INVITATION FOR BID
IFB # 14-3134CD
ABW FILTER REHABILITATION AT THE SOUTHWEST WATER RECLAMATION FACILITY

Manatee County, a political subdivision of the State of Florida, (hereinafter "County") will receive sealed bids from individuals, corporations, partnerships, and other legal entities organized under the laws of the State of Florida or authorized to conduct business in the State of Florida.

NON-MANDATORY INFORMATION CONFERENCE
In order to ensure all prospective bidders have sufficient information and understanding of County's needs, an Information Conference will be held at: **9:00 AM on November 3, 2014** at the **Southwest Water Reclamation Facility Conference Room, 5101 65th Street West, Bradenton, FL 34210. A site inspection shall take place immediately following the information conference**. Attendance is not mandatory, but is highly encouraged.

DEADLINE FOR CLARIFICATION REQUESTS: **5:00 PM on November 13, 2014**
Reference Bid Article A.06

BID OPENING TIME AND DATE DUE: **3:00 PM on November 26, 2014**

FOR INFORMATION CONTACT:
Chris Daley,CPPO, CPPB, Contract Specialist
(941) 749-3048
chris.daley@mymanatee.org
Manatee County Financial Management Department
Purchasing Division

AUTHORIZED FOR RELEASE: _____

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IFB # 14-3134CD

SECTION A
INFORMATION TO BIDDERS

A.01 OPENING LOCATION

Sealed bids will be **publicly opened** at the **Manatee County Purchasing Division, 1112 Manatee Avenue West, Suite 803, Bradenton, Florida 34205** in the presence of County officials at the time and date stated, or soon thereafter. All bidders or their representatives are invited to attend the sealed bid opening.

Any bids received after the stated time and date will not be considered. It shall be the sole responsibility of the bidder to have their bid delivered to the Manatee County Purchasing Division for receipt on or before the stated time and date. Bidder shall be solely and strictly responsible for its timely delivery to the Purchasing Division. Bids delayed by mail, courier, or bids delayed for any other reason, shall not be considered, shall not be opened at the public opening, and arrangements shall be made for their return at the bidder's request and expense.

A.02 SEALED & MARKED

Bids shall be submitted in **duplicate, one original (marked Original) and one copy (marked Copy)** of your **signed bid** shall be submitted in one **sealed** package, clearly marked on the outside **"Sealed Bid #14-3134CD- ABW Filter Rehabilitation at the Southwest Water Reclamation Facility"** along with your company name.

For your convenience, a mailing label is provided with this Invitation for Bid package. Or, you may address the package as follows:

Manatee County Purchasing Division
1112 Manatee Avenue West, Suite 803
Bradenton, Florida 34205
Sealed Bid # _____, Title _____

All blank spaces on the bid form must be filled in as noted with amounts extended and totaled and no changes shall be made in the wording of the forms or in the items thereupon. In the event a change is made in your submittal, the bidder shall write its initials by the change. Any bid may be rejected which contains any omissions, alterations, irregularities of any kind, or which shall in any manner fail to conform to the requirements of this Invitation for Bid (IFB).

A bid made by an individual, either in his/her own or proper person or under a trade or firm name, shall be executed under the individual's signature. If made by a partnership, the bid shall be executed by two or more of the general partners. If made by a corporation, the bid shall be executed by its President or other legally authorized corporate officer or agent.

A.03 SECURING BID DOCUMENTS

IFB's and related documents are available on http://www.mymanatee.org/purchasing for download in a portable document format (.PDF) file by clicking on "Bids and Proposals" from the Purchasing Division's web page. You may view and print these files using Adobe Reader software. If necessary, you may download a free copy of Adobe Reader from the link provided on the "Bids and Proposals" page.

Additionally, Manatee County collaborates with the Manatee Chamber of Commerce by announcing solicitation opportunities to the Chamber which are then passed to its members.

Manatee County may also use DemandStar to distribute bids. On the DemandStar website, http://www.DemandStar.com, click on the tab titled "My DemandStar" for more information regarding this service. Participation in the DemandStar system is not a requirement for doing business with Manatee County.

Complete copies of the IFB and all related documents are available for public inspection at the Manatee County Purchasing Division, 1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205, or by calling (941) 749-3014. Appointments are encouraged. Documents are available between the hours of 9:00 AM and 4:00 PM Monday through Friday, with the exception of holidays. A complete set of the IFB documents must be used in preparing bids. County assumes no responsibility for errors and misinterpretations resulting from the use of incomplete sets of bid documents.

A.04 EXAMINATION OF BID DOCUMENTS AND SITE(S)

It is the responsibility of each bidder before submitting a bid, to (a) examine the IFB documents thoroughly; (b) visit the site(s) to become familiar with local conditions that may affect cost, progress, performance, or furnishing of the Work; (c) consider federal, state, and local codes, laws, and regulations that may affect costs, progress, performance, or furnishing of the Work; (d) study and carefully correlate bidder's observations with the IFB documents; and (e) notify County of all conflicts, errors, or discrepancies in the IFB documents.

Each bidder may, at bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies, and obtain any additional information and data which pertain to the physical conditions at or contiguous to the site(s) or otherwise which may affect cost, progress, performance or furnishing of the Work and which bidder deems necessary to determine his bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the IFB documents. County will provide each bidder access to the site(s) to conduct such explorations and tests.

Bidder shall fill all holes, clean up and restore the site(s) to its former condition upon completion of such explorations. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and other lands designated for use by successful bidder in performing the Work are identified in the IFB documents.

All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by successful bidder. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by County unless otherwise provided in the IFB documents.

Inspection of the site(s) is **a requirement** to be considered for award of this bid. Prior to submitting a bid, each bidder shall examine the site(s) and all conditions thereon fully familiarizing themselves with the full scope of the Work. Failure to become familiar with site conditions will in no way relieve the successful bidder from the necessity of furnishing any materials or performing any work that is required to complete the project in accordance with the plans and specifications. Bidder shall acknowledge inspection of the project site(s) on his/her signed, submitted Bid Form.

A.05 MODIFICATION OF BID DOCUMENTS

If a bidder wishes to recommend changes to the IFB documents, the bidder shall furnish, in writing, data and information necessary to aid County in evaluating the request to modify the IFB documents. County is not obligated to make any changes to the IFB documents. Unless an Addendum is issued, the IFB documents shall remain unaltered. **Bidders must fully comply with the IFB documents in their entirety.**

A.06 CLARIFICATION & ADDENDA

Each bidder shall examine all IFB documents and shall judge all matters relating to their adequacy and accuracy. Any inquiries, suggestions or requests concerning interpretation, clarification or additional information pertaining to this IFB shall be made through the Manatee County Purchasing Division. County shall not be responsible for oral interpretations given by any County employee, representative, or others.

5:00 PM on November 13, 2014 shall be the deadline to submit to the Purchasing Division, in writing, all inquiries, suggestions, or requests concerning interpretation, clarification or additional information pertaining to this IFB.

This deadline has been established to maintain fair treatment of all potential bidders, while maintaining progression of the Work.

If any addenda are issued to this IFB, County will post the documents on the Purchasing Division's web page at http://www.mymanatee.org/purchasing, and then by clicking on "Bids and Proposals". If the original solicitation was broadcast via DemandStar, the addenda will also be broadcast on the DemandStar distribution system to "Planholders" on this web service.

The issuance of a written addendum is the only official method whereby interpretation, clarification or additional information can be given.

It shall be the **responsibility of each bidder, prior to submitting a bid**, to contact the Purchasing Division (see contact information on the cover page) to **determine if any addenda were issued** and to make such addenda a part of their bid.

A.07 LOBBYING

After the issuance of any IFB, prospective bidders or any agent, representative or person acting at the request of such bidder shall not contact, communicate with or discuss any matter relating in any way to the IFB with any officer, agent or employee of Manatee County other than the Purchasing Official or the contact identified in this IFB, pursuant to the Manatee County Code of Laws. This prohibition includes the act of carbon copying officers, agents or employees of Manatee County on all correspondence, including email correspondence. This requirement begins with the issuance of an IFB and ends upon execution of Agreement or when the IFB has been cancelled. Violators of this prohibition shall be subject to sanctions as provided in the Manatee County Code of Laws.

A.08 UNBALANCED BIDDING PROHIBITED

County recognizes that large and/or complex projects will often result in a variety of methods, sources, and prices. However, where in the opinion of County such variation does not appear to be justified, given bid requirements and industry and market conditions, the bid will be presumed to be unbalanced. Examples of unbalanced bids will include:

a. Bids showing omissions, alterations of form, additions not specified, or required conditional or unauthorized alternate bids.

b. Bids quoting prices that substantially deviate, either higher or lower, from those included in the bids of competitive bidders for the same line item unit costs.

c. Bids where the unit costs offered are in excess of or below reasonable cost analysis values.

In the event County determines that a bid is presumed unbalanced, it will request the opportunity to and reserves the right to, review all source quotes, bids, price lists, letters of intent, etc., which the bidder obtained and upon which the bidder relied upon to develop its bid. County reserves the right to reject as nonresponsive any presumptive unbalanced bids where the bidder is unable to demonstrate the validity and/or necessity of the unbalanced unit costs.

A.09 FRONT LOADING OF BID PRICING PROHIBITED

Prices offered for performance and/or acquisition activities which occur early in the project schedule, such as mobilization; clearing and grubbing; or maintenance of traffic; that are substantially higher than pricing of competitive bidders within the same portion of the project schedule, will be presumed to be front loaded. Front loaded bids could reasonably appear to be an attempt to obtain unjustified early payments creating a risk of insufficient incentive for the bidder to complete the Work or otherwise creating an appearance of an undercapitalized bidder.

In the event County determines that a bid is presumed to be front loaded, it will request the opportunity to, and reserves the right to, review all source quotes, bids, price lists, letters of intent, etc., which the bidder obtained and upon which the bidder relied upon to develop the pricing or acquisition timing for these bid items. County reserves the right to reject as nonresponsive any presumptive front loaded bids where the bidder is unable to demonstrate the validity and/or necessity of the front loaded costs.

A.10 WITHDRAWAL OF BIDS

Bidders may withdraw bids as follows:

a. Mistakes discovered before the public bid opening may be withdrawn by written notice from the bidder submitting the bid. This request must be received in the Purchasing Division prior to the time set for delivery and opening of the bids. A copy of the request shall be retained and the unopened bid returned to the bidder; or

b. After the bids are opened or a selection has been determined, but before an Agreement is signed, a bidder alleging a material mistake of fact may be permitted to withdraw their bid if:

   1. the mistake is clearly evident in the solicitation document; or

   2. bidder submits evidence which clearly and convincingly demonstrates that a mistake was made. Request to withdraw a bid must be in writing and approved by the Purchasing Official.

A.11 IRREVOCABLE OFFER

Any bid may be withdrawn up until the time and date set for opening of the bid. Any bid not so withdrawn shall, upon opening, constitute an irrevocable offer for a period of ninety (90) days to sell to Manatee County the goods or services set forth in the attached IFB until one or more of the bids have been duly accepted by County.

A.12 BID EXPENSES

All expenses for making bids to County are to be borne by the bidder.

A.13 RESERVED RIGHTS

County reserves the right to accept or reject any and/or all bids, to waive irregularities and technicalities, and to request resubmission. Also, County reserves the right to accept all or any part of the bid and to increase or decrease quantities to meet additional or reduced requirements of County. Any sole response received by the first submission date may or may not be rejected by County depending on available competition and current needs of County. For all items combined, the bid of the lowest, responsive, responsible bidder will be accepted, unless all bids are rejected.

The lowest, responsible bidder shall mean that bidder who makes the lowest bid to sell goods and/or services of a quality which meets or exceeds the quality of goods and/or services set forth in the IFB documents or otherwise required by County.

To be responsive, a bidder shall submit a bid which conforms in all material respects to the requirements set forth in the IFB.

To be a responsible bidder, the bidder shall have the capability in all respects to perform fully the bid requirements, and the tenacity, perseverance, experience, integrity, reliability, capacity, facilities, equipment, and credit which will assure good faith performance.

Also, County reserves the right to make such investigation as it deems necessary to determine the ability of any bidder to furnish the service requested. Information County deems necessary to make this determination shall be provided by the bidder. Such information may include, but shall not be limited to current financial statements, verification of availability of equipment and personnel, and past performance records.

A.14 APPLICABLE LAWS

Bidder must be authorized to transact business in the State of Florida. All applicable laws and regulations of the State of Florida and ordinances and regulations of Manatee County will apply to any resulting Agreement. Any involvement with the Manatee County Purchasing Division shall be in accordance with the Manatee County Purchasing Ordinance as amended.

A.15 COLLUSION

By submitting a bid to this IFB, bidder certifies that it has not divulged, discussed or compared its bid with any other bidder, and has not colluded with any other bidder or parties to this bid whatsoever. Also, bidder certifies, and in the case of a joint bid each party thereto certifies as to their own organization, that in connection with this bid:

a. any prices and/or cost data submitted have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices and/or cost data, with any other bidder or with any competitor;

b. any prices and/or cost data quoted for this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder, prior to the scheduled opening, directly or indirectly to any other bidder or to any competitor;

c. no attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a bid for the purpose of restricting competition;

d. the only person or persons interested in this bid, principal or principals is/are named therein and that no person other than therein mentioned has any interest in this bid or in the resulting Agreement to be entered into; and

e. no person or agency has been employed or retained to solicit or secure the resulting Agreement upon an agreement or understanding or a commission, percentage, brokerage, or contingent fee except bona fide employees or established commercial agencies maintained by bidder for purpose of doing business.

A.16 CODE OF ETHICS

With respect to this bid, if any bidder violates, directly or indirectly, the ethics provisions of the Manatee County Purchasing Ordinance and/or Florida criminal or civil laws related to public procurement, including but not limited to Florida Statutes, Chapter 112, Part III, Code of Ethics for Public Officers and Employees, such bidder will be disqualified from eligibility to perform the Work described in this IFB, and may also be disqualified from furnishing future goods or services to, and from submitting any future bids to supply goods or services to, Manatee County.

By submitting a bid, the bidder represents to County that all statements made and materials submitted are truthful, with no relevant facts withheld. If a bidder is determined to have been untruthful in their bid or any related presentation, such bidder will be disqualified from eligibility to perform the Work described in this IFB, and may also be disqualified from furnishing future goods or services to, and from submitting any future bids to supply goods or services to, Manatee County.

A.17 PUBLIC CONTRACTING AND ENVIRONMENTAL CRIMES

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime, as that term is defined in Florida Statute § 287.133, may not submit a bid to provide any goods or services to a public entity; may not submit a bid with a public entity for the construction or repair of a public building or public work; may not submit bids on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under an agreement with any public entity; and may not transact business with any public entity in excess of the threshold amount provided in Florida Statutes § 287.017 for CATEGORY TWO for a period of thirty-six (36) months following the date of being placed on the convicted list.

In addition, the Manatee County Code of Laws prohibits the award of any bid to any person or entity who/which has, within the past five (5) years, been convicted of, or admitted to in court or sworn to under oath, a public entity crime or of any environmental law that, in the reasonable opinion of the Purchasing Official, establishes reasonable grounds to believe the person or business entity will not conduct business in a responsible matter.

To ensure compliance with the foregoing, the Code requires all persons or entities desiring to do business with County to execute and file with the Purchasing Official an affidavit, executed under the pain and penalties of perjury, confirming that person, entity and any person(s) affiliated with the entity, does not have such a record and is therefore eligible to seek and be awarded business with County. In the case of a business entity other than a partnership or a corporation, such affidavit shall be executed by an authorized agent of the entity. In the case of a partnership, such affidavit shall be executed by the general partner(s). A Public Contracting and Environmental Crimes Certification form is attached herein for this purpose.

A.18 BID FORMS

Bids must be submitted on the provided forms, although additional pages may be attached. **Bidders must fully complete all pages of the Bid Forms. Bid Forms must be executed by an authorized signatory who has the legal authority to make the bid and bind the company. Bidders must fully comply with all requirements of this IFB in its entirety.** Failure to comply shall result in bidder being deemed nonresponsive.

A.19 LEGAL NAME

Bids shall clearly indicate the legal name, address and telephone number of the bidder on the Bid Form. Bid Forms shall be signed above the typed or printed name and title of the signer. The signer must have the authority to bind the bidder to the submitted bid.

When bidder is a partnership, the Bid Form shall be signed in the name of the firm and by all partners required under the terms of the partnership agreement. When a corporation is a bidder, the authorized corporate officers shall sign.

Bidders who are corporations or limited partnerships shall provide a certified copy of their permit to transact business in the State of Florida, preferably along with the Bid Form, or within forty-eight (48) hours after request by County.

When submitting a bid as a joint venture, it must have filed paper documents with the Division of Profession's Construction Industry Licensing Board prior to submitting a bid.

A.20 DISCOUNTS

Any and all discounts must be incorporated in the prices contained in the bid and not shown separately. The prices indicated on the Bid Form shall be the prices used in determining award.

A.21 TAXES

Manatee County is exempt from Federal Excise and State Sales Taxes. (F.E.T. Cert. No. 59-78-0089K; Florida Sales Tax Exempt Cert. No. 85-8012622206C-6); therefore, the bidder is prohibited from delineating a separate line item in his bid for any sales or service taxes. Nothing herein shall affect the bidder's normal tax liability.

A.22 DESCRIPTIVE INFORMATION

Unless otherwise specifically provided in the IFB documents, all equipment, materials and articles provided shall be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in the IFB documents, reference to any equipment, material, article or patented process, by trade name, brand name, make or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition.

A.23 AMERICANS WITH DISABILITIES ACT

County does not discriminate upon the basis of any individual's disability status. This non-discrimination policy involves every aspect of County's functions including one's access to, participation, employment, or treatment in its programs or activities. Anyone requiring **reasonable accommodation** for an Information Conference or Bid Opening should contact the person named on the cover page of this IFB document at least twenty-four (24) hours in advance of either activity.

A.24 EQUAL EMPLOYMENT OPPORTUNITY CLAUSE

In accordance with the provisions of Title VI of the Civil Rights Act of 1964 and Title 15, Part 8 of the Code of Federal Regulations, County hereby notifies all bidders that they will affirmatively ensure minority business enterprises will be afforded full opportunity to participate in response to this advertisement and will not be discriminated against on the grounds of race, color or national origin in consideration for bid award.

A.25 MBE/DBE

The State of Florida Office of Supplier Diversity provides the certification process and the database for identifying certified MBE/DBE firms. This service may be directly accessed at: http://www.osd.dms.state.fl.us/iframe.htm. If you have any questions regarding this State service, please contact their office at (850) 487-0915.

A.26 MATHEMATICAL ERRORS

In the event of multiplication/extension error(s), the unit price shall prevail. In the event of addition error(s) the extension totals will prevail. All bids shall be reviewed mathematically and corrected, if necessary, using these standards, prior to additional evaluation.

A.27 DISCLOSURE

Upon receipt, all inquiries and responses to inquiries related to this IFB become "Public Records", and shall be subject to public disclosure consistent with Florida Statues, Chapter 119.

Bids become subject to disclosure thirty (30) days after the opening or if a notice of intent to award decision is made earlier than this time as provided by Florida Statutes § 119.071(1)(b). No announcement or review of the bid shall be conducted at the public bid opening.

Based on the above, County will receive bids at the time and date stated and will make public at the opening the names of the business entities of all that submitted a bid and any amount presented as a total offer without any verification of the mathematics or the completeness of the bid.

If County rejects all bids and concurrently notices its intent to reissue the solicitation, the rejected bids are exempt from public disclosure until such time as County provides notice of an intended decision concerning the reissued solicitation or until County withdraws the reissued solicitation. A bid is not exempt for longer than twelve (12) months after the initial notice rejecting all bids.

Pursuant to Florida Statutes 119.0701, to the extent successful bidder is performing services on behalf of County, successful bidder must:

a. keep and maintain public records that ordinarily and necessarily would be required by County in order to perform the service;

b. provide the public with access to public records on the same terms and conditions that County would provide and at a cost that does not exceed the cost provided in Florida Statutes, Chapter 119, or as otherwise provided by law;

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

d. meet all requirements for retaining public records and transfer, at no cost, to County all public records in possession of successful bidder upon termination of the awarded Agreement and/or PO and destroy any duplicate public records that are exempt or confidential from public records disclosure requirements. All records stored electronically must be provided to County in a format that is compatible with County's information technology systems.

A.28 LOCAL PREFERENCE

Local business is defined as a business legally authorized to engage in the sale of the goods and/or services to be procured, and which certifies within its bid that for at least six (6) months prior to the announcement of the solicitation of bids it has maintained a physical place of business in Manatee, Desoto, Hardee, Hillsborough, Pinellas or Sarasota County with at least one full-time employee at that location.

Local preference shall not apply to the following categories of Agreements:

1. Purchases or Agreements which are funded, in whole or in part, by a governmental or other funding entity, where the terms and conditions of receipt of the funds prohibit the preference.

2. Any bid announcement which specifically provides that the general local preference policies set forth in this section are suspended due to the unique nature of the goods or services sought, the existence of an emergency as found by either the County Commission or County Administrator, or where such suspension is, in the opinion of the County Attorney, required by law.

To qualify for local preference under this section, **a local business must certify to County** by completing an "**Affidavit as to Local Business Form"**, which is available for download at www.mymanatee.org/vendor. Click on "Affidavit for Local Business" to access and print the form. Complete, notarize, and mail the notarized original to the following address: Manatee County Purchasing Division, 1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205.

It is the responsibility of the bidder to ensure accuracy of the Affidavit as to Local Business and notify County of any changes affecting same.

A.29 VENDOR REGISTRATION

Registering your business with Manatee County will enhance our opportunities to identify sources for goods and services, plus identify local businesses. This information is used for soliciting quotations up to $250,000.00 and for competitive solicitations of larger purchases.

Our staff can assist you with your registration as needed. Our office hours are 8:00 A.M. to 5:00 P.M., Monday through Friday on regular business days. Please call (941) 749-3014 if you wish to have a Purchasing staff member assist you.

Quick steps to registration: **www.mymanatee.org/purchasing**

A link to Vendor Registration is listed on the Purchasing Division's web page under "Register as a Vendor". Click on "Vendor Registration Form" for on-line input.

Registration is not mandatory; however, by taking the time to register, you are helping County to provide timely notification of quotation, bid and proposal opportunities to your business.

A.30 ePAYABLES

Manatee County and Clerk of the Circuit Court have partnered to offer the ePayables program, which allows payments to be made to vendors via credit cards. The Clerk will issue a unique credit card number to each vendor; the card has a zero balance until payments have been authorized.

After goods are delivered or services rendered, vendors submit invoices to the remit to address on the purchase order according to the current process. When payments are authorized, an email notification is sent to the vendor. The email notification includes the invoice number(s), invoice date(s), and amount of payment. There is no cost for vendors to participate in this program; however, there may be a charge by the company that processes your credit card transactions.

If you are interested in participating in this program, please complete the ePayables Application attached herein and return the completed form via email to Ms. Lori Bryan, Supervisor at lori.bryan@manateeclerk.com.

NOTE: ANY OR ALL STATEMENTS CONTAINED IN THE FOLLOWING SECTIONS: SCOPE OF WORK, BID SUMMARY, GENERAL TERMS AND CONDITIONS, GENERAL CONDITIONS, OR FORM OF CONTRACT, WHICH VARY FROM THE INFORMATION TO BIDDERS, SHALL HAVE PRECEDENCE.

END OF SECTION A

SECTION B
SCOPE OF WORK

B.01 SCOPE OF WORK

The Work included in this Invitation for Bids consists of furnishing all labor, materials, equipment and incidentals required to perform rehabilitation services to the Automatic Backwash Filters (ABW) No.2 through No.7 at the Southwest Water Reclamation Facility per the specifications and plans. The Work shall consist of, but is not limited to, replacement of porous plates and media, replacement of skimmer assemblies, replacement or modification of control panels, replacement of bridge drive assemblies and rails, demolition of existing underdrain systems and other existing filter components, concrete structural repairs, sealing of filter bypass channels, and instrumentation and control works for a complete operating system. See plan sheets for specific rehabilitation requirements for each automatic backwash filter.

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The successful Bidder shall furnish all Shop Drawings, working drawings, labor, materials, equipment, tools, services and incidentals necessary to complete all Work required by the Invitation for Bids documents.

The successful Bidder shall perform the Work complete, in place and ready for continuous service and shall include any repairs, replacements, and/or restoration required as a result of damages caused prior to acceptance by County.

The successful Bidder shall furnish and install all materials, equipment and labor which is reasonably and properly inferable and necessary for the proper completion of the Work, whether specifically indicated in the Bid Documents or not.

Inspection of the site(s) is **a requirement** to be considered for Award of this Bid. Prior to submitting a Bid, each Bidder shall examine the site(s) and all conditions thereon fully familiarizing themselves with the full scope of the Project. Failure to become familiar with site conditions will in no way relieve the Successful Bidder from the necessity of furnishing any materials or performing any Work that is required to complete the Project in accordance with the plans and Specifications. Bidder shall acknowledge inspection of the Project site(s) on his/her signed, submitted Bid Form.

A site inspection will be conducted immediately following the informational conference. Bidders who are unable to inspect the site following the informational conference shall contact Tom Birk at (941)-792-8811 ext 5179 or Jeff Blosser at (941)-792-8811 ext 5184, between the hours of 8:00 AM and 2:00 PM Monday thru Friday, for coordination of the site visit.

END OF SECTION B

SECTION C
BID SUMMARY

C.01 MINIMUM QUALIFICATIONS OF BIDDERS

No person who is not certified or registered as a General Contractor pursuant to Florida Statutes, Chapter 489 on the day the bid is submitted, and who has continuously held that certification or registration for a period of at least three (3) consecutive years immediately prior to the day the bid is submitted, may be qualified to bid on this Work. In the event that a bidder is a business organization, including a partnership, corporation, business trust or other legal entity as set forth in Florida Statutes § 489.119(2), then the bidder shall only be qualified to bid on this Work if: 1) the bidder (the business organization) is on the day the bid is submitted, and for at least three (3) consecutive years immediately prior to the day the bid is submitted has been, in continuous existence, properly licensed and registered as required by Florida law; and 2) the bidder, on the day the bid is submitted, has a certified or registered Qualifying Agent, as required by Florida Statutes § 489.119, and that Qualifying Agent has been the same Qualifying Agent of the bidder for a period of at least three (3) consecutive years immediately prior to the day the bid is submitted.

C.02 ENGINEER'S ESTIMATE

The construction cost estimate for this Work is **$1,730,259.00**, which is based on the original scope of work and drawings. Changes to the scope of work by addenda to this bid subsequent to the release of the original documents may not be accounted for in this construction cost estimate.

C.03 BASIS OF AWARD

Award shall be to the lowest, responsive, responsible Bidder having the lowest total offer for the requirements listed on the Bid Form for the Work as set forth in this Invitation for Bid. Bid prices shall include costs for furnishing all labor, equipment and/or materials for the completion of the Work in accordance with and in the manner set forth and described in the Bid Documents to County's satisfaction within the prescribed time.

Only one schedule for Completion of the Work shall be considered. Only one Award shall be made.

NOTE: Inspection of the site is a pre-requisite to be considered for award of this bid.

In evaluating bids, County shall consider the qualifications of the bidders; and if required, may also consider the qualifications of the subcontractors, suppliers, and other persons and organizations proposed. County may also consider the operating costs, maintenance requirements, performance data and guarantees of major items of materials and equipment proposed for incorporation in the Work.

Whenever two or more bids are equal with respect to price, the bid received from a local business shall be given preference in award.

Whenever two or more bids are equal with respect to price, and all other evaluative factors are otherwise equal, including local preference policies, the company providing documented environmentally preferable “green” products, materials, or supplies, shall be given preference in award.

Whenever two or more bids which are equal with respect to price are received, and neither of these bids are from a local business, and neither of these bids provides documented “green” products, the award shall be determined by a chance drawing, coin toss, or similar tie-breaking method conducted by the Purchasing Division and open to the public.

END OF SECTION C

SECTION D

GENERAL TERMS & CONDITIONS

D.01 AGREEMENT FORMS

The Agreement resulting from the acceptance of a bid shall be in the form of the Agreement stated in this IFB, which is attached herein.

A written notice confirming award or recommendation thereof will be forwarded to the successful bidder accompanied by the required number of unsigned counterparts of the Agreement. Within ten (10) days thereafter, successful bidder shall sign and deliver the required number of counterparts of the Agreement with any other required documents to County. (Note: Agreement must be approved in accordance with Chapter 2-26 of the Manatee County Code of Laws and the Administrative Standards and Procedures Manual approved by the County Administrator).

D.02 ASSIGNMENT OF AGREEMENT

Successful bidder shall not assign, transfer, convey, sublet or otherwise dispose of the resulting Agreement or of his right, title, or interest therein, or his power to execute such Agreement, or to assign any monies due or to become due there under to any other person, firm or corporation unless first obtaining the written consent of County. The giving of such consent to a particular subcontractor assignment shall not dispense with the necessity of such consent to any further or other assignment.

D.03 COMPLETION OF WORK

The Work will be completed and ready for final inspection within the specified calendar days from the date the Contract time commences to run. Only one Bid shall be considered based on **330 calendar days**. **Only one Award shall be made**.

D.04 LIQUIDATED DAMAGES

If the successful bidder refuses or fails to prosecute the Work, or any separable part thereof, with such diligence as will hinder its completion within the time specified, County may seek damages. The actual damages for delay will be impossible to determine and in lieu thereof, the successful bidder shall pay to County the sum of **$1,742** as fixed, agreed, and liquidated damages for each calendar day of the delay until the Work is finally accepted by County and the successful bidder.

D.05 PAYMENT

Successful bidder may apply for partial payment on monthly estimates, based on the amount of the Work done or completed in compliance with the provisions of the resulting Agreement. Successful bidder shall submit an application, on a standard pay application form provided or approved by County, of an approximate estimate of the proportionate value of the Work done, items and locations of the Work performed up to and including the last day of the period then ending.

County will then review said estimate and make any necessary revisions so that the estimate can receive approval for payment. If the successful bidder and County do not agree on the approximate estimate of the proportionate value of the Work done for any pay period, the determination of County will be binding. The amount of said estimate after deducting any required retainage and all previous payments shall be due and payable to the successful bidder, twenty (20) business days if County is its own Engineer of Record (EOR) or twenty-five (25) business days if outside agent approval is required after the pay estimate has been approved by the agent for County.

In accordance with the Prompt Payment Act, Florida Statutes § 218.735(7), a punch list shall be formulated. Time allowed for development of punch list:

a. Awarded agreements with an estimated cost of less than $10 million will be within thirty (30) calendar days after reaching substantial completion.

b. Awarded agreements with a cost of $10 million dollars or more will be within thirty (30) calendar days OR if extended by Agreement, up to sixty (60) calendar days after reaching substantial completion.

The final completion date of the resulting Agreement must be at least thirty (30) days after delivery of the list of items. If the list is not provided to the successful bidder by the agreed upon date, the contract completion time must be extended by the number of days County exceeds the delivery date.

It is the successful bidder's responsibility for the care of the materials. Any damage to or loss of said materials is the full responsibility of the successful bidder. Any periodical pay estimate signed by the successful bidder shall be final as to the successful bidder for any or all Work covered by the periodical pay estimate.

Any requests for payment of materials stored on site must be accompanied with a paid receipt. Successful bidder warrants and guarantees that title to all Work, materials and equipment covered by any application for payment, whether incorporated in the Work or not, will pass to County at the time of payment free and clear of all liens, claims, security interests and encumbrances (hereafter referred to as "Liens").

Successful bidder agrees to furnish an affidavit stating that all laborers, material men, and subcontractors have been paid for Work covered by the application for payment and that a partial or complete release of lien, as may be necessary, be properly executed by the material men, laborers, subcontractors for Work covered by the application for payment, sufficient to secure County from any claim whatsoever arising out of the aforesaid Work. When the successful bidder has completed the Work in compliance with the terms of the Agreement, he shall notify County in writing that the Work is ready for final inspection.

County will then advise successful bidder as to the arrangements for final inspection and what Work, if any, is required to prepare the Work or a portion thereof for final inspection. When County determines the Work or portion thereof is ready for final inspection, County shall perform same. Upon completion of final inspection, County will notify successful bidder of all particulars in which this inspection reveals that the Work is incomplete or defective. Successful bidder shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies. When all such errors have been corrected, a final re-inspection will be made.

The process will be repeated until, in the opinion of County, the Work has been completed in compliance with the terms of the IFB Documents.

When final acceptance has been made by County, County will make final payment of the resulting Agreement amount, plus all approved additions, less approved deductions and previous payments made. The resulting Agreement will be considered complete when all Work has been finished, the final inspection made, approved as-builts received, and the Work finally accepted in writing by County. Successful bidder's responsibility shall then terminate except as otherwise stated.

D.06 CONTRACT CONTINGENCY WORK

Contract contingency is a monetary allowance used solely at County's discretion to handle unexpected conditions as required to satisfactorily complete the Work in accordance with the IFB documents. A field directive must be issued by an authorized County representative to authorize use of contract contingency funds.

The percentage for contract contingency is listed on the Bid Form. Bidder shall enter the dollar amount for contract contingency based on the percentage of the total base bid. The total contract award will include contract contingency.

Appropriate uses of contract contingency include increases to existing bid item quantities that do not change the initial scope of work, which may be directed by staff; modification items not originally bid which were unforeseen yet necessary during the Work to provide a safe, complete project and that do not change the initial scope of work; and unanticipated conflicts and/or design changes required during construction which are necessary to provide a safe, complete project and that do not change the initial scope of work.

Inappropriate uses of contract contingency include anything that changes the initial scope of work, including the contract price and contract time, and adding bid items not previously contemplated that change the initial scope of work.

D.07 RETAINAGE

Retainage of 10% of the total Work in place shall be withheld until 50% complete. After 50% completion, the retainage shall be reduced to 5% of the total Work in place until final completion and acceptance of the Work by County. Upon final acceptance, the remaining retainage shall be included in the final payment.

D.08 PROGRESS REQUIREMENTS

All Work done under the resulting Agreement shall be done with a minimum of inconvenience to the private property owners in the area. Successful bidder shall coordinate his Work with private property owners such that existing utility services are maintained and they have access to their property at all times.

D.09 WARRANTY AND GUARANTEE PROVISIONS

All Work, materials, and equipment furnished as defined herein shall be guaranteed and warranted by the successful bidder for a minimum period of three (3) years, unless otherwise specified, from final acceptance by County to be free from defects due either to faulty materials or equipment or faulty workmanship.

All materials, equipment, and workmanship furnished and installed by the successful bidder is warranted and guaranteed by the successful bidder to meet the required standards and to accomplish the purposes and functions of the Work as defined, detailed, and specified herein.

County shall, following discovery thereof, promptly give written notice to the successful bidder of faulty materials, equipment, or workmanship within the period of the guarantee and the successful bidder shall promptly replace any part of the faulty equipment, material, or workmanship at his own cost. These warranty and guarantee provisions create no limitations on County as to any claims or actions for breach of guaranty or breach of warranty that County might have against parties other than the successful bidder, and do not constitute exclusive remedies of County against the successful bidder.

D.10 MATERIALS AND WORKMANSHIP

All materials and apparatus required for this Work, except as specified otherwise, shall be new, of first class quality, and shall be furnished, delivered, connected and finished in every detail. Construction shall be prescribed by good industry practice and in accordance with manufacturer's recommendations for the type being installed.

Use skilled workman trained and experienced in the necessary trades and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this section.

D.11 PROJECT CLOSE-OUT

Clean construction site and remove any and all excess materials. Correct any damages to property that may have occurred as a result of installation and/or delivery. Repair and patch all surfaces cut for installation. The successful bidder shall remedy any deficiencies promptly should County determine any Work is incomplete or defective.

When County determines the Work is acceptable in accordance with the IFB documents, successful bidder shall provide the close out submittals, including but not necessarily limited to the following:

1 set	Certificate of Warranties	
1 set	Manufacturer's Product Literature	(when applicable)
1 set	Project Record Drawings	
1 set	Subcontractor Information	(when applicable)

All manuals, schematics and handbooks shall be provided which are applicable to the equipment delivered. An operators manual, parts manual and technician manual must also be provided. Parts lists (manuals) must include OEM part numbers for items not manufactured by the successful bidder. Successful bidder shall furnish two (2) copies of each.

