proving timers in all control sequences for starting and stopping of equipment to allow the process to settle down before proceeding with any additional control functions.
      - 1) The settling timers may be overridden by setting the timer to 0 seconds.
    - b. Embed the timers in the PLC logic, tune in the field, and list separately as part of the software submittal and O&M manual.
  8. Control Panel status:
    - a. Design the PLC system to function as a stand-alone unit that performs all of the control functions described herein completely independent from the functions of the PCS system PC-based operator interfaces:
      - 1) Failure of the PCS system shall not impact data acquisition, control, scaling, alarm checking, or communication functions of the PLC.
    - b. Furnish a minimum of 1 screen that depicts the status of all enclosures containing PLCs or I/O in the control system, including but not limited to the following:
      - 1) Intrusion status on all enclosures equipped with intrusion switches.
      - 2) AC power failure:
        - a) Monitor ahead of UPS.
      - 3) DC power supply failure:
        - a) For redundant power supplies, alarm when either power supply fails.
      - 4) UPS failure signal.
  9. PLC system communication status:
    - a. Furnish a minimum of 1 screen to display all communication errors and status within the PCIS:
      - 1) Communication between PCS and PLCs, PLC to PLC, PLC to RIO and PLC and or PCS to VCP.
      - 2) Display status of each node, and summary of failures over the past 60 minutes.

- b. Generate a communications alarm if any communication fault is detected or there is no response from a node for more than a user specified time.
  - c. In the event of communications loss:
    - 1) Continue normal operation at each PLC.
    - 2) Where control parameters are received over a communications link:
      - a) If a link fails where process elements use the remote value for closed-loop control, hold operating status, speed and position, of the process elements at their last state before the communication alarm, unless other I/O local to that PLC indicates shutdown or over-ride conditions:
        - (1) Ensure that the operator can control the process using PCIS HAND mode at the local LOI.
        - b) If a link fails where process elements use the remote value to determine setpoints, settings or control levels, continue to operate using the last value received:
          - (1) Provide a manual over-ride entry at the local LOI to allow an operator to enter a different value for any such remote signal.
          - (2) Generate an alarm whenever an over-ride value is in use.
- C. Common control functions:
- 1. Incorporate common control functions into all control loops and devices and into the control programming, whether or not specifically shown in the specific control descriptions or elsewhere in the Contract Documents.
  - 2. Alarms:
    - a. Generate alarms within the PLC logic.
    - b. Indicate alarms at the LOI and HMI. Enable acknowledgement from either the HMI or the LOI.
    - c. Generate high, high-high, low, and low-low level alarms where indicated:
      - 1) Provide an alarm reset deadband for each analog value to prevent excessive repeated alarms.
      - 2) Provide logic and timers to inhibit analog alarms based on process events. For example, inhibit low flow alarms when a pump is stopped, or has not been running long enough to establish flow.

- d. Flash all alarm and fail conditions and their respective indicators on the PCIS graphic screens and local indicating lights until the condition is acknowledged by the operator, even if the alarm condition is no longer present.
- e. Once the alarm is acknowledged by an operator, display alarm conditions in a steady state (not flashing) while the alarm condition is still present:
  - 1) Flash with a cycle rate of 1/2 second on and 1/2 second off.
- f. Once the alarm has been cleared and the operator has acknowledged the alarm or fail condition, turn the graphic alarm indicator off.
- g. For all alarms that do not have inherent timers, provide an operator-adjustable proving timer to limit nuisance alarms, continuously adjustable from zero seconds to 100 minutes. The initial setting of proving timers shall be zero seconds:
  - 1) The PLC shall start the timer when it first detects an alarm condition, and shall only activate the alarm after the timer has expired.
  - 2) If the alarm condition clears while the timer is running, the timer shall reset, and the alarm shall not be activated.
- h. Use interlocks and proving timers to prevent alarms from operating due to power loss, except for loss of power alarms.
- i. Furnish an alarm silence pushbutton at each PCM, LOI, or LCP with an audible alarm to signal the PLC to turn off the audible alarm until the next alarm occurs.
- j. Any alarm that is not acknowledged after a setpoint period of time shall activate the auto dialer.
- k. Lamp test: Furnish lamp test pushbuttons at each control panel with more than 10 pilot lights, that illuminates all pilot lights on the panel:
  - 1) The lamp test may sequence through blocks of lights.
  - 2) Minimum on time for each lamp during lamp test 15 seconds.
- l. Horns and Beacons:
  - 1) Activate PCM horn and beacon on all critical alarms and on other alarms as defined by the Facility Alarm Philosophy.
  - 2) Deactivate PCM horn and beacon when PCM reset pushbutton is activated.
  - 3) Silence PCM horn when PCM silence pushbutton is activated.

3. Where a reset is shown for counts, totals and times maintained in the PLC:
  - a. Provide a reset selection on the HMI screen that displays the value.
  - b. Provide a preset function on the HMI to allow an operator-entered value to become the current accumulated total.
  - c. Limit access to the reset and preset functions to operators with suitable security level.
  - d. Log the value before reset, operator, time, and date of reset in the PCS archive.
  - e. Log the value before preset, preset value, operator, time, and date of preset in the PCS archive.
4. Where start counts are indicated on the Drawings or in the existing O&M manual, or required in this Section, count starts for each piece of equipment (off to on transitions of running status) in the PLC:
  - a. Display total starts on PCIS screens, and provide a reset function.
  - b. Where indicated, calculate number of starts for each day:
    - 1) Display current day and previous day starts on PCIS displays.
    - 2) Do not reset daily start count when overall count is reset.
    - 3) Archive starts for each day through PCS.
5. Where run time accumulation is indicated on the Drawings or in the existing O&M manual, or required in this Section, integrate accumulated run time to the nearest 0.1 hour whenever the running status input indicates that the equipment is running:
  - a. Display total run time in hours on PCIS screens.
  - b. Where indicated, calculate total run time for each day:
    - 1) Display current day and previous day run time on the HMI to the nearest 0.1 hour.
    - 2) Do not reset daily run time when overall time is reset.
    - 3) Archive run time for each day through PCS.
6. For all monitored analog values:
  - a. Convert all values to engineering units in floating-point format within the PLC.
  - b. Maintain trends in PCS.
  - c. Totalize flows in the PLC logic:
    - 1) Where totalized flows are input to a discrete input, count input pulses and multiply by the volume per pulse.



- 2) Where no totalizer input is shown, integrate the analog input over time.
    - 3) Display totals on the HMI and LOI.
    - 4) Archive totals to the historical database through PCS.
  - d. Calculate hourly, daily, and monthly averages:
    - 1) Calculations may be performed by the PLC or PCS.
    - 2) Display averages on the HMI, and archive through PCS.
  - e. Calculate minimum and maximum values for each hour, day, and month:
    - 1) Calculations may be performed by the PLC or PCS.
    - 2) Display minima and maxima on the HMI, and archive through PCS.
  - f. Generate an alarm whenever an over-ride value is in use.
7. Analog data processing:
  - a. Engineering units conversion:
    - 1) Use engineering units for all analog point values. Convert analog inputs to engineering units.
  - b. Analog magnitude checking:
    - 1) Provide upper and lower limits to prevent operator-entered values (setpoints, etc.) from falling outside acceptable limits.
  - c. Analog value quality:
    - 1) Monitor analog values received at each PLC from analog inputs or communications from another PLC or RIO, and generate alarms for the following conditions:
      - a) Rate of change in excess of acceptable limit:
        - (1) Provide a separate rate limit for each value.
      - b) Stale value:
        - (1) For analog signals that come from analog inputs or calculations using analog inputs, which are expected to have some variation each time the input is read, alarm when there is no change in the value for 10 times the normal expected scan or communication update.
8. Analog device override (LOI and HMI):
  - a. Provide the following functions from the HMI and the local LOI for each and every analog input:

- 1) An over-ride value to be used in place of the analog input:
    - a) Enter in engineering units:
      - (1) Display the calibrated range in engineering units.
      - (2) Only allow entries within the calibrated range of the instrument.
    - b) When the analog input is enabled, track the analog input so that the over-ride matches the analog input value when the input is initially disabled.
    - c) Maintain over-ride status and value in the PLC.
    - d) Only allow access to over-ride selections and settings to operators with sufficient security.
  - 2) An enable/disable selection:
    - a) When enabled, the value used by the PCIS system is equal to the analog input value.
    - b) When disabled, the analog input is ignored, and the over-ride value is used for all control and display functions.
    - c) Generate an alarm whenever an analog input is disabled.
    - d) Enter a value for the analog input from the PCIS system to the PLC.
  - 3) Use the over-ride value for all display and control functions instead of the actual analog input value.
- b. Provide the following functions in the PLC, with selections and value entry from the HMI and/or LOI:
- 1) An over-ride value to be used in place of the normal output value:
    - a) Enter in percent of output span.
    - b) When the analog output is enabled, track the analog input so that the over-ride matches the analog output value when the output is initially disabled.
  - 2) An enable/disable selection:
    - a) When enabled, the value sent to the output is the value determined by the PLC based on the control logic or operator-entered value in PCIS HAND.
    - b) When disabled, the calculated PCIS HAND values are ignored, and the over-ride value is sent to the output.
    - c) Generate an alarm whenever an analog output is disabled.

9. I/O filtering and processing:
  - a. Analog input filtering:
    - 1) For each analog input provide an adjustable first order filter, for the purpose of smoothing out spikes and other noise for analog transmitter input signals. By default, configure analog inputs with no filtering affect.
    - 2) Monitor analog input signal quality:
      - a) Over range: The input value is above the normal range (typically over 21 mA).
      - b) Under range: The input value is below the normal range (typically under 3 mA, indicating a probable broken connection).
      - c) Generate alarms for over or under range inputs.
      - d) Do not use over or under range values for control or calculation purposes:
        - (1) Where a second instrument is provided to monitor the same condition (a redundant instrument, or additional instruments furnished for averaging or different operating modes), and has a valid signal, use that input for control.
        - (2) Otherwise, hold all outputs affected by the signal at their last values before the signal went out of range.
    - 3) Digital input filtering (proving timer):
      - a) Provide an adjustable time delay function (0-10 seconds) on discrete input for the purpose of de-bouncing.
      - b) By default, discrete inputs shall be configured with de-bounce timers set to zero seconds.
10. Instrument scaling (HMI/LOI):
  - a. Provide 1 or more maintenance screens to display ranges and trigger points for all field instruments:
    - 1) For analog instruments, use input scaling values in the PLC to determine minimum and maximum calibration points.
    - 2) For discrete instruments, display calibrated pick-up and drop-out values.
11. PCIS HAND-OFF-AUTO:
  - a. Where indicated, provide HAND-OFF-AUTO and START-STOP selections in the PCIS, accessed from an LOI or HMI for operators with sufficient security, to provide the following operating modes:

- 1) PCIS AUTO: The normal, automatic control mode of the strategy which allows full PLC control in response to process conditions and programmed sequences.
  - 2) PCIS HAND: Enables PCIS Manual control where control decisions are made by an operator through the PCIS START-STOP, OPEN/CLOSE, or other selections as indicated.
  - 3) PCIS OFF: Automated PCIS control is disabled and PLC calls for all associated equipment to stop and valves to close or go to their identified safe state.
  - 4) Program the PLC so that switching a strategy between AUTO and HAND (either direction) occurs with a smooth transition. Keep running or position status unchanged when control is switched to HAND until a change is requested using the operator selections (START, STOP, OPEN, CLOSE). Keep running and position status unchanged when control is switched to AUTO until the control logic determines a change is required.
12. Display the current status of all operator selections (PCIS HAND/AUTO, PCIS START/STOP, etc.) on LOI and HMI.
  13. Permissive:
    - a. Implement software permissives where indicated to place equipment in a safe condition in response to impending hazardous process conditions. Apply software permissive when equipment is operating in PCIS AUTO or PCIS HAND:
    - b. Use hard-wired permissives for equipment protection where indicated.
  14. Process control algorithms:
    - a. Jog and hold: Unless otherwise indicated, use jog and hold control algorithms where possible:
      - 1) When the error between process variable and setpoint is beyond a setpoint deadband:
        - a) Jog valve or ramp speed in the required direction for a preset "Jog Time" or until the process variable reaches or passes the setpoint.
        - b) Then hold speed or position through a setpoint "Hold Time."
        - c) Continue alternating jog and hold until the error is less than the deadband.
      - 2) Provide operator access to Jog Time and Hold Time setpoints from the HMI.