D.12 ROYALTIES AND PATENTS

The successful bidder shall pay all royalties and license fees for equipment or processes in conjunction with the equipment and/or services being furnished. Successful bidder shall defend all suits or claims for infringement of any patent, trademark or copyright, and shall save County harmless from loss on account thereof, including costs and attorney's fees.

D.13 AUTHORIZED PRODUCT REPRESENTATION

The bidder, by virtue of submitting the name and specifications of a manufacturer's product, will be required to furnish the named manufacturer's product. Failure to perform accordingly may, in County's sole discretion, be deemed a material breach of the resulting Agreement, and shall constitute grounds for County's immediate termination of the resulting Agreement.

D.14 REGULATIONS

It shall be the responsibility of the successful bidder to assure compliance with any OSHA, EPA and/or other federal or State of Florida rules, regulations or other requirements, as each may apply.

D.15 CANCELLATION

Any failure of the successful bidder to furnish or perform the Work (including, but not limited to, commencement of the Work, failure to supply sufficient skilled workers or suitable materials or equipment) in accordance with the resulting Agreement, County may order the stop of the Work, or any portion thereof, until the cause for such order has been eliminated. If the successful bidder persistently fails to perform the Work in accordance with the resulting Agreement, County reserves the right to terminate the resulting Agreement and select the next qualified bidder or re-advertise this procurement in part or in whole. County reserves the right to cancel all or any undelivered or unexecuted portion of the resulting Agreement with or without cause.

D.16 INDEMNIFICATION

The successful bidder covenants and agrees to indemnify and save harmless County, its agents and employees, from and against all claims, suits, actions, damages, causes of action, or judgments arising out of the terms of the resulting Agreement for any personal injury, loss of life, or damage to the property sustained as a result of the performance or non-performance of services or delivery of goods; from and against any orders, judgments, or decrees, which may be entered against County, its agents or employees; and from and against all costs, attorney's fees, expenses and other liabilities incurred in the defense of any such claim, suit or action, and the investigation thereof. Nothing in the resulting Agreement shall be deemed to affect the rights, privileges and immunities of County as set forth in Florida Statutes § 768.28.

D.17 SUBCONTRACTORS, SUPPLIERS AND OTHERS

The identity of subcontractors, suppliers, and other persons and organizations (including those who are to furnish the principal items of material and equipment) may be requested by County for each bid item from any of the bidders; and the bidder shall respond within five (5) days after the date of such request. Such list shall be accompanied by an experience statement with pertinent information regarding similar Work and other evidence of qualification for each such subcontractor, supplier, persons or organization if requested by County. If County, after due investigation, has reasonable objection to any proposed subcontractor, supplier, other person or organization, County may, before the notice of intent to award is given, request the successful bidder to submit an acceptable substitute without an increase in contract price or contract time.

If successful bidder declines to make any such substitution, County may award the resulting Agreement to the next lowest qualified bidder that proposes to use acceptable subcontractors, suppliers, and other persons who County does not make written objection to. Successful bidder shall not be required to employ any subcontractor, supplier, other person or organization who successful bidder has reasonable objection to.

Subcontractors shall be bound by the terms and conditions of the resulting Agreement insofar as it applies to their work, but this shall not relieve the successful bidder from the full responsibility to County for the proper completion of all Work to be executed under the resulting Agreement.

D.18 E-VERIFY

The employment of unauthorized aliens by any successful bidder is considered a violation of Section 274(e) of the Immigration and Employment Act. If successful bidder knowingly employs unauthorized aliens, such violation shall be cause for unilateral cancellation of the resulting Agreement.

A complete list of all subcontractors proposed for any portion of the Work may be requested of any bidder deemed necessary by County. Subcontracts shall be awarded only to those subcontractors considered satisfactory by County.

The successful bidder shall utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the successful bidder during the term of the Agreement; and

The successful bidder shall expressly require any subcontractors performing work or providing services pursuant to the state contract to utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the term of the Agreement.

D.19 NO DAMAGES FOR DELAY

No claim for damages or any claim other than for an extension of time shall be made or asserted against County by reason of any delays. The successful bidder shall not be entitled to an increase in the total contract price or payment or compensation of any kind from County or direct, indirect, consequential impact or other costs, expenses for damages, including but not limited to costs of acceleration or inefficiency arising because of delay, disruption, interference or hindrance from any cause whatsoever; provided, however, that this provision shall not preclude recovery or damages by the successful bidder for hindrance or delays due solely to fraud, bad faith, or active interference on part of County or its agents. Otherwise, the successful bidder shall only be entitled to extensions of the contract time as the sole and exclusive remedy for such resulting delay, in accordance with and to the extent specifically provided above.

D.20 NO INTEREST

Any monies not paid by County when claimed to be due to the successful bidder under this Agreement shall not be subject to interest including prejudgment interest. Any monies not paid by County when claimed to be due to the successful bidder for damages awarded in the case of construction delays shall not be subject to prejudgment interest.

D.21 BE GREEN

All bidders are encouraged to use as many **environmentally preferable** "green" products, materials, supplies, etc. as possible in order to promote a safe and healthy environment. **Environmentally preferable are products or services that have a reduced adverse effect on the environment**. Where all other evaluative factors, including local preference policies, are otherwise equal, such policies and practices will be a determinative factor in the award decision.

Provide detail of your organization's initiative and its ability to meet the goal of environmental sustainability.

END OF SECTION D

SECTION E

GENERAL CONDITIONS

ARTICLE 1. DEFINITIONS

Whenever used in the Contract Documents, the following terms have the meaning indicated which are applicable to both the singular and plural thereof:

Addendum - Written or graphic instruments issued prior to the opening of Bids which clarify or change the Bid Documents.

Administrative Contract Adjustment (ACA) – A minor change to a Contract, which is less than 10% of the Contract Price or less than 20% of the Contract Time, and does not require Board approval. (Reference Resolution R-07-189)

Application for Payment - The form accepted by the Project Representative which is to be used by Contractor in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

Award - Acceptance of the Bid from the person, firm, or corporation which in the County's sole and absolute judgment will under all circumstances best serve the public interest. Award shall be made in accordance with Chapter 2-26 of the Manatee County Code.

Bid - The Offer of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bid Bond – An insurance agreement, accompanied by a monetary commitment, by which a third party (the Surety) accepts liability and guarantees that the Bidder will not withdraw the Bid.

Bidder - One who submits a Bid directly to the County, as distinct from a Sub-bidder, who submits a Bid to a Bidder.

Bid Documents - Consists of the Invitation for Bid, which includes but is not limited to the Bid Form, drawings, technical Specifications, terms and conditions, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids); and becomes a part of the resulting Contract.

Bid Summary – Specifications or scope of Work that specifically describes the Work to be done for this Project.

Bond Rider – A Bond Rider increases the Performance Bond coverage to ensure responsibility of the Contractor in executing the Work for the County in consideration of the increased value resulting from an approved change in the Contract amount.

Change Order - A document recommended by the Project Representative which is signed by Contractor and County and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Contract.

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

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

Contract Contingency - A monetary allowance used at the County's discretion, which is part of the total sum of the Contract that allows for minor changes in the Contract that do not change the initial Scope of Work, including Contract Price and Contract Time.

Contract Documents - The Contract, Invitation for Bid in its entirety, Public Construction Bond Form and Insurance Certificate(s), Drawings/Plans, Addenda (which pertain to the Bid Documents), Contractor's Bid Form (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award), and Reports, together with all written Change Orders and other documents amending, modifying or supplementing the Contract Documents issued on or after the Effective Date of the Contract.

Contract Price - The monies payable by County to Contractor under the Contract Documents as stated in the Contract.

Contract Time - The number of days or the date stated in the Notice to Proceed for the completion of the Work.

Contractor - The person, firm or corporation with whom County has entered into a Contract.

Days - All references to days are to be considered calendar days except as specified differently.

Defective - An adjective which when modifying the Work refers to work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to Project Representative's recommendation of final payment (unless responsibility for the protection thereof has been assumed by County).

Drawings - The drawings which show the character and Scope of Work to be performed and which have been prepared or approved by Engineer and are referred to in the Bid and Contract Documents.

Effective Date of the Contract - The date indicated in the Contract on which it becomes effective (date of execution).

Engineer – Licensed professional who is responsible for the preparation, signing, dating, sealing and issuing of any engineering document(s) for any engineering service or Work.

Excusable Delay - Any delay beyond the control and without the negligence of the Contractor, the County, or any other Contractor caused by events or circumstances such as, but not limited to, acts of God or of the public enemy, fires, floods, freight embargoes, acts of government other than County or epidemics. Labor disputes and above average rainfall shall give rise only to Excusable Delays.

Field Directive - A written order issued by an authorized County Representative which approves changes in the Work, but does not involve a change in the initial Scope of Work, including the Contract Price and the Contract Time. A Field Directive must be issued by an authorized County Representative to authorize use of Contract Contingency funds.

Final Completion – The Work (including items defined on the Punch List) has been completed, accepted in writing by the County, approved as-builts have been received, and is ready for final payment.

Float or Slack Time - The time available in the progress schedule during which an unexpected activity can be completed without delaying Substantial Completion of the Work.

Inexcusable Delay - Any delay caused by events or circumstances within the control of the Contractor, such as inadequate crewing, slow submittals, etc., which might have been avoided by the exercise of care, prudence, foresight, or diligence on the part of the Contractor.

Information (Pre-Bid) Conference – A meeting held by the Purchasing Division with potential Bidders, prior to the opening of the solicitation, for the purpose of answering questions, clarifying ambiguities, and responding to general issues in order to establish a common basis for understanding all of the requirements of the solicitation; may result in the issuance of an Addendum.

Material Breach – A substantial failure in the performance of the Contract, as to give the affected party the right to remedies available in the Contract.

Non-prejudicial Delay - Any delay impacting a portion of the Work within the available total Float or Slack Time and not necessarily preventing completion of the Work within the Contract Time.

Notice of Award - The written notice to the Successful Bidder stating Award has been approved by the Board of County Commissioners; or by the Purchasing Official in accordance with Chapter 2-26 of the Manatee County Code.

Notice of Intent to Award - The written notice to the apparent Successful Bidder stating Award has been recommended with final Award to be authorized by the Purchasing Official or Board of County Commissioners, as appropriate.

Notice to Proceed - Written notice by County (after execution of Contract) to Contractor fixing the date on which the Contract Time will commence to run and on which Contractor shall start to perform (ten (10) days from date of such notice) Contractor's obligations under the Contract Documents.

Payment Bond – An instrument, issued by a Surety that guarantees that Subcontractors will be paid for labor expended on the Contract.

Performance Bond – An instrument executed subsequent to Award by the successful Contractor that protects the County from loss due to Contractor’s inability to complete the Contract as agreed.

Preconstruction Conference - Prior to starting the Work, a meeting scheduled by County with Contractor to review the Work schedules, to establish procedures for handling Shop Drawings and other submissions, for processing periodical pay estimates, and such other matters as may be pertinent to the project.

Prejudicial Delay - Any excusable or Compensable Delay impacting the Work and exceeding the total float time available in the progress schedule, thus preventing completion of the Work within the Contract Time unless the Work is accelerated.

Pre-operation Testing - All field inspections, installation checks, water tests, performance tests and necessary corrections required of Contractor to demonstrate that individual components of the Work have been properly constructed and do operate in accordance with the Contract Documents for their intended purposes.

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

Project Representative - The authorized representative of Manatee County who is assigned to the project or any part thereof.

Punch List – A list of minor deficiencies or additional Work that does not prohibit achieving Substantial Completion yet must be completed before Final Completion of the Contract can be achieved.

Retainage – A certain percentage, identified in the solicitation document, is withheld from payment due to the Contractor until the Work is fully completed and accepted by County.

Schedule of Values – In the case of a total, lump sum Bid, unit prices shall be established for this Contract by the submission of a Schedule of Values. In the case of an itemized Bid, unit prices are the prices bid. The Contractor shall submit a Schedule of Values within ten (10) days of Notice to Proceed date. The schedule shall include quantities and prices of items equaling the Total Offer and will subdivide the Work into components in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work. Upon request of the County, the Contractor shall support the values with data which will substantiate their correctness.

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

Special Provisions: As required to define Work or procedures not covered in the standard Specifications, and as necessary to supplement or modify items in the standard Specifications.

Subcontractor - An individual or corporation having a direct contact with Contractor or with any other Subcontractor for the performance of a part of the Work at the site. Such person or firm has contractual relations with the Contractor, not with the County.

Substantial Completion - The stage in the progress of the Work (or a specified portion thereof) is sufficiently complete in accordance with the Contract Documents so the Work (or a specified portion thereof) can be utilized for the intended purpose.

Successful Bidder - The lowest, responsible and responsive Bidder to whom an Award is made.

Supplier - A manufacturer, fabricator, Supplier, distributor, material man or vendor.

Surety – A pledge or guarantee by an insurance company, bank, individual or corporation on behalf of the Bidder which protects against default or failure of the principal to satisfy the contractual obligations.

Underground Facilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments and any encasement containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems or water.

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

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

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

Written Amendment - A Written Amendment of the Contract Documents, signed by County and Contractor on or after the Effective Date of the Contract and normally dealing with the non-engineering or non-technical rather than strictly Work related aspects of the Contract Documents.

ARTICLE 2. PRELIMINARY MATTERS

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

2.1 The Contractor must submit a proposed schedule of the Work at the Preconstruction Conference. The purpose of this schedule is to enable the County to govern the Work, to protect the functions of the local government and its citizens and to aid in providing appropriate surveillance. The County shall have the right to reschedule Work provided such rescheduling is in accordance with the remainder of the terms of the Contract. The schedule shall show, as a minimum, the approximate dates on which each segment of the Work is expected to be started and finished, the proposed traffic flows during each month, the anticipated earnings by the Contractor for each month and the approximate number of crews and equipment to be used. The County, after necessary rescheduling and obtaining additional information for specific

purposes, shall review and approve the schedule. The Contractor shall also forward to the County, as soon as practicable after the first day of each month, a summary report of the progress of the various parts of the Work under the Contract, in fabrication and in the field, stating the existing status, estimated time of completion and cause of delay, if any. Together with the summary report, the Contractor shall submit any necessary revisions to the original schedule for the County's review and approval. In addition, more detailed schedules may be required by the County for daily traffic control.

2.2 A Notice to Proceed may be given at any time within thirty (30) days after the Effective Date of the Contract. The Contract Time will commence at the time specified in such notice. Contractor shall start to perform the Work on the date specified in the Notice to Proceed, but no Work shall be done at the site prior to the date on which the Contract Time commences to run.

2.3 If at any time the materials and appliances to be used appear to the County as insufficient or improper for securing the quality of Work required or the required rate of progress, the County may order the Contractor to increase his efficiency or to improve the character of his Work and the Contractor shall conform to such an order. The failure of the County to demand any increase of such efficiency of any improvement shall not release the County from its obligation to secure the quality of Work or the rate of progress necessary to complete the Work within the limits imposed by the Contract. The County may require the Contractor to remove from the Work such employees as the County deems incompetent, careless, insubordinate or otherwise objectionable, or whose continued employment on the Work is deemed to be contrary to the County's interest.

2.4 The County reserves the right to let other Contracts in connection with this Work. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and execution of their Work, and promptly connect and coordinate the Work with theirs.

ARTICLE 3. CONTRACT DOCUMENTS: INTENT, AMENDING, RE-USE

3.1 The Contract Documents comprise the entire Contract between County and Contractor concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the laws and ordinances of the State of Florida and Manatee County.

Should a conflict exist within the Contract Documents, the precedence in order of authority is as follows: 1) Bid Summary, 2) Special Conditions, 3) General Conditions, and 4) Drawings.

Note: Computed dimensions shall govern over scaled dimensions.

3.2 It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for in the Contract Documents. When words which have a well-known technical or trade meaning are used to describe Work, materials, or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard Specifications, manuals or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or laws or regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of County, Contractor or Engineer, or any of their agents or employees from those set forth in the Contract Documents.

3.3 The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.3.1 A Written Amendment

3.3.2 A Change Order

3.3.3 An Administrative Contract Adjustment (ACA)

3.3.4 A Work Directive Change

3.4 In addition, the requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized in one or more of the following ways:

3.4.1 Contract Contingency Work – Field Directive

3.4.2 Engineer's approval of a Shop Drawing or sample

ARTICLE 4. CONTRACTOR'S RESPONSIBILITIES

4.1 Contractor shall keep on the Work at all times during its progress a competent resident superintendent; who shall be the Contractor's representative at the site and shall have authority to act on behalf of Contractor. All communications given to the superintendent shall be as binding as if given to Contractor.

4.2 Contractor shall provide competent, suitable qualified personnel to survey and lay out the Work and perform construction as required by the Contract

Documents. Contractor shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto and except as otherwise indicated in the Contract Documents, all Work at the site shall be performed during regular working hours and Contractor will not permit overtime Work or the performance of Work on Saturday, Sunday or legal holiday without County's written consent given after prior notice to Engineer (at least seventy-two (72) hours in advance).

4.2.1 Contractor shall pay for all additional engineering charges to the County for any overtime Work which may be authorized. Such additional engineering charges shall be a subsidiary obligation of Contractor and no extra payment shall be made by County on account of such overtime Work. At County's option, overtime costs may be deducted from Contractor's monthly payment request or Contractor's Retainage prior to release of final payment.

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

4.4 All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instruction of the applicable Supplier except as otherwise provided in the Contract Documents.

4.5 Contractor shall be fully responsible to County for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect Contract with Contractor just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between County or Engineer and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of County to pay or to see to the payment of any monies due any such Subcontractor, Supplier or other person or organization.

4.6 Permits: Unless otherwise provided, Contractor shall obtain and pay for all construction permits and licenses. County shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all

governmental charges and inspection fees necessary for the prosecution of the Work.

4.7 During the progress of the Work, Contractor shall keep the premises free from accumulation of waste materials rubbish and other debris resulting from the Work. At the completion of the Work, Contractor shall remove all waste materials, rubbish, and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials and shall leave the site clean and ready for occupancy by County. Contractor shall restore to original conditions all property not designated for alteration by the Contract Documents.

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

4.9 Safety and Protection: Contractor shall comply with the Florida Department of Commerce Safety Regulations and any local safety regulations. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to:

4.9.1 all employees on the Work and other persons and organizations who may be affected thereby;

4.9.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

4.9.3 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

4.9.4 Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall provide and maintain all passageways, guard fences, lights and other facilities for the protection required by public authority or local conditions. Contractor shall provide reasonable maintenance of traffic way for the public and preservation of the County’s business, taking into full consideration all local conditions. Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed.

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

4.11 For substitutes not included with the Bid, but submitted after the Effective Date of the Contract, Contractor shall make written application to Engineer for acceptance thereof, certifying that the proposed substitute will 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. The application will also contain an itemized estimate of all costs and delays or schedule impacts that will result directly or indirectly from review, acceptance and provisions of such substitute, including costs of redesign and claims of other Contractors affected by the resulting change, all of which will be considered by the Engineer in evaluating the proposed substitute. Engineer may require Contractor to furnish at Contractor's expense, additional data about the proposed substitute. In rendering a decision, County/Engineer and Contractor shall have access to any available Float or Slack Time in the construction schedule. In the event that substitute materials or equipment not included as part of the Bid, but proposed after the Effective Date of the Contract, are accepted and are less costly than the originally specified materials or equipment, then the net difference in cost shall be credited to the County and an appropriate Change Order executed.

4.11.1 If a specific means, method, sequence, technique or procedure of construction is indicated in or required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to Engineer if Contractor submits sufficient information to allow Engineer to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents.

4.11.2 Engineer will be allowed a reasonable time within which to evaluate each proposed substitute. Engineer will be the sole judge of acceptability and no substitute will be ordered, installed or utilized without Engineer's prior written acceptance which will be evidenced by either a Change Order or an approved shop drawing. County may require Contractor to furnish at Contractor's expense a special performance guarantee or other Surety with respect to any substitute.

4.11.3 Contractor shall reimburse County for the charges of Engineer and Engineer's consultants for evaluating each proposed substitute submitted after the Effective Date of the Contract and all costs resulting from any delays in the Work while the substitute was undergoing review.

4.12 The Contractor shall furnish, free of charge, all labor, stakes, surveys, batter boards for structures, grade lines and other materials and supplies and shall set construction stakes and batter boards for establishing lines, position of structures, slopes and other controlling points necessary for the proper prosecution of the construction Work. Where rights-of-way, easements, property lines or any other conditions which make the lay-out of the project or parts of the project critical are involved, the Contractor will employ a competent surveyor who is registered in the State of Florida for lay-out and staking. These stakes and marks shall constitute the field control by and in accord with which the Contractor shall govern and execute the Work. The Contractor will be held responsible for the preservation of all stakes, marks and if for any reason any of the stakes or marks or batter boards become destroyed or disturbed, they will be immediately and accurately replaced by the Contractor.

4.13 The Contractor has, by careful examination, satisfied himself as to the nature and location of the Work and all other matters which can in any way affect the Work under this Contract, including, but not limited to details pertaining to boring, as shown on the drawings, are not guaranteed to be more than a general indication of the materials likely to be found adjacent to holes bored at the site of the Work, approximately at the locations indicated. The Contractor shall examine boring data, where available, and make his own interpretation of the subsoil investigations and other preliminary data, and shall base his Bid on his own opinion of the conditions likely to be encountered. In no event shall an extension of time be considered for any conditions that existed at the time of bidding, nor shall the Contractor receive extra compensation for completion of the project as intended by the drawings and in keeping with the Contact documents. No verbal agreement or conversation with any officer, agent or employee of the County, before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.

4.14 If the Contractor, in the course of the Work, finds that the drawings and/or Contract Documents cannot be followed, he shall immediately inform the County in writing, and the County shall promptly check the accuracy of the information. Any Work done after such discovery, until any necessary changes are authorized, will be done at the Contractor's risk.

ARTICLE 5. COUNTY'S RESPONSIBILITIES

5.1 County shall furnish the data required of County under the Contract Documents promptly and shall make payments to the Contractor within a reasonable time after the Work has been accepted by the County. Payment shall be made no more than twenty (20) business days if County is its own Engineer of Record or twenty-five (25) business days if outside agent approval is required after the pay estimate has been approved by the agent for the County. The form of all submittals, notices, Change Orders and other documents permitted or required to be used or transmitted under the Contract Documents shall be determined by the County/Engineer. Standard County forms shall be utilized.

5.2 The County shall provide the lands upon which the Work under this Contract is to be done, except that the Contractor shall provide all necessary additional land required for the erection of temporary construction facilities and storage of his materials, together with right of access to same.

5.3 The County shall have the right to take possession of and use any completed portions of the Work, although the time for completing the entire Work or such portions may not have expired, but such taking possession and use shall not be deemed an acceptance of any Work not completed in accordance with the Contract Documents.

ARTICLE 6. CHANGES IN THE WORK

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

6.2 Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented.

6.3 County and Contractor shall execute appropriate Change Orders, or Written Amendments, covering changes in the Work which are ordered by County, or which may be required because of acceptance of defective Work.

6.4 At any time Engineer may request a quotation from Contractor for a proposed change in the Work and within twenty-one (21) calendar days after receipt, Contractor shall submit a written and detailed proposal for an increase or decrease in the Contract Price or Contract Time for the proposed change. Engineer shall have twenty-one (21) calendar days after receipt of the detailed proposal to respond in writing. The proposal shall include an itemized estimate of all costs and time for performance that will result directly or indirectly from the proposed change. Unless otherwise directed, itemized estimates shall be in

sufficient detail to reasonably permit an analysis by Engineer of all material, labor, equipment, subcontracts, overhead costs and fees, and shall cover all Work involved in the change, whether such Work was deleted, added, changed or impacted. Notwithstanding the Request for Quotation, Contractor shall carry on the Work and maintain the progress schedule. Delays in the submittal of the written and detailed proposal will be considered non-prejudicial.

ARTICLE 7. CHANGE OF CONTRACT PRICE

7.1 The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at his expense without change in the Contract Price.

7.2 The Contract Price may only be changed by Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on written notice delivered by the party making the claim to the other party. Notice of the amount of the claim with supporting data shall be delivered within ten (10) days from the beginning of such occurrence and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event.

7.3 The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways, at the County’s discretion:

7.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, cost will be determined by application of such unit prices to the quantities of the items involved.

7.3.2 By mutual acceptance of lump sum.

7.3.3 On the basis of the cost of the Work, plus a 15% Contractor's fee for overhead and profit. (Contractor shall submit an itemized cost breakdown together with supporting data.)

7.4 Either County or Contractor may make a claim for an adjustment in the Contract Price. The unit price of an item of Unit Price Work shall be subject to re-evaluation and adjustment under the following conditions:

7.4.1 If the total cost of a particular item of Unit Price Work amounts to 5% or more of the Contract Price and the variation in the quantity of the particular item of Unit Price Work performed by Contractor differs by more than 15% from the estimated quantity of such item indicated in the Contract; and

7.4.2 If there is no corresponding adjustment with respect to any other item of Work; and

7.4.3 If a Contractor believes that it has incurred additional expense as a result thereof; or

7.4.4 If County believes that the quantity variation entitles it to an adjustment in the unit price; or

7.4.5 If the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

ARTICLE 8. CHANGE OF CONTRACT TIME

8.1 Contract Time may only be changed by a Change Order or a Written Amendment. Any claim for an extension or shortening of the Contract Time shall be based on written notice delivered by the party making the claim to the other party. Notice of the extent of the claim with supporting data shall be delivered within fifteen (15) days from detection or beginning of such occurrence and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event.

8.2 The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of Contractor. Such delays shall include, but not be limited to, acts or neglect by County or others performing additional Work; or to fires, floods, epidemics, abnormal weather conditions or acts of God.

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

ARTICLE 9. WARRANTY, TEST/INSPECTION, CORRECTION

9.1 Contractor warrants, for a minimum period of three (3) years or as otherwise stated herein, and guarantees to County that all Work will be in accordance with the Contract Documents and will not be defective; that County, representatives of County, and governmental agencies with jurisdictional interests will have access to the Work at reasonable time for their observation, inspecting and testing (Contractor shall give Engineer timely notice of readiness of the Work for all required approvals and shall assume full responsibility, including costs, in obtaining required tests, inspections, and approval certifications and/or acceptance, unless otherwise stated by County).

9.2 If any Work (including work of others) that is to be inspected, tested, or approved is covered without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation. Such uncovering shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice. Neither observations by

Engineer nor inspections, tests, or approvals by others shall relieve Contractor from Contractor's obligations to perform the Work in accordance with the Contract Documents.

9.3 If the Work is defective, or Contractor fails to supply sufficient skilled workers, or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, County may order Contractor to stop the Work, or any portion thereof and terminate payments to the Contractor until the cause for such order has been eliminated. Contractor shall bear all direct, indirect and consequential costs for satisfactory reconstruction or removal and replacement with non-defective Work, including, but not limited to fees and charges of engineers, architects, attorneys and other professionals and any additional expenses experienced by County due to delays to other Contractors performing additional Work and an appropriate deductive Change Order shall be issued. Contractor shall further bear the responsibility for maintaining schedule and shall not be entitled to an extension of the Contract Time and the recovery of delay damages due to correcting or removing defective Work.

9.3.1 If Contractor fails within seven (7) days after written notice to correct defective Work, or fails to perform the Work in accordance with the Contract Documents, or fails to comply with any other provision of the Contract Documents, County may correct and remedy any such deficiency to the extent necessary to complete corrective and remedial action. County may exclude Contractor from all or part of the site, take possession of all or part of the Work, Contractor's tools, construction equipment and machinery at the site or for which County has paid Contractor but which are stored elsewhere. All direct and indirect costs of County in exercising such rights and remedies will be charged against Contractor in an amount approved as to reasonableness by Engineer and a Change Order will be issued incorporating the necessary revisions.

9.3.2 If within three (3) years after the date of completion or such longer period of time as may be prescribed by laws or regulations or by the terms of any applicable special guarantee required by the Contract Documents, any Work is found to be defective, Contractor shall promptly, without cost to County and in accordance with County’s written instructions, either correct such defective Work or if it has been rejected by County, remove it from the site and replace it with non-defective Work. If Contractor does not promptly comply with the terms of such instruction, County may have the defective Work corrected or removed and all direct, indirect and consequential costs of such removal and replacement will be paid by Contractor.

ARTICLE 10. SUSPENSION OR TERMINATION OF WORK

10.1 County reserves the right to suspend the Work, or any portion thereof, at any time without cause for a period not to exceed ninety (90) days by written notice to Contractor, which will fix the date on which Work will be resumed. Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if Contractor makes an approved claim therefore.

10.1.1 If Work is suspended by County for a period that exceeds ninety (90) days; or if Work is suspended by an order of court or other public authority; or if County fails to pay Contractor, then Contractor may, upon seven (7) days written notice to County, terminate the Contract and recover payment for all Work executed.

10.1.2 In lieu of terminating the Contract, if the Engineer has failed to act on any Application for Payment or County has failed to make any payment as aforesaid, Contractor may, upon seven (7) days written notice to County, stop the Work until payment of all amounts then due have been received.

10.2 County reserves the right, after giving seven (7) days written notice, to terminate this Contract if:

10.2.1 Contractor persistently fails to perform the Work in accordance with the Contract Documents;

10.2.2 Contractor disregards laws or regulations of any public body having jurisdiction;

10.2.3 Contractor commences a voluntary case under any chapter of the Bankruptcy Code or any similar action by filing a petition under any other federal or state law relating to bankruptcy or insolvency;

10.2.4 Contractor has a petition filed against them under any chapter of the Bankruptcy Code or similar relief under any other federal or state law;

10.3 County may exclude Contractor from the site and take possession of the Work and of all Contractor's tools, construction equipment and machinery at the site and use same to the full extent they could be used (without liability to Contractor for trespass or conversion); incorporate in the Work all materials and equipment stored at the site or for which County has paid Contractor but which are stored elsewhere, and finish the Work as County may deem expedient.

10.3.1 Contractor shall not be entitled to receive any further payment beyond an amount equal to the value of material and equipment not incorporated in the Work, but delivered and suitably stored, less the aggregate of payments previously made.

10.3.2 If the direct, indirect and consequential costs of completing the Work exceed the unpaid balance of the Contract Price, Contractor shall pay the difference to County. Such costs incurred by County shall be verified by County and incorporated in a Change Order; but in finishing the Work, County shall not be required to obtain the lowest figure for the Work performed. Contractor's obligations to pay the difference between such costs and such unpaid balance shall survive termination of this Contract.

10.4 In the event sufficient budgeted funds are not available for a new fiscal year, County shall notify Contractor of such occurrence and Contract shall terminate on the last day of the current fiscal year without penalty or expense to County.

10.5 Failure of Contractor to comply with any of the provisions of this Contract shall be considered a Material Breach of Contract and shall be cause for immediate termination of Contract at the discretion of County.

10.6 In addition to all other legal remedies available to County, County reserves the right to terminate and obtain from another source, any commodities or services which have not been delivered within the Contract Time as stated in the Contract Documents.

ARTICLE 11. CONTRACT CLAIMS & DISPUTES

11.1 Except as otherwise provided herein, any dispute arising under this Contract shall be decided by the Purchasing Official in accordance with Section 2-26-63 of the Manatee County Code subject to an administrative hearing process provided in 2-26-64. The decision of the Board of County Commissioners in accordance with Section 2-26-64 of the Manatee County Code shall be the final and conclusive County decision subject to exclusive judicial review in the circuit court by a petition for certiorari.

ARTICLE 12. RESIDENT PROJECT REPRESENTATIVE - DUTIES, RESPONSIBILITIES

12.1 The Resident Project Representative is the Engineer’s Agent, who will act as directed by and under the supervision of the Engineer, and who will confer with County regarding his actions. Resident Project Representative's dealing in matters pertaining to the on-site Work shall, in general, be only with the County and Contractor and dealings with Subcontractors shall only be through or with the full knowledge of Contractor.

12.2 Resident Project Representative will:

12.2.1 Review the progress schedule, schedule of shop drawing submissions and Schedule of Values prepared by Contractor and consult with County concerning their acceptability.

12.2.2 Attend Preconstruction Conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with County and notify those expected to attend in advance. Attend meetings and maintain and circulate copies of minutes thereof.

12.2.3 Serve as County's liaison with Contractor, working principally through Contractor's superintendent and assist him in understanding the intent of the Contract Documents. As requested by Contractor, assist in obtaining additional details or information when required at the job site for proper execution of the Work.

12.2.4 Receive and record date of receipt of Shop Drawings and samples, receive samples which are furnished at the site by Contractor and notify Engineer of their availability for examination.

12.2.5 Advise Engineer and Contractor or his superintendent immediately of the commencement of any Work requiring a shop drawing or sample submission if the submission has not been approved by the County.

12.2.6 Conduct on-site observations of the Work in progress to assist Engineer in determining if the Work is proceeding in accordance with the Contract Documents and that completed Work will conform to the Contract Documents.

12.2.7 Report to County whenever he or she believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspections, tests or approvals required or if Work has been damaged prior to final payment; and advise Contractor when he believes Work should be corrected or rejected or should be uncovered of observation or requires special testing, inspection or approval.

12.2.8 Verify that tests, equipment and system start-ups and operating and maintenance instructions are conducted as required by the Contract Documents and in the presence of the required personnel, and that Contractor maintains adequate records thereof; observe, record and report to Engineer appropriate details relative to the test procedures and start-ups.

12.2.9 Accompany visiting inspectors representing public or other agencies having jurisdiction over the project; record the outcome of these inspections and report to County.

12.2.10 Transmit to Contractor, Engineer's clarifications and interpretations of the Contract Documents.

12.2.11 Consider and evaluate Contractor's suggestions or modifications in drawings or Contract Documents and report them with recommendations to County.

12.2.12 Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and sample submissions, reproductions of original Contract Documents including all Addenda, Change Orders, field orders, additional drawings issued subsequent to the execution of the Contract, Engineer's clarifications and interpretations of the Contract Documents, progress reports and other project related documents.

12.2.13 Keep a diary or log book, recording hours on the job site, weather conditions, data relative to questions of extras or deductions; list of visiting officials and representatives or manufacturers, fabricators, Suppliers and distributors; daily activities, decisions, observations in general and specific observations in more detail as in the case of observing test procedures. Send copies to County.

12.2.14 Record names, addresses and telephone numbers of all Contractors, Subcontractors and major Suppliers of materials and equipment.

12.2.15 Furnish Engineer periodic reports as required of progress of the Work and Contractor's compliance with the approved progress schedule and schedule of shop drawing submissions.

12.2.16 Consult with Engineer in advance of scheduling major tests, inspections or start of important phases of the Work.

12.2.17 Report immediately the occurrence of any accident.

12.2.18 Review applications for payment with Contractor for compliance with the established procedure for their submission and forward them with recommendations to Engineer, noting particularly their relation to the Schedule of Values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.

12.2.19 During the course of the Work, verify that certificates, maintenance and operations manuals and other data required to be assembled and furnished by Contractor are applicable to the items actually installed, and deliver this material to County for his review prior to final acceptance of the Work.

12.2.20 Before Engineer issues a certificate of Substantial Completion, submit to Contractor a list of observed items requiring completion or correction.

12.2.21 Conduct final inspection in the company of County and/or Engineer and Contractor and prepare a Punch List of items to be completed or corrected. Reference Florida Statutes § 218.735(7).

12.2.22 Verify that all items on final list have been completed or corrected and make recommendations to County concerning acceptance.

12.3 Except upon written instructions of Engineer, Resident Project Representative:

12.3.1 Shall not authorize any deviation from the Contract Documents or approve any substitute materials or equipment;

12.3.2 Shall not exceed limitations on Engineer's authority as set forth in the Contract Documents;

12.3.3 Shall not undertake any of the responsibilities of Contractor, Subcontractors or Contractor's superintendent, or expedite the Work;

12.3.4 Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents;

12.3.5 Shall not advise on or issue directions as to safety precautions and programs in connection with the Work;

12.3.6 Shall not authorize County to occupy the project in whole or in part; and

12.3.7 Shall not participate in specialized field or laboratory tests.

ARTICLE 13. APPRENTICES

13.1 If successful Contractor employs apprentices, he shall be governed and comply with the provisions of Fla.Stat. § 446.011.

NOTE: The form of all submittals, notices, Change Orders and other documents permitted or required to be used or transmitted under the Contract shall be determined by the County. Standard County forms shall be utilized.

END OF SECTION E

SECTION F

FORM OF CONTRACT
BETWEEN THE
COUNTY OF MANATEE, FLORIDA
AND CONTRACTOR AS IDENTIFIED BELOW
ON THE BASIS OF A STIPULATED UNIT COST CONTRACT PRICE

This CONTRACT is made and entered into by and between the COUNTY OF MANATEE, a political subdivision of the State of Florida, hereinafter referred to as "COUNTY" and **XXXXXXXXXXXX**, hereinafter referred to as "CONTRACTOR," duly authorized to transact business in the State of Florida, with offices located at **XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**

ARTICLE 1. WORK

CONTRACTOR shall furnish all labor, materials, supplies, and other items required to complete the Work for **IFB #14-3134CD- ABW Filter Rehabilitation at the Southwest Water Reclamation Facility** in strict accordance with Contract Documents and any duly authorized subsequent Addenda thereto, all of which are made a part hereof.

ARTICLE 2. COMPENSATION

As compensation to CONTRACTOR, COUNTY shall pay and CONTRACTOR will accept as full consideration for the performance of all Work required by **IFB #14-3134CD- ABW Filter Rehabilitation at the Southwest Water Reclamation Facility**, subject to additions and deductions as provided therein, the sum of **$xxxxx.xx** based on a completion time of **330** calendar days.

ARTICLE 3. LIQUIDATED DAMAGES

Time is of the essence in this CONTRACT. As of the date of this CONTRACT, the damages that will be suffered by COUNTY in the event of CONTRACTOR'S failure to timely complete the Work are impossible to determine. In lieu thereof, it is agreed that if CONTRACTOR fails to achieve Final Completion of the Work within **330** calendar days of issuance of the Notice to Proceed (accounting, however, for any extensions of time granted pursuant to approved Change Orders), CONTRACTOR shall pay to COUNTY, as liquidated damages (and not as a penalty), the sum of $**1,742** per calendar day for each day beyond **120** days until CONTRACTOR achieves Final Completion. COUNTY

shall have the option of withholding said liquidated damages from any pay application(s) thereafter submitted by CONTRACTOR. Alternatively, CONTRACTOR shall immediately pay said sums to COUNTY upon COUNTY'S demand for same.

ARTICLE 4. ENGINEER

The COUNTY of MANATEE, Public Works Department, is responsible as COUNTY and CH2MHill as "ENGINEER," designed this Project and is responsible for technical/engineering reviews and decisions. The ENGINEER is a member of COUNTY'S Project Management team which is collectively responsible for ensuring the Work is completed in accordance with the Contract Documents.

All communications involving this Project will be addressed to: Anthony Benitez, P.E., Project Engineer II, Public Works Department and to the Engineer of Record, Thomas V. Waldeck, CH2MHill. All invoicing will be addressed to the attention of: Anthony Benitez (address noted below) with invoice copies sent to Thomas V. Waldeck, (address noted below).

Manatee County Public Works Dept.
IFB# 14-3134CD
Attention: Anthony Benitez, PE
Project Engineer II
1022 26th Avenue East
Bradenton, Florida 34208
Phone (941) 708-7450 ext. 7333

CH2MHill
IFB# 14-3134CD
Attn: Thomas V. Waldeck
Project Manager
4350 West Cypress Street
Tampa, Florida 33607
Phone (813) 281-7745

Where the terms ENGINEER and/or COUNTY are used in the Contract Documents, it shall mean COUNTY'S Project Management team.

ARTICLE 5. CONTRACTOR'S REPRESENTATIONS

In order to induce COUNTY to enter into this CONTRACT, CONTRACTOR makes the following representations:

5.1 CONTRACTOR has familiarized itself with the nature and extent of the Bid Documents, Work, site, locality and all local conditions and laws and regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

5.2 CONTRACTOR has studied carefully all drawings of the physical conditions upon which CONTRACTOR is entitled to rely.

5.3 CONTRACTOR has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies which pertain to the physical conditions at or contiguous to the site or which otherwise may affect the cost, progress, performance or furnishing of the Work as CONTRACTOR considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Bid Documents; and no additional examinations, investigations, explorations, tests, reports, studies or similar information or data are or will be required by CONTRACTOR for such purposes.

5.4 CONTRACTOR has reviewed and checked all information and data shown or indicated on the Bid Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. Any additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities conducted by CONTRACTOR will be done at CONTRACTOR'S expense.

5.5 CONTRACTOR has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Bid.

5.6 CONTRACTOR has given COUNTY written notice of all conflicts, errors or discrepancies that have been discovered in the Bid Documents and the written resolution thereof by COUNTY is acceptable to CONTRACTOR.

5.7 CONTRACTOR shall schedule and perform the Work subject to COUNTY'S approval and shall hold COUNTY harmless from all liabilities incurred due to CONTRACTOR'S failure to coordinate with COUNTY.

ARTICLE 6. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire CONTRACT between COUNTY and CONTRACTOR concerning the Work consist of the following:

6.1 This CONTRACT and Bid Document **IFB #14-3134CD**

6.2 Invitation for Bid # **14-3134CD**, in its entirety

6.3 Public Construction Bond Form and Insurance Certificate(s)

6.4 Drawings/Plans (not attached)

6.5 Addendum number **x** to **x** inclusive

6.6 CONTRACTOR'S Bid Form

6.7 Reports

6.8 The following, which may be delivered or issued after the Effective Date of the CONTRACT and are not attached hereto: all written Change Orders and other documents amending, modifying, or supplementing the Contract Documents.

6.9 The documents listed in paragraphs above are attached to this CONTRACT (except as noted otherwise above). There are no Contract Documents other than those listed above in this Article 6.

ARTICLE 7. DISPUTE RESOLUTION

Disputes shall be resolved as follows: good faith negotiations by the designated agents of the parties and if not resolved by such designated agents, CONTRACTOR shall submit its claim, with the basis for the dispute, in writing to the Manatee County Purchasing Official for a determination and handling in accordance with the provisions of Chapter 2-26 of the Manatee County Code.

ARTICLE 8. NO WAIVER

8.1 The failure of CONTRACTOR or COUNTY to insist on the strict performance of the terms and conditions hereof shall not constitute or be construed as a waiver or relinquishment of either party's right to thereafter enforce the same in accordance with this CONTRACT in the event of a continuing or subsequent default on the part of CONTRACTOR or COUNTY.

8.2 Nothing herein shall be interpreted as a waiver of COUNTY of its rights, including the limitations of the limited waiver of sovereign immunity, as set forth in Florida Statute 768.28, or any other statute, and COUNTY expressly reserves these rights to the full extent allowed by law.

ARTICLE 9. NO THIRD-PARTY BENEFICIARIES

This CONTRACT is solely for the benefit of the parties hereto, and no right, privilege, or cause of action shall by reason hereof accrue upon, to, or for the benefit of any third party. Nothing in this CONTRACT is intended or shall be construed to confer upon or give any person, corporation, partnership, trust, private entity, agency, or any other governmental entity any right, privilege, remedy, or claim under or by reason of this CONTRACT or any provisions or conditions hereof.

ARTICLE 10. GOVERNING LAW, JURISDICTION AND VENUE

10.1 This CONTRACT and the construction and enforceability thereof shall be interpreted under the laws of the State of Florida.

10.2 CONTRACTOR consents and agrees that all legal proceedings related to the subject matter of this CONTRACT shall be governed by the laws of the State of Florida.

10.3 CONTRACTOR consents and agrees that jurisdiction for such proceedings shall lie exclusively with such court, and venue shall be in the Circuit Court of the Twelfth Judicial Circuit in and for Manatee County, Florida.

10.4 In the event of any litigation arising under the terms of this CONTRACT, each party shall be responsible for their own attorney's fees, including appellate fees, regardless of the outcome of the litigation.

ARTICLE 11. FORCE MAJEURE

Neither party shall be considered in default of performance of such obligations hereunder to the extent that performance of such obligations or any of them is delayed or prevented by Force Majeure. Force Majeure shall include, but not be limited to hostility, revolution, civil commotion, strike, epidemic, fire, flood, wind, earthquake, hurricane, or other disruptive event of nature, act of terrorism, explosion, lack of or failure of transportation or bridge/roadway facilities, any law, proclamation, regulation, ordinance or other act of government, or any act of God or any cause whether of the same or different nature, existing or future; provided that the cause, whether or not enumerated in this Article, is beyond the control and without the fault or negligence of the party seeking relief under this Article.

ARTICLE 12. MISCELLANEOUS

12.1 Terms used in this CONTRACT are defined in Article 1 of Section E, General Conditions.

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

12.3 COUNTY and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements, and obligations contained in the Contract Documents.

12.4 By accepting Award of this CONTRACT, CONTRACTOR, which shall include its directors, officers and employees, represents that it presently has no interest in and shall acquire no interest in any business or activity which would conflict in any manner with the performance of duties or services required hereunder.

CONTRACT

IFB # 14-3134CD

IN WITNESS WHEREOF, the parties hereto have caused this CONTRACT **14-3134CD** to be duly executed by their authorized representatives.

CONTRACTOR

By: _____

_____
Print Name & Title of Signer

Date: _____

COUNTY OF MANATEE, FLORIDA

By: _____
Melissa M. Wendel, CPPO
Purchasing Official

Date: _____

BID FORM

(Submit in duplicate)

For: 14-3134CD- ABW Filter Rehabilitation at the Southwest Water Reclamation Facility

Total Offer: _____
Based on a completion time of 330 calendar days

We, the undersigned, hereby declare that we have carefully reviewed the IFB Documents in their entirety and with full knowledge and understanding of the aforementioned herewith submit this bid, completely meeting each and every specification, term, and condition contained therein.

Only one schedule for Completion of the Work shall be considered. Only one award shall be made.

As bidder, we understand that the IFB documents, in its entirety, including but not limited to, all specifications, terms, and conditions shall be made a part of any resulting Agreement between Manatee County and the successful bidder. Failure to comply shall result in Agreement default, whereupon, the defaulting successful bidder shall be required to pay for any and all re-procurement costs, damages, and attorney fees as incurred by County, and agrees to forfeit his/her bid bond.

Communications concerning this bid shall be addressed as follows: **(Complete all fields)**

Bidder's Name: _____

Mailing Address: _____

Telephone: ( ) _____ Fax: ( ) _____

Email Address: _____

I, _____ **on** [date(s)] _____ **attest that I have visited the project site(s) to familiarize myself with the full scope of work required for the bid.**

Acknowledge Addendum No.____ Dated: _____ Acknowledge Addendum No._____ Dated: _____
Acknowledge Addendum No.____ Dated: _____ Acknowledge Addendum No._____ Dated: _____
Acknowledge Addendum No.____ Dated: _____ Acknowledge Addendum No._____ Dated: _____

Authorized Signature(s): _____

Name and Title of Above Signer(s): _____

Date: _____

BID FORM

(Submit in Duplicate)

ABW FILTER REHABILITATION AT THE SOUTHWEST WATER RECLAMATION FACILITY

Bid Based on Completion Time of 330 Calendar Days

ITEM NO.	DESCRIPTION	UNITS	QTY.	BID PRICE PER UNIT ($)	TOTAL BID PRICE ($)
1	Mobilization	LS	1	$	$
2	Demolition and Cleaning of Filters No. 3, 4, and 5 Underdrain Systems	LS	1	$	$
3	Furnish And Install Underdrain Systems, Filter Media, Control Panels, Skimmer Assemblies, Backwash Shoe Assemblies, Backwash Shoe Tensioning Assemblies, Bridge Drive Assemblies, Bridge Idler Assemblies, Festoon Cable Systems, Rails, Rail Caps, Limit Switches, Level Sensors, And Limit Switch Trip Peg Assemblies In Filters No. 3, 4, And 5.	LS	1	$	$
4	Furnish and Install A Control Panel, Limit Switch, Level Sensor, Limit Switch Trip Peg Assembly, Skimmer Assembly, Festoon Cable System, Rails, Rail Caps, and Wheels For Filter No. 2	LS	1	$	$
5	Furnish and Install Limit Switches, Festoon Cables, Limit Switch Trip Peg Assemblies and Skimmer Assemblies For Filters No. 6 and 7	LS	1	$	$
6	Structural Rehabilitation of Filters No. 2, 3, 4, And 5	LS	1	$	$
7	Seal Bypass Channels of Filters No. 1, 2, 3, 4, 5, 6 and 7	LS	1	$	$
8	Cleanup and Demobilization	LS	1	$	$
	TOTAL BASE BID - Based on Completion Time of 330 Calendar Days				$
9	**CONTRACT CONTINGENCY WORK (USED ONLY WITH COUNTY APPROVAL)**		**10% OF TOTAL BASE BID**		$
	TOTAL OFFER with Contract Contingency - Based on Completion Time of 330 Calendar Days				$

Bidder Name: _____

Authorized Signature: _____

MAILING LABEL

Cut along the outside border and affix this label to your sealed bid envelope to identify it as a "Sealed Bid". Be sure to include the name of the company submitting the bid and the bid due date and time where requested.

MAILING LABEL TO AFFIX TO OUTSIDE OF SEALED BID PACKAGE:

SEALED BID - DO NOT OPEN

BIDDER: _____

SEALED BID NO: 14-3134CD

BID TITLE: ABW Filter Rehabilitation at the Southwest Water Reclamation Facility

DUE DATE/TIME: _____ @ _____

EXHIBIT A

INSURANCE AND BONDING REQUIREMENTS

The successful bidder will not commence Work under the resulting Agreement until all insurance under this section, and such insurance coverage as might be required by County, has been obtained. The successful bidder shall obtain, and submit to the Purchasing Division within ten (10) calendar days from the date of notice of intent to award, at his expense, the following minimum amounts of insurance (inclusive of any amounts provided by an umbrella or excess policy):

Insurance / Bond Type	**Required Limits**
1. ☒ Automobile Liability:	Bodily Injury and Property Damage, Owned/Non-Owned/Hired; Automobile included $ 300,000 each occurrence *This policy shall contain severability of interests provisions.*
2. ☒ Commercial General Liability: (Occurrence Form - patterned after the current ISO form)	Bodily Injury and Property Damage $ 1,000,000 single limit per occurrence; $ 2,000,000 aggregate This shall include Premises and Operations; Independent Contractors; Products and Completed Operations and Contractual Liability. *This policy shall contain severability of interests provisions.*
3. ☒ Employer's Liability:	$ 1,000,000 single limit per occurrence
4. ☒ Worker's Compensation:	Statutory Limits of Florida Statutes, Chapter 440 and all Federal Government Statutory Limits & Requirements
5. ☐ Other Insurance, as noted:	a. ☐ Aircraft Liability $ _____ per occurrence Coverage shall be carried in limits of not less than $5,000,000 each occurrence if applicable to the completion of the services under this Agreement. b. ☐ Installation Floater $ _____ If the resulting Agreement **does not** include construction of or additions to above ground building or structures, but does involve the installation of machinery or equipment, successful bidder shall provide an **"Installation Floater"** with the minimum amount of insurance to be 100% of the value of such addition(s), building(s), or structure(s). c. ☐ Maritime Coverage (Jones Act) $ _____ per occurrence Coverage shall be maintained where applicable to the completion of the Work.

Insurance / Bond Type	Required Limits
	d. ☐ Pollution $ _____ per occurrence
	e. ☐ Professional Liability $ _____ per claim and in the aggregate • $1,000,000 per claim and in the aggregate • $2,000,000 per claim and in the aggregate f. ☐ Project Professional Liability $ _____ per occurrence g. ☐ Property Insurance $ _____ If the resulting Agreement includes construction of or additions to above ground buildings or structures, bidder *may* provide **"Builder's Risk"** insurance with the minimum amount of insurance to be 100% of the value of such addition(s), building(s), or structure(s). *To the extent that property damage is covered by commercial insurance, County and successful bidder agree to waive all subrogation rights against each other, except such rights as they may have to the proceeds of such insurance. Successful bidder shall require a similar waiver of subrogation from each of its bidder personnel and sub-consultants, to include Special Consultants; successful bidder shall provide satisfactory written confirmation to County of these additional waivers.* h. ☐ U.S. Longshoreman's and Harborworker's Act $ _____ per occurrence Coverage shall be maintained where applicable to the completion of the Work. i. ☐ Valuable Papers Insurance $ _____ per occurrence j. ☐ Watercraft, $ _____ per occurrence
6. ☒ Bid Bond:	Bid bond shall be submitted by bidder for 5% of the total amount of the bid.
7. ☒ Performance Bond:	For projects in excess of $100,000.00, performance bond shall be submitted by bidder for 100% of the award amount. $ _____

The amounts and types of insurance coverage shall conform to the minimum requirements set forth in this Insurance and Bonding exhibit, with the use of Insurance Services Office (ISO) forms and endorsements or their equivalents. If successful bidder has any self-insured retentions or deductibles under any of the listed minimum required coverage, successful bidder must identify on the certificate of insurance the nature and amount of such self-insured retentions or deductibles and provide satisfactory evidence of financial responsibility for such obligations. All self-insured retentions or deductibles will be successful bidder's sole responsibility.

Nothing herein shall in any manner create any liability of County in connection with any claim against the successful bidder for labor, services, or materials, or of subcontractors; and nothing herein shall limit the liability of the successful bidder or successful bidder's sureties to County or to any workers, suppliers, material men or employees in relation to the resulting Agreement.

By way of its submission of a bid hereto, bidder:

a. Represents that bidder maintains, and will maintain during the term of any Agreement arising from this solicitation, all insurance coverage required herein from responsible companies duly authorized to do business under the laws of the State of Florida that hold an A.M. Best rating of "A-" or better, and are deemed acceptable to County as set forth in this solicitation.

b. Agrees that insurance, as specified herein, shall remain in force and effect without interruption from the date of commencement of the Work throughout the duration of the project, including any warranty periods.

c. Agrees that if the initial or any subsequently issued certificate of insurance expires prior to completion of the Work, successful bidder shall furnish to County renewal or replacement certificate(s) of insurance no later than ten (10) calendar days after the expiration date on the certificate. Failure of successful bidder to provide County with such renewal certificate(s) shall be considered justification for County to terminate any and all agreements.

d. Agrees that bidder and/or its insurance carrier shall provide thirty (30) days written notice to County of policy cancellation or non-renewal on the part of the insurance carrier or the successful bidder. Successful bidder shall also notify County, in a like manner, within twenty-four (24) hours after receipt, of any notices of expiration, cancellation, non-renewal or material change in coverage or limits received by successful bidder from its insurer and nothing contained herein shall relieve successful bidder of this requirement to provide notice. In the event of a reduction in the aggregate limit of any policy to be provided by successful bidder hereunder, successful bidder shall immediately take steps to have the aggregate limit reinstated to the full extent permitted under such policy.

e. Agrees that failure of successful bidder to obtain and maintain proper amounts of insurance at all times as called for herein shall constitute a material breach of the resulting Agreement, which may result in immediate termination.

f. Agrees that, should at any time the successful bidder not maintain the insurance coverage(s) required herein, County may terminate the Agreement or at its sole discretion shall be authorized to purchase such coverage(s) and charge successful bidder for such coverage(s) purchased. If successful bidder fails to reimburse County for such costs within thirty (30) days after demand, County has the right to offset these costs from any amount due successful bidder under this Agreement or any other agreement between the County and successful bidder. County shall be under no obligation to purchase such

insurance, nor shall it be responsible for the coverage(s) purchased or the insurance companies used. The decision of County to purchase such insurance coverage(s) shall in no way be construed to be a waiver of any of its rights under the Contract Documents.

g. Agrees to provide, upon request, the entire and complete insurance policies required herein.

Certificate of Insurance Requirements:

a. Certificates of insurance in duplicate evidencing the insurance coverage specified herein shall be filed with the Purchasing Division before operations are begun. The required certificates of insurance shall name the types of policy, policy number, date of expiration, amount of coverage, companies affording coverage, and also shall refer specifically to the bid number and title of the project, and must read: For any and all work performed on behalf of Manatee County.

b. **Additional Insured:** The Automobile Liability and Commercial General Liability policies provided by the successful bidder to meet the requirements of this IFB shall name Manatee County, Board of County Commissioners, as an additional insured as to the operations of the successful bidder under this IFB and shall contain severability of interests provisions.

c. In order for the certificate of insurance to be accepted it **must** comply with the following:

1. The "Certificate Holder" shall be:
Manatee County
Board of County Commissioners
Bradenton, FL
IFB# 14-3134CD, ABW Filter Rehabilitation at the Southwest Water Reclamation Facility
For any and all work performed on behalf of Manatee County.

2. Certificate shall be mailed to:
Manatee County Purchasing Division
1112 Manatee Avenue West, Suite 803
Bradenton, FL 34205
Attn: Chris Daley,CPPO, CPPB, Contract Specialist

Bid Bond/Certified Check:

By submitting a bid to this Invitation for Bid, the bidder agrees should the bidder's bid be accepted, **to execute the form of Agreement and present the same to Manatee County for approval within ten (10) calendar days after notice of intent to award**. The bidder further agrees that failure to execute and deliver said form of Agreement **within ten (10) calendar days** will result in damages to Manatee County and as guarantee of payment of same a bid bond/certified check shall be enclosed within the submitted sealed bid in the amount of five (5%) percent of the total amount of the bid. The bidder further agrees that in case the bidder fails to enter into an Agreement, as prescribed by Manatee County, the bid bond/certified check accompanying the bid shall be forfeited to Manatee County as agreed liquidated damages. If County enters into an Agreement with a bidder, or if County rejects any and/or all bids, accompanying bond will be promptly returned.

Performance and Payment Bonds:

Successful bidder shall furnish surety bonds using the Public Construction Bond form prescribed in Florida Statutes § 255.05, which is provided herein, as security for faithful performance of the

Agreement awarded as a result of this bid and for the payment of all persons performing labor and/or furnishing material in connection therewith. Failure to provide the required bonds on the prescribed form may result in successful bidder being deemed nonresponsive. Bonds must be in the form prescribed in Florida Statutes § 255.05, and must not contain notice, demand or other terms and conditions, including informal pre-claim meetings, not provided for in Florida Statutes § 255.05.

Surety of such bonds shall be in an amount equal to 100% of the Contract Price issued by a duly authorized and nationally recognized Surety company, authorized to do business in the State of Florida, satisfactory to this County. Surety shall be rated as "A-" or better as to general policy holders rating and Class V or higher rating as to financial size category and the amount required shall not exceed five (5%) percent of the reported policy holders' surplus, all as reported in the most current Best Key Rating Guide, published by A.M. Best Company, Inc. of 75 Fulton Street, New York, New York, 10038. The attorney-in-fact who signs the bonds must file with the bonds, a certificate and effective dated copy of power-of-attorney. Performance and payment bonds shall be issued to Manatee County, a political subdivision of the State of Florida, within ten (10) calendar days after notice of intent to award.

In addition, pursuant to Florida Statutes § 255.05(1)(b), prior to commencing Work, the successful bidder shall be responsible and bear all costs associated to record the performance and payment bond with the Manatee County Clerk of the Circuit Court. A certified copy of said recording shall be furnished to the Purchasing Division upon filing. Pursuant to Florida Statutes § 255.05(1)(b), County will make no payment to the successful bidder until the successful bidder has complied with this paragraph.

Furnishing performance and payment bonds shall be requisite to execution of an Agreement with County. Said performance and payment bonds will remain in force for the duration of the Agreement with the premiums paid by the successful bidder. Failure of the successful bidder to execute such Agreement and to supply the required bonds shall be just cause for cancellation of the award. County may then contract with the next lowest, responsive and responsible bidder or re-advertise this IFB. If another bidder is accepted, and notice given within ninety (90) days after the opening of the bids, this acceptance shall bind the bidder as though they were originally the successful bidder.

Failure of County at any time to require performance by the successful bidder of any provisions set out in the resulting Agreement will in no way affect the right of County, thereafter, to enforce those provisions.

When activity occurs within the resulting Agreement that increases the amount of the Agreement by either an approved Administrative Contract Adjustment (ACA) or an approved Change Order, a recorded bond rider shall be provided before the additional Work can proceed. All premiums shall be paid by the successful bidder.

EXHIBIT B

BIDDER'S QUESTIONNAIRE

(Submit in Duplicate)

The bidder warrants the truth and accuracy of all statements and answers herein provided. (Attach additional pages if necessary.)

THIS QUESTIONNAIRE MUST BE COMPLETED AND SUBMITTED WITH YOUR BID

1. Contact Information:

   FEIN #: _____

   License #: _____
   License Issued to: _____
   Date License Issued (MM/DD/YR): _____
   Company Name: _____
   Physical Address: _____
   City: _____ State of Incorporation: _____ Zip Code: _____
   Phone Number: ( ) _____ Fax Number: ( ) _____
   Email address: _____

2. Bidding as: an individual __; a partnership __; a corporation __; a joint venture __

3. If a partnership, list names and addresses of partners; if a corporation, list names of officers, directors, shareholders, and state of incorporation; if joint venture, list names and address of ventures' and the same if any venture are a corporation for each such corporation, partnership, or joint venture:

   _____
   _____
   _____
   _____

4. Bidder is authorized to do business in the State of Florida: ☐ Yes ☐ No

   For how many years? _____

5. Your organization has been in business (under this firm's name) as a

   _____

   Is this firm in bankruptcy? _____

6. Attach a list of projects where this specific type of Work was performed.

BIDDER: _____

7. Is this firm currently contemplating or in litigation? Provide summary details.

_____

_____

_____

8. Have you ever been assessed liquidated damages under a contract during the past five (5) years? If so, state when, where (contact name, address and phone number) and why.

_____

_____

_____

9. Have you ever failed to complete Work awarded to you? Or failed to complete projects within contract time? If so, state when, where (contact name, address, phone number) and why.

_____

_____

_____

10. Have you ever been debarred or prohibited from providing a bid to a governmental entity? If yes, name the entity and describe the circumstances.

_____

_____

_____

11. Will you subcontract any part of this Work? If so, describe which portion(s) and to whom.

_____

_____

_____

BIDDER: _____

12. If any, list MBE/DBE (with Agreement amount) to be utilized:

_____

_____

_____

13. What equipment do you own to accomplish this Work? (A listing may be attached)

_____

_____

_____

14. What equipment will you purchase/rent for the Work? (Specify which)

_____

_____

_____

15. List the following in connection with the Surety which is providing the bond(s):

Surety's Name: _____

Address: _____

_____

Name, address, phone number and email of Surety's resident agent for service of process in Florida:

Agent's Name: _____

Address: _____

_____

Phone: _____

Email: _____

BIDDER: _____

EXHIBIT C

PUBLIC CONTRACTING AND ENVIRONMENTAL CRIMES CERTIFICATION

SWORN STATEMENT PURSUANT TO ARTICLE V,
MANATEE COUNTY PURCHASING ORDINANCE

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

This sworn statement is submitted to the Manatee County Board of County Commissioners by

_____

[Print individual's name and title]

___ for _____[Print name of entity submitting sworn statement]

whose business address is _____

and (if applicable) its Federal Employer Identification Number (FEIN) is _____. If the entity has no FEIN, include the Social Security Number of the individual signing this sworn statement: _____.

I understand that no person or entity shall be awarded or receive a County agreement for public improvements, procurement of goods or services (including professional services) or a County lease, franchise, concession or management agreement, or shall receive a grant of County monies unless such person or entity has submitted a written certification to County that it has not:

(1) been convicted of bribery or attempting to bribe a public officer or employee of Manatee County, the State of Florida, or any other public entity, including, but not limited to the Government of the United States, any state, or any local government authority in the United States, in that officer's or employee's official capacity; or

(2) been convicted of an agreement or collusion among bidders or prospective bidders in restraint of freedom of competition, by agreement to bid a fixed price, or otherwise; or

(3) been convicted of a violation of an environmental law that, in the sole opinion of County's Purchasing Official, reflects negatively upon the ability of the person or entity to conduct business in a responsible manner; or

(4) made an admission of guilt of such conduct described in items (1), (2) or (3) above, which is a matter of record, but has not been prosecuted for such conduct, or has made an admission of guilt of such conduct, which is a matter of record, pursuant to formal prosecution. An admission of guilt shall be construed to include a plea of nolo contendere; or

(5) where an officer, official, agent or employee of a business entity has been convicted of or has admitted guilt to any of the crimes set forth above on behalf of such an entity and pursuant to the direction or authorization of an official thereof (including the person committing the offense, if he is an official of the business entity), the business shall be chargeable with the conduct herein above set forth. A business entity shall be chargeable with the conduct of an affiliated entity, whether wholly owned, partially owned, or one which has common ownership or a common Board of Directors. For purposes of this Form, business entities are affiliated if, directly or indirectly, one business entity controls or has the power to control another business entity, or if an individual or group of individuals controls or has the power to control both entities. Indicia of control shall include, without limitation, interlocking management or ownership, identity of interests among family members, shared organization of a business entity following the ineligibility of a business entity under this Article, or using substantially the same management, ownership or principles as the ineligible entity.

(Continued)

Any person or entity who claims that this Article is inapplicable to him/her/it because a conviction or judgment has been reversed by a court of competent jurisdiction shall prove the same with documentation satisfactory to County's Purchasing Official. Upon presentation of such satisfactory proof, the person or entity shall be allowed to contract with County.

I UNDERSTAND THAT THE SUBMISSION OF THIS FORM TO THE CONTRACTING OFFICER FOR MANATEE COUNTY IS VALID THROUGH DECEMBER 31 OF THE CALENDAR YEAR IN WHICH IT IS FILED. I ALSO UNDERSTAND THAT ANY CONTRACT OR BUSINESS TRANSACTION SHALL PROVIDE FOR SUSPENSION OF PAYMENTS, OR TERMINATION, OR BOTH, IF THE CONTRACTING OFFICER OR COUNTY ADMINISTRATOR DETERMINES THAT **SUCH PERSON OR ENTITY HAS MADE FALSE CERTIFICATION.**

_____
[Signature]

STATE OF FLORIDA
COUNTY OF _____

Sworn to and subscribed before me this ____ day of _____, 20_____ by _____

Personally known _____ OR Produced identification _____
[Type of identification]

_____ My commission expires _____
Notary Public Signature

_____
[Print, type or stamp Commissioned name of Notary Public]

Signatory Requirement - In the case of a business entity other than a partnership or a corporation, this affidavit shall be executed by an authorized agent of the entity. In the case of a partnership, this affidavit shall be executed by the general partner(s). In the case of a corporation, this affidavit shall be executed by the corporate president.

EXHIBIT D

SWORN STATEMENT

THE FLORIDA TRENCH SAFETY ACT

THIS FORM MUST BE SIGNED IN THE PRESENCE OF A NOTARY PUBLIC OR BY AN OFFICER AUTHORIZED TO ADMINISTER OATHS.

1. This Sworn Statement is submitted with **IFB NO. 14-3134CD**

2. This Sworn Statement is submitted by_____ 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 _____.

3. Name of individual signing this Sworn Statement is: _____,
   Whose relationship to the above entity is: _____.

4. The Trench Safety Standards that will be in effect during the construction of this project shall include, but are not limited to: Laws of Florida, Chapters 90-96, TRENCH SAFETY ACT, and OSHA RULES AND REGULATIONS 29 CFR 1926.650 Subpart P, effective October 1, 1990.

5. The undersigned assures that the entity will comply with the applicable Trench Safety Standards and agrees to indemnify and hold harmless County and Engineer, and any of their agents or employees from any claims arising from the failure to comply with said standard.

6. The undersigned has appropriated the following costs for compliance with the applicable standards:

Trench Safety Measure (Description)	Units of Measure (LF, SY)	Unit Quantity	Unit Cost	Extended Cost
a. _____	_____	_____	$_____	_____
b. _____	_____	_____	$_____	_____
c. _____	_____	_____	$_____	_____
d. _____	_____	_____	$_____	_____

7. The undersigned intends to comply with these standards by instituting the following procedures:
   _____
   _____
   _____

THE UNDERSIGNED, in submitting this bid, represents that they have reviewed and considered all available geotechnical information and made such other investigations and tests as they may deem necessary to adequately design the trench safety system(s) to be utilized on this project.

_____
(AUTHORIZED SIGNATURE / TITLE)

SWORN to and subscribed before me this _____ day of _____, 20_____.

(Impress official seal)

Notary Public, State of Florida: _____

My commission expires: _____

R. B. "Chips" Shore

CLERK OF THE CIRCUIT COURT AND COMPTROLLER OF MANATEE COUNTY

1115 Manatee Avenue West, Bradenton, Florida 34205 - Phone (941) 749-1800 – Fax (941) 741-4082
P.O. Box 25400, Bradenton, Florida 34206 - www.manateeclerk.com

EXHIBIT E: E PAYABLES APPLICATION

Company name_____

Contact person_____

Phone number_____

Email Address_____

FINANCE USE ONLY

Open orders: YES or NO

PEID _____

CREATE DATE _____

CONFIRMED WITH _____
Name and phone number

IFAS _____

BANK _____

INITIALS_____

Revised: June 26, 2013

Return completed form to:

Via email to: lori.bryan@manateeclerk.com

Via fax to: (941) 741-4011

Via mail:

PO Box 1000

Bradenton, Fl 34206

TECHNICAL SPECIFICATIONS

FOR THE CONSTRUCTION OF

SWWRF ABW FILTER REHAB

PREPARED FOR:

MANATEE COUNTY UTILITIES
MANATEE COUNTY, FL

VOLUME 1 OF 2
TECHNICAL SPECIFICATIONS

For Information regarding
this project contact:

THOMAS V. WALDECK, P.E.
4350 West Cypress Street
Suite #600
Tampa, FL 33607-4178
(813) 281-7745

CH2MHILL

CH2M HILL
Project No. 491792

SEPTEMBER 2014

BID DOCUMENTS

SECTION 00 01 07
SEALS PAGE

MANATEE COUNTY UTILITIES
MANATEE COUNTY, FLORIDA

SWWRF ABW FILTER REHAB

TECHNICAL SPECIFICATIONS

Tao Fu, P.E. No. 63138

DIVISION 01 – GENERAL REQUIREMENTS
01 01 00, 01 01 50, 01 03 00, 01 09 00, 01 15 00,
01 15 20, 01 15 30, 01 29 00, 01 31 00, 01 31 13,
01 31 19, 01 32 00, 01 33 00, 01 37 00, 01 38 00,
01 41 00, 01 42 13, 01 43 33, 01 50 00, 01 58 00,
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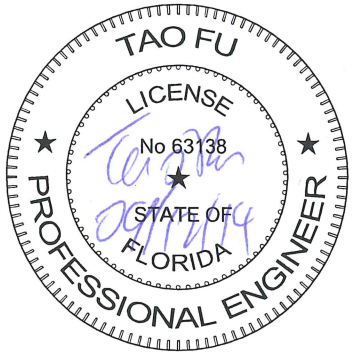
DIVISION 02 – EXISTING CONDITIONS
02 41 00
DIVISION 44 – POLLUTION CONTROL EQUIPMENT
44 43 15

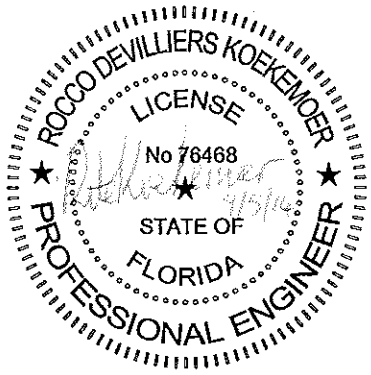


DIVISION 3—CONCRETE

DIVISION 5—METALS

ENGINEER

ROCCO KOEKEMOER

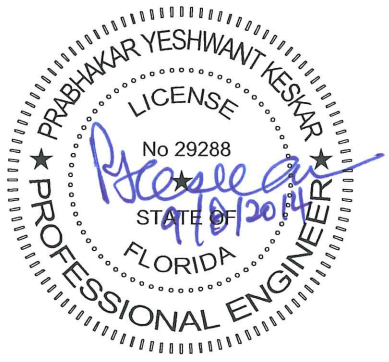


DIVISION 26—ELECTRICAL

DIVISION 40—PROCESS INTEGRATION

ENGINEER

PY KESKAR



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TECHNICAL

SPECIFICATIONS

SECTION 01 01 00
SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. The completed Work will provide Owner with rehabilitated Automatic Backwash Filters and includes:

1. Replace porous plates, and media for Filters No. 3, 4, and 5.
2. Replace skimmer assemblies for Filters No. 2 through 7.
3. Replace control panels of Filters No. 2, 3, 4, and 5.
4. Modification of control panels of Filters No. 6 and 7 for the installation of new skimmer assemblies.
5. Replace all bridge drive assemblies, rails, rail caps, wheels, and shafts for Filters No. 3 through 5. Replace all rails, rail caps, and wheels for Filter No. 2.
6. Replace backwash shoe and tensioning assemblies for Filters No. 3 through 5.
7. Replace flat festoon electrical power and signal cables for Filters No. 2 through 7. Replace festoon cable tracks and cable trolleys for Filters No. 2 through No. 5.
8. Replacement of indexing peg systems on Filters No. 2 through 7.
9. Replace limit switches and level sensors for Filters No. 2 through No. 5. Replace limit switches for Filters No. 6 and 7.
10. Provide an un-installed spare skimmer pump.
11. Concrete structural repair of Filters No. 2 through 5.
12. Seal off all seven filter bypass channels with Type 316 stainless steel plates.
13. Demolition of existing underdrain systems of Filters No. 3 through 5. Demolition of existing control panels, rails, level sensors, and festoon cable tracks and trolleys of Filters No. 2 through 5. Demolition of existing indexing peg systems, festoon cables and limit switches of Filters No. 2 through 7. Demolition of any other existing filter components as required for a complete operating system.
14. Electrical, Instrumentation and Control works for a complete operating system.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 01 50 CONTROL OF WORK

PART 1 GENERAL

1.01 WORK PROGRESS

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

1.02 PRIVATE LAND

The Contractor shall not enter or occupy private land outside of easements, except by permission of the affected property owner.