- b. PID algorithms: Use where indicated, or where necessary to provide fast response:
  - 1) Provide a PID faceplate with the following displays and functions for each PID control algorithm:
    - a) Display Output, CV.
    - b) Display Setpoint, SP.
    - c) Display Process Variable, PV.
    - d) Allow for operator selection of Automatic or Manual control of the output.
    - e) Under Manual control of output allow the operator to enter the desired output value.
    - f) Allow for input of the 3 Proportional, Integral and Derivative tuning parameters.
    - g) Configure PID loops to prevent reset windup when controlled equipment is operating in Manual (local or PCIS), or when the equipment has reached a physical limit.
    - h) When controlled equipment is being operated in remote PCIS HAND, configure the PID function to track the process variable to provide a smooth transfer between Manual and Automatic modes.
    - i) Provide selectable slew rates with adjustable setpoints to allow the PID algorithm to slowly ramp to its final value to minimize system disturbance.
- 15. Breaker status:
  - a. Display the following data to the extent it is available from the specified device:
    - 1) Open.
    - 2) Closed.
    - 3) Tripped.
    - 4) Ground fault.
- 16. Power and starter information:
  - a. Retrieve data via power quality meters, motor protection relays, digital bus networks, or metering instruments, as indicated.
  - b. Display the following data to the extent it is available from the specified device:
    - 1) Current: [XXXX.X A]:
      - a) A-Phase.

- b) B-Phase.
- c) C-Phase.
- 2) Volts: [XXXX.X V]:
  - a) A-Phase.
  - b) B-Phase.
  - c) C-Phase.
- 3) Reactive power: [XXXX.X kVAR].
- 4) Real power: [XXXX.X kW].
- 5) Apparent power: [XXXX.X kVA].
- 6) Power factor: [0.XX percent].
- c. For engine/generator system monitoring, also display percent of rated output.

**3.05 REPAIR/RESTORATION (NOT USED)**

**3.06 RE-INSTALLATION (NOT USED)**

**3.07 FIELD QUALITY CONTROL (NOT USED)**

**3.08 ADJUSTING (NOT USED)**

**3.09 CLEANING (NOT USED)**

**3.10 DEMONSTRATION AND TRAINING**

A. As specified in Section 17050.

**3.11 PROTECTION (NOT USED)**

1.1. SCHEDULES (NOT USED)

## **END OF SECTION 17100 CONTROL STRATEGIES**

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## SECTION 17720 CONTROL SYSTEMS: PROGRAMMABLE LOGIC CONTROLLERS

### PART 1 - GENERAL

#### 3.12 SUMMARY

- A. Section includes:
  - 1. Programmable logic controller (PLC) based control systems hardware.
  - 2. Development software to be used with the specified PLC hardware.
- B. Related sections:
  - 1. Section 17050 - Common Work Results for Process Control and Instrumentation Systems.
  - 2. Section 17733 - Control Systems: Network Materials and Equipment.

#### 3.13 REFERENCES

- A. As specified in Section 17050.
- B. Institute of Electrical and Electronics Engineers (IEEE).

#### 3.14 DEFINITIONS

- A. As specified in Section 17050.
- B. Specific definitions:
  - 1. CPU: Central processing unit.
  - 2. I/O: Input/Output.
- C. Specific definitions:
  - 1. Development operating software: The software provided by the PLC manufacturer for use in programming the PLC.
  - 2. Application software: The software that is programmed specifically for the Project.

#### 3.15 SYSTEM DESCRIPTION

- A. Provide all PLC hardware as indicated on the Drawings and as specified in this Section.

#### 3.16 SUBMITTALS

- A. Furnish submittals as specified in Sections 01330 and 17050.
- B. Product data:
  - 1. CPU:
    - a. Processor type.
    - b. Processor speed.



- c. Memory.
    - d. Internal processor battery back-up time.
  - 2. I/O modules:
    - a. Type.
    - b. Standard wiring diagram.
- C. Calculations:
  - 1. Submit calculations or documented estimate to verify that memory requirements of this Section are met, including spare requirements. If possible, use PLC manufacturer's calculation or estimating worksheet.
  - 2. Submit calculations to verify that spare I/O requirements of this Section are met.
  - 3. Submit calculations to verify that PLC power supply requirements of this Section are met.
- D. Product data:
  - 1. Programming languages.
  - 2. Operating system requirements.
- E. Control logic:
  - 1. Fully annotated copy of programmed PLC logic.
  - 2. Cross-referenced index of all PLC registers or points.
- F. Provide application software for the specific Project process requirements.
  - 1. Fully annotated copy of programmed PLC logic in its native format.
  - 2. Cross-referenced index of all PLC registers or points.

### **3.17 QUALITY ASSURANCE**

- A. As specified in Section 17050.
- B. Provide PLC hardware manufactured at facilities certified to the quality standards of ISO 9001.
- C. Additional requirements:
  - 1. Provide PLC system components by a single manufacturer:
    - a. Third-party communication modules may be used only for communication or network media functions not provided by the PLC manufacturer.
  - 2. Use PLC manufacturer approved hardware, such as cable, mounting hardware, connectors, enclosures, racks, communication cable, splitters, terminators, and taps.

3. All PLC hardware, CPUs, I/O devices, and communication devices shall be new, free from defects, and produced by manufacturers regularly engaged in the manufacture of these products.

### **3.18 DELIVERY, STORAGE, AND HANDLING**

- A. As specified in Section 17050.

### **3.19 PROJECT OR SITE CONDITIONS**

- A. As specified in Section 17050.

### **3.20 SEQUENCING (NOT USED)**

### **3.21 SCHEDULING (NOT USED)**

### **3.22 WARRANTY**

- A. As specified in Section 17050.

### **3.23 SYSTEM START-UP (NOT USED)**

### **3.24 OWNER'S INSTRUCTIONS (NOT USED)**

### **3.25 COMMISSIONING (NOT USED)**

### **3.26 MAINTENANCE**

- A. As specified in Section 17050.
- B. In addition to the spare parts requirements specified in Section 17050
  1. CPU: 1 spare for each type of CPU in the system.
  2. I/O cards: 3 spares for each type of I/O card in the system.
  3. Power supplies; 2 spares for every power supply in the system.
  4. Network/communications cards: 1 spare for every network or communications card in the system.
  5. Remote adapter: 1 spare for every remote adaptor in the system.
  6. Chassis: 1 spare for each chassis size in the system.
- C. Installed spare requirements:
  1. I/O points:
    - a. Provide total of 25 percent spare I/O capacity for each type of I/O at every PLC and remote inputs and outputs (RIO) if possible.
    - b. Wire all spare I/O points to field terminal blocks in the same enclosure the PLC resides in if possible.
  2. PLC backplane capacity:
    - a. Provide 25-percent or 3 spare backplane slots, whichever is greater in all racks containing I/O if possible.
  3. PLC memory:

- a. Provide 50-percent spare program volatile memory.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Acceptable manufacturers:
  1. Rockwell Automation:
    - a. CompactLogix.
- B. The PLC programming software system shall be manufactured by PLC hardware manufacturer:
  1. Rockwell Software:
    - a. Studio 5000.

### **2.02 EXISTING PRODUCTS (NOT USED)**

### **2.03 MATERIALS (NOT USED)**

### **2.04 MANUFACTURED UNITS**

- A. Programmable logic controller:
  1. Construction:
    - a. Furnish plug-in modular system.
    - b. Provide PLCs capable of operating in a hostile industrial environment without fans, air conditioning, or electrical filtering:
      - 1) Temperature: 0 to 55 degrees Celsius.
      - 2) RFI: 80 to 1,000 MHz
      - 3) Vibration: 10 to 500 Hertz.
      - 4) Humidity: 0 to 95 percent.
    - c. Provide internal power supplies designed to protect against over-voltage and frequency distortion characteristics frequently encountered with the local power utility.
    - d. Design the PLC system to function as a stand-alone unit that performs all of the control functions described herein completely independent from the functions of the SCADA system PC-based operator interfaces:
      - 1) Failure of the SCADA system shall not impact data acquisition, control, scaling, alarm checking, or communication functions of the PLC.
  2. CPU:
    - a. Configure each CPU so that it contains all the software relays, timers, counters, number storage registers, shift registers, sequencers,

- arithmetic capability, and comparators necessary to perform the specified control functions.
- b. Capable of interfacing with all discrete inputs, analog inputs, discrete outputs, analog outputs, and communication cards to meet the specified requirements.
  - c. Capable of supporting and implementing closed loop floating-point math and PID control that is directly integrated into the CPU control program.
3. Memory:
- a. Supply with sufficient memory to implement the specified control functions plus a reserve capacity as specified with the requirements of this Section:
    - 1) Reserve capacity:
      - a) Totally free from any system use.
      - 2) Programmed in a multi-mode configuration with multiple series or parallel contacts, function blocks, counters, timers, and arithmetic functions.
4. Programming:
- a. Provide a system where processors are programmed by:
    - 1) Portable laptop computer both locally and via the PLC control network.
5. PLC power supply:
- a. Input: as required by existing conditions.
  - b. Mounted in the PLC housing or as indicated in the Drawings.
  - c. Sized to power all modules mounted in that housing including an average module load for any empty housing slots plus 50 percent above that total.
6. PLC input/output, I/O modules:
- a. General:
    - 1) Compatible with all of the PLCs being furnished under the contract and by the same manufacturer as the PLCs.
    - 2) Provide I/O modules that:
      - a) Isolate in accordance with IEEE Surge Withstand Standards and NEMA Noise Immunity Standards.
      - b) Provide A/D and D/A converters with optically or galvanically isolated inputs and outputs.
      - c) Accept dual-ended inputs.

- 3) The use of common grounds between I/O points is not acceptable.
  - 4) Provide modules that are removable without having to disconnect wiring terminals:
    - a) Utilize a swing-arm or plug-in wiring connector.
  - 5) Provide at each PLC the I/O modules for the following:
    - a) Designated future I/O points contained in the I/O Lists and/or shown on the P&IDs, control schematics, or described in the control strategies.
    - b) Installed spare capacity in accordance with the requirements of this Section.
    - c) Wire all spares provided to the field terminal strip.
  - 6) Condition, filter, and check input signals for instrument limit conditions.
  - 7) Filter, scale, and linearize the raw signal into an engineering-units-based measurement.
  - 8) Alarm measurements for high, low, rate-of-change limits, and alarm trends.
  - 9) Provide external fuses mounted on the field connection terminal block for all discrete input, discrete output, and analog input I/O points.
  - 10) When multiple cards of the same I/O type are provided and parallel equipment, instrumentation, or redundant processes exist, distribute I/O among cards to ensure that a single card failure will not render an entire process unavailable.
- b. Discrete input modules:
- 1) Defined as contact closure inputs from devices external to the input module.
  - 2) Provide inputs that are optically isolated from low-energy common-mode transients to 1,500 volts peak from users wiring or other I/O modules.
  - 3) Individually isolated inputs.
  - 4) With LED's to indicate status of each discrete input.
  - 5) Input signal level: As indicated in the schematics and as required to interface with the equipment and instruments. It is most desirable to stick with a signal voltage level where possible.

- 6) Provide input module points that are individually fused with blown-fuse indicator lights, mounted external of the module on the output terminal strip:
  - a) Coordinate external fuse size with the protection located on the module, so that the external fuse opens first under a fault condition.
- c. Discrete output modules:
  - 1) Defined as contact closure outputs for ON/OFF operation of devices external to the output module:
    - a) Triac outputs may be used, with the permission of the Engineer. Care must be used in applying this type of module to ensure that the leakage current through the output device does not falsely signal or indicate an output condition.
  - 2) Optically isolated from inductively generated, normal mode and low-energy common-mode transients to 1,500 volts peak.
  - 3) LEDs to indicate status of each output point.
  - 4) Each output point: Individually isolated.
- d. Analog input modules:
  - 1) Signal type: Provide 4-20 mA for most applications; other levels are acceptable to interface to vendor control panels.
  - 2) Analog-to-digital conversion: Minimum 12-bit precision with the digital result entered into the processor.
  - 3) The analog-to-digital conversion updated with each scan of the processor. Individually isolated each input.
  - 4) Coordinate the size of the external fuse with the protection located on the module, so that the external fuse opens first under a fault condition.
- e. Analog output modules:
  - 1) Signal type: Provide 4-20 mA for most applications; other levels are acceptable to interface to vendor control panels.
  - 2) Individual isolated output points each rated for loads of up to 1,200 ohms.
7. Communications modules:
  - 1)
  - b. Network communications modules:
    - 1) General:
      - a) Install communications modules in the PLC backplane

- 2) Modbus:
    - a) Ports: [1][2].
    - b) Each port individually configurable as Modbus Master or Slave.
  - 3) Provide all network taps, connectors, termination resistors, drop cables, and trunk cables necessary for remote I/O communications.
8. PLC backplane housing:
- a. Mount the PLC power supply, CPU, communications module, and I/O modules in a suitable standard PLC backplane or housing.
  - b. Provide spare slots in each PLC and RIO location in accordance with the requirements of this Section.
  - c. Provide a blank slot filler module for each spare slot.
  - d.
- B. PLC programming software:
1. Furnish operating software capable of monitoring and/or controlling the PLCs via the PLC data network:
    - a. Contain diagnostics to collect troubleshooting and performance data and display it in easy to understand graphs and tables.
    - b. Monitor devices at each drop on the PLC data network for proper communications.
    - c. Provide the ability to program all PLCs on the PLC data network from the Engineer's console.
  2. PLC Programming Laptop/Desktop Operating system :
    - a. Microsoft Windows 10.
  3. The PLC programming software shall be suitable for the PLCs specified above.
  4. PLC programming software for all programming, monitoring, searching, and editing:
    - a. Usable both on-line, while connected to the PLC, and off-line.
    - b. The operating software shall display multiple series and parallel contacts, coils, timers, counters, and mathematical function blocks.
    - c. Capable of disabling/forcing all inputs, outputs, and coils to simulate the elements of the ladder logic, forced elements shall be identifiable by means of color change.
    - d. Include a search capability to locate any address or element and its program location.

- e. Display at the EC, PLC status information, such as faults and communication errors and amount of memory remaining.
5. The PLC programming software shall support the following programming languages:
  - a. Ladder Diagram.
  - b. Function Block Diagram.
6. Generate a PLC program printout, which is fully documented, through the PLC programming software:
  - a. Fully documented program listings include, as a minimum, appropriate rungs, address, and coils shown with comments to clarify to a reader what that segment of the program accomplishes on an individual line-by-line basis.
  - b. Include a sufficient embedded comment for every rung of the program explaining the control function accomplished in said rung.
  - c. Use a mnemonic associated with each contact, coil, etc. that describes its function.
  - d. Utilize the tag and loop identification as contained in the P&IDs:
    - 1) If additional internal coils, timers, etc. are used for a loop, they shall contain the loop number.
  - e. Provide a cross-reference report of program addresses.
7. Software functions automatically without operator intervention, except as required to establish file names and similar information:
  - a. Furnish the operating system software that is the standard uncorrupted product of the PLC manufacturer with the following minimum functions:
    - 1) Respond to demands from a program request.
    - 2) Dynamic allocation of the resources available in the PLC. These resources include main memory usage, computation time, peripheral usage, and I/O channel usage.
    - 3) Allotment of system resources based on task priority levels such that a logical allocation of resources and suitable response times are ensured.
    - 4) Queuing of requests in order of priority if one or more requested resources are unavailable.
    - 5) Resolution of contending requests for the same resource in accordance with priority.
    - 6) Service requests for execution of one program by another.
    - 7) Transfer data between programs as requested.



- 8) Management of all information transfers to and from peripheral devices.
  - 9) Control and recovery from all program fault conditions.
  - 10) Diagnose and report real-time hardware device errors.
8. Program execution:
    - a. Application software - program execution scheduled on a priority basis:
      - 1) A multilevel priority interrupt structure is required.
      - 2) Enter into a list of pending programs a program interrupted by a higher priority program:
        - a) Resume its execution once it becomes the currently highest priority program.
      - 3) Schedule periodic programs.
      - 4) Base the allocation of resources to a time-scheduled program on its relative priority and the availability of resources.
  9. Start-up and restart:
    - a. Provide software that initializes and brings a PLC or any microprocessor-based hardware unit from an inactive condition to a state of operational readiness.
    - b. Initialization:
      - 1) Determination of system status before start-up of initializing operating system software and initializing application software.
      - 2) Loading of all memory-resident software, initializing timers, counters, and queues, and initialization of all dynamic database values.
  10. Shutdown:
    - a. Where possible, provide orderly shutdown capability for shutdowns resulting from equipment failure, including other PLC processor failures, primary power failure, or a manually entered shutdown command.
    - b. Upon loss of primary power, a high-priority hardware interrupt initiates software for an immediate, orderly shutdown.
    - c. Hardware is quickly and automatically commanded to a secure state in response to shutdown command or malfunction.
    - d. Alarm PLC failure at the operator interface level.
  11. Diagnostics:

- a. Furnish diagnostic programs with the PLC software package to detect and isolate hardware problems and assist maintenance personnel in discovering the causes for system failures.
  - b. Use the manufacturer's standard diagnostic routines as much as possible.
  - c. Furnish diagnostic software and test programs for each significant component in the control system.
  - d. As a minimum, provide diagnostic routines to test for power supply, central processing unit, memory, communications, and I/O bus failures.
12. Calendar/time program:
- a. The calendar/time program to update the second, minute, hour, day, month, and year and transfer accurate time and date information to all system level and application software.
  - b. Variations in the number of days in each month and in leap years must be handled automatically by the program.
  - c. The operator must be able to set or correct the time and date from any operator interface, only at the highest security level.
13. Algorithms:
- a. Implementation of algorithms for the determinations of control actions and special calculations involving analog and discrete data.
  - b. Algorithms must be capable of outputting positional or incremental control outputs or providing the product of calculations.
  - c. Algorithms must include alarm checks where appropriate.
  - d. Provide, as a minimum, the following types of algorithms:
    - 1) Performs functions such as summing several variables, raising to a power, roots, dividing, multiplying, and subtracting.
    - 2) A switch algorithm, which reads the current and value from its input address and stores it as the value of its output address. 2 types of switches shall be accommodated: 2 outputs with 1 input and 1 output with 2 inputs.
    - 3) A 3-mode proportional-integral-derivative, PID, controller algorithm, with each of the 3 modes independently adjustable, supporting both direct and reverse-acting modes.
    - 4) Lead, lag, dead time, and ratio compensators.
    - 5) Integration and totalization of analog process variables.
14. Furnish a comprehensive database for the analog inputs, calculated values, control modules, and outputs:

- a. In addition, provide spare database points for future expansion.
15. One integrated database can be utilized for all types of analog points or separate databases for each type; in either case the database for each point must include all specified aspects.
16. All portions of the database must be available for use by the display, report, and other specified software modules.
17. All of the data fields and functions specified below must be part of the point definition database at the operator interface. Provide the capability to define new database points through the point display specified below as well as modifying defined points through these displays. This point definition and modification must include all of the features and functions defined below. The analog database software must support the following functions and attributes:
  - a. Analog input signal types:
    - 1) Provide software at the remote terminal units (RTUs) and PLCs to read variable voltage/current signals and pulse duration/frequency type analog input signals.
  - b. Input accuracy:
    - 1) Inputs must be read with an accuracy of within 0.05-percent full scale or better.
    - 2) Data conversion errors must be less than 0.05-percent full scale.
    - 3) Pulse accumulation error less than or equal to 1 count of actual input count at a scan rate of once a minute.
    - 4) Maintain for a minimum of 1 year the system accuracy stated above without adjustments.
  - c. Blocking:
    - 1) Provide mechanisms to inhibit or block the scanning and/or processing of any analog input through the operator interface.
    - 2) For any input so blocked, the operator may manually enter a value to be used as the input value.
  - d. Filtering:
    - 1) For each analog input, provide a first order lag digital filter with an adjustable filter factor.
  - e. Linearizing:
    - 1) Where analog inputs require square root extraction or other linearization, provide a mechanism to condition the filtered data before the process of scaling and zero suppression takes place.

- f. Calculated values:
  - 1) Provide means to allow for pseudo-inputs calculated by algebraic and/or Boolean expressions utilizing real inputs, other calculated value, constants, etc.
  - 2) These values must be handled the same as real inputs in terms of record-keeping, alarming, etc.
- g. Scaling and zero suppression:
  - 1) Provide a conversion program to convert input values into engineering units in a floating-point format.
- h. Alarms:
  - 1) Provide an alarm program to check all analog variables against high-high, high, low, and low-low alarm limits.
  - 2) When an analog value exceeds a set limit, it must be reported as an alarm based on individually set priority level for each alarm point.
  - 3) Provide an adjustable hysteresis band in order to prevent excessive alarms when a variable is hovering around an alarm limit.
  - 4) Report return to normal shall also be reported.
  - 5) Must be possible to inhibit alarms based on external events, e.g., lock-out low pump flow alarm when the pump is off.
- i. Averages:
  - 1) Provide a program to calculate and store hourly, daily, and monthly averages of analog variables.
  - 2) Continuously compute averages, e.g., the average for the current period to the present point in time must be stored in memory and available for use in displays, etc.
  - 3) Update hourly averages each minute or at the polling interval for the selected variable.
  - 4) Update daily averages at least once each hour and calculate using the results of the hourly averages.
  - 5) Update monthly averages at least once each day and calculate using the results of the daily averages.
  - 6) At the end of each averaging period, store the average values for the period on the hard disk for historical record keeping and reset the present period average register to the present value of the variable.

- 7) The active database must include the present period average and previous period average for each variable and averaging period.
- j. Totals:
- 1) Provide a program to calculate and store hourly, daily, and monthly totalization of analog variables.
  - 2) Assign a scaling factor to each variable to convert to the appropriate units based on a 1-minute totalizing interval.
  - 3) Assign a separate factor for each totalizing interval.
  - 4) Variables for which totalization is inappropriate must have scaling factors of zero.
  - 5) At the end of each totalizing period, store the totalized values for the period on the hard disk for historical record keeping and reset the present period totalization register to zero.
  - 6) The active database must include the present period total and previous period total for each variable and totalizing period.
- k. Engineering units:
- 1) Provide software to allow the system and the operator to convert all the measured analog variables to any desired engineering units.
  - 2) The operator must be able to view displays and generate reports of any measured variable in one or more engineering units such as flow in gpm, mgd, cfs, and acre-feet per day.
  - 3) Pre-program the conversion of the engineering units, and if not pre-programmed, the operator must be able to program new engineering unit conversions by using simple methods, e.g., multiplication of the database attributes by a constant.
  - 4) The programming method must be at a level and compatible with the specified training of the operator and the Owner's personnel.
  - 5) New conversions must not require the services of a special programmer and/or special, high-level, programming training.
- l. Control modules:
- 1) For each control function configured, whether processed at the RTU, PLC, or operator interface, maintain a file of necessary data including input values, setpoints, constants, intermediate calculated values, output value and limit clamps, etc.
  - 2) Input and output assignments, setpoints, and constants must be adjustable by the operator through the operator interface.