1.03 WORK LOCATIONS

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

1.04 OPEN EXCAVATIONS

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

B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be barricaded and well lighted at all times when construction is not in progress.

1.05 DISTRIBUTION SYSTEMS AND SERVICES

A. The Contractor shall avoid interruptions to water, telephone, cable TV, sewer, gas, or other related utility services. He shall notify the County and the appropriate agency well in advance of any requirement for dewatering, isolating, or relocating

a section of a utility, so that necessary arrangements may be made.

B. If it appears that utility service will be interrupted for an extended period, the County may order the Contractor to provide temporary service lines at the Contractor's expense. Inconvenience of the users shall be kept to the minimum, consistent with existing conditions. The safety and integrity of the systems are of prime importance in scheduling work.

1.06 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

A. The Contractor shall assume full responsibility for the protection of all buildings, structures and utilities, public or private, including poles, signs, services to building utilities, gas pipes, water pipes, hydrants, sewers, drains and electric and telephone cables and other similar facilities, whether or not they are shown on the Drawings. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind. Any damage resulting from the Contractor's operation shall be repaired by the Contractor at his expense.

B. The Contractor shall bear full responsibility for obtaining locations of all underground structures and utilities (including existing water services, drain lines and sewers). Services to buildings shall be maintained and all costs or charges resulting from damage thereto shall be paid by the Contractor.

C. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be a part of the work under the Contract and all costs in connection therewith shall be included in the unit prices established in the Bid.

D. If, in the opinion of the County, permanent relocation of a utility owned by the County is required, he may direct the Contractor, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices, if applicable, or as extra work as classified in the General Conditions. If relocation of a privately owned utility is required, the County will notify the utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the County and utility and shall have no claim for delay due to such relocation. The Contractor shall notify public utility companies in writing at least 48 hours (excluding Saturdays, Sundays and legal holidays) before excavating near their utilities.

1.07 TEST PITS

Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor immediately after the utility location and the surface shall be restored in a manner equal or better than the original condition. No separate payment will be made.

1.08 CARE AND PROTECTION OF PROPERTY

A. The Contractor shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the

part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition equal or better to that existing before the damage was done, or he shall make good the damage in another manner acceptable to the County.

B. All sidewalks which are disturbed by the Contractor's operations shall be restored to their original or better condition by the use of similar or comparable materials. All curbing shall be restored in a condition equal to the original construction and in accordance with the best modern practice.

C. Along the location of this work, all fences, walks, bushes, trees, shrubbery and other physical features shall be protected and restored in a thoroughly workmanlike manner unless otherwise shown on the drawings. Fences and other features removed by the Contractor shall be replaced in the location indicated by the County as soon as conditions permit. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be regraded and sodded to equal or exceed original conditions.

D. Trees close to the work which drawings do not specify to be removed, shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification to the County. All injuries to bark, trunk, limbs and roots of trees shall be repaired by dressing, cutting and painting according to approved methods, using only approved tools and materials.

E. The protection, removal and replacement of existing physical features along the line of work shall be a part of the work under the Contract and all costs in connection therewith shall be included in the unit and/or lump sum prices established under the items in the Bid.

1.09 MAINTENANCE OF TRAFFIC

A. Open pits, trenches, unpaved streets, debris, or other obstructions due to construction that will prevent the normal flow of traffic during an extended construction stoppage, for any reason, shall be minimized. In the event an extended construction stoppage is found to be necessary, Contractor shall, at his own expense, provide normal traffic flow during extended construction stoppage. Extended stoppage will be defined by the County.

B. All excavated material shall be placed so that vehicular and pedestrian traffic may be maintained at all times. If the Contractor's operations cause traffic hazards, he shall repair the road surface, provide temporary roadways, erect wheel guards or fences, or take other safety measures which are satisfactory to the County.

C. Any changes to the traffic pattern require a Traffic Control Plan as detailed in section 01570 of this specification..

1.10 WATER FOR CONSTRUCTION PURPOSES

A. In locations where public water supply is available, the Contractor may purchase water for all construction purposes.

B. The Contractor shall be responsible for paying for all water tap fees incurred for the purpose of obtaining a potable water service or temporary use meter.

1.11 MAINTENANCE OF FLOW

The Contractor shall at his own cost, provide for the flow of sewers, drains and water courses interrupted during the progress of the work and shall immediately cart away and remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the County well in advance of the interruption of any flow.

1.12 CLEANUP

During the course of the work, the Contractor shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures and any other refuse remaining from the construction operations and shall leave the entire site of the work in a neat and orderly condition.

1.13 COOPERATION WITHIN THIS CONTRACT

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

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

1.14 PROTECTION OF CONSTRUCTION AND EQUIPMENT

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

B. All structures shall be protected in a manner approved by the County. Should any of the floors or other parts of the structures become heaved, cracked, or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor, at his own expense and to the satisfaction of the County. If, in the final inspection of the work, any defects, faults, or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the warranty period described in the Contract.

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

1.15 CONSTRUCTION WITHIN RIGHT-OF-WAY

Where pipe lines are installed within FDOT right-of-way, all excavation backfill and compaction for the purpose of reconstructing roadways and/or adjacent slopes contiguous thereto shall be in accordance with FDOT or Manatee County Standards and Specifications, whichever is applicable. Contractor shall satisfy the authorized representative of the FDOT with respect to proper safety procedures, construction methods, required permitting, etc., within the FDOT right-of-way.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 03 00 SPECIAL PROJECT PROCEDURES

PART 1 GENERAL

1.01 PERMITS

Upon notice of award, the Contractor shall immediately apply for all applicable permits not previously obtained by the County to do the work from the appropriate governmental agency or agencies. No work shall commence until all applicable permits have been obtained and copies delivered to the County. The costs for obtaining all permits shall be borne by the Contractor.

1.02 CONNECTIONS TO EXISTING SYSTEM

The Contractor shall perform all work necessary to locate, excavate and prepare for connections to the existing systems all as shown on the Drawings or where directed by the County. The cost for this work and for the actual connection shall be included in the price bid for the project and shall not result in any additional cost to the County. The termination point for each contract shall be as shown on the Contract Drawings.

1.03 RELOCATIONS

The Contractor shall be responsible for the coordination of the relocation of structures, including but not limited to light poles, power poles, signs, sign poles, fences, piping, conduits and drains that interfere with the positioning of the work as set out on the Drawings. No relocation of the items under this Contract shall be done without approval from the County.

1.04 EXISTING UNDERGROUND PIPING, STRUCTURES AND UTILITIES

A. The attention of the Contractor is drawn to the fact that during excavation, the possibility exists of the Contractor encountering various utility lines not shown on the Drawings. The Contractor shall exercise extreme care before and during excavation to locate and flag these lines as to avoid damage to the existing lines.

B. It is the responsibility of the Contractor to ensure that all utility or other poles, the stability of which may be endangered by the close proximity of excavation, are temporarily stayed in position while work proceeds in the vicinity of the pole and that the utility or other companies concerned be given reasonable advance notice.

C. The existing utility 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. The Contractor shall be responsible for notifying the various utility companies to locate their respective utilities in advance of construction in conformance with all requirements provided for in the Florida Underground Facilities Damage Prevention and Safety Act (Florida Statutes, Title XXXIII, Chapter 556).

D. The existing piping and utilities that interfere with new construction shall be rerouted as shown, specified, or required. Before any piping and utilities not shown

on the Drawings are disturbed, the Contractor shall notify the County and shall provide suggestions on how best to resolve the issue.

E. The Contractor shall exercise care in any excavation to locate all existing piping and utilities. All utilities which do not interfere with complete work shall be carefully protected against damage. Any existing utilities damaged in any way by the Contractor shall be restored or replaced by the Contractor at his expense as directed by the County.

F. It is intended that wherever existing utilities such as water, sewer, gas, telephone, 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 in the Drawings. However, when in the opinion of the County this procedure is not feasible, he may direct the use of fittings for a utilities crossing as detailed on the Drawings. No deflections will be allowed in gravity sanitary sewer lines or in existing storm sewer lines.

1.05 SUSPENSION OF WORK DUE TO WEATHER

Refer to FDOT Standards and Specifications Book, Section 8.

1.06 HURRICANE PREPAREDNESS PLAN

A. Within 30 days of the date of Notice to Proceed, the Contractor shall submit to the County a Hurricane Preparedness Plan. The plan should outline the necessary measures which the Contractor proposes to perform at no additional cost to the County in case of a hurricane warning.

B. In the event of inclement weather, or whenever County shall direct, Contractor shall insure that he and his Subcontractors shall carefully protect work and materials against damage or injury from the weather. If, in the opinion of the County, any portion of work or materials is damaged due to the failure on the part of the Contractor or Subcontractors to protect the work, such work and materials shall be removed and replaced at the expense of the Contractor.

1.07 POWER SUPPLY

Electricity as may be required for construction and permanent power supply shall be secured and purchased by the Contractor.

1.08 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 County and if so shall be protected for a reasonable time until picked up by the County. Any equipment or material not worthy of salvaging, as directed by the County, shall be disposed of by the Contractor at no additional cost.

1.09 DEWATERING

A. The Contractor shall do all groundwater pumping necessary to prevent flotation of any part of the work during construction operations with his own equipment.

B. The Contractor shall pump out water and wastewater which may seep or leak into the excavations for the duration of the Contract and with his own equipment. He shall dispose of this water in an appropriate manner.

1.10 ADDITIONAL PROVISIONS

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

B. The Contractor shall provide, at his own expense, all necessary temporary facilities for access to and for protection of, all existing facilities. The County's personnel must have ready access at all times to the existing facilities. The Contractor is responsible for all damage to existing structures, equipment and facilities caused by his construction operations and must repair all such damage when and as ordered by the County.

1.11 CONSTRUCTION CONDITIONS

The Contractor shall strictly adhere to the specific requirements of the governmental unit(s) and/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.

1.12 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 dust.

B. Sound levels must meet Manatee County Ordinance #87-34, (which amends Ordinance 81-3, The Manatee County Noise Control Ordinance). Sound levels in excess of such ordinance are sufficient cause to have the work halted until equipment can be quieted to these levels. Work stoppage by the County for excessive noise shall not relieve the Contractor of the other portions of this specification.

C. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

1.13 WARRANTIES

A. All material supplied under these Specifications shall be warranted by the Contractor and the manufacturers for a period of three (3) years. Warranty period shall commence on the date of County acceptance.

B. The material shall be warranted to be free from defects in workmanship, design and materials. If any part of the system should fail during the warranty period, it shall be replaced at no expense to the County.

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 warranties from each of the respective suppliers or manufacturers for all the material specified under these contract specifications,

D. In the event that the manufacturer is unwilling to provide a three-year warranty commencing at the time of County acceptance, the Contractor shall obtain from the manufacturer a four (4) year warranty starting at the time of equipment delivery to the job site. This four-year warranty shall not relieve the Contractor of the three-year warranty starting at the time of County acceptance of the equipment.

1.14 FUEL STORAGE & FILLING

A. If the contractor is storing fuel on site, or doing his own fuel filling of portable equipment (other than hand-held equipment), he is responsible for any required response, clean-up or reporting required, at no additional cost to the county.

B. The Contractor shall prepare and submit a fuel storage / spill abatement plan prior to start of construction if required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 09 00 REFERENCE STANDARDS

PART 1 GENERAL

1.01 REQUIREMENTS

Abbreviations and acronyms used in Contract Documents to identify reference standards.

A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents, or applicable codes established stricter standards.

B. Publication Date: The most recent publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.

1.03 ABBREVIATIONS, NAMES AND ADDRESSES OR ORGANIZATIONS

Obtain copies of reference standards direct from publication source, when needed for proper performance of work, or when required for submittal by Contract Documents.

AA — Aluminum Association
818 Connecticut Avenue, N.W.
Washington, DC 20006

AASHTO — American Association of State Highway and Transportation Officials
444 North Capital Street, N.W.
Washington, DC 20001

ACI — American Concrete Institute
Box 19150
Reford Station
Detroit, MI 48219

AI — Asphalt Institute
Asphalt Institute Building
College Park, MD 20740

AISC — American Institute of Steel Construction
1221 Avenue of the Americas
New York, NY 10020

AISI — American Iron and Steel Institute
1000 16th Street NW
Washington, DC 20036

ANSI — American National Standards Institute
1430 Broadway

New York, NY 10018

ASHRAE American Society of Heating, Refrigerating and Air Conditioning Engineers
179l Tullie Circle, N.E.
Atlanta, GA 30329

ASME American Society of Mechanical Engineers
345 East 47th Street
New York, NY 10017

ASTM American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

AWWA American Water Works Association
6666 West Quincy Avenue
Denver, CO 80235

AWS American Welding Society
2501 N.W. 7th Street
Miami, FL 33125

CRSI Concrete Reinforcing Steel Institute
180 North LaSalle Street, Suite 2110
Chicago, IL 60601

FDEP Florida Department of Environmental Protection
3900 Commonwealth Blvd.
Tallahassee, Florida 32399

FDOT Florida Department of Transportation Standards Specifications for Road and Bridge Construction
Maps & Publication Sales - Mail Station 12
605 Suwannee St.
Tallahassee, FL 32399-0450

FS Federal Specification
General Services Administration Specifications and Consumer Information Distribution Section (WFSIS)
Washington Navy Yard, Bldg. 197
Washington, DC 20407

MCPW UTIL STD Manatee County Utility Engineering
4410-B 66th St. W.
Bradenton, FL 34210

MLSFA Metal Lath/Steel Framing Association
221 North LaSalle Street
Chicago, IL 60601

MMA Monorail Manufacturer's Association

1326 Freeport Road
Pittsburgh, PA 15238

NAAMM National Association of Architectural Metal Manufacturers
221 North LaSalle Street
Chicago, IL 60601

NEMA National Electrical Manufacturer's Assoc.
2101 L Street N.W.
Washington, DC 20037

OHSA Occupational Safety and Health Assoc.
5807 Breckenridge Pkwy., Suite A
Tampa, FL 33610-4249

PCA Portland Cement Association
5420 Old Orchard Road
Skokie, IL 20076

PCI Prestressed Concrete Institute
20 North Wacker Drive
Chicago, IL 60606

SDI Steel Door Institute
712 Lakewood Center North
Cleveland, OH 44107

SMACNA Sheet Metal and Air Conditioning Contractor's National Association
8224 Old Court House Road
Vienna, VA 22180

SSPC Steel Structures Painting Council
402 24th Street, Suite 600
Pittsburgh, PA 15213

SWFWMD Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34604-6899

UL Underwriter's Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 15 00 MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SCOPE

A. The scope of this section of the Contract Documents is to further define the items included in each Bid Item in the Bid Form section of the Contract Documents. Payment will be made based on the specified items included in the description in this section for each bid item.

B. All contract prices included in the Bid Form section will be full compensation for all shop drawings, working drawings, 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.

1.02 WORK OUTSIDE AUTHORIZED LIMITS

No payment will be made for work constructed outside the authorized limits of work.

1.03 MEASUREMENT STANDARDS

Unless otherwise specified for the particular items involved, all measurements of distance shall be taken horizontally or vertically.

1.04 AREA MEASUREMENTS

In the measurement of items to be paid for on the basis of area of finished work, the lengths and/or widths to be used in the calculations shall be the final dimensions measured along the surface of the completed work within the neat lines shown or designated.

1.05 LUMP SUM ITEMS

Where payment for items is shown to be paid for on a lump sum basis, no separate payment will be made for any item of work required to complete the lump sum items. Lump sum contracts shall be complete, tested and fully operable prior to request for final payment. Contractor shall provide a break-down of the lump sum totals in the bid form.

No separate payment will be made for the following items and the cost of such work shall be included in the applicable pay items of work. Final payments shall not be requested by the Contractor or made by the County until as-built (record) drawings have been submitted and approved by the County.

1. Shop Drawings, Working Drawings.
2. Clearing, grubbing and grading except as hereinafter specified.
3. Trench excavation, including necessary pavement removal and rock removal, except as otherwise specified.
4. Dewatering and disposal of surplus water.
5. Structural fill, backfill, and grading.
6. Replacement of unpaved roadways, and shrubbery plots.
7. Cleanup and miscellaneous work.
8. Foundation and borrow materials, except as hereinafter specified.
9. Testing and placing system in operation.
10. Any material and equipment required to be installed and utilized for the tests.

11. Pipe, structures, pavement replacement, asphalt and shell driveways and/or appurtenances included within the limits of lump sum work, unless otherwise shown.
12. Maintaining the existing quality of service during construction.
13. Maintaining or detouring of traffic.
14. Appurtenant work as required for a complete and operable system.
15. Painting.
16. As-built Record Drawings.

BID ITEM 1 - MOBILIZATION

Measurement and payment for this Bid Item shall include full compensation for the required 100 percent (100%) Performance Bond, 100 Percent (100%) Payment Bond, all required insurance for the project and the Contractor's mobilization costs as shown in the Bid Form. Mobilization includes, but it not limited to: preparation and movement of personnel, equipment, supplies and incidentals such as safety and sanitary supplies/ facilities

Payment for mobilization shall not exceed 10 percent (10%) of the total Contract cost unless the Contractor can prove to the County that his actual mobilization cost exceeds 10 percent (10%).

Partial payments for this Bid Item will be made in accordance with the following schedule:

Percent of Original Contract Amount:	Percent Allowable Payment of Mobilization Bid Item Price:
5	25
10	35
25	45
50	50
75	75
100	100

These payments will be subject to the standard retainage provided in the Contract. Payment of the retainage will be made after completion of the work and demobilization.

BID ITEM 2 - DEMOLITION AND CLEANING OF FILTERS NO. 3, 4, AND 5 UNDERDRAIN SYSTEMS

Payment for all work included under this Bid Item shall represent full compensation in accordance with the lump sum price bid for the demolition and cleaning of the underdrain systems of Automatic Backwash Filters No. 3, 4, and 5 all as shown on the Contract Drawings and/or called for in the Contract Specifications, ready for approval and acceptance by the County. Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM 3 – FURNISH AND INSTALL UNDERDRAIN SYSTEMS, FILTER MEDIA, CONTROL PANELS, SKIMMER ASSEMBLIES, BACKWASH SHOE ASSEMBLIES, BACKWASH SHOE TENSIONING ASSEMBLIES, BRIDGE DRIVE ASSEMBLIES, BRIDGE IDLER ASSEMBLIES, FESTOON CABLE SYSTEMS, RAILS, RAIL CAPS, LIMIT SWITCHES, LEVEL SENSORS, AND LIMIT SWITCH TRIP PEG ASSEMBLIES IN FILTERS NO. 3, 4, AND 5.

Payment for all work included under this Bid Item shall represent full compensation in accordance with the lump sum price bid for the furnishing and installation of the underdrain systems, filter media, control panels, skimmer assemblies, backwash shoe assemblies, backwash shoe tensioning assemblies, bridge drive assemblies, bridge idler assemblies, festoon cable systems, rails, rail caps, underdrain systems, media, limit switches, level sensors, and limit switch trip peg assemblies in Filters No. 3, 4, and 5, and all other materials and equipment necessary for a complete and fully operable system, including testing and start-up, all as shown on the Contract Drawings and/or called for in the Contract Specifications, ready for approval and acceptance by the County. The lump sum price shall also include demolition of the existing components, protection of existing structures, and any off-site material required to establish original site conditions. Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM 4 – FURNISH AND INSTALL A CONTROL PANEL, LIMIT SWITCH, LEVEL SENSOR, LIMIT SWITCH TRIP PEG ASSEMBLY, SKIMMER ASSEMBLY, FESTOON CABLE SYSTEM, RAILS, RAIL CAPS, AND WHEELS FOR FILTER NO. 2

Payment for all work included under this Bid Item shall represent full compensation in accordance with the lump sum price bid for the furnishing and installation of a control panel, limit switch, level sensor, limit switch trip peg assembly, a skimmer assembly, a festoon cable system, rails, rail caps, and wheels for Filter No. 2, and all other materials and equipment necessary for a complete and fully operable system, including testing and start-up, all as shown on the Contract Drawings and/or called for in the Contract Specifications, ready for approval and acceptance by the County. The lump sum price shall also include demolition of the existing components, protection of existing structures, and any off-site material required to establish original site conditions. Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM 5 – FURNISH AND INSTALL LIMIT SWITCHES, FESTOON CABLES, LIMIT SWITCH TRIP PEG ASSEMBLIES AND SKIMMER ASSEMBLIES FOR FILTERS NO. 6 AND 7

Payment for all work included under this Bid Item shall represent full compensation in accordance with the lump sum price bid for the furnishing and installation of limit switches, festoon cables, limit switch trip peg assemblies and skimmer assemblies in Filters No. 6 and 7, and all other materials and equipment necessary for a complete and fully operable system, including testing and start-up, all as shown on the Contract Drawings and/or called for in the Contract Specifications, ready for approval and acceptance by the County. The lump sum price shall also include demolition of the existing components, protection of existing structures, and any off-site material required to establish original site conditions. Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM 6 – STRUCTURAL REHABILITATION OF FILTERS NO. 2, 3, 4, AND 5

Payment for all work included under this Bid Item shall represent full compensation in accordance with the lump sum price bid for the structural rehabilitation of Filters No. 2, 3, 4, and 5, including concrete structural repair and the replacement of rails and rail supports, all as shown on the Contract Drawings and/or called for in the Contract Specifications, ready for approval and acceptance by the County. The lump sum price shall also include protection of existing structures, and any off-site material required to establish original site conditions. Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM 7 – SEAL BYPASS CHANNELS OF FILTERS NO. 1, 2, 3, 4, 5, 6 AND 7

Payment for all work included under this Bid Item shall represent full compensation in accordance with the lump sum price bid to seal the bypass channels of Filters No. 1, 2, 3, 4, 5, 6, and 7 as shown on the Contract Drawings and/or called for in the Contract Specifications, ready for approval and acceptance by the County. The lump sum price shall also include protection of existing structures, and any off-site material required to establish original site conditions. Measurement for periodic payments of this lump sum bid item will be in accordance with the approved Schedule of Values, to be supplied by the Contractor in accordance with the Contract Documents.

BID ITEM 8 - CLEANUP AND DEMOBILIZATION

Payment for all work included under this Bid Item shall be made at the Contract lump sum price bid listed in the Bid Form and shall represent full compensation for all labor, materials and equipment required to perform all the work as shown on the Contract Drawings and specified herein and any other miscellaneous work not specifically included for payment under other Bid Items obviously necessary to complete the Contract. Partial payments will be based on the breakdown of the Bid Item in accordance with the Schedule of Values submitted by the Contractor and approved by the County. Payment shall also include full compensation for project photographs, as-builts record drawings, project signs, traffic control, rubbish and spoil removal, repair, replacement or relocation of all signs, walls, private irrigation systems and related items and any and all other items required to complete the project in accordance with Contract Documents.

BID ITEM 9 - CONTRACT CONTINGENCY WORK

Payment for all work under this Bid Item and listed in the Bid Form shall be made only at the County's discretion in order to satisfactorily complete the project in accordance with the Plans and Specifications. This Bid Item shall not exceed 10% of the Bidder's Total Base Bid. The Bidder shall calculate and enter a dollar amount for this Bid Item.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 15 20 REQUESTS FOR PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Submit Applications for Payment to the Project Manager or as directed at the preconstruction meeting, in accordance with the schedule established by Conditions of the Contract and Agreement between County and Contractor.

1.02 FORMAT AND DATA REQUIRED

A. Submit payment requests in the form provided by the County with itemized data typed in accordance with the Bid Form.

B. Provide construction photographs in accordance with Contract Documents.

1.03 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

A. When the County requires substantiating data, Contractor shall submit suitable information with a cover letter.

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

1.04 PREPARATION OF APPLICATION FOR FINAL PAYMENT

Fill in application form as specified for progress payments.

1.05 SUBMITTAL PROCEDURE

A. Submit applications for payment at the times stipulated in the Agreement.

B. Number: Three (3) copies of each application; all signed and certified by the Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 15 30 CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.01 DEFINITION

A. Change Order: Major change in contract scope or time that must be approved and executed by the Board before it becomes effective.

B. Administrative Change Adjustment: Minor change order under 10% of project cost or 20% time, does not have to be Board approved.

C. Field Directive Change: Change to contract quantity that does not require a change of scope or time extension.

1.02 REQUIREMENTS INCLUDED

A. The Contractor shall promptly implement change order procedures:

1. Provide full written data required to evaluate changes.
2. Maintain detailed records of work done on a time-and-material/force account basis.
3. Provide full documentation to County on request.

B. The Contractor shall designate a member of the Contractor's organization who:

1. Is authorized to accept changes to the Work.
2. Is responsible for informing others in the Contractor's employ of the authorized changes into the Work.

1.03 PRELIMINARY PROCEDURES

A. Project Manager may initiate changes by submitting a Request to Contractor. Request will include:

1. Detailed description of the change, products, costs and location of the change in the Project.
2. Supplementary or revised Drawings and Specifications.
3. The projected time extension for making the change.
4. A specified period of time during which the requested price will be considered valid.
5. Such request is for information only and is not an instruction to execute the changes, nor to stop work in progress.

B. Contractor may initiate changes by submitting a written notice to the Project Manager, containing:

1. Description of the proposed changes.
2. Statement of the reason for making the changes.
3. Statement of the effect on the Contract Sum and the Contract Time.
4. Statement of the effect on the work of separate contractors.

5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

1.04 FIELD DIRECTIVE CHANGE

A. In lieu of a Change Order, the Project Manager may issue a Field Directive change for the Contractor to proceed with additional work within the original intent of the Project.

B. Field Directive change will describe changes in the work, with attachments of backup information to define details of the change.

C. Contractor must sign and date the Field Directive change to indicate agreement with the terms therein.

1.05 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump sum proposal and for each unit price which has not previously been established, with sufficient substantiating data to allow the County to evaluate the quotation.

B. On request, provide additional data to support time and cost computations:

1. Labor required.
2. Equipment required.
3. Products required.
    a. Recommended source of purchase and unit cost.
    b. Quantities required.
4. Taxes, insurance and bonds.
5. Credit for work deleted from Contract, similarly documented.
6. Overhead and profit.
7. Justification for any change in Contract Time.

C. Support each claim for additional costs and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal.

1. Name of the County's authorized agent who ordered the work and date of the order.
2. Date and time work was performed and by whom.
3. Time record, summary of hours work and hourly rates paid.
4. Receipts and invoices for:
    a. Equipment used, listing dates and time of use.
    b. Products used, listing of quantities.
    c. Subcontracts.

1.06 PREPARATION OF CHANGE ORDERS

A. Project Manager will prepare each Change Order.

B. Change Order will describe changes in the Work, both additions and deletions, with attachments as necessary to define details of the change.

C. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.07 LUMP SUM/FIXED PRICE CHANGE ORDER

A. Project Manager initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by the Contractor, or requests from the County, or both.

B. Once the form has been completed, all copies should be sent to Contractor for approval. After approval by Contractor, all copies should be sent to County for approval. The County will distribute executed copies after approval by the Board of County Commissioners.

1.08 UNIT PRICE CHANGE ORDER

A. Contents of Change Orders will be based on, either:

1. County's definition of the scope of the required changes.
2. Contractor's Proposal for a change, as approved by the County.
3. Survey of completed work.

B. The amounts of the unit prices to be:

1. Those stated in the Agreement.
2. Those mutually agreed upon between County and Contractor.

1.09 TIME AND MATERIAL/FORCE ACCOUNT CHANGE ORDER/CONSTRUCTION CHANGE AUTHORIZATION

A. At completion of the change, Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this Section.

B. County will determine the allowable cost of such work, as provided in General Conditions and Supplementary Conditions.

C. County will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.

D. County and Contractor will sign and date the Change Order to indicate their agreement therewith.

1.10 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Periodically revise Schedule of Values and Application for Payment forms to record each change as a separate item of work, and to record the adjusted Contract Sum.

B. Periodically revise the Construction Schedule to reflect each change in Contract Time. Revise sub schedules to show changes for other items of work affected by the changes.

C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Schedule of Values.
2. Application for Payment.
3. Final Application for Payment.

1.02 SCHEDULE OF VALUES

A. The Contractor shall submit to the County a Schedule of Values allocated to the various portions of the work, within 10 days after date of Notice to Proceed.

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

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

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

E. Summation of the complete Schedule of Values representing all the Work shall equal the Contract Price.

F. Schedule of Values will be considered for approval by County 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.

G. Schedule of Values 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.

H. Follow the bid form included in this Contract Documents as the format for listing component items.

1.03 APPLICATION FOR PAYMENT

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

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

C. Provide separate form for each schedule as applicable.

D. Include accepted Schedule of Values for each schedule or portion of lump sum Work and the unit price breakdown for the Work to be paid on a unit priced basis.

E. Include separate line item for each Change Order and Work Change Directive executed prior to date of submission. Provide further breakdown of such as requested by Engineer.

F. Preparation:

1. Round values to nearest dollar.
2. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule as applicable, and such supporting data as may be requested by Engineer.

1.04 PAYMENT

A. Payment for all Lump Sum Work shown or specified in Contract Documents is included in the Contract Price. Payment will be based on a percentage complete basis for each line item of the accepted Schedule of Values.

1.05 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:

1. Loading, hauling, and disposing of rejected material.
2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
4. Material not unloaded from transporting vehicle.
5. Defective Work not accepted by Owner.
6. Material remaining on hand after completion of Work.

1.06 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

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

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 00 CONSTRUCTION SCHEDULE & PROJECT RESTRAINTS

PART 1 GENERAL

1.01 GENERAL

A. Construction under this contract must be coordinated with the County and accomplished in a logical order to maintain utilization and flow through existing facilities and public properties and rights-of-way and to allow construction to be completed within the time allowed by Contract Documents and in the manner set forth in the Contract.

1.02 CONSTRUCTION SCHEDULING GENERAL PROVISIONS

A. No work shall be done between 7:00 p.m. and 7:00 a.m. nor on weekends or legal holidays without written permission of the County. However, emergency work may be done without prior permission.

B. Night work may be established by the Contractor as regular procedure with the written permission of the County. Such permission, however, may be revoked at any time by the County if the Contractor fails to maintain adequate equipment and supervision for the proper execution and control of the work at night.

C. Due to potential health hazards and requirements of the State of Florida and the U.S. Environmental Protection Agency, existing facilities must be maintained in operation.

D. The Contractor shall be fully responsible for providing all temporary piping, plumbing, electrical hook-ups, lighting, temporary structure, or other materials, equipment and systems required to maintain the existing facility's operations. All details of temporary piping and temporary construction are not necessarily shown on the Drawings or covered in the Specifications. However, this does not relieve the Contractor of the responsibility to insure that construction will not interrupt proper facility operations.

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

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. The Contractor shall submit a critical path schedule as described herein.

B. The planning, scheduling, management and execution of the work is the sole responsibility of the Contractor. The progress schedule requirement is established to allow County to review Contractor's planning, scheduling, management and execution of the work; to assist County in evaluating work progress and make

progress payments and to allow other contractors to cooperate and coordinate their activities with those of the Contractor.

2.02 FORM OF SCHEDULES

A. Prepare schedules using the latest version of Microsoft Project, or other County approved software, in the form of a horizontal bar chart diagram. The diagram shall be time-scaled and sequenced by work areas. Horizontal time scale shall identify the first work day of each week.

B. Activities shall be at least as detailed as the Schedule of Values. Activity durations shall be in whole working days. In addition, man-days shall be shown for each activity or tabulated in an accompanying report.

C. Diagrams shall be neat and legible and submitted on sheets at least 8-1/2 inches by 11 inches suitable for reproduction. Scale and spacing shall allow space for notations and future revisions.

2.03 CONTENT OF SCHEDULES

A. Each monthly schedule shall be based on data as of the last day of the current pay period.

B. Description for each activity shall be brief, but convey the scope of work described.

C. Activities shall identify all items of work that must be accomplished to achieve substantial completion, such as items pertaining to Contractor's installation and testing activities; items pertaining to the approval of regulatory agencies; contractor's time required for submittals, fabrication and deliveries; the time required by County to review all submittals as set forth in the Contract Documents; items of work required of County to support pre-operational, startup and final testing; time required for the relocation of utilities. Activities shall also identify interface milestones with the work of other contractors performing work under separate contracts with County.

D. Schedules shall show the complete sequence of construction by activities. Dates for beginning and completion of each activity shall be indicated as well as projected percentage of completion for each activity as of the first day of each month.

E. Submittal schedule for shop drawing review, product data, and samples shall show the date of Contractor submittal and the date approved submittals will be required by the County, consistent with the time frames established in the Specifications.

F. For Contract change orders granting time extensions, the impact on the Contract date(s) shall equal the calendar-day total time extension specified for the applicable work in the Contract change orders.

G. For actual delays, add activities prior to each delayed activity on the appropriate critical path(s). Data on the added activities of this type shall portray all steps leading to the delay and shall further include the following: separate activity identification, activity description indicating cause of the delay, activity duration consistent with whichever set of dates below applies, the actual start and finish

dates of the delay or, if the delay is not finished, the actual start date and estimated completion date.

H. For potential delays, add an activity prior to each potentially delayed activity on the appropriate critical path(s). Data for added activities of this type shall include alternatives available to mitigate the delay including acceleration alternatives and further show the following: separate activity identification, activity description indicating cause of the potential delay and activity duration equal to zero work days.

2.04 SUPPORTING NARRATIVE

A. Status and scheduling reports identified below shall contain a narrative to document the project status, to explain the basis of Contractor's determination of durations, describe the Contract conditions and restraints incorporated into the schedule and provide an analysis pertaining to potential problems and practical steps to mitigate them.