- 3) Provide control algorithms for manual control with output values adjustable by the operator.
  - m. Analog outputs:
    - 1) Analog outputs must be maintained as part of the database.
    - 2) These outputs must be adjustable manually by the operator through the operator interface or through automatic control algorithms.
  18. Some of the above functions may be better accomplished in the data acquisition and graphic display software package; it is the responsibility of the ICSC to optimize the location of the various functions between all software packages.
- C. General control functions:
1. Analog control functions:
    - a. PID, lead/lag, signal select, alarm, limit, delay, and time base.
    - b. Furnish the control system complete with a library of mathematical/calculation software to support averaging, weighted average, addition, subtraction, multiplication, division, square root extraction, exponential, AND, OR, NAND, NOR, XOR, and NXOR functions.
    - c. All math utilities must be linkable to process data points or manual inputs via control block configuration.
    - d. By linking control blocks to data points, the math library must support system unit conversion and calculation requirements.
  2. Discrete control functions:
    - a. AND, OR, NOT, EXCLUSIVE OR, comparators, delays, and time base.
  3. Software support:
    - a. Retain in firmware all control and logic functions at each RTU and PLC and in RAM at the operator interface.
    - b. Call each function as required by the configured controls to perform the intended function.
  4. Control and status discrepancies:
    - a. Generate a discrepancy/fail alarm for any generator, breaker or final control element if a discrepancy exists between a system or operator command and the device status.
      - 1) For example, the system commands to start (call), and the generator fails to start (run status report back), within predetermined operator programmable time delay (time disagree), then a discrepancy (fail) alarm shall be generated.

- b. Involuntary change in the device's status must also generate an alarm:
    - 1) For example, a generator starts when not commanded to do so, or a generator shuts down while running even though it still has a command to run.
  - c. Each command, status, and alarm must cause the color of the symbol to change.
  - d. Because many discrete final control elements have a cycle time in excess of the scan interval, provide each control output with an associated delay period selected to be longer than the operating period of the control element:
    - 1) Delay periods for each final control element must be adjustable at the operator interface.
    - 2) List all time delays in the final documentation.
  - 5. Some of the above functions may be better accomplished in the data acquisition and graphic display software package; it is the responsibility of the ICSC to optimize the location of the various functions between all software packages.
- D. Control configuration:
- 1. Provide software to allow control strategies to be developed, and their operation initiated through the operator interface.
  - 2. Provide standardized control point displays for defining the control functions including the function type, input/output addresses, setpoints and tuning constants, etc.
  - 3. Provide a mechanism to link separate control functions together into an integrated control strategy.
  - 4. Provide a mechanism to download operational/control setpoints developed at any operator interface to any PLC or RTU for operational implementation.
  - 5. Provide a mechanism to define and implement operational/control setpoints locally at the PLC or RTU and to upload them to the operator interface for operational record keeping.
  - 6. Perform control configurations on-line at the operator interface; the PLC or RTU may be taken off-line when being configured or downloaded.
- E. Remote inputs and outputs (RIOs):
- 1. Compatible with all of the PLCs being furnished under this Contract and shall be by the same manufacturer as the PLCs, and as a minimum, includes:
    - a. Power supply.

- b. Rack.
  - c. Backplane.
  - d. Communications module.
  - e. I/O modules.
  - f. Enclosure.
2. Provide all cables and software needed for a complete and operational RIO system as specified in the Contract Documents.
  3. Provide a group of pre-assigned diagnostic registers to report RIO system faults to the driver PLC.
  4. The control system must continue operation should a fault occur on a single RIO drop:
    - a. Upon clearing the fault, restart communications to that drop automatically.

**2.05 EQUIPMENT (NOT USED)****2.06 COMPONENTS (NOT USED)****2.07 ACCESSORIES (NOT USED)****2.08 MIXES (NOT USED)****2.09 FABRICATION (NOT USED)****2.10 FINISHES (NOT USED)****2.11 SOURCE QUALITY CONTROL**

- A. As specified in Section 17050.

**PART 3 EXECUTION****3.01 EXAMINATION (NOT USED)****3.02 PREPARATION (NOT USED)****3.03 INSTALLATION**

- A. As specified in Section 17050.
- B. Utilize personnel to accomplish or supervise the physical installation of all elements, components, accessories, or assemblies:
  1. Employ installers who are skilled and experienced in the installation and connection of all elements, components, accessories, and assemblies.
- C. All components of the control system including all data network cables are the installation responsibility of the ICSC unless specifically noted otherwise.
- D. General:
  1. The control system logic program shall reside at the PLC level.



- E. Use the tag and loop identifications found on the P&IDs for all tags used and/or assigned as part of the application software work provided by the ICSC.
- F. Program the PLC logic using the following language(s):
  - 1. Ladder Diagram.
  - 2. Function Block Diagram.
- G. Contractor shall provide copy of all PLC programs.
  - 1. All PLC programs shall be “unlocked” and provided without any copy protection.
  - 2. All PLC programs shall become the property of the City.

### **3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION**

- A. Provide a minimum of 4 CD/DVD copies of the following:
  - 1. Application software:
    - a. Finalized fully annotated copy of programmed PLC logic in its native format.
    - b. Cross-referenced index of all PLC registers or points.

### **3.05 REPAIR/RESTORATION (NOT USED)**

### **3.06 RE-INSTALLATION (NOT USED)**

### **3.07 FIELD QUALITY CONTROL**

- A. As specified in Section 17050.

### **3.08 ADJUSTING (NOT USED)**

### **3.09 CLEANING**

- A. As specified in Section 17050.

### **3.10 DEMONSTRATION AND TRAINING**

- A. As specified in Section 17050.
- B. Tailor training specifically for this Project that reflects the entire control system installation and configuration.
- C. Perform training by pre-approved and qualified representatives of the ICSC and/or manufacturer of the PLC hardware and programming software:
  - 1. A representative of the ICSC may perform the PLC hardware training only if the representative has completed the manufacturer’s training course for the PLC hardware.
  - 2. A representative of the ICSC may perform the PLC programming software training only if the representative has completed the manufacturer’s training course for the PLC programming software.

**3.11 PROTECTION**

A. As specified in Section 17050.

**3.12 SCHEDULES (NOT USED)**

**END OF SECTION 17720 CONTROL SYSTEMS: PROGRAMMABLE LOGIC  
CONTROLLERS**

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## SECTION 17721 CONTROL SYSTEMS: HUMAN MACHINE INTERFACE (HMI)

### PART 1 - GENERAL

#### 1.1. SUMMARY

A. Section includes:

- 1.) Human machine interface (HMI) control systems hardware and software.

B. Related sections:

- 1.) Section 17050 - Common Work Results for Process Control and Instrumentation Systems.

#### 1.2. REFERENCES

- A. As specified in Section 17050.

#### 1.3. DEFINITIONS

- A. As specified in Section 17050.

#### 1.4. SYSTEM DESCRIPTION

- A. Provide all HMI hardware identified in the Contract Documents.

#### 1.5. SUBMITTALS

- A. Furnish submittals in accordance with Sections 01330 and 17050.

B. Product data:

- 1.) Complete manufacturer's brochures for each item of equipment.
- 2.) Complete manufacturer's brochures that identify HMI software and options. Mark up to clearly show options and components to be provided, and cross out any options or components that will not be provided.
- 3.) Manufacturer's operation and installation instructions.
- 4.) Additional requirements:
  - (i) Display type and size.
  - (ii) Operator input.
  - (iii) Processor type and speed.
  - (iv) Memory size.
  - (v) Programming protocols.
  - (vi) Communication protocols.
  - (vii) Power requirements.
  - (viii) Operating temperature and humidity ranges. NEMA ratings.

- C. Shop drawings:
    - 1.) Furnish the following:
      - (i) System block diagram showing relationship and connections between devices. Include manufacturer and model information, and address settings.
      - (ii) Mounting drawings with dimensions and elevations for each equipment location, including identification of all components, preparation and finish data, and nameplates.
      - (iii) Electrical connection diagrams.
      - (iv) Complete grounding requirements.
    - 2.) Graphic Screens:
      - (i) Color printouts of each graphic screen and all control pop-ups.
    - 3.) Furnish data sheets for each component together with a technical product brochure or bulletin:
      - (i) Manufacturer's model number.
      - (ii) Project equipment tag.
    - 4.) Complete and detailed bills of materials identified by each cabinet. Include with each bill of material item the following:
      - (i) Quantity.
      - (ii) Description.
      - (iii) Manufacturer.
      - (iv) Part numbers.
  - D. Operation and maintenance manuals:
    - 1.) Complete installation, operations, calibration, and testing manuals as described in Section 17050.
  - E. Record documents:
    - 1.) Electrical connection diagrams revised to reflect any changes made in the field and submitted as record Drawings.
- 1.6. QUALITY ASSURANCE
- A. As specified in Section 17050.
  - B. Examine the complete set of Contract Documents and verify that the HMI equipment is compatible with the installed conditions.
  - C. Notify the Engineer if any installation condition does not meet the manufacturer's recommendations or specifications.

- D. Provide HMI hardware manufactured at facilities certified to the quality standards of ISO Standard 9001 - Quality Systems - Model for Quality Assurance in Design/Development, Production, Installation, and Servicing.
- E. System compatibility:
  - 1.) The software must be the standard operating software system designed specifically for use with the HMI hardware.
  - 2.) The software must be furnished and developed by the manufacturer of the HMI hardware.
- 1.7. DELIVERY, STORAGE, AND HANDLING
  - A. As specified in Section 17050.
- 1.8. PROJECT OR SITE CONDITIONS
  - A. Project environmental conditions as specified in Section 17050.
    - 1.) Provide HMI equipment suitable for the installed site conditions including, but not limited to, site altitude, site seismic conditions, humidity, and ambient temperatures.
- 1.9. SEQUENCING (NOT USED)
- 1.10. SCHEDULING (NOT USED)
- 1.11. WARRANTY
  - A. As specified in Section 17050.
- 1.12. SYSTEM START-UP (NOT USED)
- 1.13. OWNER'S INSTRUCTIONS (NOT USED)
- 1.14. COMMISSIONING (NOT USED)
- 1.15. MAINTENANCE (NOT USED)
  - A. As specified in Section 17050.
  - B. Provide system upgrades and maintenance fixes for a period of 2 years from substantial completion.

## **PART 2 - PRODUCTS**

- 2.1. MANUFACTURERS
  - A. One of the following or equal:
    - 1.) Allen-Bradley: PanelView Plus
  - B. Provide the HMI graphic software system manufactured by the HMI hardware manufacturer.
  - C. One of the following or equal:
    - 1.) Rockwell Software FactoryTalk View Machine Edition.

## 2.2. EXISTING PRODUCTS (NOT USED)

## 2.3. MATERIALS (NOT USED)

## 2.4. MANUFACTURED UNITS

### A. Human machine interface:

#### 1.) General:

- (i) Provide human machine interfaces located on the face of the PCM as indicated on the Drawings.
- (ii) Human machine interface consists of graphical display screen with operator input capabilities.
- (iii) Capable of stand-alone operation in conjunction with 1 PLC.
- (iv) Equipped with data network communication capabilities.

#### 2.) Display:

- (i) Type:
  - (a) Color TFT LCD screen.
- (ii) Resolution:
  - (a) 1024 by 768 pixels.
- (iii) Size: As indicated on the Drawings to replace existing unit
- (iv) Easy display viewing at any angle in various ambient light conditions.
- (v) Operator input:
  - (a) Configurable touch screen.
- (vi) Screen update speed: The screen update speed and screen change speed less than 1 second.
- (vii) Provide following features for outdoor use:
  - (a) Anti-glare screen overlay.
  - (b) Luminescence: Minimum 1,000 Nits.

#### 3.) Graphic configuration:

- (i) Easily configured graphics by:
  - (a) Portable laptop computer both locally and via the PLC data network.
  - (b) SCADA Engineer's console via the PLC data network.
- (ii) As specified in Section in this Section.

#### 4.) Memory:

- (i) Application:

- (a) 32 MB Flash EPROM.
- 5.) CPU: Minimum 100 MHz.
- 6.) Communications:
  - (i) RS232.
  - (ii) Ethernet.
- 7.) Environment:
  - (i) Temperature: 0 to 50 degrees Celsius.
  - (ii) Relative humidity: 10 to 90 percent.
- 8.) Electrical:
  - (i) Power supply:
    - (a) As required by existing conditions.
- B. Human machine interface software:
  - 1.) Provide a complete software package to be used for programming the necessary screens and operator interaction with the HMIs.
  - 2.) Operating system:
    - (i) Microsoft Windows10.
  - 3.) Furnish software with preconfigured symbols, objects, graphics, and imported bitmaps for the generation of the displays.
  - 4.) Software must allow bitmaps to be imported or exported to or from other applications.
  - 5.) Capable of generating custom reports, complete with screen prints.
  - 6.) Capable of working with multiple screens concurrently.
  - 7.) Provide dialog boxes for defining object attributes.
  - 8.) Configure objects using fill in dialog boxes.
  - 9.) Furnish graphic and text editor that allows custom formatting in order to customize and change the appearance of objects and text:
    - (i) Allow selection of different fill patterns to define object status.
  - 10.) As a minimum, provide the following object capabilities:
    - (i) Operator inputs:
      - (a) Momentary pushbutton.
      - (b) Maintained pushbutton.
      - (c) Latched pushbutton.
      - (d) Multistate pushbutton.
      - (e) Keypad enable button.



- (f) Cursor point.
  - (ii) Control list selectors:
    - (a) Standard control list.
    - (b) Piloted control list.
  - (iii) Global objects.
  - (iv) Display objects:
    - (a) Bar graph.
    - (b) Scale.
    - (c) Message display.
    - (d) Multistate indicator.
    - (e) List indicator.
    - (f) Numeric data display.
  - (v) Screen selector objects:
    - (a) Go to.
    - (b) Return.
    - (c) Screen list selector.
  - (vi) Embedded variables:
    - (a) Time.
    - (b) Date.
    - (c) Numeric variable.
  - (vii) Graphics:
    - (a) Lines.
    - (b) Shapes.
    - (c) Freeform drawings.
    - (d) Imported graphics.
    - (e) Background text.
    - (f) Selection table for standard ISA symbols.
    - (g) PID controller faceplate.
  - (viii) Alarm screens.
- 11.) Documentation:
- (i) Provide complete user documentation, including examples of how to operate the various modules within the system.

- (ii) Provide the documentation in electronic format, HTML based with the ability to search for topics by keyword or search or specific text.

12.) On-line help:

- (i) Provide an on-line "help" facility, based upon Windows standard Hypertext:
  - (a) Useful, context-sensitive information on the operation of the package:
    1. That can be invoked on-line through a point-and-click operation.
    2. The "help" facility must also support the ability to perform full text word search, add custom comments, bookmark topics, copy and pasting into another application, printing, and use of system fonts and colors.

2.5. EQUIPMENT (NOT USED)

2.6. COMPONENTS (NOT USED)

2.7. ACCESSORIES

2.8. MIXES (NOT USED)

2.9. FABRICATION (NOT USED)

2.10. FINISHES (NOT USED)

2.11. SOURCE QUALITY CONTROL

- A. As specified in Section 17050.

### **PART 3 - EXECUTION**

3.1. EXAMINATION

- A. As specified in Section 17050.

3.2. PREPARATION (NOT USED)

3.3. INSTALLATION

- A. As specified in Section 17050.
- B. All components of the control system including all data network cables are the installation responsibility of the ICSC unless specifically noted otherwise.
- C. Provide panel support bracing if more than 25 percent of the area has been removed to allow for the mounting of the HMI.
- D. All tags used and/or assigned as part of the application programming work are to use the tag and loop identifications found on the P&IDs.
- E. Station graphics:

- 1.) Configure the graphic display for each device both in the treatment plant, and/or process area, including but not limited to:
  - (i) Symbols for:
    - (a) Pumps.
    - (b) Valves.
    - (c) Major instruments.
    - (d) Flowmeters.
    - (e) Pressure transmitter.
    - (f) Major equipment.
  - (ii) Alarm symbols including intrusion alarm.
  - (iii) Relevant test and operational data.
  - (iv) Status for each controller or controlled device:
    - (a) Hand-Off-Auto Status.
    - (b) Local-Off-Remote Status.
    - (c) Run.
    - (d) Call.
    - (e) Fail.
    - (f) Open.
    - (g) Close.
    - (h) Hold.
    - (i) Modulate.
    - (j) Running.
  - (v) Depict a change of state of pumps and valves by a change in color.
- 2.) Production and usage bar graph:
  - (i) Depict the production for each site and/or piece of equipment, as determined during the requisite graphics meeting, within the treatment plant, summarized to type, and total usage, with a bar graph and numeric value for each analog value.
- 3.) System level summary:
  - (i) Show the level for the plant influent and effluent production, etc, via a display using bar graphs and numbers, as determined during the requisite graphics meeting.
- 3.4. ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)
- 3.5. REPAIR/RESTORATION (NOT USED)

- 3.6. RE-INSTALLATION (NOT USED)
- 3.7. FIELD QUALITY CONTROL
  - A. As specified in Section 17050.
- 3.8. ADJUSTING (NOT USED)
- 3.9. CLEANING
  - A. As specified in Section 17050.
- 3.10. DEMONSTRATION AND TRAINING
  - A. As specified in Section 17050.
  - B. Perform the training using pre-approved and qualified representatives of the ICSC and or manufacturer of the HMI software:
    - 1.) A representative of the ICSC may perform the training only if the representative has completed the manufacturer's training course for the HMI software.
- 3.11. PROTECTION
  - A. As specified in Section 17050.
- 3.12. SCHEDULES (NOT USED)

**END OF SECTION 17721 CONTROL SYSTEMS: HUMAN MACHINE INTERFACE  
(HMI)**

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**SECTION 17733 CONTROL SYSTEMS: NETWORK MATERIALS AND EQUIPMENT****PART 1 - GENERAL**

## 1.1. SUMMARY

## A. Section includes:

- 1.) Materials and equipment used in process control and LAN networks including:
  - (i) Network switches.
  - (ii) Media converters.
  - (iii) Routers.
  - (iv) Patch panels and other data network hardware.
  - (v) Related accessories.

## B. Related sections:

- 1.) The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
- 2.) It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
- 3.) The following sections are related to the Work described in this Section. This list of related sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents.
  - (i) Section 01330 - Submittal Procedures.
  - (ii) Section 17050 - Common Work Results for Process Control and Instrumentation Systems.
  - (iii) Section 17730 - Control Systems: PCS Computer Equipment.
  - (iv) Section 17950 - Testing, Calibration, and Commissioning.

## 1.2. REFERENCES

- A. As specified in Section 17050.
- B. Institute of Electrical and Electronics Engineers (IEEE):
  - 1.) 802.3 - Ethernet.
  - 2.) 802.11 - Wireless LANs.

## 1.3. DEFINITIONS

- A. As specified in Section 17050.

#### 1.4. SYSTEM DESCRIPTION

- A. Provide all network equipment identified in the Contract Documents.

#### 1.5. SUBMITTALS

- A. Furnish submittals as specified in Sections 01330 and 17050.
- B. Product data:
  - 1.) Include information on all network equipment.
  - 2.) Manufacturer's operation and installation instructions.
- C. Shop drawings:
  - 1.) Complete set of drawings including but not limited to:
    - (i) System block diagram showing relationship and connections between devices provided under this Contract and existing equipment. Include manufacturer and model information, and address settings.
    - (ii) Network riser diagram.
    - (iii) Network port diagram, which physically locates all ports within the facility, and identifies their patch panel and switch port.
    - (iv) Construction drawings for all equipment cabinets, including dimensions, identification of all components, preparation and finish data, and nameplates.
    - (v) Electrical connection diagrams.
    - (vi) Complete grounding requirements.
  - 2.) Furnish data sheets for each component together with a technical product brochure or bulletin:
    - (i) Manufacturer's model number.
    - (ii) Project equipment tag.
  - 3.) Complete and detailed bills of materials broken up by each cabinet. Each bill of material item will include the following:
    - (i) Quantity.
    - (ii) Description.
    - (iii) Manufacturer.
    - (iv) Part numbers.
- D. Test reports:
  - 1.) As specified in Section 17950 and noted in this Section.
  - 2.) Signed test results as described in this Section.
  - 3.) Test results shall include:

- (i) Narrative describing the test procedures followed.
  - (ii) Block diagram of test set up.
  - (iii) Manufacturer's information on test equipment used.
  - (iv) Detailed test results.
  - (v) A narrative summarizing the results of the testing and identifying any further action required.
- E. Operating manuals:
- 1.) Complete installation, operation, calibration, and testing manuals as specified in Section 17050.
- F. Record drawings:
- 1.) As specified in Section 17050.
  - 2.) Electrical connection diagrams shall be revised to reflect any changes made in the field and submitted as record drawings.
- 1.6. QUALITY ASSURANCE
- A. As specified in Section 17050.
- 1.7. DELIVERY, STORAGE, AND HANDLING
- A. As specified in Section 17050.
- 1.8. PROJECT OR SITE CONDITIONS
- A. As specified in Section 17050.
- 1.9. SEQUENCING (NOT USED)
- 1.10. SCHEDULING (NOT USED)
- 1.11. WARRANTY
- A. As specified in Section 17050.
- 1.12. SYSTEM START-UP (NOT USED)
- 1.13. OWNER'S INSTRUCTIONS (NOT USED)
- 1.14. COMMISSIONING (NOT USED)
- 1.15. MAINTENANCE (NOT USED)

## **PART 2 - PRODUCTS**

- 2.1. MANUFACTURERS (NOT USED)
  - 2.2. EXISTING PRODUCTS (NOT USED)
  - 2.3. MATERIALS (NOT USED)
  - 2.4. MANUFACTURED UNITS
- A. Ethernet switches:



- 1.) Managed Process floor Ethernet switches:
  - (i) Manufacturers: One of the following, no equal:
    - (a) N-Tron 7000 Series.
  - (ii) Properties:
    - (a) Hardware:
      1. Power supply:
        - a. Provide redundant power supplies.
        - b. 24 VDC, 350 Watts per power supply.
      2. No fans or moving parts.
    - (b) Performance:
      1. Switch fabric speed: 8 Gbps, minimum.
      2. Gigabit throughput.
      3. Latency 2.9 microseconds.
      4. Enclosure:
        - a. All metal hardened housing.
        - b. 15g Shock for 10ms minimum.
        - c. Cat 6 grounding for shield drains.
      5. 10/100Base-TX RJ-45 Copper Ports (quantity as indicated on the Drawings).
      6. 100Base-FX Full Duplex Fiber Optic Ports (quantity as indicated on the Drawings).
      7. 1,000Base-T Mini GBIC Full Duplex (quantity as indicated on the Drawings).
      8. Ports will auto negotiate speed duplex and MDIX.
      9. MTBF of 2M Hours.
      10. Capable of performing basic switching without special programming or configurations. Additional features available through software setup includes but not limited to:
        - a. Full SNMP and Web Browser Management.
        - b. Detailed Ring Map and Fault Location Charting Web Browser display.
        - c. VLAN.
        - d. QoS.
        - e. Trunking.