B. The narrative shall specifically include:

1. Actual completion dates for activities completed during the monthly report period and actual start
   dates for activities commenced during the monthly report period.
2. Anticipated start dates for activities scheduled to commence during the following monthly report period.
3. Changes in the duration of any activity and minor logic changes.
4. The progress along the critical path in terms of days ahead or behind the Contract date.
5. If the Monthly Status Report indicates an avoidable delay to the Contract completion date or interim completion dates as specified in the Agreement, Contractor shall identify the problem, cause and the activities affected and provide an explanation of the proposed corrective action to meet the milestone dates involved or to mitigate further delays.
6. If the delay is thought to be unavoidable, the Contractor shall identify the problem, cause, duration, specific activities affected and restraints of each activity.
7. The narrative shall also discuss all change order activities whether included or not in the revised/current schedule of legal status. Newly introduced change order work activities and the CPM path(s) that they affect, must be specifically identified. All change order work activities added to the schedule shall conform with the sequencing and Contract Time requirements of the applicable Change Order.
8. Original Contract date(s) shall not be changed except by Contract change order. A revision need not be submitted when the foregoing situations arise unless required by County. Review of a report containing added activities will not be construed to be concurrence with the duration or restraints for such added activities; instead the corresponding data as ultimately incorporated into the applicable Contract change order shall govern.
9. Should County require additional data, this information shall be supplied by Contractor within 10 calendar days.

2.05 SUBMITTALS

A. Contractor shall submit estimated and preliminary progress schedules (as identified in the Terms and Conditions of the Contract and the General Conditions), monthly status reports, a start-up schedule and an as-built schedule report all as specified herein.

B. All schedules, including estimated and preliminary schedules, shall be in conformance with the Contract Documents.

C. The finalized progress schedule discussed in the Contract Documents shall be the first monthly status report and as such shall be in conformance with all applicable specifications contained herein.

D. Monthly Status Report submittals shall include a time-scaled (days after notice to proceed) diagram showing all contract activities and supporting narrative. The initial detailed schedule shall use the notice to proceed as the start date. The finalized schedule, if concurred with by County, shall be the work plan to be used by the contractor for planning, scheduling, managing and executing the work.

E. The schedule diagram shall be formatted as above. The diagram shall include (1) all detailed activities included in the preliminary and estimated schedule submittals, (2) calendar days prior to substantial completion, (3) summary activities for the remaining days. The critical path activities shall be identified, including critical paths for interim dates, if possible.

F. The Contractor shall submit progress schedules with each application for payment.

2.06 MONTHLY STATUS REPORTS

A. Contractor shall submit detailed schedule status reports on a monthly basis with the Application for Payment. The first such status report shall be submitted with the first Application for Payment and include data as of the last day of the pay period. The Monthly Report shall include a "marked-up" copy of the latest detailed schedule of legal status and a supporting narrative including updated information as described above. The Monthly Report will be reviewed by County and Contractor at a monthly schedule meeting and Contractor will address County's comments on the subsequent monthly report. Monthly status reports shall be the basis for evaluating Contractor's progress.

B. The "marked-up" diagram shall show, for the latest detailed schedule of legal status, percentages of completion for all activities, actual start and finish dates and remaining durations, as appropriate. Activities not previously included in the latest detailed schedule of legal status shall be added, except that contractual dates will not be changed except by change order. Review of a marked-up diagram by County will not be construed to constitute concurrence with the time frames, duration, or sequencing for such added activities; instead the corresponding data as ultimately incorporated into an appropriate change order shall govern.

2.07 STARTUP SCHEDULE

A. At least 60 calendar days prior to the date of substantial completion, Contractor shall submit a time-scaled (days after notice to proceed) diagram detailing the work

to take place in the period between 60 days prior to substantial completion, together with a supporting narrative. County shall have 10 calendar days after receipt of the submittal to respond. Upon receipt of County's comments, Contractor shall make the necessary revisions and submit the revised schedule within 10 calendar days. The resubmittal, if concurred with by County, shall be the Work Plan to be used by Contractor for planning, managing, scheduling and executing the remaining work leading to substantial completion.

B. The time-scaled diagram shall use the latest schedule of legal status for those activities completed ahead of the last 60 calendar days prior to substantial completion and detailed activities for the remaining 60-day period within the time frames outlined in the latest schedule of legal status.

C. Contractor will be required to continue the requirement for monthly reports, as outlined above. In preparing this report, Contractor must assure that the schedule is consistent with the progress noted in the startup schedule.

2.08 REVISIONS

A. All revised Schedule Submittals shall be made in the same form and detail as the initial submittal and shall be accompanied by an explanation of the reasons for such revisions, all of which shall be subject to review and concurrence by County. The revision shall incorporate all previously made changes to reflect current as-built conditions. Minor changes to the approved submittal may be approved at monthly meetings; a minor change is not considered a revision in the context of this paragraph.

B. A revised schedule submittal shall be submitted for review when required by County.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 13
PROJECT COORDINATION

PART 1 GENERAL

1.01 SUBMITTALS

A. Sequence of Construction: Within 4 weeks from notice to proceed.

1.02 RELATED WORK AT SITE

A. General:

1. Other work that is either directly or indirectly related to scheduled performance of the Work under these Contract Documents, listed henceforth, is anticipated to be performed at Site by others.
2. Coordinate the Work of these Contract Documents with work of others as specified in General Conditions.
3. Include sequencing constraints specified herein as a part of Progress Schedule.

1.03 CONSTRUCTION SAFETY PROGRAM

A. The Contractor shall develop and maintain for the duration of this Contract, a safety program that will effectively incorporate and implement all required safety provisions. The safety program shall be consistent with all Project Site safety requirements. The Contractor shall appoint an employee who is qualified and authorized to supervise and enforce compliance with the safety program.

B. The duty of the Engineer to conduct construction review of the Contractor’s performance is not intended to include a review or approval of the adequacy of the Contractor's safety supervisor, the safety program, or any safety measures taken in, on, or near the construction site.

1.04 SAFETY EQUIPMENT

A. The Contractor, as part of his safety program, shall maintain at his office or other well-known place at the jobsite, safety equipment applicable to the work as prescribed by the governing safety authorities, all articles necessary for giving first-aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of any person who may be injured on the jobsite.

B. The Contractor shall do all work necessary to protect the general public from hazards, including, but not limited to, surface irregularities or unramped grade changes in pedestrian sidewalk or walkway, and trenches or excavations in roadway. Barricades, lanterns, and proper signs shall be furnished in sufficient amount to safeguard the plant staff, public, and the work.

C. The performance of all work and all completed construction, particularly with respect to ladders, platforms, structure openings, scaffolding, shoring, lagging, machinery guards and the like, shall be in accordance with the applicable governing safety authorities.

D. During construction, the Contractor shall construct and at all times maintain satisfactory and substantial temporary chain link fencing, solid fencing, railing, barricades or steel plates, as applicable, at all openings, obstructions, or other hazards in streets, sidewalks, floors, roofs, and walkways. All such barriers shall have adequate warning lights as necessary, or required, for safety.

1.05 ACCIDENT REPORTS

A. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Engineer and Owner. In addition, the Contractor must promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the Site, giving full details and statements of witnesses.

B. If a claim is made by anyone against the Contractor or any Subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Engineer, giving full details of the claim.

1.06 SAFE ACCESS BY FEDERAL, STATE, AND LOCAL GOVERNMENT OFFICIALS

A. Authorized government officials shall at all times have safe access to the work, and the Contractor shall provide proper facilities for such access and inspection.

1.07 UTILITY NOTIFICATION AND COORDINATION

A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during the Work. Contact Owner to obtain contact person for each utility.

1.08 PROJECT MILESTONES

A. General: Include the Milestones specified herein as a part of the Progress Schedule required under Section 01 32 00, Construction Progress Documentation.

1.09 FACILITY OPERATIONS

A. Continuous operation of Owner's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.

B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner's operations.

C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner's facility.

D. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and Engineer. Such authorization will be considered within 48 hours after receipt of Contractor's written request.

E. Construct Work in the following stages to allow for Owner's continuous occupancy and for uninterrupted operation during construction. The following sequence is not all inclusive and is intended to provide the Contractor with suggestions on construction sequence. The Contractor shall be responsible for planning the construction sequence, and presenting a detailed plan for review and approval by the Owner.

1. The Contractor shall meet the following requirements when sequencing the construction.
    a. Only one filter shall be taken out of service at any given time except when sealing off the filter bypass channels for each group of filters. The Contractor shall request, in writing, to take any filter offline no later than 2 weeks before the anticipated date. Written approval by the Owner is required for taking any filter down at any given time.
    b. Filters No. 3, 4 and 5 shall be fully rehabilitated and put back in service first. The Contractor shall follow direction from the Owner on the exact order of filters to be rehabilitated one at a time during construction.

c. Filters No. 2, 6, and 7 can be rehabilitated sequentially in any order only after Filters No. 3, 4, and 5 are fully rehabilitated and in operation.
d. Sealing off any bypass channels shall occur after all Filters are fully rehabilitated and in operation.
e. Sealing off the bypass channels for Filters No. 1 and 2, sealing off the bypass channels for Filters No. 3, 4, and 5, and sealing off the bypass channels for Filters No. 6 and 7 shall not occur concurrently.
f. Electrical and Instrumentation and Controls: The construction of these systems shall be coordinated with the mechanical equipment such that power and controls shall be installed and ready for startup at the appropriate time. The electrical system shall be installed, and connections shall be made to existing power feeds so as to minimize downtime.

F. Process or Facility Shutdown:

1. Provide 14 days advance written request for approval of need to shut down a process or facility to Owner and Engineer.
2. Power outages will be considered upon 48 hours written request to Owner and Engineer. Describe the reason, anticipated length of time, and areas affected by the outage. Provide temporary provisions for continuous power supply to critical facility components.

G. Do not proceed with Work affecting a facility's operation without obtaining Owner's and Engineer's advance approval of the need for and duration of such Work.

H. Relocation of Existing Facilities:

1. During construction, it is expected that minor relocations of Work will be necessary.
2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
4. Perform relocations to minimize downtime of existing facilities.
5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Engineer.

1.10 ADJACENT FACILITIES AND PROPERTIES

A. Examination:

1. After Effective Date of the Agreement and before Work at Site is started, Contractor, Engineer, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

B. Documentation:

1. Record and submit documentation of observations made on examination inspections in accordance with Section 01 38 00, Construction Photographs.
2. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and Owner.

1.11 REFERENCE POINTS AND SURVEYS

A. Location and elevation of bench marks are shown on Drawings. Contractor shall survey before and after the rail installation to ensure that the tolerance meets the Filter Manufacturer's requirements.

B. Contractor's Responsibilities:

1. Provide additional survey and layout required to layout the Work.
2. Notify Engineer at least 3 working days in advance of time when grade and line to be provided by Owner will be needed.
3. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
4. In event of discrepancy in data or staking provided by Owner, request clarification before proceeding with Work.
5. Maintain complete accurate log of survey work as it progresses as a Record Document.
6. On request of Engineer, submit documentation.
7. Provide competent employee(s), tools, stakes, and other equipment and materials as Engineer may require to:
    a. Check layout, survey, and measurement work performed by others.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CUTTING, FITTING, AND PATCHING

A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.

B. Obtain prior written authorization of Engineer before commencing Work to cut or otherwise alter:

1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
2. Weather-resistant or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Work of others.

C. Refinish surfaces to provide an even finish.

1. Refinish continuous surfaces to nearest intersection.
2. Refinish entire assemblies.
3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and the Work is evident in finished surfaces.

D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown on Drawings.

E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.

F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.

G. Remove specimens of installed Work for testing when requested by Engineer.

END OF SECTION

SECTION 01 31 19
PROJECT MEETINGS

PART 1 GENERAL

1.01 GENERAL

A. Engineer will schedule physical arrangements for meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 days after each meeting to participants and parties affected by meeting decisions.

1.02 PRECONSTRUCTION CONFERENCE

A. Contractor shall be prepared to discuss the following subjects, as a minimum:

1. Required schedules.
   a. Provide 4 week schedule and full construction schedule during meetings.
2. Status of Bonds and insurance.
3. Sequencing of critical path work items.
4. Progress payment procedures.
5. Project changes and clarification procedures.
6. Use of Site, access, office and storage areas, security and temporary facilities.
7. Major product delivery and priorities.
8. Contractor’s safety plan and representative.

B. Attendees will include:

1. Owner’s representatives.
2. Contractor’s office representative.
3. Contractor’s resident superintendent.
4. Contractor’s quality control representative.
5. Subcontractors’ representatives whom Contractor may desire or Engineer may request to attend.
6. Engineer’s representatives.
7. Others as appropriate.

1.03 PRELIMINARY SCHEDULES REVIEW MEETING

A. As set forth in General Conditions and Section 01 32 00, Construction Progress Documentation.

1.04 PROGRESS MEETINGS

A. Engineer will schedule regular progress meetings at Site, conducted weekly to review the Work progress, Progress Schedules, Schedule of Submittals, Application for Payment, contract modifications, and other matters needing discussion and resolution.

B. Attendees will include:

1. Owner's representative(s), as appropriate.
2. Contractor, Subcontractors, and Suppliers, as appropriate.
3. Engineer's representative(s).
4. Others as appropriate.

1.05 PREINSTALLATION MEETINGS

A. When required in individual Specification sections, convene at Site prior to commencing the Work of that section.

B. Require attendance of entities directly affecting, or affected by, the Work of that section.

C. Notify Engineer 5 days in advance of meeting date.

D. Provide suggested agenda to Engineer to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

1.06 FACILITY STARTUP MEETINGS

A. Schedule and attend a minimum of two facility startup meetings. The first of such meetings shall be held prior to submitting Facility Startup Plan, as specified in Section 01 91 14, Equipment Testing and Facility Startup, and shall include preliminary discussions regarding such plan.

B. Agenda items shall include, but not be limited to, content of Facility Startup Plan, coordination needed between various parties in attendance, and potential problems associated with startup.

C. Attendees will include:

1. Contractor.
2. Contractor's designated quality control representative.
3. Subcontractors and equipment manufacturer's representatives whom Contractor deems to be directly involved in facility startup.

4. Engineer’s representatives.
5. Owner’s operations personnel.
6. Others as required by Contract Documents or as deemed necessary by Contractor.

1.07 OTHER MEETINGS

A. In accordance with Contract Documents and as may be required by Owner and Engineer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Preliminary Progress Schedule: Submit at least 7 days prior to preconstruction conference.
2. Detailed Progress Schedule:
   a. Submit initial Detailed Progress Schedule within 21 days after Effective Date of the Agreement.
   b. Submit an Updated Progress Schedule at each update, in accordance with Article Detailed Progress Schedule.
3. Submit with Each Progress Schedule Submission:
   a. Contractor's certification that Progress Schedule submission is actual schedule being utilized for execution of the Work.
   b. Progress Schedule: four legible copies.
   c. Narrative Progress Report: Same number of copies as specified for Progress Schedule.
4. Prior to final payment, submit a final Updated Progress Schedule.

1.02 PRELIMINARY PROGRESS SCHEDULE

A. In addition to basic requirements outlined in General Conditions, show a detailed schedule, beginning with Notice to Proceed, for minimum duration of 120 days, and a summary of balance of Project through Final Completion.

B. Show activities including, but not limited to the following:

1. Notice to Proceed.
2. Permits.
3. Submittals, with review time. Contractor may use Schedule of Submittals specified in Section 01 33 00, Submittal Procedures.
4. Early procurement activities for long lead equipment and materials.
5. Initial Site work.
6. Earthwork.
7. Specified Work sequences and construction constraints.
8. Contract Milestone and Completion Dates.
9. Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.
10. System startup summary.
11. Project close-out summary.
12. Demobilization summary.

C. Update Preliminary Progress Schedule monthly as part of progress payment process. Failure to do so may result in the Owner withholding all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to Engineer.

D. Format: In accordance with Article Progress Schedule— Critical Path Network**.**

1.03 DETAILED PROGRESS SCHEDULE

A. In addition to requirements of General Conditions, submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.

B. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.

C. When accepted by Engineer, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Updated Progress Schedules.

D. Format: In accordance with Article Progress Schedule— Critical Path Network.

E. Update biweekly to reflect actual progress and occurrences to date, including weather delays.

1.04 PROGRESS SCHEDULE—CRITICAL PATH NETWORK

A. General: Comprehensive computer-generated schedule using CPM, generally as outlined in Associated General Contractors of America (AGC) 580, “Construction Project Planning and Scheduling Guidelines.” If a conflict occurs between the AGC publication and this Specification, this Specification shall govern.

B. Contents:

1. Schedule shall begin with the date of Notice to Proceed and conclude with the date of Final Completion.
2. Identify Work calendar basis using days as a unit of measure.
3. Show complete interdependence and sequence of construction and Project-related activities reasonably required to complete the Work.

4. Identify the Work of separate stages and other logically grouped activities, and clearly identify critical path of activities.
5. Reflect sequences of the Work, restraints, delivery windows, review times, Contract Times and Project Milestones set forth in the Agreement and Section 01 31 13, Project Coordination.
6. Include as applicable, at a minimum:
    a. Obtaining permits, submittals for early product procurement, and long lead time items.
    b. Mobilization and other preliminary activities.
    c. Initial Site work.
    d. Specified Work sequences, constraints, and Milestones, including Substantial Completion date(s) Subcontract Work.
    e. Major equipment design, fabrication, factory testing, and delivery dates.
    f. Sitework.
    g. Concrete Work.
    h. Structural steel Work.
    i. Architectural features Work.
    j. Conveying systems Work.
    k. Equipment Work.
    l. Mechanical Work.
    m. Electrical Work.
    n. Instrumentation and control Work.
    o. Other important Work for each major facility.
    p. Equipment and system startup and test activities.
    q. Project closeout and cleanup.
    r. Demobilization.
7. No activity duration, exclusive of those for Submittals review and product fabrication/delivery, shall be less than 1 day nor more than 14 days, unless otherwise approved.
8. Activity duration for Submittal review shall not be less than review time specified unless clearly identified and prior written acceptance has been obtained from Engineer.

C. Network Graphical Display:

1. Plot or print on paper not greater than 30 inches by 42 inches or smaller than 22 inches by 34 inches, unless otherwise approved.
2. Title Block: Show name of Project, Owner, date submitted, revision or update number, and the name of the scheduler. Updated schedules shall indicate data date.
3. Identify horizontally across top of schedule the time frame by year, month, and day.
4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
5. Indicate the critical path.

6. Show, at a minimum, the controlling relationships between activities.
7. Plot activities on a time-scaled basis, with the length of each activity proportional to the current estimate of the duration.
8. Plot activities on an early start basis unless otherwise requested by Engineer.
9. Provide a legend to describe standard and special symbols used.

D. Schedule Report:

1. On 8-1/2-inch by 11-inch white paper, unless otherwise approved.
2. List information for each activity in tabular format, including at a minimum:
   a. Activity Identification Number.
   b. Activity Description.
   c. Original Duration.
   d. Remaining Duration.
   e. Early Start Date (Actual start on Updated Progress Schedules).
   f. Early Finish Date (Actual finish on Updated Progress Schedules).
   g. Late Start Date.
   h. Late Finish Date.
   i. Total Float.
3. Sort reports, in ascending order, as listed below: Activity number sequence with predecessor and successor activity.

1.05 PROGRESS OF THE WORK

A. Updated Progress Schedule shall reflect:

1. Progress of Work to within 5 working days prior to submission.
2. Approved changes in Work scope and activities modified since submission.
3. Delays in Submittals or resubmittals, deliveries, or Work.
4. Adjusted or modified sequences of Work.
5. Other identifiable changes.
6. Revised projections of progress and completion.
7. Report of changed logic.

B. Produce detailed subschedules during Project, upon request of Owner or Engineer, to further define critical portions of the Work such as facility shutdowns.

C. If Contractor fails to complete activity by its latest scheduled completion date and this Failure is anticipated to extend Contract Times (or Milestones), Contractor shall, within 7 days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current Progress Schedule. Actions by Contractor to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.

D. Owner may order Contractor to increase plant, equipment, labor force or working hours if Contractor fails to:

1. Complete a Milestone activity by its completion date.
2. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

1.06 NARRATIVE PROGRESS REPORT

A. Format:

1. Organize same as Progress Schedule.
2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.

B. Contents:

1. Number of days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).
2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.
3. Contractor’s plan for management of Site (e.g., lay down and staging areas, construction traffic), utilization of construction equipment, buildup of trade labor, and identification of potential Contract changes.
4. Identification of new activities and sequences as a result of executed Contract changes.
5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.
6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.
7. Changes to activity logic.
8. Changes to the critical path.
9. Identification of, and accompanying reason for, any activities added or deleted since the last report.
10. Steps taken to recover the schedule from Contractor-caused delays.

1.07 SCHEDULE ACCEPTANCE

A. Engineer's acceptance will demonstrate agreement that:

1. Proposed schedule is accepted with respect to:
   a. Contract Times, including Final Completion and all intermediate Milestones are within the specified times.
   b. Specified Work sequences and constraints are shown as specified.
   c. Access restrictions are accurately reflected.
   d. Startup and testing times are as specified.
   e. Submittal review times are as specified.
   f. Startup testing duration is as specified and timing is acceptable.
2. In all other respects, Engineer's acceptance of Contractor's schedule indicates that, in Engineer's judgment, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. Engineer's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to Engineer's attention in submittal. Schedule remains Contractor's responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.

B. Unacceptable Preliminary Progress Schedule:

1. Make requested corrections; resubmit within 10 days.
2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process, during which time Contractor shall update schedule on a monthly basis to reflect actual progress and occurrences to date.

C. Unacceptable Detailed Progress Schedule:

1. Make requested corrections; resubmit within 10 days.
2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process.

D. Narrative Report: All changes to activity duration and sequences, including addition or deletion of activities subsequent to Engineer's acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 DEFINITIONS

A. Action Submittal: Written and graphic information submitted by Contractor that requires Engineer's approval.

B. Informational Submittal: Information submitted by Contractor that requires Engineer's review and determination that submitted information is in accordance with the Conditions of the Contract.

1.02 PROCEDURES

A. Direct submittals to Engineer at the following, unless specified otherwise.

1. Available at preconstruction conference.

B. Transmittal of Submittal:

1. Contractor shall:
   a. Review each submittal and check for compliance with Contract Documents.
   b. Stamp each submittal with uniform approval stamp before submitting to Engineer.
      1) Stamp to include Project name, submittal number, Specification number, Contractor's reviewer name, date of Contractor's approval, and statement certifying submittal has been reviewed, checked, and approved for compliance with Contract Documents.
      2) Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
2. Complete, sign, and transmit with each submittal package, one Transmittal of Contractor's Submittal form attached at end of this section.
3. Identify each submittal with the following:
   a. Numbering and Tracking System:
      1) Sequentially number each submittal.
      2) Resubmission of submittal shall have original number with sequential alphabetic suffix.

b. Specification section and paragraph to which submittal applies.
c. Project title and Engineer's project number.
d. Date of transmittal.
e. Names of Contractor, Subcontractor or Supplier, and manufacturer as appropriate.

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

C. Format:

1. Do not base Shop Drawings on reproductions of Contract Documents.
2. Package submittal information by individual specification section. Do not combine different specification sections together in submittal package, unless otherwise directed in specification.
3. Present in a clear and thorough manner and in sufficient detail to show kind, size, arrangement, and function of components, materials, and devices, and compliance with Contract Documents.
4. Index with labeled tab dividers in orderly manner.

D. Timeliness: Schedule and submit in accordance Schedule of Submittals, and requirements of individual specification sections.

E. Processing Time:

1. Time for review shall commence on Engineer's receipt of submittal.
2. Engineer will act upon Contractor's submittal and transmit response to Contractor not later than 30 days after receipt, unless otherwise specified.
3. Resubmittals will be subject to same review time.
4. No adjustment of Contract Times or Price will be allowed as a result of delays in progress of Work caused by rejection and subsequent resubmittals.

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

G. Incomplete Submittals:

1. Engineer will return entire submittal for Contractor's revision if preliminary review deems it incomplete.
2. When any of the following are missing, submittal will be deemed incomplete:
   a. Contractor's review stamp; completed and signed.
   b. Transmittal of Contractor's Submittal; completed and signed.
   c. Insufficient number of copies.

H. Submittals not required by Contract Documents:

1. Will not be reviewed and will be returned stamped “Not Subject to Review.”
2. Engineer will keep one copy and return submittal to Contractor.

1.03 ACTION SUBMITTALS

A. Prepare and submit Action Submittals required by individual specification sections.

B. Shop Drawings:

1. Copies: Six.
2. Identify and Indicate:
   a. Applicable Contract Drawing and Detail number, products, units and assemblies, and system or equipment identification or tag numbers.
   b. Equipment and Component Title: Identical to title shown on Drawings.
   c. Critical field dimensions and relationships to other critical features of Work. Note dimensions established by field measurement.
   d. Project-specific information drawn accurately to scale.
3. Manufacturer’s standard schematic drawings and diagrams as follows:
   a. Modify to delete information that is not applicable to the Work.
   b. Supplement standard information to provide information specifically applicable to the Work.
4. Product Data: Provide as specified in individual specifications.
5. Foreign Manufacturers: When proposed, include names and addresses of at least two companies that maintain technical service representatives close to Project.

C. Samples:

1. Copies: Two, unless otherwise specified in individual specifications.
2. Preparation: Mount, display, or package Samples in manner specified to facilitate review of quality. Attach label on unexposed side that includes the following:
   a. Manufacturer name.
   b. Model number.
   c. Material.
   d. Sample source.

3. Manufacturer's Color Chart: Units or sections of units showing full range of colors, textures, and patterns available.
4. Full-size Samples:
    a. Size as indicated in individual specification section.
    b. Prepared from same materials to be used for the Work.
    c. Cured and finished in manner specified.
    d. Physically identical with product proposed for use.

D. Action Submittal Dispositions: Engineer will review, comment, stamp, and distribute as noted:

1. Approved:
    a. Contractor may incorporate product(s) or implement Work covered by submittal.
    b. Distribution:
        1) One copy furnished Owner.
        2) One copy furnished Resident Project Representative.
        3) One copy retained in Engineer's file.
        4) Remaining copies returned to Contractor appropriately annotated.
2. Approved as Noted:
    a. Contractor may incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
    b. Distribution:
        1) One copy furnished Owner.
        2) One copy furnished Resident Project Representative.
        3) One copy retained in Engineer's file.
        4) Remaining copies returned to Contractor appropriately annotated.
3. Partial Approval, Resubmit as Noted:
    a. Make corrections or obtain missing portions, and resubmit.
    b. Except for portions indicated, Contractor may begin to incorporate product(s) or implement Work covered by submittal, in accordance with Engineer's notations.
    c. Distribution:
        1) One copy furnished Owner.
        2) One copy furnished Resident Project Representative.
        3) One copy retained in Engineer's file.
        4) Remaining copies returned to Contractor appropriately annotated.

4. Revise and Resubmit:
    a. Contractor may not incorporate product(s) or implement Work covered by submittal.
    b. Distribution:
        1) One copy furnished Resident Project Representative.
        2) One copy retained in Engineer's file.
        3) Remaining copies returned to Contractor appropriately annotated.

1.04 INFORMATIONAL SUBMITTALS

A. General:

1. Copies: Submit six copies, unless otherwise indicated in individual specification section.
2. Refer to individual specification sections for specific submittal requirements.
3. Engineer will review each submittal. If submittal meets conditions of the Contract, Engineer will forward copy to appropriate parties. If Engineer determines submittal does not meet conditions of the Contract and is therefore considered unacceptable, Engineer will retain one copy and return remaining copy with review comments to Contractor, and require that submittal be corrected and resubmitted.

B. Certificates:

1. General:
    a. Provide notarized statement that includes signature of entity responsible for preparing certification.
    b. Signed by officer or other individual authorized to sign documents on behalf of that entity.
2. Welding: In accordance with individual specification sections.
3. Installer: Prepare written statements on manufacturer's letterhead certifying installer complies with requirements as specified in individual specification section.
4. Material Test: Prepared by qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
5. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in individual specification sections.
6. Manufacturer's Certificate of Compliance: In accordance with Section 01 43 33, Manufacturers' Field Services.
7. Manufacturer's Certificate of Proper Installation: In accordance with Section 01 43 33, Manufacturers' Field Services.

C. Construction Photographs: In accordance with Section 01 31 13, Project Coordination, and as may otherwise be required in Contract Documents.

D. Closeout Submittals: In accordance with Section 01 77 00, Closeout Procedures.

E. Contractor-design Data (related to temporary construction):

1. Written and graphic information.
2. List of assumptions.
3. List of performance and design criteria.
4. Summary of loads or load diagram, if applicable.
5. Calculations.
6. List of applicable codes and regulations.
7. Name and version of software.
8. Information requested in individual specification section.

F. Manufacturer's Instructions: Written or published information that documents manufacturer's recommendations, guidelines, and procedures in accordance with individual specification section.

G. Operation and Maintenance Data: As required in Section 01 78 23, Operation and Maintenance Data.

H. Payment:

1. Application for Payment: In accordance with Section 01 29 00, Payment Procedures.
2. Schedule of Values: In accordance with Section 01 29 00, Payment Procedures.

I. Schedules:

1. Schedule of Submittals: Prepare separately or in combination with Progress Schedule as specified in Section 01 32 00, Construction Progress Documentation.
    a. Show for each, at a minimum, the following:
        1) Specification section number.
        2) Identification by numbering and tracking system as specified under Paragraph Transmittal of Submittal.
        3) Estimated date of submission to Engineer, including reviewing and processing time.
    b. On a monthly basis, submit updated Schedule of Submittals to Engineer if changes have occurred or resubmittals are required.

2. Progress Schedules: In accordance with Section 01 32 00, Construction Progress Documentation.

J. Special Guarantee: Supplier's written guarantee as required in individual specification sections.

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

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

1. Promptly submit notifications, reports, certifications, payrolls, and otherwise as may be required, directly to the applicable federal, state, or local governing agency or their representative.
2. Transmit to Engineer for Owner's records one copy of correspondence and transmittals (to include enclosures and attachments) between Contractor and governing agency.

M. Test, Evaluation, and Inspection Reports:

1. General: Shall contain signature of person responsible for test or report.
2. Factory:
    a. Identification of product and specification section, type of inspection or test with referenced standard or code.
    b. Date of test, Project title and number, and name and signature of authorized person.
    c. Test results.
    d. If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
    e. Provide interpretation of test results, when requested by Engineer.
    f. Other items as identified in individual specification sections.
3. Field:
    a. As a minimum, include the following:
        1) Project title and number.
        2) Date and time.
        3) Record of temperature and weather conditions.
        4) Identification of product and specification section.
        5) Type and location of test, Sample, or inspection, including referenced standard or code.
        6) Date issued, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.

7) If test or inspection deems material or equipment not in compliance with Contract Documents, identify corrective action necessary to bring into compliance.
8) Provide interpretation of test results, when requested by Engineer.
9) Other items as identified in individual specification sections.

N. Testing and Startup Data: In accordance with Section 01 91 14, Equipment Testing and Facility Startup.

O. Training Data: In accordance with Section 01 43 33, Manufacturers' Field Services.

1.05 SUPPLEMENTS

A. The supplement listed below, following "End of Section", is part of this Specification.

1. Form: Transmittal of Contractor's Submittal.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

CH2MHILL

TRANSMITTAL OF CONTRACTOR'S SUBMITTAL

(ATTACH TO EACH SUBMITTAL)

DATE: _____

TO: _____ _____ _____ _____ _____ **FROM**: _____ Contractor _____ _____ _____	Submittal No.: _____ ☐ New Submittal ☐ Resubmittal Project: _____ Project No.: _____ Specification Section No.: _____ **(Cover only one section with each transmittal)** Schedule Date of Submittal: _____

SUBMITTAL TYPE:	☐ Shop Drawing	☐ Sample	☐ Informational

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model Number, Etc.)	Spec. and Para. No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

Contractor hereby certifies that (i) Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: _____

Contractor (Authorized Signature)

SECTION 01 37 00 SCHEDULE OF VALUES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall submit to the County a Schedule of Values allocated to the various portions of the work, within 10 days after date of Notice to Proceed.

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

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

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Schedule of Values will be considered for approval by County 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 of Values 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. Follow the table of contents for the Contract Document as the format for listing component items for structures:

1. Identify each line item with the number and title of the respective major section of the specification.
2. For each line item, list sub values of major products or operations under item.

D. Follow the bid sheets included in this Contract Documents as the format for listing component items for pipe lines.

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 38 00 CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall employ a competent photographer to take construction record photographs including furnishing all labor, materials, equipment and incidentals necessary to obtain photographs of all construction areas.

B. Construction progress information shall consist of photographs and digital photographs on a recordable compact disc (CD-R).

1.02 QUALIFICATIONS

A. All photography shall be done by a competent camera operator who is fully experienced and qualified with the specified equipment.

B. For the video recording, the audio portion should be done by a person qualified and knowledgeable in the specifics of the Contract, who shall speak with clarity and diction so as to be easily understood.

1.03 PROJECT PHOTOGRAPHS

A. Provide one print of each photograph with each pay application.

B. Provide one recordable compact disc with digital photographs with each pay application.

C. Negatives:

1. All negatives shall remain the property of photographer.
2. The Contractor shall require that photographer maintain negatives or protected digital files for a period of two years from date of substantial completion of the project.
3. Photographer shall agree to furnish additional prints to County at commercial rates applicable at time of purchase. Photographer shall also agree to participate as required in any litigation requiring the photographer as an expert witness.

D. The Contractor shall pay all costs associated with the required photography and prints. Any parties requiring additional photography or prints shall pay the photographer directly.

E. All project photographs shall be a single weight, color image. All finishes shall be smooth surface and glossy and all prints shall be 8 inches x 10 inches.

F. Each print shall have clearly marked on the back, the name of the project, the orientation of view, the date and time of exposure, name and address of the photographer and the photographers numbered identification of exposure.

G. All project photographs shall be taken from locations to adequately illustrate conditions prior to construction, or conditions of construction and state of progress. The Contractor shall consult with the County at each period of photography for instructions concerning views required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 41 00 TESTING AND TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. County shall employ and pay for the services of an independent testing laboratory to perform testing specifically indicated on the Contract Documents or called out in the Specifications. County may elect to have materials and equipment tested for conformity with the Contract Documents at any time.

1. Contractor shall cooperate fully with the laboratory to facilitate the execution of its required services.
2. Employment of the laboratory shall in no way relieve the Contractor's obligations to perform the work of the Contract.

1.02 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.
2. Approve or accept any portion of the Work.
3. Perform any duties of the Contractor.

1.03 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel; provide access to Work and/or to Manufacturer's operations.

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

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

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

E. Furnish incidental labor and facilities:

1. To provide access to work to be tested.
2. To obtain and handle samples at the project site or at the source of the product to be tested.
3. To facilitate inspections and tests.
4. For storage and curing of test samples.

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

1. When tests or inspections cannot be performed due to insufficient notice, Contractor shall reimburse County for laboratory personnel and travel expenses incurred due to Contractor's negligence.

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

H. If the test results indicate the material or equipment complies with the Contract Documents, the County shall pay for the cost of the testing laboratory. If the tests and any subsequent retests indicate the materials and equipment fail to meet the requirements of the Contract Documents, the contractor shall pay for the laboratory costs directly to the testing firm or the total of such costs shall be deducted from any payments due the Contractor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 42 13
ABBREVIATIONS AND ACRONYMS

PART 1 GENERAL

1.01 REFERENCE TO STANDARDS AND SPECIFICATIONS OF TECHNICAL SOCIETIES

A. Reference to standards and specifications of technical societies and reporting and resolving discrepancies associated therewith shall be as provided in Article 3 of the General Conditions, and as may otherwise be required herein and in the individual Specification sections.

B. Work specified by reference to published standard or specification of government agency, technical association, trade association, professional society or institute, testing agency, or other organization shall meet requirements or surpass minimum standards of quality for materials and workmanship established by designated standard or specification.

C. Where so specified, products or workmanship shall also meet or exceed additional prescriptive or performance requirements included within Contract Documents to establish a higher or more stringent standard of quality than required by referenced standard.

D. Where two or more standards are specified to establish quality, product and workmanship shall meet or exceed requirements of most stringent.

E. Where both a standard and a brand name are specified for a product in Contract Documents, proprietary product named shall meet or exceed requirements of specified reference standard.

F. Copies of standards and specifications of technical societies:

1. Copies of applicable referenced standards have not been bound in these Contract Documents.
2. Where copies of standards are needed by Contractor, obtain a copy or copies directly from publication source and maintain in an orderly manner at the Site as Work Site records, available to Contractor’s personnel, Subcontractors, Owner, and Engineer.