- f. CIP Messaging.
  - g. Port Mirroring.
  - h. DHCP Server with Option 61, Option 82 Relay Agent and Local IP Addressing.
11. OPC 2.0 Compliant Monitoring.
  12. IGMP Snooping with Ethernet I/P plug & play compatibility.
  13. RJ-45 Copper Ports Auto Negotiates Speed, Duplex, and MDIX.
  14. Store-and-forward technology.
  15. Redundant Power Inputs (10-30 VDC).
  16. 802.1d, 802.1w, 802.1D RSTP.
  17. Rapid Spanning Tree protocol.
  18. Ring Management with 30ms heal times.
- (c) Environment:
1. Operating temperature range: 32 to 140 Degrees Fahrenheit.
  2. Humidity: 15 to 95 percent, non-condensing.
- (d) Connector type:
1. Fiber: SC.
  2. Copper: RJ-45.
    - a. Quantity of copper and fiber ports as required to provide connections as indicated on the Drawings: As required to provide the number of connections required plus 20 percent spare ports of each type used.
- (e) Mounting:
1. DIN Rail mounting.
- B. Patch panels:
- 1.) General:
    - (i) Fiber:
      - (a) All optical fibers shall be provided with strain relief and terminated at a fiber patch panel. Final connections between the patch panel and the fiber optic network equipment shall be made via fiber optic patch cords.
      - (b) All fibers, active and dark, shall be terminated at the patch panels.

- (c) Interconnect and patch panel housings shall provide space for excess fiber and provide strain relief for the fiber cable.
- (d) Fiber cables shall be installed such that the outer sheath of the cable is carried into the interconnect enclosure or patch panels before breaking out buffer tubes.
- (ii) Patch Cords:
  - (a) Final connections between the patch panel and network equipment shall be by patch cords.
  - (b) All premises cables shall be terminated at the patch panels.
  - (c) Cables shall be installed such that the outer sheath of the cable is carried into the interconnect enclosure or patch panels before breaking out conductors.
  - (d) Maintain twist of broken out conductors per EIA/TIA standards.
- 2.) Cabinet style fiber patch panels:
  - (i) DIN rail mounted:
    - (a) Use for the termination of a single cable inside of cabinets, in small enclosures or as indicated on the plans.
    - (b) DIN rail mounted fiber interconnects shall be provided as complete units including the housing, the connector panels and the fiber connectors.
    - (c) DIN rail mounted fiber interconnects shall provide physical protection for both the incoming cable and the outgoing patch cords.
    - (d) Capacity:
      - 1. As shown on the plans, minimum 6 connections.
    - (e) Accessories:
      - 1. Blanks for unused connector panels.
    - (f) Manufacturers: The following or equal:
      - 1. Hirshmann MIPP.
      - 2. DINSpace SNAP XL.
- 2.5. EQUIPMENT (NOT USED)
- 2.6. COMPONENTS (NOT USED)
- 2.7. ACCESSORIES
  - A. Provide duplex patch cords to connect the interface cards provided with the associated patch panels.
  - B. Furnish accessories as specified in Section 17730.

- 2.8. MIXES (NOT USED)
- 2.9. FABRICATION (NOT USED)
- 2.10. FINISHES (NOT USED)
- 2.11. SOURCE QUALITY CONTROL (NOT USED)

### **PART 3 - EXECUTION**

- 3.1. EXAMINATION (NOT USED)
- 3.2. PREPARATION (NOT USED)
- 3.3. INSTALLATION
  - A. As specified in Section 17050.
  - B. Provide installation and configuration for the new and existing managed Ethernet switches. Provide configuration of the Ethernet switch network for a complete, functioning plant control system as indicated on the Drawings and as specified herein:
    - 1.) Refer to SCADA block diagrams for all new network connections.
    - 2.) Provide configuration for all managed Ethernet switches and other components including but not limited to VLAN (virtual local area network), additional Plant PLC communication cards and separate managed Ethernet switches as required, such that there is isolation of the following networks:
      - (i) Field and PLC I/O network: This includes the connections between the Plant PLC and:
        - (a) Plant PLC expansion racks.
        - (b) Plant PLC remote I/O (RIO) racks.
        - (c) Field Networks.
        - (d) HMI(s) part of a Plant PLC.
        - (e) Vendor furnished Ethernet network components.
      - (ii) Process Control network: This includes the connections between the Plant PLC and other Plant PLCs.
      - (iii) SCADA network: This includes the connections between the various SCADA equipment including but not limited to servers (existing), workstations and printers.
    - 3.) The process floor managed Ethernet switches for the process control network shall be configured and programmed for rapid fail over protection.
    - 4.) The enterprise level managed Ethernet switches shall be configured for a communication protocol that is compatible with the process control network's rapid fail over protocol.

- C. Install Velcro wrap on all cable bundles within the network rack/enclosure.
- D. All cables and equipment shall be installed in strict conformance with the manufacturer's recommendations:
  - 1.) Cables shall be installed avoiding sharp bends.
  - 2.) Install cable using lubricant designed for cable pulling.
  - 3.) Cable ties or other cable supports shall be installed without crimping the LAN cables.
  - 4.) Install LAN cables without splices.
  - 5.) Installed bend radii shall not exceed 4 times the cable diameter.
  - 6.) Terminated all pairs at the jack and the patch panel.
- E. Install cables a minimum of 40 inches away from electrical motors and transformers.
- F. Install cables a minimum of 12 inches away from fluorescent lighting.
- G. Individual pairs will be untwisted less than 1/2 inch at termination points.
- H. All cables and terminations shall be labeled with cable designations as specified in Section 16075.
- I. Each data port shall be individually labeled with its patch panel/switch port ID:
  - 1.) Labeling must be printed - no handwritten labels will be allowed.
- J. At the completion of the wiring installation, provide the following documentation:
  - 1.) A plan-view of the premise(s) showing the jack numbering scheme.
  - 2.) A printed certification report for the entire wiring installation showing compliance with all EIA/TIA specifications for data cable.
  - 3.) Reports such as those generated by Fluke DSP cable certification equipment meet this requirement.
  - 4.) Each device with a unique IP address shall be individually labeled with its IP address. The labeling must be printed; handwritten labels will not be allowed.
- K. Managed Ethernet switches:
  - 1.) Configure switches to prevent broadcast storms.
  - 2.) Installations utilizing Rockwell PLCs and multicast messaging shall employ IGMP and snooping on all Rockwell components.
- 3.4. ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)
- 3.5. REPAIR/RESTORATION (NOT USED)

- 3.6. RE-INSTALLATION (NOT USED)
- 3.7. FIELD QUALITY CONTROL (NOT USED)
- 3.8. ADJUSTING
  - A. Perform all firmware installations, configuration and other set up, as required, to place the network into proper operation.
- 3.9. CLEANING
  - A. As specified in Section 17050.
- 3.10. DEMONSTRATION AND TRAINING
  - A. As specified in Section 17050.
  - B. After completion of the cable system tests and before placing the system in operation, power up all devices installed on the LAN and verify communication between the devices.
  - C. Verify that all equipment is operable on the network simultaneously. Confirm that all network device communications settings are properly configured.
- 3.11. PROTECTION (NOT USED)
- 3.12. SCHEDULES (NOT USED)

**END OF SECTION 17733 CONTROL SYSTEMS: NETWORK MATERIALS AND EQUIPMENT**

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## SECTION 17950 TESTING, CALIBRATION, & COMMISSIONING

### PART 1 - GENERAL

#### 1.1. SUMMARY

A. Section includes:

- 1.) Testing requirements that apply to process control and instrumentation systems for the entire Project.

B. Related sections:

- 1.) The Contract Documents are complementary; what is called for by one is as binding as if called for by all.
- 2.) It is the Contractor's responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor's Work.
- 3.) The following sections are related to the Work described in this Section. This list of related sections is provided for convenience only and is not intended to excuse or otherwise diminish the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents.
  - (i) Section 17050 - Common Work Results for Process Control and Instrumentation Systems.
  - (ii) Section 17100 - Control Strategies.

#### 1.2. REFERENCES

- A. As specified in Section 17050.
- B. Electronics Industries Alliance (EIA).
- C. Telecommunications Industry Association (TIA).

#### 1.3. DEFINITIONS

- A. As specified in Sections 01756 and 17050.
- B. Specific definitions:

- 1.) PTO: Profibus Trade Organization.

#### 1.4. SYSTEM DESCRIPTION (NOT USED)

#### 1.5. SUBMITTALS

- A. Furnish submittals as specified in Section 01330.
- B. General:

- 1.) Reference additional detailed test submittal scheduling and prerequisite requirements as specified in the Sequencing article of Section 17050.



- C. Overall test plan:
- 1.) Develop the PCIS system test submittals in consultation and cooperation with all applicable subcontractors.
  - 2.) Develop and submit an overall testing plan for the PCIS. The overall test plan to be reviewed and approved by the Engineer before detailed test plans, procedures, and forms will be reviewed.
  - 3.) Describe the test phases as they apply specifically to this Project and each process system.
  - 4.) Provide a preliminary testing schedule to show the sequence of tests and commissioning as they apply to each process system and each PLC.
  - 5.) Provide a description of factory tests. Describe what equipment will be included, what testing equipment will be used, and the simulator that will be used.
  - 6.) Provide examples of proposed forms and checklists.
- D. Test procedures:
- 1.) Develop and submit detailed test procedures to show that the integrated SCADA system hardware and software is fully operational and in compliance with the requirements specified in the Contract Documents.
  - 2.) Provide a statement of test objectives for each test.
  - 3.) Prepare specific procedures for each process system.
  - 4.) Describe sequentially the steps to be followed in verifying the correct operation of each process system, including all features described in the loop descriptions, control strategies, and shown in the P&IDs. Implied or generic test procedures are not acceptable.
  - 5.) Specify who will perform the tests, specifically what testing equipment will be used (including serial numbers and NIST-traceable calibration), and how the testing equipment will be used.
  - 6.) Describe the expected role of the Engineer, as well as any requirements for assistance from Owner's staff.
  - 7.) Provide the forms and checklists to be used.
- E. Test forms:
- 1.) Provide test and calibration forms and checklists for each of the following:
    - (i) Installation tests.
    - (ii) Functional tests.
    - (iii) Instrumentation and Controls Performance test.

- (iv) Communication Testing including all digital bus and all forms of Ethernet.
  - 2.) Test forms shall include the detailed test procedures, or shall include clear references to separate pages containing the complete test procedure applicable to each form. If references to procedures are used, the complete procedure shall be included with each test binder.
  - 3.) Every page of each test form shall include project name, date, time, name of person conducting the test, signature of person conducting the test, and for witnessed tests, place for signature of person (Engineer and Owner) witnessing the test.
  - 4.) Some sample test forms are included at the end of this Section. These test forms show the minimum required test form content. They are not complete, and have not been customized for this Project. The Contractor is to develop and submit test forms customized for the Project and meeting all of the specified test and submittal requirements.
- F. Testing binders:
- 1.) Sub-system to be tested, provide and submit a test binder containing all test procedures and individual test forms for the test. References to other documents for test procedures and requirements are not acceptable.
  - 2.) Fill out in advance headings and all other information known before the test.
  - 3.) Include applicable test plan information, as well as a list of all test prerequisites, test personnel, and equipment.
  - 4.) Include or list reference material and provide separately at the time of the test.
  - 5.) Record test results and verify that all test requirements and conditions have been met.
- G. Test reports:
- 1.) At the conclusion of each test, submit a complete test report, including all test results and certifications.
  - 2.) Include all completed test binders, forms, and checklists.
  - 3.) Submission, review, and acceptance of each test report is required before the start of the sub-system.
- 1.6. QUALITY ASSURANCE
- A. Test personnel:
- 1.) Furnish qualified technical personnel to perform all calibration, testing, and verification. The test personnel are required to be familiar with this Project and the equipment, software, and systems before being assigned to the test program.

- 1.7. DELIVERY, STORAGE, AND HANDLING (NOT USED)
- 1.8. PROJECT OR SITE CONDITIONS (NOT USED)
- 1.9. SEQUENCING (NOT USED)
- 1.10. SCHEDULING
  - A. As specified in Section 17050.
- 1.11. WARRANTY (NOT USED)
- 1.12. SYSTEM START-UP (NOT USED)
- 1.13. OWNER'S INSTRUCTIONS (NOT USED)
- 1.14. MAINTENANCE (NOT USED)

## **PART 2 - PRODUCTS**

- 2.1. MANUFACTURERS (NOT USED)
- 2.2. EXISTING PRODUCTS (NOT USED)
- 2.3. MATERIALS (NOT USED)
- 2.4. MANUFACTURED UNITS (NOT USED)
- 2.5. EQUIPMENT (NOT USED)
- 2.6. COMPONENTS (NOT USED)
- 2.7. ACCESSORIES (NOT USED)
- 2.8. MIXES (NOT USED)
- 2.9. FABRICATION (NOT USED)
- 2.10. FINISHES (NOT USED)
- 2.11. SOURCE QUALITY CONTROL (NOT USED)

## **PART 3 - EXECUTION**

- 3.1. EXAMINATION (NOT USED)
- 3.2. PREPARATION (NOT USED)
- 3.3. INSTALLATION
  - A. As specified in Section 17050.
  - B. Installation supervision:
    - 1.) Provide as specified in Section 17050.
- 3.4. ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)
- 3.5. REPAIR/RESTORATION (NOT USED)
- 3.6. RE-INSTALLATION (NOT USED)

3.7. COMMISSIONING AND PROCESS START-UP

A. Source Testing:

1.) Provide manufacturer services as specified in the table below.

Section Number	Section Title	Source Testing (Witnessed or Non-Witnessed)
17100	Control Strategies	Non-Witnessed
17710	Control Systems - Panels, Enclosures, and Panel Components	Witnessed
17950	Testing, Calibration, and Commissioning	Witnessed

B. Owner Training:

1.) Complete Owner training as specified in Section 17050.

C. Installation Testing:

1.) General:

(i) The Owner reserves the right to test any specified function, whether or not explicitly stated in the test submittals.

(ii) Failure testing:

(a) In addition to demonstrating correct operation of all specified features, demonstrate how the system reacts and recovers from abnormal conditions including, but not limited to:

1. Equipment failure.
2. Operator error.
3. Communications sub-system error.
4. Power failure.
5. Process equipment failure.
6. High system loading conditions.

(iii) Conduct testing Monday through Friday during normal working hours for no more than 8 hours per day.

(a) Testing at other times requires approval of the Engineer.

2.) Sequencing:

(i) See additional requirements specified in the Sequencing article of Section 17050.

3.) Calibration:

- (i) After installation but before starting other tests, calibrate and adjust all instruments, devices, valves, and systems, in conformance with the component manufacturer's instructions and as specified in these Contract Documents.
- (ii) Components having adjustable features are to be set carefully for the specific conditions and applications of this installation. Test and verify that components and/or systems are within the specified limits of accuracy.
- (iii) Replace either individually or within a system, defective elements that cannot achieve proper calibration or accuracy.
- (iv) Calibration points:
  - (a) Calibrate each analog instrument at 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent of span, using test instruments with accuracies traceable to NIST.
  - (v) Field verify calibration of instruments that have been factory-calibrated to determine whether any of the calibrations are in need of adjustment.
  - (vi) Analyzer calibration:
    - (a) Calibrate and test each analyzer system as a workable system after installation. Follow the testing procedures directed by the manufacturers' technical representatives.
  - (vii) Complete instrument calibration sheets for every field instrument and analyzer.
  - (viii) Calibration tags:
    - (a) Attach a calibration and testing tag to each instrument, piece of equipment, or system.
    - (b) Sign the tag when calibration is complete.
- 4.) LAN cable post-testing:
  - (i) After installing the cable and connectors, test all cables using the LAN certification to confirm the installation meets the requirements of the specification.
  - (ii) Provide test documentation that includes the cable number, total length of cable, a permanent hard copy, as well as a-USB or CD copy of all traces.
    - (a) After installing connectors:
    - (b) Perform cable end-to-end testing on all installed cables from both ends of the cable. Test shall include cable system performance tests and confirm the absence of wiring errors.

- (c) Submit a signed test report presenting the results of the cable testing.
  - (d) Repair or replace any portions of the system not meeting ANSI/TIA/EIA standards for a Category 5e installation. Repaired sections shall be retested.
  - (iii) Submit 3 copies of all final documentation (including traces), using the approved test form, to the Engineer upon successful completion of the testing.
- 5.) Loop check/validation:
- (i) Check all control loops under simulated operating conditions by causing a range of input signals at the primary control elements and observing appropriate responses of the respective control and monitoring elements, final control elements, and the graphic displays associated with the SCADA system. Issue commands from the SCADA system and verify proper responses of field devices. Use actual process inputs wherever available.
  - (ii) Provide “end-to-end” tests:
    - (a) Test SCADA system inputs from field device to SCADA system operator workstations.
    - (b) Test SCADA system outputs from SCADA operator workstations to field devices and equipment.
    - (c) Observe and record responses at all intermediate devices.
    - (d) Test and record operator commands and signal readouts to each operator device where there is more than one operator interface point.
    - (e) For each signal, perform separate tests for SCADA computer screens, local operator interface (LOI) screens, and local control panels.
  - (iii) Retest any loop following any necessary corrections.
  - (iv) Apply simulated sensor inputs corresponding to 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent of span for networks that incorporate analog elements, and monitor the resulting outputs to verify compliance to accuracy tolerance requirements.
  - (v) Apply continuously variable up and down analog inputs to verify the proper operation and setting of discrete devices (signal trips, etc.).
  - (vi) Apply provisional settings on controllers and alarm setpoints.
  - (vii) Record all analog loop test data on test forms.
  - (viii) Exercise each field device requiring an analog command signal, through the SCADA system. Vary, during the validation process,

the output from the PLC SCADA system and measure the end device position, speed, etc. to confirm the proper operation of the device for the supplied analog signal. Manually set the output from the SCADA screen at 0 percent, 25 percent, 50 percent, 75 percent, and 100 percent and measure the response at the final device and at any intermediate devices.

- (ix) Exercise each field device providing a discrete input to the SCADA system in the field and observe the proper operation shall be observed at the operator workstation:
  - (a) Test limit switches, set limits mechanically, and observe proper operation at the operator workstation.
  - (b) Exercise starters, relay contacts, switch contacts, and observe proper operation.
  - (c) Calibrate and test instruments supplying discrete inputs, and observe proper operation.
- (x) Test each device accepting a discrete output signal from the SCADA. Perform the appropriate operator action at the SCADA operator stations (including LOIs, if present) and confirm the proper operation of the field device:
  - (a) Stroke valves through outputs from the SCADA system, and confirm proper directional operation. Confirm travel limits and any feedback signals to the SCADA system.
  - (b) Exercise motors starters from the SCADA system and verify proper operation through direct field observation.
  - (c) Exercise solenoids and other field devices from the SCADA system and verify proper operation through direct field observation.
- (xi) Include in the test forms:
  - (a) Analog input devices:
    1. Calibration range.
    2. Calibration data: Input, output, and error at each test value.
    3. Analog input associated PLC register address.
    4. Value in PLC register at each test point.
    5. Value displayed at each operator interface station (local operator interface displays and SCADA workstations).
  - (b) Analog output devices:
    1. Calibration range.
    2. Test value at each test point.
    3. Analog output associated PLC register address.

4. Control variable value at field device at each test point.
  5. Physical device response at each test point:
    - a. Response to be actual valve position, or motor speed, etc.
  - (c) Discrete instrument input devices:
    1. Switch setting, contact action, and dead band.
    2. Valve position switches:
      - a. Response in the PLC as the valve is stroked from the PLC.
      - b. Field observed actual valve position, and valve indicator position as the valve is stroked from the PLC.
    3. Operator interface switches (control stations and other pilot devices) and associated response.
    4. Starter and drive auxiliary device contact response.
    5. Response of all other discrete inputs to the PLC.
  - (d) Discrete output devices:
    1. Observed response of field device to the discrete output from the PLC.
    2. Observe the proper operation of Open, Close, Start, Stop, On, Off, etc.
  - (e) Test equipment used and associated serial numbers.
- D. Functional Testing:
- 1.) General:
    - (i) Commence Functional tests after completion of all loop check/validation tests:
      - (a) As specified in Section 17050, Sequencing and Scheduling article.
    - (ii) Functional to demonstrate proper operation of all systems with process equipment operating over full operating ranges under conditions as closely resembling actual operating conditions as possible.
    - (iii) Additional tests are specified in other Instrumentation and Control Sections.
    - (iv) Follow approved detailed test procedures and check lists for Functional Test activities.
  - 2.) Control logic operational validation:



- (i) The purpose of control logic validation is to field test the operation of the complete control system, including all parts of the SCADA system, all control panels (including vendor control panels), all control circuits, all control stations, all monitored/controlled equipment, and final control elements.
  - (ii) Demonstrate all control functionality shown on the P&IDs, control schematics, and other drawings, and specified in the loop descriptions, control strategies, Electrical Specifications, and Mechanical Equipment Specifications.
  - (iii) Test in detail on a function-by-function and sentence-by-sentence basis.
  - (iv) Thoroughly test all hardware and software functions:
    - (a) Including all hardwired and software control circuit interlocks and alarms.
  - (v) Test final control elements, controlled equipment, control panels, and ancillary equipment under startup, shut down, and steady-state operating conditions to verify all logic and control is achieved.
  - (vi) Control logic validation tests to include, but not limited to: a repeat of all control logic tests from the FAT, modified and expanded to include all field instruments, control panels, circuits, and equipment.
- 3.) Loop tuning:
- (i) Optimally tune all electronic control stations and software control logic incorporating proportional, integral, or derivative control. Apply control signal disturbances at various process variable levels and adjusting the gain, reset, or rate settings as required to achieve proper response.
  - (ii) Verify the transient stability of final control elements operating over the full range of operating conditions, by applying control signal disturbances, monitoring the amplitude and decay rate of control parameter oscillations and making necessary controller adjustments as required to eliminate excessive oscillatory amplitudes and decay rates. As a minimum, achieve 1/4 wave amplitude decay ratio damping (subsidence ratio of 4) under the full range of operating conditions.
  - (iii) If excessive oscillations or system instability occur, as determined by the Engineer, continue tuning and parameter adjustments, or develop and implement any additional control algorithms needed to achieve satisfactory control loop operation.
- 4.) Functional validation sheets:
- (i) Document each Functional test on an approved test form.

- (ii) Document loop tuning with a report for each loop, including two-pen chart recordings showing the responses to step disturbance at a minimum of 3 setpoints or process rates approved by the Engineer. Show tuning parameters on the charts, along with time, date, and sign-off by Contractor and Engineer.
  - (iii) Include on the form, functions which can be demonstrated on a loop-by-loop basis:
    - (a) Loop number and P&ID number.
    - (b) Control strategy, or reference to specification tested.
    - (c) Test procedures: Where applicable, use the FAT function-by-function, sentence-by-sentence loop test checklist forms modified to meet the requirements of the Functional test. Otherwise, create new forms.
  - (iv) For functions that cannot be demonstrated on a loop-by-loop basis (such as overall plant power failure), include on the test form a listing of the specific steps and tests to be conducted. Include with each test description the following information:
    - (a) Specification page and paragraph of function demonstrated.
    - (b) Description of function and/or text from specification.
    - (c) Test procedures: use the FAT loop test checklist forms modified to meet the specific testing conditions of the Functional test.
- 5.) Functional certification:
- (i) Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756.
    - (a) Including all test forms with test data entered, submitted to the Engineer with a clear and unequivocal statement that all Functional test requirements have been satisfied.
- E. Instrumentation and Controls Performance Testing:
- 1.) After the Process Operational Period, test PCIS system for additional 60 days as specified in this Section to identify issues and make corrections, as needed.
  - 2.) General:
    - (i) The performance test is part of the Work that must be completed as a condition of substantial completion and final completion for the entire Project.
    - (ii) The complete PLC control and SCADA system must run continuously for the duration of the performance test.
    - (iii) Test and use the entire process control system under standard operating conditions.