1.02 ABBREVIATIONS

A. Abbreviations for trade organizations and government agencies: Following is a list of construction industry organizations and government agencies to which references may be made in the Contract Documents, with abbreviations used.

1.	AA	Aluminum Association
2.	AABC	Associated Air Balance Council
3.	AAMA	American Architectural Manufacturers Association
4.	AASHTO	American Association of State Highway and Transportation Officials
5.	ABMA	American Bearing Manufacturers' Association
6.	ACI	American Concrete Institute
7.	AEIC	Association of Edison Illuminating Companies
8.	AGA	American Gas Association
9.	AGMA	American Gear Manufacturers' Association
10.	AI	Asphalt Institute
11.	AISC	American Institute of Steel Construction
12.	AISI	American Iron and Steel Institute
13.	AITC	American Institute of Timber Construction
14.	ALS	American Lumber Standards
15.	AMCA	Air Movement and Control Association
16.	ANSI	American National Standards Institute
17.	APA	APA – The Engineered Wood Association
18.	API	American Petroleum Institute
19.	APWA	American Public Works Association
20.	AHRI	Air-Conditioning, Heating, and Refrigeration Institute
21.	ASA	Acoustical Society of America
22.	ASABE	American Society of Agricultural and Biological Engineers
23.	ASCE	American Society of Civil Engineers
24.	ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
25.	ASME	American Society of Mechanical Engineers
26.	ASNT	American Society for Nondestructive Testing
27.	ASSE	American Society of Sanitary Engineering
28.	ASTM	ASTM International
29.	AWI	Architectural Woodwork Institute
30.	AWPA	American Wood Preservers' Association
31.	AWPI	American Wood Preservers' Institute
32.	AWS	American Welding Society
33.	AWWA	American Water Works Association

34.	BHMA	Builders Hardware Manufacturers' Association
35.	CBM	Certified Ballast Manufacturer
36.	CDA	Copper Development Association
37.	CGA	Compressed Gas Association
38.	CISPI	Cast Iron Soil Pipe Institute
39.	CMAA	Crane Manufacturers' Association of America
40.	CRSI	Concrete Reinforcing Steel Institute
41.	CS	Commercial Standard
42.	CSA	Canadian Standards Association
43.	CSI	Construction Specifications Institute
44.	DIN	Deutsches Institut für Normung e.V.
45.	DIPRA	Ductile Iron Pipe Research Association
46.	EIA	Electronic Industries Alliance
47.	EJCDC	Engineers Joint Contract Documents' Committee
48.	ETL	Electrical Test Laboratories
49.	FAA	Federal Aviation Administration
50.	FCC	Federal Communications Commission
51.	FDA	Food and Drug Administration
52.	FEMA	Federal Emergency Management Agency
53.	FIPS	Federal Information Processing Standards
54.	FM	FM Global
55.	Fed. Spec.	Federal Specifications (FAA Specifications)
56.	FS	Federal Specifications and Standards (Technical Specifications)
57.	GA	Gypsum Association
58.	GANA	Glass Association of North America
59.	HI	Hydraulic Institute
60.	HMI	Hoist Manufacturers' Institute
61.	IBC	International Building Code
62.	ICBO	International Conference of Building Officials
63.	ICC	International Code Council
64.	ICEA	Insulated Cable Engineers' Association
65.	IFC	International Fire Code
66.	IEEE	Institute of Electrical and Electronics Engineers, Inc.
67.	IESNA	Illuminating Engineering Society of North America
68.	IFI	Industrial Fasteners Institute
69.	IGMA	Insulating Glass Manufacturer's Alliance
70.	IMC	International Mechanical Code
71.	INDA	Association of the Nonwoven Fabrics Industry
72.	IPC	International Plumbing Code
73.	ISA	International Society of Automation
74.	ISO	International Organization for Standardization

75.	ITL	Independent Testing Laboratory
76.	JIC	Joint Industry Conferences of Hydraulic Manufacturers
77.	MIA	Marble Institute of America
78.	MIL	Military Specifications
79.	MMA	Monorail Manufacturers' Association
80.	MSS	Manufacturer's Standardization Society
81.	NAAMM	National Association of Architectural Metal Manufacturers
82.	NACE	NACE International
83.	NBGQA	National Building Granite Quarries Association
84.	NEBB	National Environmental Balancing Bureau
85.	NEC	National Electrical Code
86.	NECA	National Electrical Contractor's Association
87.	NEMA	National Electrical Manufacturers' Association
88.	NESC	National Electrical Safety Code
89.	NETA	InterNational Electrical Testing Association
90.	NFPA	National Fire Protection Association
91.	NHLA	National Hardwood Lumber Association
92.	NICET	National Institute for Certification in Engineering Technologies
93.	NIST	National Institute of Standards and Technology
94.	NRCA	National Roofing Contractors Association
95.	NRTL	Nationally Recognized Testing Laboratories
96.	NSF	NSF International
97.	NSPE	National Society of Professional Engineers
98.	NTMA	National Terrazzo and Mosaic Association
99.	NWWDA	National Wood Window and Door Association
100.	OSHA	Occupational Safety and Health Act (both Federal and State)
101.	PCI	Precast/Prestressed Concrete Institute
102.	PEI	Porcelain Enamel Institute
103.	PPI	Plastic Pipe Institute
104.	PS	Product Standards Section-U.S. Department of Commerce
105.	RMA	Rubber Manufacturers' Association
106.	RUS	Rural Utilities Service
107.	SAE	SAE International
108.	SDI	Steel Deck Institute
109.	SDI	Steel Door Institute
110.	SJI	Steel Joist Institute
111.	SMACNA	Sheet Metal and Air Conditioning Contractors National Association
112.	SPI	Society of the Plastics Industry
113.	SSPC	The Society for Protective Coatings

114.	STI/SPFA	Steel Tank Institute/Steel Plate Fabricators Association
115.	SWI	Steel Window Institute
116.	TEMA	Tubular Exchanger Manufacturers' Association
117.	TCA	Tile Council of North America
118.	TIA	Telecommunications Industry Association
119.	UBC	Uniform Building Code
120.	UFC	Uniform Fire Code
121.	UL	Underwriters Laboratories Inc.
122.	UMC	Uniform Mechanical Code
123.	USBR	U.S. Bureau of Reclamation
124.	WCLIB	West Coast Lumber Inspection Bureau
125.	WI	Wood Institute
126.	WWPA	Western Wood Products Association

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 43 33
MANUFACTURERS' FIELD SERVICES

PART 1 GENERAL

1.01 DEFINITIONS

A. Person-Day: One person for 8 hours within regular Contractor working hours.

1.02 SUBMITTALS

A. Informational Submittals:

1. Training Schedule: Submit, in accordance with requirements of this Specification, not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.
2. Lesson Plan: Submit, in accordance with requirements of this Specification, proposed lesson plan not less than 21 days prior to scheduled training and revise as necessary for acceptance.

1.03 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

A. Authorized representative of the manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment manufacturer to issue the certifications required of the manufacturer. Additional qualifications may be specified in the individual specification section.

B. Representative subject to acceptance by Owner and Engineer. No substitute representatives will be allowed unless prior written approval by such has been given.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 FULFILLMENT OF SPECIFIED MINIMUM SERVICES

A. Furnish manufacturers' services, when required by an individual specification section, to meet the requirements of this section.

B. Where time is necessary in excess of that stated in the Specifications for manufacturers' services, or when a minimum time is not specified, time required to perform specified services shall be considered incidental.

C. Schedule manufacturer' services to avoid conflict with other onsite testing or other manufacturers' onsite services.

D. Determine, before scheduling services, that conditions necessary to allow successful testing have been met.

E. Only those days of service approved by Engineer will be credited to fulfill specified minimum services.

F. When specified in individual specification sections, manufacturer's onsite services shall include:

1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
3. Providing, on a daily basis, copies of manufacturers' representatives field notes and data to Engineer.
4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Engineer.
5. Resolution of assembly or installation problems attributable to or associated with respective manufacturer's products and systems.
6. Assistance during functional and performance testing, and facility startup and evaluation.
7. Training of Owner's personnel in the operation and maintenance of respective product as required.

3.02 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

A. When so specified, a Manufacturer's Certificate of Compliance, a copy of which is attached to this section, shall be completed in full, signed by entity supplying the product, material, or service, and submitted prior to shipment of product or material or execution of the services.

B. Engineer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.

C. Such form shall certify proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.

D. May reflect recent or previous test results on material or product, if acceptable to Engineer.

3.03 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this section, shall be completed and signed by equipment manufacturer's representative.

B. Such form shall certify signing party is a duly authorized representative of manufacturer, is empowered by manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to ensure equipment is complete and operational.

3.04 TRAINING

A. General:

1. Furnish manufacturers' representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.
2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information specified in Section 01 78 23, Operation and Maintenance Data.
3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.

B. Training Schedule:

1. List specified equipment and systems that require training services and show:
   a. Respective manufacturer.
   b. Estimated dates for installation completion.
   c. Estimated training dates.
2. Allow for multiple sessions when several shifts are involved.
3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by manufacturers' representatives. Adjust schedule for interruptions in operability of equipment.
4. Coordinate with Section 01 32 00, Construction Progress Documentation, and Section 01 91 14, Equipment Testing and Facility Startup.

C. Lesson Plan: When manufacturer or vendor training of Owner personnel is specified, prepare a lesson plan for each required course containing the following minimum information:

1. Title and objectives.
2. Recommended attendees (such as, managers, engineers, operators, maintenance).
3. Course description, outline of course content, and estimated class duration.
4. Format (such as, lecture, self-study, demonstration, hands-on).
5. Instruction materials and equipment requirements.
6. Resumes of instructors providing training.

D. Prestartup Training:

1. Coordinate training sessions with Owner's operating personnel and manufacturers' representatives and with submission of operation and maintenance manuals in accordance with Section 01 78 23, Operation and Maintenance Data.
2. Complete at least 14 days prior to beginning of facility startup.

E. Post-startup Training: If required in Specifications, furnish and coordinate training of Owner's operating personnel by respective manufacturer's representatives.

3.05 SUPPLEMENTS

A. The supplements listed below, following "End of Section", are part of this Specification.

1. Form: Manufacturer's Certificate of Compliance.
2. Form: Manufacturer's Certificate of Proper Installation.

END OF SECTION

MANUFACTURER'S CERTIFICATE OF COMPLIANCE

OWNER: _____

PROJECT NAME: _____

PROJECT NO: _____

PRODUCT, MATERIAL, OR SERVICE SUBMITTED: _____

Comments: _____

_____

_____

_____

_____

_____

I hereby certify that the above-referenced product, material, or service called for by the Contract for the named Project will be furnished in accordance with all applicable requirements. I further certify that the product, material, or service are of the quality specified and conform in all respects with the Contract requirements, and are in the quantity shown.

Date of Execution: _____, 20___

Manufacturer: _____

Manufacturer's Authorized Representative *(print)*: _____

_____

(Authorized Signature)

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____

EQPT TAG NO: _____ EQPT/SYSTEM: _____

PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

☐ Installed in accordance with Manufacturer's recommendations.

☐ Inspected, checked, and adjusted.

☐ Serviced with proper initial lubricants.

☐ Electrical and mechanical connections meet quality and safety standards.

☐ All applicable safety equipment has been properly installed.

☐ Functional tests.

☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

_____

_____

_____

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20___

Manufacturer: _____

By Manufacturer's Authorized Representative: _____

(Authorized Signature)

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Nursery and Landscape Association (ANLA): American Standards for Nursery Stock.
2. Federal Emergency Management Agency (FEMA).
3. National Fire Prevention Association (NFPA): 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.
4. Telecommunications Industry Association (TIA): 568-C, Commercial Building Telecommunications Cabling Standard.
5. U.S. Department of Agriculture (USDA): Urban Hydrology for Small Watersheds.
6. U.S. Weather Bureau: Rainfall-Frequency Atlas of the U.S. for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years.

1.02 SUBMITTALS

A. Informational Submittals:

1. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
2. Temporary Utility Submittals: Sanitary.
3. Temporary Control Submittals: Plan for disposal of waste materials and intended haul routes.

1.03 MOBILIZATION

A. Mobilization shall include, but not be limited to, these principal items:

1. Obtaining required permits.
2. Moving Contractor’s field office and equipment required for first month operations onto Site.
3. Installing temporary construction power, wiring, and lighting facilities.
4. Providing onsite communication facilities, including telephones.
5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
6. Arranging for erection of Contractor’s work and storage yard.

7. Posting OSHA required notices and establishing safety programs and procedures.
8. Having Contractor's superintendent at Site full time.

B. Use area designated for Contractor's temporary facilities as shown on Drawings.

1.04 PROTECTION OF WORK AND PROPERTY

A. Comply with Owner's safety rules while on Owner's property.

B. Keep Owner informed of serious onsite accidents and related claims.

C. Use of Explosives: No blasting or use of explosives will be allowed onsite.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 TEMPORARY UTILITIES

A. Power:

1. Electric power will be available at or near Site. Determine type and amount available and make arrangements for obtaining temporary electric power service, metering equipment, and pay costs for electric power used during Contract period, except for portions of the Work designated in writing by Engineer as substantially complete.
2. Cost of electric power will be borne by Contractor.

B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.

C. Water:

1. Include costs to connect and transport water to construction areas in Contract Price.
2. Owner will provide a place of temporary connection for construction water at Site. Provide temporary facilities and piping required to bring water to point of use and remove when no longer needed. Install an acceptable metering device and pay for water used at Owner's current rate.
3. Provide and bear costs of necessary water required for testing equipment, tanks or basins, and piping prior to Substantial Completion, unless otherwise specifically stated in Specifications for equipment, systems, or facilities to be tested.

D. Provide means to prevent water used for testing from flowing back into source pipeline.

E. Sanitary and Personnel Facilities: Provide and maintain facilities for Contractor's employees, Subcontractors, and other onsite employers' employees. Service, clean, and maintain facilities and enclosures.

F. Telephone Service:

1. Contractor: Arrange and provide onsite telephone service for use during construction. Pay costs of installation and monthly bills.

G. Fire Protection: Furnish and maintain on Site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

3.02 PROTECTION OF WORK AND PROPERTY

A. General:

1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
2. Maintain in continuous service existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and other utilities encountered along line of the Work, unless other arrangements satisfactory to owners of said utilities have been made.
3. Where completion of the Work requires temporary or permanent removal or relocation of existing utility, coordinate activities with owner of said utility and perform work to their satisfaction.
4. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
5. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
6. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.

7. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance: Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
8. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
9. Maintain original Site drainage wherever possible.

B. Existing Structures:

1. Where Contractor contemplates removal of small structures such as mailboxes, signposts, and culverts that interfere with Contractor's operations, obtain approval of property owner and Engineer.
2. Move mailboxes to temporary locations accessible to postal service.
3. Replace items removed in their original location and a condition equal to or better than original.

C. Finished Construction: Protect finished floors and concrete floors exposed as well as those covered with composition tile or other applied surfacing.

D. Waterways: Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.

E. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water.

3.03 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Minimize air pollution from construction operations.
2. Burning: Of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of dumping rock and of carrying rock away in trucks to cause a minimum of dust. Give unpaved streets, roads, detours, or haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.

4. Provide and maintain temporary dust-tight partitions, bulkheads, or other protective devices during construction to permit normal operation of existing facilities. Construct partitions of plywood, insulating board, plastic sheets, or similar material. Construct partitions in such a manner that dust and dirt from demolition and cutting will not enter other parts of existing building or facilities. Remove temporary partitions as soon as need no longer exists.

B. Noise Control:

1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.
2. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments.

C. Water Pollution Control:

1. Prior to commencing excavation and construction, obtain Owner's agreement with detailed plans showing procedures intended to handle and dispose of sewage, groundwater, and dewatering pump discharges.
2. Comply with Section 01 57 13, Temporary Erosion and Sedimentation Control, for stormwater flow and surface runoff.
3. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

D. Erosion, Sediment, and Flood Control: Provide, maintain, and operate temporary facilities as specified in Section 01 57 13, Temporary Erosion and Sedimentation Control, to control erosion and sediment releases, and to protect the Work and existing facilities from flooding during construction period.

3.04 STORAGE YARDS AND BUILDINGS

A. Coordinate requirements with Section 01 61 00, Common Product Requirements.

B. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.

C. Temporary Storage Buildings:

1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.

2. Arrange or partition to provide security of contents and ready access for inspection and inventory.
3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

3.05 ACCESS ROADS

A. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.

B. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.

C. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.

D. Upon completion of construction, restore ground surface disturbed by access road construction to original grade.

3.06 PARKING AREAS

A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner’s operations, or construction operations.

B. Provide parking facilities for personnel working on Project. No employee or equipment parking will be permitted on Owner’s existing paved areas, except as specifically designated for Contractor’s use.

3.07 VEHICULAR TRAFFIC

A. Comply with Laws and Regulations regarding closing or restricting use of public streets or highways. No public or private road shall be closed, except by written permission of proper authority. Ensure the least possible obstruction to traffic and normal commercial pursuits.

B. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.

C. Whenever it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.

D. Road Closures: Maintain satisfactory means of exit for persons residing or having occasion to transact business along route of the Work. If it is necessary to close off roadway or alley providing sole vehicular access to property for periods greater than 2 hours, provide written notice to each owner so affected 3 days prior to such closure. In such cases, closings of up to 4 hours may be allowed. Closures of up to 10 hours may be allowed if a week's written notice is given and undue hardship does not result.

E. Maintenance of traffic is not required if Contractor obtains written permission from Owner and tenant of private property, or from authority having jurisdiction over public property involved, to obstruct traffic at designated point.

F. In making street crossings, do not block more than one-half the street at a time. Whenever possible, widen shoulder on opposite side to facilitate traffic flow. Provide temporary surfacing on shoulders as necessary.

G. Maintain top of backfilled trenches before they are paved, to allow normal vehicular traffic to pass over. Provide temporary access driveways where required. Cleanup operations shall follow immediately behind backfilling.

H. When flaggers and guards are required by regulation or when deemed necessary for safety, furnish them with approved orange wearing apparel and other regulation traffic control devices.

I. Notify fire department and police department before closing street or portion thereof. Notify said departments when streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without written permission from fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. Furnish Contractor's night emergency telephone numbers to police department.

J. Coordinate traffic routing with that of others working in same or adjacent areas.

3.08 CLEANING DURING CONSTRUCTION

A. In accordance with General Conditions, as may be specified in other Specification sections, and as required herein.

B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up and dispose of debris.

C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least weekly, dispose of such waste materials, debris, and rubbish offsite.

D. At least weekly, brush sweep entry drive, roadways, and other streets and walkways affected by the Work and where adjacent to the Work.

END OF SECTION

SECTION 01 58 00 PROJECT IDENTIFICATION AND SIGNS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish, install and maintain County project identification signs.

B. Remove signs on completion of construction.

C. Allow no other signs to be displayed except for traffic control and safety.

1.02 PROJECT IDENTIFICATION SIGN (COUNTY)

A. One painted sign, of not less than 32 square feet (3 square meters) area, with painted graphic content to include:

1. Title of Project.
2. Name of County.
3. Names and titles of authorities as directed by County.
4. Prime Contractor.

B. Graphic design, style of lettering and colors: As approved by the County.

C. Erect on the site at a lighted location of high public visibility, adjacent to main entrance to site, as approved by the County

1.03 INFORMATIONAL SIGNS

A. Painted signs with painted lettering, or standard products.

1. Size of signs and lettering: as required by regulatory agencies, or as appropriate to usage.
2. Colors: as required by regulatory agencies, otherwise of uniform colors throughout project.

B. Erect at appropriate locations to provide required information.

1.04 QUALITY ASSURANCE

A. Sign Painter: Professional experience in type of work required.

B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.

1.05 PUBLIC NOTIFICATION

A. Door Hangers: The Contractor shall generate and distribute door hangers to all residents who will be impacted by project construction.

1. Residents impacted include anyone who resides inside, or within 500 feet of project limits of construction.

B. Door Hangers shall be distributed prior to start of construction of the project. Hangers shall be affixed to doors of residents via elastic bands or tape.

EXAMPLE:

PLEASE PARDON THE INCONVENIENCE WHILE THE ROADWAY IS BEING RECONSTRUCTED IN YOUR NEIGHBORHOOD

This project consists of utility improvements and the reconstruction of ??? Boulevard from U.S. ??? to ??? Street West. The project is expected to begin in August, 200X and be completed in July 200X.

Location Map

WE HOPE TO KEEP ANY INCONVENIENCE TO A MINIMUM. HOWEVER, IF YOU HAVE ANY PROBLEMS, PLEASE CONTACT THE FOLLOWING:

A. Contractor
Contractor Address
Contractor Phone (Site Phone)

Project Manager
PM Address
PM Phone No. & Ext.

B. Project Inspector
Inspector Phone Number

AFTER HOURS EMERGENCY NUMBER – (941) 747-HELP
THANK YOU FOR YOUR UNDERSTANDING AND PATIENCE
MANATEE COUNTY GOVERNMENT – PROJECT MANAGEMENT DEPT.

PART 2 PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: May be new or used, wood or metal, in sound condition structurally adequate to work and suitable for specified finish.

B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.

1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.

C. Rough Hardware: Galvanized.

D. Paint: Exterior quality, as specified in the Contract Documents.

PART 3 EXECUTION

3.01 PROJECT IDENTIFICATION SIGN

A. Paint exposed surface or supports, framing and surface material; one coat of primer and one coat of exterior paint.

B. Paint graphics in styles, size and colors selected.

3.02 MAINTENANCE

The Contractor shall maintain signs and supports in a neat, clean condition; repair damages to structures, framing or sign.

3.03 REMOVAL

The Contractor shall remove signs, framing, supports and foundations at completion of project.

END OF SECTION

SECTION 01 60 00 MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. 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 the County.
3. Manufactured and Fabricated Products:
   a. Design, fabricate and assemble in accordance with the best engineering and shop practices.
   b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
   c. Two or more items of the same kind shall be identical and manufactured by the same manufacturer.
   d. Products shall be suitable for service conditions.
   e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
4. Do not use material or equipment for any purpose other than that for which it is specified.
5. All material and equipment incorporated into the project shall be new.

1.02 MANUFACTURER'S INSTRUCTIONS

A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to County. 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. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with County prior to proceeding. Do not proceed with work without clear instructions.

1.03 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 methods to prevent soiling or damage to products or packaging.

1.04 SUBSTITUTIONS AND PRODUCT OPTIONS

Contractor's Options:

1. For products specified only by reference standard, select any product meeting that standard.
2. For products specified by naming one or more products or manufacturers and "or equal", Contractor must submit a request for substitutions of any product or manufacturer not specifically named in a timely manner so as not to adversely affect the construction schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 61 00
COMMON PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 DEFINITIONS

A. Products:

1. New items for incorporation in the Work, whether purchased by Contractor or Owner for the Project, or taken from previously purchased stock, and may also include existing materials or components required for reuse.
2. Includes the terms material, equipment, machinery, components, subsystem, system, hardware, software, and terms of similar intent and is not intended to change meaning of such other terms used in Contract Documents, as those terms are self-explanatory and have well recognized meanings in construction industry.
3. Items identified by manufacturer's product name, including make or model designation, indicated in manufacturer's published product literature, that is current as of the date of the Contract Documents.

1.02 DESIGN REQUIREMENTS

A. Design of installation, systems, equipment, and components, including supports and anchorage, shall be in accordance with the requirements of latest version of local codes.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Altitude: Provide materials and equipment suitable for installation and operation under rated conditions at 17 feet above sea level.

B. Provide equipment and devices installed outdoors or in unheated enclosures capable of continuous operation within an ambient temperature range of 30 degrees F to 100 degrees F.

1.04 PREPARATION FOR SHIPMENT

A. When practical, factory assemble products. Mark or tag separate parts and assemblies to facilitate field assembly. Cover machined and unpainted parts that may be damaged by the elements with strippable protective coating.

B. Package products to facilitate handling and protect from damage during shipping, handling, and storage. Mark or tag outside of each package or crate to indicate its purchase order number, bill of lading number, contents by name, name of Project and Contractor, equipment number, and approximate weight. Include complete packing list and bill of materials with each shipment.

C. Extra Materials, Special Tools, Test Equipment, and Expendables:

1. Furnish as required by individual Specifications.
2. Schedule:
    a. Ensure that shipment and delivery occurs concurrent with shipment of associated equipment.
    b. Transfer to Owner shall occur immediately subsequent to Contractor's acceptance of equipment from Supplier.
3. Packaging and Shipment:
    a. Package and ship extra materials and special tools to avoid damage during long term storage in original cartons insofar as possible, or in appropriately sized, hinged-cover, wood, plastic, or metal box.
    b. Prominently displayed on each package, the following:
        1) Manufacturer's part nomenclature and number, consistent with Operation and Maintenance Manual identification system.
        2) Applicable equipment description.
        3) Quantity of parts in package.
        4) Equipment manufacturer.
4. Deliver materials to Site.
5. Notify Engineer upon arrival for transfer of materials.
6. Replace extra materials and special tools found to be damaged or otherwise inoperable at time of transfer to Owner.

D. Request a minimum 7-day advance notice of shipment from manufacturer. Upon receipt of manufacturer's advance notice of shipment, promptly notify Engineer of anticipated date and place of equipment arrival.

E. Factory Test Results: Reviewed and accepted by Engineer before product shipment as required in individual Specification sections.

1.05 DELIVERY AND INSPECTION

A. Deliver products in accordance with accepted current Progress Schedule and coordinate to avoid conflict with the Work and conditions at Site. Deliver anchor bolts and templates sufficiently early to permit setting prior to placement of structural concrete.

B. Deliver products in undamaged condition, in manufacturer's original container or packaging, with identifying labels intact and legible. Include on label, date of manufacture and shelf life, where applicable.

C. Unload products in accordance with manufacturer's instructions for unloading or as specified. Record receipt of products at Site. Promptly inspect for completeness and evidence of damage during shipment.

D. Remove damaged products from Site and expedite delivery of identical new undamaged products, and remedy incomplete or lost products to provide that specified, so as not to delay progress of the Work.

1.06 HANDLING, STORAGE, AND PROTECTION

A. Handle and store products in accordance with manufacturer's written instructions and in a manner to prevent damage. Store in approved storage yards or sheds provided in accordance with Section 01 50 00, Temporary Facilities and Controls. Provide manufacturer's recommended maintenance during storage, installation, and until products are accepted for use by Owner.

B. Manufacturer's instructions for material requiring special handling, storage, or protection shall be provided prior to delivery of material.

C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration. Keep running account of products in storage to facilitate inspection and to estimate progress payments for products delivered, but not installed in the Work.

D. Store electrical, instrumentation, and control products, and equipment with bearings in weather-tight structures maintained above 60 degrees F. Protect electrical, instrumentation, and control products, and insulate against moisture, water, and dust damage. Connect and operate continuously space heaters furnished in electrical equipment.

E. Store fabricated products above ground on blocking or skids, and prevent soiling or staining. Store loose granular materials in well-drained area on solid surface to prevent mixing with foreign matter. Cover products that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

F. Store finished products that are ready for installation in dry and well-ventilated areas. Do not subject to extreme changes in temperature or humidity.

G. After installation, provide coverings to protect products from damage due to traffic and construction operations. Remove coverings when no longer needed.

H. Hazardous Materials: Prevent contamination of personnel, storage area, and Site. Meet requirements of product specification, codes, and manufacturer's instructions.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide manufacturer's standard materials suitable for service conditions, unless otherwise specified in the individual Specifications.

B. Where product specifications include a named manufacturer, with or without model number, and also include performance requirements, named manufacturer's products must meet the performance specifications.

C. Like items of products furnished and installed in the Work shall be end products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation and maintenance, spare parts and replacement, manufacturer's services, and implement same or similar process instrumentation and control functions in same or similar manner.

D. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

E. Provide interchangeable components of the same manufacturer, for similar components, unless otherwise specified.

F. Equipment, Components, Systems, and Subsystems: Design and manufacture with due regard for health and safety of operation, maintenance, and accessibility, durability of parts, and shall comply with applicable OSHA, state, and local health and safety regulations.

G. Regulatory Requirement: Coating materials shall meet federal, state, and local requirements limiting the emission of volatile organic compounds and for worker exposure.

H. Safety Guards: Provide for all belt or chain drives, fan blades, couplings, or other moving or rotary parts. Cover rotating part on all sides. Design for easy installation and removal. Use 16-gauge or heavier; galvanized steel, aluminum coated steel, or galvanized or aluminum coated 1/2-inch mesh expanded steel. Provide galvanized steel accessories and supports, including bolts. For outdoors application, prevent entrance of rain and dripping water.

I. Authority Having Jurisdiction (AHJ):

1. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the AHJ, material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ in order to provide a basis for approval under NEC.
2. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark.

J. Equipment Finish:

1. Provide manufacturer's standard finish and color, except where specific color is indicated.
2. If manufacturer has no standard color, provide equipment with gray finish as approved by Owner.

K. Special Tools and Accessories: Furnish to Owner, upon acceptance of equipment, all accessories required to place each item of equipment in full operation. These accessory items include, but are not limited to, adequate oil and grease (as required for first lubrication of equipment after field testing), light bulbs, fuses, hydrant wrenches, valve keys, handwheels, chain operators, special tools, and other spare parts as required for maintenance.

L. Lubricant: Provide initial lubricant recommended by equipment manufacturer in sufficient quantity to fill lubricant reservoirs and to replace consumption during testing, startup, and operation until final acceptance by Owner.

2.02 FABRICATION AND MANUFACTURE

A. General:

1. Manufacture parts to U.S.A. standard sizes and gauges.
2. Two or more items of the same type shall be identical, by the same manufacturer, and interchangeable.
3. Design structural members for anticipated shock and vibratory loads.
4. Use 1/4-inch minimum thickness for steel that will be submerged, wholly or partially, during normal operation.
5. Modify standard products as necessary to meet performance Specifications.

B. Lubrication System:

1. Require no more than weekly attention during continuous operation.
2. Convenient and accessible; oil drains with bronze or stainless steel valves and fill-plugs easily accessible from the normal operating area or platform. Locate drains to allow convenient collection of oil during oil changes without removing equipment from its installed position.
3. Provide constant-level oilers or oil level indicators for oil lubrication systems.
4. For grease type bearings, which are not easily accessible, provide and install stainless steel tubing; protect and extend tubing to convenient location with suitable grease fitting.

2.03 SOURCE QUALITY CONTROL

A. Where Specifications call for factory testing to be witnessed by Engineer, notify Engineer not less than 14 days prior to scheduled test date, unless otherwise specified.

B. Calibration Instruments: Bear the seal of a reputable laboratory certifying instrument has been calibrated within the previous 12 months to a standard endorsed by the National Institute of Standards and Technology (NIST).

C. Factory Tests: Perform in accordance with accepted test procedures and document successful completion.

PART 3 EXECUTION

3.01 INSPECTION

A. Inspect materials and equipment for signs of pitting, rust decay, or other deleterious effects of storage. Do not install material or equipment showing such effects. Remove damaged material or equipment from the Site and expedite delivery of identical new material or equipment. Delays to the Work resulting from material or equipment damage that necessitates procurement of new products will be considered delays within Contractor’s control.

3.02 INSTALLATION

A. Equipment Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

B. No shimming between machined surfaces is allowed.

C. Install the Work in accordance with NECA Standard of Installation, unless otherwise specified.

D. Repaint painted surfaces that are damaged prior to equipment acceptance.

E. Do not cut or notch any structural member or building surface without specific approval of Engineer.

F. Handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's instructions, and as may be specified. Retain a copy of manufacturers' instruction at Site, available for review at all times.

3.03 FIELD FINISHING

A. In accordance with individual Specification sections.

3.04 ADJUSTMENT AND CLEANING

A. Perform required adjustments, tests, operation checks, and other startup activities.

3.05 LUBRICANTS

A. Fill lubricant reservoirs and replace consumption during testing, startup, and operation prior to acceptance of equipment by Owner.

END OF SECTION

SECTION 01 62 00 STORAGE AND PROTECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Provide secure storage and protection for products to be incorporated into the work and maintenance and protection for products after installation and until completion of Work.

1.02 STORAGE

A. Store products immediately on delivery and protect until installed in the Work, in accord with manufacturer's instructions, with seals and labels intact and legible.

B. Exterior Storage

1. Provide substantial platform, blocking or skids to support fabricated products above ground to prevent soiling or staining.
   a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
   b. Prevent mixing of refuse or chemically injurious materials or liquids.

A. Arrange storage in manner to provide easy access for inspection.

1.03 MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continuing basis.
3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings and finishes is not acceptable under requirements of these Contract Documents.

B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1. Equipment shall not be shipped until approved by the County. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the County.
2. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the County 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. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.
5. Lubricants shall be changed upon completion of installation and as frequently as required, thereafter during the period between installation and acceptance.
6. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

1.04 PROTECTION AFTER INSTALLATION

A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide coverings to protect finished surfaces from damage.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 71 00 CLEANING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Execute cleaning during progress of the work and at completion of the work, as required by the General Conditions.

1.02 DISPOSAL REQUIREMENTS

Conduct cleaning and disposal operations to comply with all Federal, State and Local codes, ordinances, regulations and anti-pollution laws.

PART 2 PRODUCTS

2.01 MATERIALS

A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

A. Execute periodic cleaning to keep the work, the site and adjacent properties free from accumulation of waste materials, rubbish and wind-blown debris, resulting from construction operations.

B. Provide on-site containers for the collection of waste materials, debris and rubbish.

C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 DUST CONTROL

A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.

B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

3.03 FINAL CLEANING

A. Employ skilled workmen for final cleaning.

B. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.

C. Prior to final completion or County occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire work is clean.

END OF SECTION

SECTION 01 72 00 PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall maintain at the site for the County one record copy of:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. County's field orders or written instructions.
6. Approved shop drawings, working drawings and samples.
7. Field test records.
8. Construction photographs.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

1. Provide files and racks for storage of documents.
2. Provide locked cabinet or secure storage space for storage of samples.

B. File documents and samples in accordance with CSI format.

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

D. Make documents and samples available at all times for inspection by the County.

1.03 MARKING DEVICES

A. Provide felt tip marking pens for recording information in the color code designated by the County.

1.04 RECORDING

A. Label each document "PROJECT RECORD" in neat large printed letters.

B. Record information concurrently with construction progress.

C. Do not conceal any work until required information is recorded.

D. Drawings; Legibly mark to record actual construction:

1. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc. Locations of drainage ditches, swales,

water lines and force mains shall be shown every 200 feet (measured along the centerline) or alternate lot lines, whichever is closer. Dimensions at these locations shall indicate distance from centerline of right-of-way to the facility.

2. Field changes of dimension and detail.
3. Changes made by Field Order or by Change Order.
4. Details not on original contract drawings.
5. Equipment and piping relocations.
6. Locations of all valves, fire hydrants, manholes, water and sewer services, water and force main fittings, underdrain cleanouts, catch basins, junction boxes and any other structures located in the right-of-way or easement, shall be located by elevation and by station and offset based on intersection P.I.'s and centerline of right-of-way. For facilities located on private roads, the dimensioning shall be from centerline of paving or another readily visible baseline.
7. Elevations shall be provided for all manhole rim and inverts; junction box rim and inverts; catch basin rim and inverts; and baffle, weir and invert elevations in control structures. Elevations shall also be provided at the PVI's and at every other lot line or 200 feet, whichever is less, of drainage swales and ditches. Bench marks and elevation datum shall be indicated.
8. Slopes for pipes and ditches shall be recalculated, based on actual field measured distances, elevations, pipe sizes, and type shown. Cross section of drainage ditches and swales shall be verified.
9. Centerline of roads shall be tied to right-of-way lines. Elevation of roadway centerline shall be given at PVI's and at all intersections.
10. Record drawings shall show bearings and distances for all right-of-way and easement lines, and property corners.
11. Sidewalks, fences and walls, if installed at the time of initial record drawing submittal, shall be located every 200 feet or alternate lot lines, whichever is closer. Dimensions shall include distance from the right-of-way line and the back of curb and lot line or easement line.
12. Sanitary sewer mainline wyes shall be located from the downstream manhole. These dimensions shall be provided by on-site inspections or televiewing of the sewer following installation.
13. Elevations shall be provided on the top of operating nuts for all water and force main valves.
14. Allowable tolerance shall be ± 6.0 inches for horizontal dimensions. Vertical dimensions such as the difference in elevations between manhole inverts shall have an allowable tolerance of ± 1/8 inch per 50 feet (or part thereof) of horizontal distance up to a maximum tolerance of ± 2 inch.
15. Properly prepared record drawings on mylar, together with two copies, shall be certified by a design professional (Engineer and/or Surveyor registered in the State of Florida), employed by the Contractor, and submitted to the County.