- (iv) Exercise all system functions.
  - (v) Log failure, any system interruption and accompanying component, subsystem, or program failure including time of occurrence, duration of each failure, failure classification, and cause.
    - (a) Provide a competently trained technician or programmer on call for the Project Site during all normal working days and hours from the start of the performance test until final acceptance of the system.
      - 1. Response time to the Project Site: 24 hours or less, for a major failure.
- 3.) Failures:
- (i) Classify failures as either major or minor.
    - (a) Minor failure:
      - 1. A small and non-critical component failure or software problem that can be corrected by the Owner's operators.
      - 2. Log this occurrence but this is not a reason for stopping the test and is not grounds for non-acceptance.
      - 3. Should the same or similar component failure occur repeatedly, this may be considered as grounds for non-acceptance.
      - 4. Failure of one printer or operator station is considered a minor failure providing all functions can be provided by backup equipment, i.e., alternate printers and operator station, and repairs can be made and equipment returned to service within 3 working days.
    - (b) Major failure:
      - 1. Considered to have occurred when a component, subsystem, software control, or program fault causes a halt in or improper operation of the system and/or when a technician's work is required to make a repair or to re-initiate operation of the system.
      - 2. Cause termination of the performance test.
      - 3. Start a new acceptance test when the causes of a major failure have been corrected.
      - 4. A failure is also considered major when failure of any control system that results in an overflow, underflow, overdose, or underdose condition occurs.
- 4.) Technician report:

- (i) Each time a technician is required to respond to a system malfunction, they must complete a report, which includes details concerning the nature of the complaint or malfunction and the resulting repair action required and taken.
- (ii) If a malfunction occurs which clears itself or which the operator on duty is able to correct, no report is required or logged as specified above.
- (iii) If a technician has performed work but no report is written, then a major failure is considered to have occurred.
- (iv) Each report shall be submitted within 24 hours to the Engineer and the Owner, or its representative.

3.8. FIELD QUALITY CONTROL (NOT USED)

3.9. ADJUSTING (NOT USED)

3.10. CLEANING (NOT USED)

3.11. PROTECTION (NOT USED)

3.12. SCHEDULES

A. Example test forms:

- 1.) Example test forms are attached at the end of this Section. They may be used as a starting point for the development of Project-specific test forms for this Project.
- 2.) The example test forms are not intended to be complete or comprehensive. Edit and supplement the forms to meet the requirements for testing and test forms specified in this Section and other Contract Documents.

3.13.

**END OF SECTION 17950 TESTING, CALIBRATION, & COMMISSIONING**

	<b>INSTALLATION AND CERTIFICATION CHECKLIST DOCUMENTATION</b>	
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INSTRUMENT LOOP  
NO. \_\_\_\_\_

SERVICE  
DESCRIPTION \_\_\_\_\_

A COPY OF LATEST ISSUE OF THE FOLLOWING DOCUMENTS ARE INCLUDED  
IN THIS INSTRUMENT INSTALLATION CERTIFICATION FILE:

- INSTRUMENT SPECIFICATION SHEETS (FOR ALL INSTRUMENTS IN THE LOOP)
- INSTRUMENT INSTALLATION DETAILS (FOR ALL INSTRUMENTS IN THE LOOP)
- INSTRUMENT LOOP WIRING DIAGRAMS
- INSTRUMENT INSTALLATION CERTIFICATION CHECKLIST
- SIZING CALCULATIONS
- INSTRUMENT INSTALLATION SCHEDULE (APPLICABLE PART)
- NAMEPLATE SCHEDULE (APPLICABLE PART)
- VENDOR LITERATURE CALIBRATION INFORMATION

INSTRUMENT LOOP IS PART OF EQUIPMENT START-UP/SHUTDOWN INTERLOCKS?    No    Yes

REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CHECKED BY (COMPANY) \_\_\_\_\_ ACCEPTED BY (COMPANY) \_\_\_\_\_

SIGNATURE \_\_\_\_\_ SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_ DATE \_\_\_\_\_

	<b>SWITCHES INSTALLATION AND CALIBRATION CHECKLIST</b>	
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INSTRUMENT LOOP NO. \_\_\_\_\_

SERVICE DESCRIPTION \_\_\_\_\_

CHECK BELOW, WHEN COMPLETED:

- BENCH CALIBRATED PER SPECIFICATION SHEET NO. \_\_\_\_\_
- VERIFIED PER P&ID NO. \_\_\_\_\_
- CORRESPONDS TO SPECIFICATION SHEET NO. \_\_\_\_\_
- WIRING CORRECT PER INSTRUMENT LOOP DRAWING NO. \_\_\_\_\_
- INSTALLATION CORRECT PER DETAIL NO. \_\_\_\_\_
- ACCESSORIES ARE PRESENT AND PROPERLY INSTALLED
- INSTRUMENT IS ACCESSIBLE FOR MAINTENANCE OR REMOVAL
- ENGRAVED LAMINATED NAMEPLATE (NO SPELLING ERRORS) PERMANENTLY INSTALLED

INSTRUMENT LOOP IS PART OF EQUIPMENT START-UP/SHUTDOWN INTERLOCKS?  No  Yes

FIELD CALIBRATION CHECK						
CONT ACT NO.	FUNCTION	FOR SIGNAL	CONTACT IS TO	AT SPECIFIED VALUE FOR	ACTUAL TRIP POINT WAS	
1	<input type="checkbox"/> ALARM	<input type="checkbox"/> INCR	<input type="checkbox"/> OPEN	SET PT = _____	SET PT	_____
	<input type="checkbox"/> S/D PERM	<input type="checkbox"/> DEC R	<input type="checkbox"/> CLOS E	RESET = _____	RESET	_____
2	<input type="checkbox"/> ALARM	<input type="checkbox"/> INCR	<input type="checkbox"/> OPEN	SET PT = _____	SET PT	_____
	<input type="checkbox"/> S/D PERM	<input type="checkbox"/> DEC R	<input type="checkbox"/> CLOS E	RESET = _____	RESET	_____
3	<input type="checkbox"/> ALARM	<input type="checkbox"/> INCR	<input type="checkbox"/> OPEN	SET PT = _____	SET PT	_____
	<input type="checkbox"/> S/D PERM	<input type="checkbox"/> DEC R	<input type="checkbox"/> CLOS E	RESET = _____	RESET	_____
4	<input type="checkbox"/> ALARM	<input type="checkbox"/> INCR	<input type="checkbox"/> OPEN	SET PT = _____	SET PT	_____
	<input type="checkbox"/> S/D PERM	<input type="checkbox"/> DEC R	<input type="checkbox"/> CLOS E	RESET = _____	RESET	_____

NOTE: PERM IS ABBREVIATION FOR PERMISSIVE





	<b>TRANSMITTER/CONTROLLER/INDICATOR INSTALLATION AND CALIBRATION CHECKLIST</b>	
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INSTRUMENT LOOP IS PART OF EQUIPMENT START-UP/SHUTDOWN INTERLOCKS? N Ye  
o s

INSTRUMENT TYPE  TRANSMITTER  CONTROLLER  INDICATOR

OTHER DESCRIPTION \_\_\_\_\_

INSTRUMENT TAG NO. \_\_\_\_\_ SERIAL NO. \_\_\_\_\_

SERVICE DESCRIPTION \_\_\_\_\_

<b><u>BENCH CALIBRATION CHECK</u></b>
---------------------------------------

INPUT RANGE = _____	OUTPUT RANGE = _____
HEAD CORRECTION = _____	<input type="checkbox"/> LINEAR
CALIBRATED SPAN = _____	<input type="checkbox"/> SQUARE ROOT

% CALIB SPAN	DESIRED VALUE	ACTUAL VALUE	EXPECTED VALUE	ACTUAL VALUE
0				
50				
100				

CHECK BELOW, WHEN COMPLETED:

BENCH CALIBRATED PER SPECIFICATION SHEET NO. \_\_\_\_\_

VERIFIED PER P&ID NO. \_\_\_\_\_

CORRESPONDS TO SPECIFICATION SHEET NO. \_\_\_\_\_

- WIRING CORRECT PER INSTRUMENT LOOP DRAWING NO. \_\_\_\_\_
- INSTALLATION CORRECT PER DETAIL NO. \_\_\_\_\_
- ACCESSORIES ARE PRESENT AND PROPERLY INSTALLED
- INSTRUMENT IS ACCESSIBLE FOR MAINTENANCE OR REMOVAL
- ENGRAVED LAMINATED NAMEPLATE (NO SPELLING ERRORS) PERMANENTLY INSTALLED

<b><u>FIELD CALIBRATION CHECK</u></b>				
INPUT RANGE = _____			OUTPUT RANGE = _____	
% CALIB SPAN	DESIRED VALUE	ACTUAL VALUE	EXPECTED VALUE	ACTUAL VALUE
0				
50				
100				

	<b>TRANSMITTER/CONTROLLER/INDICATOR OR INSTALLATION AND CALIBRATION CHECKLIST</b>	
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DIRECT                       REVERSE

ACTION VERIFIED AT 50% SPAN

ACTION VERIFIED  
AT \_\_\_\_\_ SPAN

<b>CONTROLLER SETTINGS</b>								
SETTING	GAIN	PB	RESET (INTEGRAL)	DERIV (RATE)	HIGH LIMIT	LOW LIMIT	ELEV. ZERO	ZERO SUPP
PRE-TUNE								
POST-TUNE								

<b>PRE-TUNE SETTINGS</b>					
	GAIN	PB	RESET (REPEAT/MIN)	RESET (MIN/REPEAT)	DERIVATION (MINUTES)
FLOW	1.0	100	10	0.1	N/A
LEVEL	1.0	100	MIN.	MAX.	N/A
PRESSURE	2.0	50	2.0	0.5	N/A
TEMP.	4.0	25	0.1	10	OFF

REMARKS \_\_\_\_\_

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CHECKED BY  
(COMPANY)

\_\_\_\_\_

ACCEPTED BY  
(COMPANY)

\_\_\_\_\_

SIGNATURE

\_\_\_\_\_

SIGNATURE

\_\_\_\_\_

DATE

\_\_\_\_\_

DATE

\_\_\_\_\_

	<b>ANALYZERS INSTALLATION AND CALIBRATION CHECKLIST</b>	
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INSTRUMENT LOOP IS PART OF EQUIPMENT START-UP/SHUTDOWN INTERLOCKS?    No    Yes

TYPE OF INSTRUMENT \_\_\_\_\_

INSTRUMENT TAG NO. \_\_\_\_\_ SERIAL NO. \_\_\_\_\_

SERVICE DESCRIPTION \_\_\_\_\_

CHECK BELOW, IF TRUE

BENCH CALIBRATED PER SPECIFICATION SHEET NO. \_\_\_\_\_

VERIFIED PER P&ID NO. \_\_\_\_\_

CORRESPONDS TO SPECIFICATION SHEET NO. \_\_\_\_\_

WIRING CORRECT PER INSTRUMENT LOOP DRAWING NO. \_\_\_\_\_

INSTALLATION CORRECT PER DETAIL NO. \_\_\_\_\_

ACCESSORIES ARE PRESENT AND PROPERLY INSTALLED

INSTRUMENT IS ACCESSIBLE FOR MAINTENANCE OR REMOVAL

ENGRAVED LAMINATED NAMEPLATE (NO SPELLING ERRORS) PERMANENTLY INSTALLED

REMARKS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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CHECKED BY (COMPANY) \_\_\_\_\_ ACCEPTED BY (COMPANY) \_\_\_\_\_

SIGNATURE \_\_\_\_\_ SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_ DATE \_\_\_\_\_

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