E. Specifications and Addenda; Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
2. Changes made by field order or by change order.

F. Shop Drawings (after final review and approval):

1. Five sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

1.05 SUBMITTAL

A. Prior to substantial completion and prior to starting the bacteria testing of water lines, deliver signed and sealed Record Documents and Record Drawings to the County. These will be reviewed and verified by the inspector. If there are any required changes or additions, these shall be completed and the entire signed and sealed set resubmitted prior to final pay application.

B. The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings. Record drawings shall be certified by the professional(s) (Engineer or Surveyor licensed in Florida), as stipulated by the Land Development Ordinance and submitted on signed and sealed paper drawings, signed and dated mylar drawings together with an AutoCAD version on a recordable compact disk (CD).

C. The CD shall contain media in AutoCad Version 2004 or later, or in any other CAD program compatible with AutoCad in DWG or DXF form. All fonts, line types, shape files or other pertinent information used in the drawing and not normally included in AutoCad shall be included on the media with a text file or attached noted as to its relevance and use.

D. Accompany submittal with transmittal letter, containing:

1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each Record Document.
5. Signature of Contractor or his authorized representative.

Note: The data required to properly prepare these record drawings shall be obtained at the site, at no cost to the County by the responsible design professional or his/her duly appointed representative. The appointed representative shall be a qualified employee of the responsible design professional or a qualified inspector retained by the responsible design professional on a project-by-project basis.

PART 2 STANDARDS

2.01 MINIMUM RECORD DRAWING STANDARDS FOR ALL RECORD DRAWINGS SUBMITTED TO MANATEE COUNTY

A. Record drawings shall be submitted to at least the level of detail in the contract documents. It is anticipated that the original contract documents shall serve as at least a background for all record information. Original drawings in CAD format may be requested of the County.

B. Drawings shall meet the criteria of paragraph 1.04 D above.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 74 00 WARRANTIES AND BONDS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Compile specified warranties and bonds.

B. Compile specified service and maintenance contracts.

C. Co-execute submittals when so specified.

D. Review submittals to verify compliance with Contract Documents.

E. Submit to County for review and transmittal.

1.02 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors.

B. Number of original signed copies required: Two each.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product or work item.
2. Firm, with name of principal, address and telephone number.
3. Scope.
4. Date of beginning of warranty, bond or service and maintenance contract.
5. Duration of warranty, bond or service maintenance contract.
6. Provide information for County's personnel:
   a. Proper procedure in case of failure.
   b. Instances which might affect the validity of warranty or bond.
7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2 inch x 11 inch punched sheets for standard 3-ring binder. Fold larger sheets to fit into binders.
2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:
   a. Title of Project.
   b. Name of Contractor.

C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.04 TIME OF SUBMITTALS

A. Make submittals within ten days after date of substantial completion and prior to final request for payment.

B. For items of work, where acceptance is delayed materially beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.05 SUBMITTALS REQUIRED

A. Submit warranties, bonds, service and maintenance contracts as specified in respective sections of Specifications.

B. Approval by the County of all documents required under this section is a pre-requisite to requesting a final inspection and final payment

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Submit prior to application for final payment.
   a. Record Documents: As required in General Conditions.
   b. Approved Shop Drawings and Samples: As required in the General Conditions.
   c. Special bonds, Special Guarantees, and Service Agreements.
   d. Consent of Surety to Final Payment: As required in General Conditions.
   e. Releases or Waivers of Liens and Claims: As required in General Conditions.
   f. Releases from Agreements.
   g. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01 29 00, Payment Procedures.
   h. Extra Materials: As required by individual Specification sections.

1.02 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
   a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
   b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.

4. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Engineer to recommend whole or any part of Contractor's Application for Payment, either partial or final.

1.03 RELEASES FROM AGREEMENTS

A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way.

B. In the event Contractor is unable to secure written releases:

1. Inform Owner of the reasons.
2. Owner or its representatives will examine the Site, and Owner will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
4. When Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate Claims that Contractor has failed to fulfill terms of side agreement or special easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from Engineer at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
2. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.

3. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by Engineer.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
    a. Color Coding:
        1) Green when showing information deleted from Drawings.
        2) Red when showing information added to Drawings.
        3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by “cloud” drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
    a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
    b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
    c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
    d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
    e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Engineer’s written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
    a. Clearly identify the item by accurate note such as “cast iron drain,” “galv. water,” and the like.

b. Show, by symbol or note, vertical location of item (“under slab,” “in ceiling plenum,” “exposed,” and the like).
c. Make identification so descriptive that it may be related reliably to Specifications.

3.02 FINAL CLEANING

A. At completion of the Work or of a part thereof and immediately prior to Contractor’s request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor’s notice of completion, clean entire Site or parts thereof, as applicable.

1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner.
2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
4. Broom clean exterior paved driveways and parking areas.
5. Hose clean sidewalks, loading areas, and others contiguous with principal structures.
6. Rake clean all other surfaces.
7. Leave water courses, gutters, and ditches open and clean.

B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

END OF SECTION

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Detailed information for the preparation, submission, and Engineer's review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.

1.02 DEFINITIONS

A. Preliminary Data: Initial and subsequent submissions for Engineer's review.

B. Final Data: Engineer-accepted data, submitted as specified herein.

C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.03 SEQUENCING AND SCHEDULING

A. Equipment and System Data:

1. Preliminary Data:
   a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by Engineer.
   b. Submit prior to shipment date.
2. Final Data: Submit Instructional Manual Formatted data not less than 30 days prior to equipment or system field functional testing.

B. Materials and Finishes Data:

1. Preliminary Data: Submit at least 15 days prior to request for final inspection.
2. Final Data: Submit within 10 days after final inspection.

1.04 DATA FORMAT

A. Prepare preliminary data in the form of an instructional manual. Prepare final data on electronic media.

B. Instructional Manual Format:

1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
2. Size: 8-1/2 inches by 11 inches, minimum.
3. Cover: Identify manual with typed or printed title “OPERATION AND MAINTENANCE DATA” and list:
    a. Project title.
    b. Designate applicable system, equipment, material, or finish.
    c. Identity of separate structure as applicable.
    d. Identify volume number if more than one volume.
    e. Identity of equipment number and Specification section.
4. Spine:
    a. Project title.
    b. Identify volume number if more than one volume.
5. Title Page:
    a. Contractor name, address, and telephone number.
    b. Subcontractor, Supplier, installer, or maintenance contractor’s name, address, and telephone number, as appropriate.
        1) Identify area of responsibility of each.
        2) Provide name and telephone number of local source of supply for parts and replacement.
6. Table of Contents:
    a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
    b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
7. Paper: 20-pound minimum, white for typed pages.
8. Text: Manufacturer’s printed data, or neatly typewritten.
9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
10. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.

C. Data Compilation Format:

1. Compile all Engineer-accepted preliminary O&M data into a hard-copy, hard-bound set.
2. Each set shall consist of the following:
    a. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
    b. Cover: Identify each volume with typed or printed title “OPERATION AND MAINTENANCE DATA, VOLUME NO. ___ OF ___”, and list:
        1) Project title.

2) Contractor's name, address, and telephone number.
3) If entire volume covers equipment or system provided by one Supplier include the following:
a) Identity of general subject matter covered in manual.
b) Identity of equipment number and Specification section.

c. Provide each volume with title page and typed table of contents with consecutive page numbers. Place contents of entire set, identified by volume number, in each binder.

d. Table of contents neatly typewritten, arranged in a systematic order:
1) Include list of each product, indexed to content of each volume.
2) Designate system or equipment for which it is intended.
3) Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.

e. Section Dividers:
1) Heavy, 80 pound cover weight, tabbed with numbered plastic index tabs.
2) Fly-Leaf:
a) For each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment.
b) List with Each Product:
(1) Name, address, and telephone number of Subcontractor, Supplier, installer, and maintenance contractor, as appropriate.
(2) Identify area of responsibility of each.
(3) Provide local source of supply for parts and replacement.
c) Identity of separate structure as applicable.

f. Assemble and bind material, as much as possible, in same order as specified in the Contract Documents.

D. Furnish the final, complete O&M Manual in electronic format on a CD-ROM. Use the latest version of Microsoft Word, Excel, and Adobe PDF formats. The Owner shall have the ability to modify the Adobe PDF format files.

1. Text, photos, and Drawings shall all be placed on clearly marked CD-ROMs in a current version of Adobe PDF file System. A single Adobe PDF file may be used if the total number of pages in the manual does not exceed 50. For manuals with more than 50 pages (text and graphics), each subsection should be a separate Adobe PDF file.
2. The electronic form of the manual shall be provided with a linked Table of Contents, which will serve as the primary navigational aid for the user, from inside an Internet browser.

3. Each Adobe PDF file shall have at least five keywords assigned to it, based on its individual subject material. If an entire manual (less than 50 pages) is contained in one Adobe PDF file, then sufficient keywords should be used to ensure that "searching" for a particular subsection will be successful. (Example: if "calibration" is a subsection, then the word calibrate and/or calibration should be added to the keyword list.) If each subsection is a separate Adobe PDF file, then keywords should be designed to lead the user to all commonly used terms of the text.
4. Cataloging or indexing should not be done. All manuals will be indexed when aggregated in the complete plant O&M Manual.
5. Each Adobe PDF file should be configured in the same way so that users are presented with a standard interface for all manuals, regardless of Equipment Supplier. To accomplish this, follow this procedure for each Adobe PDF file provided:
    a. From the main menu, select File, then open the subject Adobe PDF file.
    b. With the file open, select File, Document Properties, Summary (current version of Adobe Acrobat). Enter the Title, Subject, Author, and Keywords for this file. Make these consistent and descriptive of subject document. Binding should be Left Edge.
    c. Select File, Document Properties, Open Options:
        1) Initial View: Page only.
        2) Page Number: One.
        3) Magnification: Fit Width.
        4) Page Layout: Single page.
        5) Window Options: Resize window to initial page, center window on screen.
        6) User Interface Options: None.

1.05 SUBMITTALS

A. Informational:

1. Data Outline: Submit two copies of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.
2. Preliminary Data:
    a. Submit two copies for Engineer's review.
    b. If data meets conditions of the Contract:
        1) One copy will be returned to Contractor.
        2) One copy will be forwarded to Resident Project Representative.
    c. If data does not meet conditions of the Contract:
        1) All copies will be returned to Contractor with Engineer's comments (on separate document) for revision.
        2) Engineer's comments will be retained in Engineer's file.

3) Resubmit two copies revised in accordance with Engineer's comments.

3. Final Data: Submit two copies in format specified herein.

1.06 DATA FOR EQUIPMENT AND SYSTEMS

A. Content for Each Unit (or Common Units) and System:

1. Product Data:
   a. Include only those sheets that are pertinent to specific product.
   b. Clearly annotate each sheet to:
      1) Identify specific product or part installed.
      2) Identify data applicable to installation.
      3) Delete references to inapplicable information.
   c. Function, normal operating characteristics, and limiting conditions.
   d. Performance curves, engineering data, nameplate data, and tests.
   e. Complete nomenclature and commercial number of replaceable parts.
   f. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
   g. Spare parts ordering instructions.
   h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, terminals).
2. As-installed, color-coded piping diagrams.
3. Charts of valve tag numbers, with the location and function of each valve.
4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
   a. Format:
      1) Provide reinforced, punched, binder tab; bind in with text.
      2) Reduced to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.
      3) Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.
      4) Identify Specification section and product on Drawings and envelopes.
   b. Relations of component parts of equipment and systems.
   c. Control and flow diagrams.
   d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.

5. Instructions and Procedures: Within text, as required to supplement product data.
    a. Format:
        1) Organize in consistent format under separate heading for each different procedure.
        2) Provide logical sequence of instructions for each procedure.
        3) Provide information sheet for Owner's personnel, including:
            a) Proper procedures in event of failure.
            b) Instances that might affect validity of guarantee or Bond.
    b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
    c. Operating Procedures:
        1) Startup, break-in, routine, and normal operating instructions.
        2) Test procedures and results of factory tests where required.
        3) Regulation, control, stopping, and emergency instructions.
        4) Description of operation sequence by control manufacturer.
        5) Shutdown instructions for both short and extended duration.
        6) Summer and winter operating instructions, as applicable.
        7) Safety precautions.
        8) Special operating instructions.
    d. Maintenance and Overhaul Procedures:
        1) Routine maintenance.
        2) Guide to troubleshooting.
        3) Disassembly, removal, repair, reinstallation, and re-assembly.
6. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, Closeout Procedures.

B. Content for Each Electric or Electronic Item or System:

1. Description of Unit and Component Parts:
    a. Function, normal operating characteristics, and limiting conditions.
    b. Performance curves, engineering data, nameplate data, and tests.
    c. Complete nomenclature and commercial number of replaceable parts.
    d. Interconnection wiring diagrams, including control and lighting systems.
2. Circuit Directories of Panelboards:
3. Electrical service.
4. Control requirements and interfaces.
5. Communication requirements and interfaces.
6. List of electrical relay settings, and control and alarm contact settings.

7. Electrical interconnection wiring diagram, including as applicable, single-line, three-line, schematic and internal wiring, and external interconnection wiring.
8. As-installed control diagrams by control manufacturer.
9. Operating Procedures:
    a. Routine and normal operating instructions.
    b. Startup and shutdown sequences, normal and emergency.
    c. Safety precautions.
    d. Special operating instructions.
10. Maintenance Procedures:
    a. Routine maintenance.
    b. Guide to troubleshooting.
    c. Adjustment and checking.
    d. List of relay settings, control and alarm contact settings.
11. Manufacturer's printed operating and maintenance instructions.
12. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format:
    a. Use Maintenance Summary Form bound with this section or electronic facsimile of such.
    b. Each Maintenance Summary may take as many pages as required.
    c. Use only 8-1/2-inch by 11-inch size paper.
    d. Complete using typewriter or electronic printing.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
    a. Data to be consistent with manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
    b. "Unit" is the unit of measure for ordering the part.
    c. "Quantity" is the number of units recommended.
    d. "Unit Cost" is the current purchase price.

1.07 DATA FOR MATERIALS AND FINISHES

A. Content for Architectural Products, Applied Materials, and Finishes:

1. Manufacturer's data, giving full information on products:
    a. Catalog number, size, and composition.
    b. Color and texture designations.

c. Information required for reordering special-manufactured products.

2. Instructions for Care and Maintenance:
   a. Manufacturer’s recommendation for types of cleaning agents and methods.
   b. Cautions against cleaning agents and methods that are detrimental to product.
   c. Recommended schedule for cleaning and maintenance.

B. Content for Moisture Protection and Weather Exposed Products:

1. Manufacturer’s data, giving full information on products:
   a. Applicable standards.
   b. Chemical composition.
   c. Details of installation.
2. Instructions for inspection, maintenance, and repair.

1.08 SUPPLEMENTS

A. The supplement listed below, following “End of Section”, is part of this Specification.

1. Form: Maintenance Summary Form.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER'S LOCAL REPRESENTATIVE _____

   a. Name_____ Telephone No. _____

   b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	**Frequency**	**Lubricant (If Applicable)**
List briefly each maintenance operation required and refer to specific information in manufacturer's standard maintenance manual, if applicable. (Reference to manufacturer's catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER'S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

SECTION 01 91 14
EQUIPMENT TESTING AND FACILITY STARTUP

PART 1 GENERAL

1.01 DEFINITIONS

A. Facility: Entire Project, or an agreed-upon portion, including all of its unit processes.

B. Functional Test: Test or tests in presence of Engineer and Owner to demonstrate that installed equipment meets manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.

C. Performance Test: Test or tests performed after any required functional test in presence of Engineer and Owner to demonstrate and confirm individual equipment meets performance requirements specified in individual sections.

D. Unit Process: As used in this section, a unit process is a portion of the facility that performs a specific process function, such as automatic backwash filter equipment.

E. Facility Performance Demonstration:

1. A demonstration, conducted by Contractor, with assistance of Owner, to demonstrate and document the performance of the entire operating facility, both manually and automatically (if required), based on criteria developed in conjunction with Owner and as accepted by Engineer.
2. Such demonstration is for the purposes of (i) verifying to Owner entire facility performs as a whole, and (ii) documenting performance characteristics of completed facility for Owner's records. Neither the demonstration nor the evaluation is intended in any way to make performance of a unit process or entire facility the responsibility of Contractor, unless such performance is otherwise specified.

1.02 SUBMITTALS

A. Informational Submittals:

1. Facility Startup and Performance Demonstration Plan.
2. Functional and performance test results.
3. Completed Unit Process Startup Form for each unit process.
4. Completed Facility Performance Demonstration/Certification Form.

1.03 FACILITY STARTUP AND PERFORMANCE DEMONSTRATION PLAN

A. Develop a written plan, in conjunction with Owner's operations personnel; to include the following:

1. Step-by-step instructions for startup of each unit process and the complete facility.
2. Unit Process Startup Form (sample attached), to minimally include the following:
   a. Description of the unit process, including equipment numbers/nomenclature of each item of equipment and all included devices.
   b. Detailed procedure for startup of the unit process, including valves to be opened/closed, order of equipment startup, etc.
   c. Startup requirements for each unit process, including water, power, chemicals, etc.
   d. Space for evaluation comments.
3. Facility Performance Demonstration/Certification Form (sample attached), to minimally include the following:
   a. Description of unit processes included in the facility startup.
   b. Sequence of unit process startup to achieve facility startup.
   c. Description of computerized operations, if any, included in the facility.
   d. Contractor certification facility is capable of performing its intended function(s), including fully automatic operation.
   e. Signature spaces for Contractor and Engineer.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Facility Startup Meetings: Schedule, in accordance with requirements of Section 01 31 19, Project Meetings, to discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Owner involvement.

B. Contractor's Testing and Startup Representative:

1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
2. Representative(s) shall be present during startup meetings and shall be available at all times during testing and startup.

C. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for testing and startup.

D. Provide Subcontractor and equipment manufacturers' staff adequate to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.

E. Owner will:

1. Provide water, power, chemicals, and other items as required for startup, unless otherwise indicated.
2. Operate process units and facility with support of Contractor.
3. Provide labor and materials as required for laboratory analyses.
4. Furnish assistance of manufacturer's representative(s) for Owner-furnished products, as specified in Section 01 64 00, Owner-Furnished Products.
5. Make available spare parts, special tools, and operation and maintenance information for Owner-furnished products.

3.02 EQUIPMENT TESTING

A. Preparation:

1. Complete installation before testing.
2. Furnish qualified manufacturers' representatives, when required by individual Specification sections.
3. Obtain and submit from equipment manufacturer's representative Manufacturer's Certificate of Proper Installation Form, in accordance with Section 01 43 33, Manufacturers' Field Services, when required by individual Specification sections.
4. Equipment Test Report Form: Provide written test report for each item of equipment to be tested, to include the minimum information:
    a. Owner/Project Name.
    b. Equipment or item tested.
    c. Date and time of test.
    d. Type of test performed (Functional or Performance).
    e. Test method.
    f. Test conditions.
    g. Test results.
    h. Signature spaces for Contractor and Engineer as witness.
5. Cleaning and Checking: Prior to beginning functional testing:
    a. Calibrate testing equipment in accordance with manufacturer's instructions.
    b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
    c. Lubricate equipment in accordance with manufacturer's instructions.
    d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.

e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
f. Check power supply to electric-powered equipment for correct voltage.
g. Adjust clearances and torque.
h. Test piping for leaks.

6. Ready-to-test determination will be by Engineer based at least on the following:
   a. Acceptable Operation and Maintenance Data.
   b. Notification by Contractor of equipment readiness for testing.
   c. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.
   d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested including items to be furnished by Owner.
   e. Availability and acceptability of manufacturer's representative, when specified, to assist in testing of respective equipment.
   f. Satisfactory fulfillment of other specified manufacturer's responsibilities.
   g. Equipment and electrical tagging complete.
   h. Delivery of all spare parts and special tools.

B. Functional Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Owner and Engineer in writing at least 10 days prior to scheduled date of testing.
3. Prepare Equipment Test Report summarizing test method and results.
4. When, in Engineer's opinion, equipment meets functional requirements specified, such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Engineer/Owner's signature as witness on Equipment Test Report.

C. Performance Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Engineer and Owner in writing at least 10 days prior to scheduled date of test.
3. Performance testing shall not commence until equipment has been accepted by Engineer as having satisfied functional test requirements specified.
4. Type of fluid, gas, or solid for testing shall be as specified.
5. Unless otherwise indicated, furnish labor, materials, and supplies for conducting the test and taking samples and performance measurements.
6. Prepare Equipment Test Report summarizing test method and results.

7. When, in Engineer's opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by Engineer's signature on Equipment Test Report.

3.03 STARTUP OF UNIT PROCESSES

A. Prior to unit process startup, equipment within unit process shall be accepted by Engineer as having met functional and performance testing requirements specified.

B. Make adjustments, repairs, and corrections necessary to complete unit process startup.

C. Startup shall be considered complete when, in opinion of Engineer, unit process has operated in manner intended for 5 continuous days without significant interruption. This period is in addition to functional or performance test periods specified elsewhere.

D. Significant Interruption: May include any of the following events:

1. Failure of Contractor to provide and maintain qualified onsite startup personnel as scheduled.
2. Failure to meet specified functional operation for more than 2 consecutive hours.
3. Failure of any critical equipment or unit process that is not satisfactorily corrected within 5 hours after failure.
4. Failure of any noncritical equipment or unit process that is not satisfactorily corrected within 8 hours after failure.
5. As determined by Engineer.

E. A significant interruption will require startup then in progress to be stopped. After corrections are made, startup test period to start from beginning again.

3.04 FACILITY PERFORMANCE DEMONSTRATION

A. When, in the opinion of Engineer, startup of all unit processes has been achieved, sequence each unit process to the point that facility is operational.

B. Demonstrate proper operation of required interfaces within and between individual unit processes.

C. After facility is operating, complete performance testing of equipment and systems not previously tested.

D. Document, as defined in Facility Startup and Performance Demonstration Plan, the performance of the facility, until all unit processes are operable and under control of computer system.

E. Certify, on the Facility Performance Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic operation.

3.05 SUPPLEMENTS

A. Supplements listed below, following “End of Section,” are a part of this Specification:

1. Unit Process Startup Form.
2. Facility Performance Demonstration/Certification Form.

END OF SECTION

UNIT PROCESS STARTUP FORM

OWNER: _____ **PROJECT:** _____

Unit Process Description: (Include description and equipment number of all equipment and devices):

_____

_____

_____

_____

Startup Procedure (Describe procedure for sequential startup and evaluation, including valves to be opened/closed, order of equipment startup, etc.):

_____

_____

_____

_____

_____

Startup Requirements (Water, power, chemicals, etc.): _____

_____

_____

Evaluation Comments: _____

_____

_____

_____

FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM

OWNER:_____ **PROJECT:**_____

Unit Processes Description (List unit processes involved in facility startup):

_____

_____

_____

_____

Unit Processes Startup Sequence (Describe sequence for startup, including computerized operations, if any):

_____

_____

_____

_____

_____

Contractor Certification that Facility is capable of performing its intended function(s), including fully automatic operation:

Contractor: _____ **Date:** _____**, 20____**

Engineer: _____ **Date:** _____**, 20____**

(Authorized Signature)

SECTION 02 41 00
DEMOLITION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Air-Conditioning, Heating, and Refrigeration Institute (AHRI): Guideline K, Containers for Recovered Non-flammable Fluorocarbon Refrigerants.
2. American National Standards Institute (ANSI): A10.6, Safety Requirements for Demolition Operations.
3. Occupational Safety and Health Administration (OSHA), U.S. Code of Federal Regulations (CFR) Title 29 Part 1926—Occupational Safety and Health Regulations for Construction.
4. Environmental Protection Agency (EPA), U.S. Code of Federal Regulations (CFR), Title 40:
    a. Part 61—National Emission Standards for Hazardous Air Pollutants.
    b. Part 82—Protection of Stratospheric Ozone.
    c. Part 273—Standards for Universal Waste Management.

1.02 DEFINITIONS

A. Demolition: Dismantling, razing, destroying, or wrecking of any fixed building or structure or any part thereof.

B. Modify: Provide all necessary material and labor to modify an existing item to the condition indicated or specified.

C. Salvage/Salvageable: Remove and deliver, to the specified location(s), the equipment, building materials, or other items so identified to be saved from destruction, damage, or waste; such property to remain that of Owner. Unless otherwise specified, title to items identified for demolition shall revert to Contractor.

1.03 SUBMITTALS

A. Informational Submittals:

1. Submit proposed Demolition/Renovation Plan, in accordance with requirements specified herein, for approval before such Work is started.
2. Submit copies of any notifications, authorizations and permits required to perform the Work.

1.04 REGULATORY AND SAFETY REQUIREMENTS

A. When applicable, demolition Work shall be accomplished in strict accordance with 29 CFR 1926-Subpart T.

B. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the General Conditions, Contractor's safety requirements shall conform to ANSI A10.6.

1.05 DEMOLITION/RENOVATION PLAN

A. Demolition/Renovation Plan shall provide for safe conduct of the Work and shall include:

1. Detailed description of methods and equipment to be used for each operation.
2. The Contractor's planned sequence of operations, including coordination with other work in progress.

1.06 SEQUENCING AND SCHEDULING

A. The Work of this Specification shall not commence until Contractor's Demolition/Renovation Plan has been approved by Engineer.

B. Include the Work of this Specification in the progress schedule, as specified in Section 01 32 00, Construction Progress Documentation.

C. The Work shall be conducted in sequence in accordance with Section 01 31 13 Project Coordination.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXISTING FACILITIES TO BE DEMOLISHED OR RENOVATED

A. Facilities:

1. Facilities scheduled for complete demolition include:
   a. The underdrain systems of Filters No. 3, 4, and 5, including the filter media and porous plates. The demolition shall be conducted in accordance to filter manufacturer's written instructions.
      1) Dismantle all power from the bridge unit. Remove the bridge washwater hood, backwash mechanism, pumps, and all bridge components, for ease of demolition of existing underdrain system and installation of new underdrain system. The removed and dismantled components shall be properly stored and installed back to the bridge after the

completion of the installation of the new underdrain system in accordance to filter manufacturer's written instructions.

2) The existing media shall be removed from all cells and disposed of offsite.
3) All cell spacer rods, cell extensions, porous plates, and retaining angles shall be removed. Porous plates shall be disposed of offsite. Cell space rods, cell extensions and wall support angles shall be properly stored for reuse with new porous plates. Cell dividers shall remain in place and not be damaged.
4) Remove a portion of the grout fillets on both ends of the filter bed for the demolition and installation of the underdrain system in in accordance to filter manufacturer's written instructions.
5) Walking on the cell dividers is not allowed without first laying down sheets of plywood or other equipment to support workmen.

b. Other existing equipment to be replaced in accordance to Section 44 43 15, Automatic Backwash Filter Rehabilitation, including but not limited to:
1) Rails, rail caps, wheels and shafts of Filters No. 3 through 5.
2) Rails, rail caps and wheels of Filters No. 2.
3) Rail supports, concrete anchorages, and grout for Filters No. 2 through 5.
4) Limit switch trip peg systems of Filters No. 2 through 7.
5) Control panels of Filters No. 2 through 5.
6) Backwash shoes and tension assemblies of Filters No. 3 through 5.
7) Bridge drive assemblies of Filters No. 3 through 5.
8) Flat electrical power and signal cables of Filters No. 2 through 7.
9) Festoon cable rails and trolleys of Filters No. 2 through 5.
10) Skimmer assemblies of Filters No. 2 through 7.
11) Limit switches of Filters No. 2 through 7.
12) Level sensors of Filters No. 2 through 5.

B. Patching:

1. Where removals leave holes and damaged surfaces exposed in the finished Work, patch and repair to match adjacent finished surfaces as to texture and finish.
2. Where new Work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new Work.
3. Concrete patching and repairs shall be per 03 01 32, Repair Concrete Surfaces.

4. Patching shall be as specified and indicated, and shall include: Fill holes and depressions caused by previous physical damage or left as a result of removals in existing structure with an approved patching material, applied in accordance with the manufacturer's printed instructions.

C. Electrical:

1. When removing designated equipment, conduit and wiring may require rework to maintain service to other equipment.
2. Rework existing circuits, or provide temporary circuits as necessary during renovation to maintain service to existing lighting and equipment not scheduled to be renovated. Verify existing conditions, make all necessary adjustments, and record the Work on the Record Drawings.
3. Reuse of existing luminaires, devices, conduits, boxes, or equipment will be permitted only where specifically indicated.
4. Raceways and Cabling Scheduled for Future Use: Cap/seal and tag.

3.02 PROTECTION

A. Dust Control: Prevent the spread of dust to occupied portions of the building and avoid the creation of a nuisance in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

B. Existing Work:

1. Survey the site and examine the Drawings and Specifications to determine the extent of the Work before beginning any demolition or renovation.
2. Take necessary precautions to avoid damage to existing items scheduled to remain in place, to be reused, or to remain the property of Owner; any Contractor-damaged items shall be repaired or replaced as directed by Engineer.
3. Ensure that structural elements are not overloaded as a result of or during performance of the Work. Responsibility for additional structural elements or increasing the strength of existing structural elements as may be required as a result of any Work performed under this Contract shall be that of the Contractor. Repairs, reinforcement, or structural replacement must have Engineer approval.
4. Do not overload pavements to remain.

C. Facilities:

1. Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.

2. Floors, roofs, walls, columns, pilasters, and other structural elements that are designed and constructed to stand without lateral support or shoring, and are determined by Contractor to be in stable condition, shall remain standing without additional bracing, shoring, or lateral support until demolished, unless directed otherwise by the Engineer.
3. Protect all facility elements not scheduled for demolition.
4. Provide interior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities.

D. Protection of Personnel:

1. During demolition, continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site.
2. Provide temporary barricades and other forms of protection to protect Owner's personnel and the general public from injury due to demolition Work.
3. Provide protective measures as required to provide free and safe passage of Owner's personnel and the general public to occupied portions of the structure.

3.03 TITLE TO MATERIALS

A. All salvaged equipment and materials will remain the property of Owner.

B. With the exception of the following listed salvaged equipment, all items designated to be removed shall become the property of Contractor:

1. Control Panels and all components mounted on the panels.
2. Instruments.

C. Title to equipment and materials resulting from demolition is vested in the Contractor upon approval by Engineer of Contractor's Demolition Plan, and the resulting authorization by Engineer to begin demolition.

D. Title to temporarily removed equipment and materials that are scheduled to be re-used shall remained with the Owner. They shall be properly stored in accordance to filter manufacturer's written instruction before being re-installed.

3.04 DISPOSITION OF MATERIAL

A. Do not remove equipment and materials without approval of Contractor's Demolition Plan by Engineer.

B. Remove salvaged items designated as the property of Owner in a manner to prevent damage. Deliver salvaged items that are designated as the property of Owner to a storage site as directed on the Site.

C. Owner will not be responsible for the condition or loss of, or damage to, property scheduled to become Contractor's property after Engineer's authorization to begin demolition. Materials and equipment shall not be viewed by prospective purchasers or sold on the Site.

3.05 CLEANUP

A. Debris and rubbish shall be removed from site. Debris and rubbish shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

END OF SECTION

SECTION 03 01 32
REPAIR CONCRETE SURFACES

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Concrete Institute (ACI): 301, Specifications for Structural Concrete.
2. ASTM International (ASTM):
   a. A82/A82M, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
   b. A185/A185M, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
   c. A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   d. C109/C109M, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
   e. C348, Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.
   f. C496/C496M, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
   g. C666/C666M, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
   h. C882/C882M, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
   i. C1202, Standard Test Method for Electrical Indication of Concrete’s Ability to Resist Chloride Ion Penetration.
   j. C1583/C1583M, Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method).
   k. D4258, Standard Practice for Surface Cleaning Concrete for Coating.
   l. D4259, Standard Practice for Abrading Concrete.

1.02 DEFINITIONS

A. Abrasive Blasting: Surface preparation method that uses compressed air intermixed with an abrasive medium to clean surface of substrate concrete, exposed steel, and reinforcing steel. Compressed air and abrasive medium is projected at high speed through a nozzle directly at the surface. Method is used to remove corrosion by-products, laitance, or other materials that may inhibit bond of repair concrete.

B. Defective Area: Surface defect such as honeycomb, rock pockets, indentations and surface voids greater than 3/16-inch deep, surface voids greater than 3/4-inch diameter, cracks in liquid containment structures 0.005-inch wide and wider, cracks in other structures 0.010-inch wide and wider, spalls, chips, embedded debris, deviations in formed surface that exceed specified tolerances which include but are not limited to fins, form pop-outs, and other projections, and at exposed concrete which includes texture irregularities, stains, and other color variations that cannot be removed by cleaning.

C. High-Pressure Water Blasting: Sometimes referred to as hydro-demolition. Uses water that may contain an abrasive medium, projected under high pressure and high velocity. Used for demolition, cutting, partial or full depth removal, cleaning, scarifying, or roughening of concrete surfaces, or removing existing coatings, for preparation of substrate concrete surfaces.

1.03 SUBMITTALS

A. Action Submittals:

1. Product data sheets for each material supplied.
2. Drawings or photographs indicating location, size, estimated quantity, and proposed repair mortar for each repair location in existing concrete.
3. Drawings or photographs indicating location, size, and condition of exposed concrete reinforcing.
4. Drawings indicating results of sounding for hollow areas including location, size, and estimated quantity of hollow-sounding areas for each repair location.

B. Informational Submittals:

1. Repair Mortar System: Manufacturer’s preparation and installation instructions.
2. Mesh manufacturer’s installation instructions and allowable load criteria.
3. Written description of equipment proposed for concrete removal and surface preparation.

4. Certificates:
    a. Manufacturer's Certificate of Compliance, in accordance with Section 01 61 00, Common Product Requirements, that proposed repair mortar systems:
        1) Meet or exceed specified performance criteria when tested in accordance with Article Field Quality Control.
        2) Are prepackaged, shrinkage compensated, specially designed for use on vertical and overhead surfaces that are exposed to sewage.
    b. Mortar Manufacturer's Certificate of Proper Installation, in accordance with Section 01 43 33, Manufacturers' Field Services.
5. Statements of Qualification:
    a. Repair mortar system applicator.
    b. Repair mortar system manufacturer's representative.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Repair Mortar System Applicator: Trained and experienced applicator recognized or certified by repair mortar system manufacturer.
2. Repair Mortar System Manufacturer's Representative: As specified in Section 01 43 33, Manufacturers' Field Services.

B. Pre-repair Conference:

1. Required Meeting Attendees:
    a. Contractor.
    b. Repair Subcontractor.
    c. Technical representative for repair material manufacturer.
    d. Engineer.
2. Schedule and conduct prior to incorporation of respective products into Project. Notify Engineer of location and time.
3. Agenda shall include, but not limited to:
    a. Review of field conditions. Conduct field observations of existing conditions and Work to be performed.
    b. Based on above observations, repair material manufacturer's technical representative shall confirm material selection and make Project-specific repair method recommendations.
    c. Technical representative for repair material manufacturer shall review proposed surface preparation, material application, consolidation, finishing, curing, and protection of repair material from weather conditions.
    d. Establish procedure for identifying potential damage resulting from Work.
    e. Other specified requirements requiring coordination.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package repair mortar system products in moisture-resistant bags, pails, or moisture-resistant bulk bags.

B. Deliver, store, and handle repair materials in accordance with manufacturer's printed instructions.

PART 2 PRODUCTS

2.01 SYSTEM C—POLYMER-MODIFIED REPAIR MORTAR

A. Polymer-modified, one- or two-component, cementitious based, chloride resistant, flowable, gray in color, working time of 20 minutes minimum, surface renovation mortar.

B. Cured Mortar Properties:

1. Compressive Strength, ASTM C109/C109M at 28 Days: 7,000 psi minimum.
2. Flexural Strength, ASTM C348 at 28 Days: 1,200 psi minimum.
3. Slant Shear Bond Strength, ASTM C882/C882M Test Method Modified with No Bonding Agent at 28 Days: 2,000 psi minimum.
4. Splitting Tensile Strength, ASTM C496/C496M at 28 Days: 500 psi minimum.
5. Freeze Thaw Resistance, ASTM C666/C666M, at 300 Cycles: 90 percent RDM.
6. Chloride Ion Permeability Based on Charge Passed, ASTM C1202: 800 coulombs maximum.

C. Manufacturers and Products:

1. BASF Construction Chemicals, LLC - Building Systems, Shakopee, MN; Emaco R300 CI.
2. Sika Corp., Lyndhurst, NJ; SikaTop 123 PLUS.
3. Euclid Chemical Co., Cleveland, OH; DuralTop Gel.

2.02 WATER

A. Clean and free from oil, acid, alkali, organic matter, or other deleterious substances, meeting federal drinking water standards.

2.03 REINFORCEMENT

A. Deformed Reinforcing Bars: ASTM A615/A615M, Grade 60, where welding is not required.

B. Mesh Reinforcement: Welded wire fabric flat sheets with spacing of wires and wire size in accordance with ASTM A185/A185M, wire 75 ksi minimum tensile strength per ASTM A82/A82M, and repair mortar system manufacturer's recommendations.

C. Tie Wire: 16-gauge, galvanized.

D. Mesh Anchors:

1. Manufacturers and Products:
   a. Powers Fastening, Inc., Brewster, NY; Tie Wire Version of Power-Stud.
   b. Hilti Fastener Systems, Tulsa, OK; Kwik Bolt II HHDCA, 1/4-inch ceiling hanger.

2.04 CEMENTITIOUS BONDING AGENT AND REINFORCEMENT COATING

A. Cementitious adhesive, specifically formulated for bonding plastic portland cement concrete or mortar to hardened portland cement concrete.

1. Mixed Bonding Agent Properties:
   a. Pot Life: 75 minutes to 105 minutes.
   b. Contact Time: 24 hours.
2. Cured Cementitious Adhesive Properties:
   a. Splitting Tensile Strength, ASTM C496/C496M at 28 Days: 500 psi minimum.
   b. Flexural Strength, ASTM C348: 1,000 psi minimum.
   c. Slant Shear Bond Strength, ASTM C882/C882M at 14 Days:
      1) 2-Hour Open Time: 2,500 psi minimum.
      2) 24-Hour Open Time: 2,000 psi minimum.
3. Bonding agent shall not produce a vapor barrier.
4. Compatible with repair system.

B. Manufacturers and Products:

1. BASF Construction Chemicals, LLC - Building Systems, Shakopee, MN; Emaco P24.
2. Sika Corp., Lyndhurst, NJ; Sika Armatec 110 EpoCem.
3. Euclid Chemical Co., Cleveland, OH: Dural Prep AC.

2.05 PAINT MATERIALS

A. General:

1. Manufacturer's highest quality products suitable for intended service.

2. Compatibility: Only compatible materials from a single manufacturer shall be used in the Work. Particular attention shall be directed to compatibility of primers and finish coats.
3. Thinners, Cleaners, Driers, and Other Additives: As recommended by coating manufacturer.

B. Products:

1. Coal-Tar Epoxy: Amine, polyamide, or phenolic epoxy type 70 percent volume solids minimum, suitable for immersion service.

PART 3 EXECUTION

3.01 GENERAL

A. Existing Concrete Work:

1. Make provisions for repair of existing Filters No. 2, 3, 4, and 5 for the following. Repairs include:
   a. Spalled concrete at existing rail anchor bolts.
   b. Spalled concrete at expansion joints.
2. Repair existing concrete coatings damaged or removed during Work.

3.02 PREPARATION

A. Identify unsound and deteriorated concrete by sounding techniques, or as directed by Engineer, and review proposed extent of repair with Engineer.

B. Remove unsound, honeycombed, deteriorated, or otherwise defective areas of concrete from work areas.

1. Use 8,000 psi minimum high-pressure water blasting machine as required for Site conditions.
2. Remove concrete to abrade substrate concrete surfaces to a minimum amplitude roughness of 3/16 inch measured between high and low points with a 3-foot long straightedge, in accordance with ASTM D4259.
3. Final surface is required to be flush with existing adjacent surface. Remove existing concrete depth as required for application of minimum thickness of repair mortar.

C. Do not use power-driven jackhammers, chipping hammers, or scabblers unless water blasting is not permitted or practical due to Site conditions, or may cause other damage to equipment or facilities. In such cases where chipping hammers are required, limit size of chipping hammer to 16 pounds or lighter, or use small electric chipping hammer, to reduce formation of micro-fractures in substrate concrete surface.

D. Following removal of unsound or deteriorated concrete, check substrate concrete surface by sounding techniques to identify unsound concrete remaining or resulting from use of chipping hammer.

E. Remove unsound concrete to satisfaction of Engineer.

F. Square edges of patch areas by sawing or chipping to avoid tapered shoulders or featheredges. Avoid cutting embedded reinforcing steel. Roughen polished saw-cut edge by high-pressure water blasting.

G. Remove concrete adjacent to reinforcing bar to a minimum of 1-inch clearance around reinforcing bar for application and bonding of new repair mortar to circumference of exposed reinforcing bar if one or more of the following surface conditions exist:

1. 50 percent or more of circumference around reinforcing bar is exposed during concrete removal.
2. 25 percent or more of circumference around reinforcing bar is exposed during concrete removal and corrosion is present to extent that more than 25 percent loss of section has occurred.
3. Otherwise evident that bond between existing concrete and reinforcing bar has been destroyed or has deteriorated as determined by Engineer.

H. Clean exposed reinforcing steel bars of loose rust and concrete splatter per recommendations of repair material manufacturer and in accordance with ASTM D4258.

I. Keep areas from which concrete has been removed free of dirt, dust, and water blasting waste slurry. Remove laitance and other bond inhibiting contaminates from prepared areas.

J. Dampen repair areas at least 6 inches beyond area to receive repair mortar for at least 24 hours to provide saturated surface dry (SSD) condition without standing water at time of application of mortar as required by and in accordance with repair mortar manufacturer’s printed instructions.

K. Collect and dispose of spent water and concrete debris from removal operations offsite in manner and location acceptable to Owner.

3.03 REINFORCEMENT INSTALLATION

A. Provide reinforcement when existing reinforcement is not exposed, and when mortar application is more than 3 inches deep, unless otherwise shown on Drawings.

B. Replace deteriorated reinforcing with new reinforcing equivalent in cross-sectional area to original reinforcing as directed by Engineer.

C. Install mesh anchors in accordance with mesh manufacturer's instructions.

D. Fasten reinforcing bars to mesh anchors with tie wire to prevent from moving during placement of repair mortar.

E. Lap reinforcement mesh a minimum of one mesh spacing and securely fasten mesh to mesh anchors, or to reinforcement fastened to mesh anchors, with tie wire at intervals no more than 12 inches to prevent movement during application of repair mortar.

F. Coat exposed new and existing reinforcing bars and reinforcement mesh with cementitious reinforcement coating at same time as substrate concrete is coated, as specified below, per repair mortar and cementitious reinforcement coating manufacturers' printed instructions.

3.04 PROTECTION

A. If cementitious coating or bonding agent is used, protect adjacent surfaces from over application. Promptly remove bonding agent applied beyond repair area.

3.05 SYSTEM C—POLYMER-MODIFIED REPAIR MORTAR APPLICATION

A. Mix mortar in accordance with manufacturer's printed instructions.

B. Bond Coat: Apply to prepared substrate concrete surface before application of mortar in accordance with repair mortar manufacturer's printed instructions. Do not apply more bond coat than can be covered with mortar before bond coat dries. Do not retemper bond coat.

C. Place mortar by hand and trowel to specified surface finish, in accordance with requirements of repair material's printed instructions.

D. Finish repair mortar to smooth even surface matching adjacent concrete surface with hand float application.

E. Cure as specified in Article Curing, and in accordance with manufacturer's printed instructions.

3.06 CURING

A. Prior to curing, apply water fog to repair mortar system in accordance with repair mortar system manufacturer's printed instructions.

B. Cure in accordance with repair mortar manufacturer's printed instructions.

C. Where permitted by repair mortar manufacturer's printed instructions, commence water curing after repair mortar system application and when curing will not cause erosion of mortar.

D. Continuously water cure repair mortar system for a period of 7 days.

E. Do not cure using curing compound or membrane, unless method is part of repair mortar system manufacturer's printed instructions and approval is obtained from Engineer.

F. Cure intermediate layers of repair mortar in accordance with repair mortar manufacturer's printed instructions.

G. Where curing compound is permitted by repair mortar system manufacturer, apply curing compound as specified.

3.07 FIELD QUALITY CONTROL

A. Sounding for Hollow Areas:

1. Light hammer tap repaired areas and area extending 12 inches past limits of repaired area listening for hollow sound to determine areas that have not properly bonded to substrate concrete.
2. Mark hollow areas for removal and replacement.

B. Compression Strength Test:

1. Test in accordance with ASTM C109/C109M, except modified by making samples using repair mortar.
2. Obtain production samples of mixed wet mortar materials from nozzle, or mixer, during construction for compliance with Specifications for testing at 7 days, and 28 days.
3. Provide a minimum of three samples for each 200 square feet of mortar repair, and a minimum of three samples in total, whichever is greater, for testing.
4. Record location where repair mortar is being applied at time production samples are obtained.

C. Direct Tension Bond Test:

1. In Situ Bond Testing: Perform tension bond test in accordance with ASTM C1583/C1583M.
2. Record locations on in situ bond tests on each type of applied repair mortar.

D. Testing laboratory retained by Owner will test the following:

1. Compression Strength Test:
   a. Testing will follow a “modified” ASTM C109/C109M.
   b. A minimum of three production samples of mixed material will be obtained from each 200 square feet of mortar repair, and a minimum of three samples in total, whichever is greater, for testing at 7 days, and 28 days.
   c. Record location where repair mortar is being applied at time production samples are obtained.
2. Direct Tension Bond Test:
   a. Two core samples will be obtained and tested for each 2,000 square feet of repair work.
   b. Cores will be 2-1/2-inch or 3-inch diameter to a total depth equal to at least 2.5 times repair mortar thickness.
   c. Bond Strength of Repair Mortar to Substrate Concrete: 300 psi minimum in direct tension without failure or movement.
   d. Record locations of Bond Tests on each type of applied repair mortar tested.

E. Retest mortar repairs that do not meet test requirements.

F. Repair and fill holes using same repair mortar where core samples have been removed.

3.08 MORTAR REPAIR FAILED TEST

A. Remove and replace unacceptable Work.

B. Hollow Sounding Areas: Saw cut hollow sounding areas to a new square edge. Remove unsound mortar repair. Prepare substrate surface and reapply repair mortar as specified herein above.

C. Failed Compression Strength Test: Remove affected areas of repair mortar represented by failed compression strength test results. Prepare substrate surface and reapply repair mortar as specified herein above.

D. Failed Bond Tests: Remove affected areas of repair mortar represented by failed bond test results. Prepare substrate surface and reapply repair mortar as specified herein above.

E. Retest areas where repair mortar was removed and replaced, in accordance with test requirements specified herein above.

3.09 COATING OF REPAIRED CONCRETE SURFACES

A. Application:

1. Extent of concrete coating: Coating shall be applied to concrete surfaces previously coated. This includes areas damaged during concrete repairs or other Work.

B. Concrete Surface Preparation:

1. Do not begin until repair mortar has cured as required my repair mortar manufacturer.
2. Meet requirements of SSPC SP 13.
3. Remove grease, oil, dirt, salts or other chemicals, loose materials, or other foreign matter by solvent, detergent, or other suitable cleaning methods.
4. Brush-off blast clean to remove loose concrete and laitance, and provide a tooth for binding.
5. Obtain coating manufacturer’s recommendations for additional preparation, if required.
6. Unless otherwise required for proper adhesion, ensure surfaces are dry prior to painting.

3.10 MANUFACTURER’S SERVICES

A. Provide repair mortar system manufacturer’s representative at Site in accordance with Section 01 43 33, Manufacturers’ Field Services, for review acceptability of surface preparation, mixing and installation assistance, training of repair mortar system applicators, inspection, and Certification of Proper Installation.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Iron and Steel Institute (AISI): Stainless Steel Types.
2. American National Standards Institute (ANSI).
3. American Welding Society (AWS):
   a. A2.4, Standard Symbols for Welding, Brazing, and Nondestructive Examination.
   b. A3.0, Standard Welding Terms and Definitions.
   c. D1.6/D1.6M, Structural Welding Code - Stainless Steel.
4. ASTM International (ASTM):
   a. A240/A240M, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
   b. A276, Standard Specification for Stainless Steel Bars and Shapes.
   c. A380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.
   d. A967, Standard Specification for Chemical Passivation Treatments for Stainless Steel Parts.
   e. C881/C881M, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
   f. D1056, Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
   g. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
   h. F594, Standard Specification for Stainless Steel Nuts.
5. International Code Council Evaluation Service (ICC-ES): AC308, Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements.
6. Specialty Steel Industry of North America (SSINA):
   a. Specifications for Stainless Steel.
   b. Design Guidelines for the Selection and Use of Stainless Steel.
   c. Stainless Steel Fabrication.
   d. Stainless Steel Fasteners.

1.02 DEFINITIONS

A. Anchor Bolt: Cast-in-place anchor; concrete.

B. Concrete Anchor: Post-installed concrete anchors listed in this Specification.

C. Corrosive Area: Containment area or area exposed to delivery, storage, transfer, or use of chemicals.

D. Exterior Area: Location not protected from weather by building or other enclosed structure.

E. Interior Dry Area: Location inside building or structure where floor is not subject to liquid spills or washdown, nor where wall or roof slab is common to a water-holding or earth-retaining structure.

F. Interior Wet Area: Location inside building or structure where floor is sloped to floor drains or gutters and is subject to liquid spills or washdown, or where wall, floor, or roof slab is common to a water-holding or earth-retaining structure.

G. Submerged: Location at or below top of wall of open water-holding structure, such as basin or channel, or wall, ceiling or floor surface inside a covered water-holding structure, or exterior belowgrade wall or roof surface of water-holding structure, open or covered.

H. CJP: Complete Joint Penetration.

I. CWI: Certified Welding Inspector.

J. NDT: Nondestructive Testing.

K. PQR: Procedure Qualification Record.

L. VT: Visual Testing.

M. WPQ: Welder/Welding Operator Performance Qualification.

N. WPS: Welding Procedure Specification.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
    a. Metal fabrications, including welding and fastener information.
    b. Specific instructions for concrete anchor installation, including drilled hole size, preparation, placement, procedures, and instructions for safe handling of anchoring systems.
    c. Welding:
        1) Shop WPSs and PQRs.

2) Welding Data: Indicate, by welding symbols or sketches, details of welded joints and preparation of base metal. Provide complete joint welding details showing bevels, groove angles, and root openings for welds.
3) Welding symbols shall be in accordance with AWS A2.4.
4) Welding terms and definitions shall be in accordance with AWS A3.0.

B. Informational Submittals:

1. Concrete Post-Installed Anchors:
   a. Manufacturer's product description and printed installation instructions.
   b. Current ICC-ES Report for each type of post-installed anchor to be used.
   c. Adhesive Anchor Installer Certification.
2. Passivation method for stainless steel members.
3. Welding:
   a. WPQs.
   b. CWI credentials.
   c. Welding Documentation: Submit on forms in referenced welding codes.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Adhesive Anchor Installer: Trained to install adhesive anchors in accordance with manufacturer's printed installation instructions.
2. WPSs: In accordance with AWS D1.6/D1.6M (Annex N Forms) or ASME BPVC SEC IX (Forms QW-482 and QW-483) for shop welding.
3. WPQs: In accordance with AWS D1.6/D1.6M (Annex N Forms) or ASME BPVC SEC IX (Form QW-484).
4. CWI: Certified in accordance with AWS QC1, and having prior experience with specified welding codes. Alternate welding inspector qualifications require approval by Engineer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Insofar as practical, factory assemble specified items. Assemblies, because of necessity, have to be shipped unassembled shall be packaged and tagged in manner that will protect materials from damage and will facilitate identification and field assembly.

B. Package stainless steel items in a manner to provide protection from carbon impregnation.

C. Store fabricated items in dry area, not in direct contact with ground.

D. Store adhesives anchors at service temperature ranges recommended by manufacturer.

PART 2 PRODUCTS

2.01 SOURCE QUALITY CONTROL

A. CWI shall be present whenever shop welding is performed. CWI shall perform inspection, as necessary, prior to assembly, during assembly, during welding, and after welding. CWI shall perform inspections as required in AWS D1.6/D1.6M or referenced welding code and as follows:

1. Verifying conformance of specified job material and proper storage.
2. Monitoring conformance with approved WPS.
3. Monitoring conformance of WPQ.
4. Inspecting weld joint fit-up and performing in-process inspection.
5. Providing 100 percent visual inspection of welds.
6. Maintaining records and preparing report confirming results of inspection and testing comply with the Work.

2.02 GENERAL

A. Unless otherwise indicated, meet the following requirements:

Item	ASTM Reference
Stainless Steel:	
Bars and Angles	A276, AISI Type 316 (316L for welded connections)
Steel Plate, Sheet, and Strip	A240/A240M, AISI Type 316 (316L for welded connections)
Bolts, Threaded Rods, Anchor Bolts, and Anchor Studs	F593, AISI Type 316, Condition CW
Nuts	F594, AISI Type 316, Condition CW

B. Bolts, Washers, and Nuts: Use stainless steel as indicated in Fastener Schedule at end of this section.

2.03 POST-INSTALLED CONCRETE ANCHORS

A. General:

1. AISI Type 316 stainless as shown in Fastener Schedule at end of this section.
2. Current ICC-ES Report indicating acceptance per 2010 Florida Building Code for anchors at structural applications in cracked concrete.
3. Anchors shall be suitable for long-term loads, as well as for wind loads.

B. Adhesive Anchors (Epoxy Anchors):

1. If approved by Engineer, adhesive anchors used in sustained tension applications (such as overhead or cantilevered applications) shall have current ICC-ES Report that demonstrates compliance with ICC-ES AC308 for cracked concrete.
2. Threaded Rod:
   a. ASTM F593 stainless steel threaded rod, diameter as shown on Drawings.
   b. Length as required, to provide minimum depth of embedment.
   c. Clean and free of grease, oil, or other deleterious material.
3. Adhesive:
   a. Two-component, insensitive to moisture, designed to be used in adverse freeze/thaw environments.
   b. Cure Temperature, Pot Life, and Workability: Compatible for intended use and anticipated environmental conditions.
   c. Mixed Adhesive: Nonsag light paste consistency with ability to remain in 1-inch diameter overhead drilled hole without runout.
   d. Meet requirements of ASTM C881/C881M.
4. Packaging and Storage:
   a. Disposable, self-contained cartridge system capable of dispensing both components in proper mixing ratio and fitting into manually or pneumatically operated caulking gun.
   b. Store adhesive cartridges and adhesive components on pallets or shelving in covered storage area.
   c. Container Markings: Include manufacturer’s name, product name, batch number, mix ratio by volume, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.
   d. Dispose of when:
      1) Shelf life has expired.
      2) Stored other than in accordance with manufacturer’s instructions.
5. Manufacturers and Products:
   a. Hilti, Inc., Tulsa, OK; HIT Doweling Anchor System, HIT RE 500 SD (ESR-2322).

b. Simpson Strong-Tie Co., Inc., Pleasanton, CA; SET-XP Epoxy Adhesive Anchors(ESR-2508).
c. Powers Fasteners, Brewster NY, PE1000+ Adhesive anchoring system (ESR-2583).

C. Adhesive Threaded Inserts:

1. Stainless steel, internally threaded inserts.
2. Manufacturer and Product: Hilti, Inc., Tulsa, OK; HIS-RN Insert with HIT-RE 500-SD adhesive.

2.04 ACCESSORIES

A. Antiseizing Lubricant for Stainless Steel Threaded Connections:

1. Resists washout.
2. Manufacturers and Products:
   a. Bostik, Middleton, MA; Neverseez.
   b. Saf-T-Eze Div., STL Corp., Lombard, IL; Anti-Seize.

2.05 FABRICATION

A. General:

1. Finish exposed surfaces smooth, sharp, and to well-defined lines.
2. Furnish necessary rabbets, lugs, and brackets so work can be assembled in neat, substantial manner.
3. Conceal fastenings where practical; where exposed, flush countersink.
4. Drill metalwork and countersink holes as required for attaching hardware or other materials.
5. Grind cut edges smooth and straight. Round sharp edges to small uniform radius. Grind burrs, jagged edges, and surface defects smooth.
6. Fit and assemble in largest practical sections for delivery to Site.

B. Materials: Use stainless steel shapes, unless otherwise noted.

C. Welding:

1. Weld connections and grind exposed welds smooth. When required to be watertight, make welds continuous.
2. Welded fabrications shall be free from twisting or distortion caused by improper welding techniques.
3. Stainless Steel: Meet requirements of AWS D1.6/D1.6M.

D. Watertight Seal: Where required or shown, furnish sealant of a type that is satisfactory for use in contact with sewage. Cover full bearing surfaces.

E. Fitting: Where movement of fabrications is required or shown, cut, fit, and align items for smooth operation. Make corners square and opposite sides parallel.

F. Accessories: Furnish as required for a complete installation. Fasten by welding or with stainless steel bolts or screws.

2.06 ACCESSORIES

A. Neoprene Gasket:

1. ASTM D1056, 2C1, soft, closed-cell neoprene gasket material, suitable for exposure to sewage and sewage gases, unless otherwise shown on Drawings.
2. Thickness: Minimum 1/4 inch.
3. Furnish without skin coat.
4. Manufacturer and Product: Monmouth Rubber and Plastics Corporation, Long Branch, NJ; Durafoam DK1111LD.

2.07 SOURCE QUALITY CONTROL

A. Visually inspect all fabrication welds and correct deficiencies.

1. Stainless Steel: AWS D1.6/D1.6M.

PART 3 EXECUTION

3.01 GENERAL

A. Installation of Metal Fabrications:

1. Install metal fabrications plumb and level, accurately fitted, free from distortion or defects.
2. Install rigid, substantial, and neat in appearance.
3. Install manufactured products in accordance with manufacturer’s recommendations.
4. Obtain Engineer approval prior to field cutting steel members or making adjustments not scheduled.

B. Welding and Fabrication by Welding: Conform to governing welding codes referenced in attached Welding and Nondestructive Testing Table.

3.02 CONCRETE POST-INSTALLED ANCHORS

A. Begin installation only after concrete to receive anchors has attained design strength.

B. Install in accordance with manufacturer’s instructions.

C. Provide minimum embedment, edge distance, and spacing as shown on the Drawings, unless indicated otherwise by anchor manufacturer's instructions.

D. Use only drill type and bit type and diameter recommended by anchor manufacturer. Clean hole of debris and dust with brush and compressed air per manufacturer's printed installation instructions.

E. When embedded steel or rebar is encountered in drill path, slant drill to clear obstruction. If drill must be slanted more than 10 degrees to clear obstruction, notify Engineer for direction on how to proceed.

F. Adhesive Anchors:

1. Do not install adhesive anchors when temperature of concrete is below 40 degrees F or above 100 degrees F, unless cold temperature adhesives, compliant with ACI 308 are used. Refer to the respective ICC-ES report and manufacturer's printed installation instructions.
2. Remove water from hole with oil-free compressed air. Damp or water filled holes may be allowed only if approved in manufacturer's printed installation instructions and ICC-ES report.
3. Do not disturb anchor during recommended curing time.
4. Do not exceed maximum torque as specified in manufacturer's printed installation instructions.

3.03 ELECTROLYTIC PROTECTION

A. Stainless Steel:

1. During handling and installation, take necessary precautions to prevent carbon impregnation of stainless steel members.
2. After installation, visually inspect stainless steel surfaces for evidence of iron rust, oil, paint, and other forms of contamination.
3. Remove contamination using cleaning and passivation methods in accordance with requirements of ASTM A380 and ASTM A967.
4. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles.
5. After treatment, visually inspect surfaces for compliance.

3.04 FIELD QUALITY CONTROL

A. Contractor-Furnished Quality Control: Manufacturer's Certificate of Compliance per Section 01 61 00, Common Product Requirements, for test results, or calculations, or Drawings that ensure material and equipment design and design criteria meet requirements of Section 01 61 00, Common Product Requirements.

3.05 WELD DEFECT REPAIR

A. Repair and retest rejectable weld defects until sound weld metal has been deposited in accordance with appropriate welding codes.

3.06 FASTENER SCHEDULE

A. Unless indicated otherwise on Drawings, provide fasteners as follows:

Service Use and Location	Product	Remarks
1. Drilled Anchors for Metal Components to Cast-in-Place		
Submerged, Exterior, Interior Wet, and Corrosive Areas	Adhesive stainless steel anchors	

B. Antiseizing Lubricant: Use on stainless steel threads.

C. Do not use adhesive anchors to support fire-resistive construction or where ambient temperature will exceed 120 degrees F.

END OF SECTION

SECTION 26 05 01
ELECTRICAL

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Electronic Industries Association (EIA/TIA): 569, Commercial Building Standard for Telecommunications Pathways and Spaces.
2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
   a. C62.41, Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
   b. PC62.41.1, Draft Guide on the Surge Environment in Low-Voltage (1,000 V and less) AC Power Circuits.
   c. 112, Standard Test Procedure for Polyphase Induction Motors and Generators.
   d. 114, Standard Test Procedures for Single-Phase Induction Motors.
3. International Electrical Testing Association (NETA): ATS, Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
4. National Electrical Contractor's Association, Inc. (NECA): 1, Standard Practices for Good Workmanship in Electrical Contracting.
5. National Electrical Manufacturers Association (NEMA):
   a. C80.1, Rigid Steel Conduit-Zinc Coated.
   b. C80.3, Electrical Metallic Tubing-Zinc Coated.
   c. C80.6, Intermediate Metal Conduit-Zinc Coated (IMC).
   d. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
   e. ICS 1, Industrial Control and Systems: General Requirements.
   f. ICS 2, Industrial Control and Systems: Controllers, Contactors, and Overload Relays Rated Not More Than 2000 Volts AC or 750 Volts DC.
   g. ICS 2.3, Industrial Control and Systems: Instructions for the Handling, Installation, Operation and Maintenance of Motor Control Centers.
   h. MG 1, Motors and Generators.
   i. PB 1, Panelboards.
   j. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
   k. ST 20, Dry Type Transformers for General Applications.
   l. TC 2, Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.

m. TC 3, PVC Fittings for Use with Rigid PVC Conduit and Tubing.
n. WC 55, Instrumentation Cables and Thermocouple Wire.
o. WC 70, Standard for Non-Shielded Power Cables Rated 2,000 V or Less for the Distribution of Electrical Energy.
p. WD 1, General Color Requirements for Wiring Devices.

6. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
7. Underwriters Laboratories, Inc. (UL):
   a. 1, Flexible Metal Conduit.
   b. 6, Electrical Rigid Metal Conduit—Steel.
   c. 13, Power-Limited Circuit Cables.
   d. 44, Thermoset Insulated Wires and Cables.
   e. 62, Flexible Cord and Fixture Wire.
   f. 67, Panelboards.
   g. 98, Enclosed and Dead-Front Switches.
   h. 198C, High Interrupting Capacity Fuses, Current Limiting Types.
   i. 198E, Class R Fuses.
   j. 360, Liquid-Tight Flexible Steel Conduit.
   k. 486A, Wire Connectors and Soldering Lugs for Use with Copper Conductors.
   l. 486C, Splicing Wire Connectors.
   m. 489, Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit Breaker Enclosures.
   n. 508, Industrial Control Equipment.
   o. 510, Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
   p. 514B, Fittings for Cable and Conduit.
   q. 651, Schedule 40 and 80 PVC Conduit.
   r. 674, Electric Motors And Generators for use in Division 1 Hazardous (Classified) Locations.
   s. 797, Electrical Metallic Tubing.
   t. 854, Service-Entrance Cables.
   u. 870, Wireways, Auxiliary Gutters, and Associated Fittings.
   v. 943, Ground-Fault Circuit Interrupters.
   w. 1059, Terminal Blocks.
   x. 1242, Intermediate Metal Conduit.
   y. 1277, Electrical Power and Control Tray Cables with Optional Optical-Fibre Members.
   z. 1449, Transient Voltage Surge Suppressors.
   aa. 1561, Dry-Type General Purpose and Power Transformers.
   bb. 2111, Overheating Protection for Motors.

1.02 SCOPE OF WORK

A. The Electrical Subcontractor shall provide all electrical work shown on Drawings D-01, D-02, E-01, and repair/upgrade work schematically shown on reference drawings R-15 through R-21 part of Supplement-1.

B. The special flat multi conductor power and control cables required for Filters No. 2, 3, 4, and 5 shall be furnished under Section 44 43 15, Automatic Backwash Filter Rehabilitation and installed, terminated, and tested by Electrical Subcontractor.

C. Four new filter control panels shall be furnished for filters #2 through #5 under Division 44, Pollution Control Equipment and installed, wired, terminated by Electrical Subcontractor.

D. Field repair, replace specified control components, rewire and test existing control panels for filters #6 and #7.

E. Furnish, install, wire, terminate and test all interconnecting control and power wiring control and power wiring as shown and specified to provide an operational filter system.

F. Provide support to the ABW filter rehab contractor for control system testing and checkout, for all filter panels. Coordinate with Division 44, Pollution Control Equipment for all testing requirements and control panel details.

1.03 DEFINITIONS

A. AHJ: Authority Having Jurisdiction.

B. MCOV: Maximum Allowable Continuous Operating Voltage.

C. MOV: Metal Oxide Varistor.

D. SASD: Silicon Avalanche Suppressor Diode.

E. SVR: Surge Voltage Rating.

F. SPD: Surge Protective Device.

1.04 SUBMITTALS

A. Shop Drawings:

1. Provide manufacturer’s data for the following:
   a. Electrical service components.
   b. Communications service components.
   c. Nameplates, signs, and labels.

d. Enclosures.
e. Service entrance equipment.
f. Switches, receptacles, boxes and device plates.
g. Wiring Devices.
h. Transformers.

2. Conductors: Wire, cable, and accessories descriptive product information.
3. Conduit:
   a. Manufacturer's Literature:
      1) Rigid galvanized steel conduit.
      2) Electric Metallic Tubing.
      3) Flexible metal, liquid-tight conduit.
      4) Conduit Fittings.
   b. Conduit layout drawings for conduit installations.
4. Panelboards:
   a. Manufacturer's data sheets for each type of panelboard, protective device, accessory item, and component.
   b. Manufacturer's Shop Drawings including dimensions and layout.
5. Grounding and Bonding:
   a. Ground Rods.
   b. Exothermic Connections.
   c. Mechanical Connections.
   d. Compression Connections.
6. Electrical Testing:
   a. Submit 30 days prior to performing inspections or tests:
      1) Schedule for performing inspection and tests.
      2) List of references to be used for each test.
      3) Sample copy of test form for each test and inspection.
   b. Submit test and inspection reports and certificates for each electrical item tested and inspected within 30 days of completion.

B. Informational Submittals:

1. Field test reports.
2. Signed permits indicating Work is acceptable to regulatory authorities having jurisdiction.
3. Operation and Maintenance Data:
   a. Provide for all equipment, as well as each device having features that can require adjustment, configuration, or maintenance.
   b. Minimum information shall include manufacturer's preprinted instruction manual, one copy of the approved submittal information for the item, tabulation of any settings, and copies of any test reports.
   c. Provide redlines of all Contract Drawings showing "as-built" conditions.

1.05 APPROVAL BY AUTHORITY HAVING JURISDICTION

A. Provide the Work in accordance with NFPA 70, National Electrical Code (NEC). Where required by the Authority Having Jurisdiction (AHJ), material and equipment shall be labeled or listed by a nationally recognized testing laboratory or other organization acceptable to the AHJ, in order to provide a basis for approval under the NEC.

B. Materials and equipment manufactured within the scope of standards published by Underwriters Laboratories, Inc. shall conform to those standards and shall have an applied UL listing mark or label.

PART 2 PRODUCTS

2.01 GENERAL

A. Products shall comply with all applicable provisions of NFPA 70. All products shall have UL label as applicable.

B. Like Items of Equipment: End products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer’s service.

C. Equipment and Devices Installed Outdoors or in Unheated Enclosures: Capable of continuous operation within ambient temperature range of minus 20 degrees F to 105 degrees F.

D. Equipment Finish: Manufacturer's standard finish color, except where specific color is indicated.

2.02 OUTLET AND DEVICE BOXES

A. Sheet Steel: One-piece drawn type, zinc- or cadmium-plated.

B. Cast Metal:

1. Box: Cast ferrous metal.
2. Cover: Gasketed, weatherproof, and cast ferrous metal with stainless steel screws.
3. Hubs: Threaded.
4. Lugs: Cast Mounting.
5. Manufacturers and Products:
   a. Crouse-Hinds; Type FS or FD.
   b. Appleton; Type FS or FD.

2.03 JUNCTION AND PULL BOXES

A. Outlet Boxes Used as Junction or Pull Box: As specified under Article Outlet and Device Boxes.

B. Conduit Bodies Used as Junction Boxes: As specified under Article Conduit and Fittings.

C. Large Sheet Steel Box:

1. NEMA 250, Type 1.
2. Box: Code-gauge, galvanized steel.
3. Cover: Full access, screw type.
4. Machine Screws: Corrosion-resistant.

D. Large Stainless Steel Box:

1. NEMA 250, Type 4X.
2. Box: 14-gauge, ASTM A240, Type 304 stainless steel with white enamel painted interior mounting panel.
3. Cover: Nonhinged with screws.
4. Hardware and Machine Screws: ASTM A167, Type 304 stainless steel.
5. Manufacturers:
    a. Hoffman Engineering Co.
    b. Robroy Industries.

2.04 WIRING DEVICES

A. Switches:

1. NEMA WD 1 and FS W-S-896.
2. Industrial grade, totally enclosed, ac type, with quiet tumbler switches and screw terminals.
3. Capable of controlling 100 percent tungsten filament and fluorescent lamp loads.
4. Rating: 20 amps, 120/277 volts.
5. Color: Gray.
6. Automatic grounding clip and integral grounding terminal on mounting strap.
7. Manufacturers and Products:
    a. Leviton; 1221 Series.
    b. Bryant; 4901 Series.
    c. Hubbell; 1221 Series.

B. Receptacle, Single and Duplex:

1. NEMA WD 1 and FS W-C-596.
2. Specification grade, two-pole, three-wire grounding type with screw type wire terminals suitable for 10 AWG.
3. High strength, thermoplastic base color.
4. Color: Gray.
5. Contact Arrangement: Contact to be made on two sides of each inserted blade without detent.
6. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
7. One-piece mounting strap with integral ground contact (rivetless construction).
8. Manufacturers and Products:
   a. Leviton; 5262/5362 Series.
   b. Bryant; 5262/5362 Series.
   c. Hubbell; 5262/5362 Series.

C. Receptacle, Ground Fault Circuit Interrupter:

1. Duplex, listed Class A to UL Standard 943, tripping at 5 mA.
2. Color: Gray.
3. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
4. Size: For 2-inch by 4-inch outlet boxes.
5. Standard Model: NEMA WD 1, with screw terminals and provisions for testing.
6. Impact resistant nylon face.
7. Manufacturers:
   a. Bryant.
   b. Hubbell.
   c. Leviton.

2.05 DEVICE PLATES

A. General: Sectional type plates not permitted.

B. Plastic:

1. Material: Specification grade, 0.10-inch minimum thickness, noncombustible, thermosetting.
2. Color: To match associated wiring device.
3. Mounting Screw: Oval-head metal, color matched to plate.

C. Metal:

1. Material: Specification grade, one-piece, 0.040-inch nominal thickness stainless steel.

2. Finish: ASTM A167, Type 302/304, satin.
3. Mounting Screw: Oval-head, finish matched to plate.

D. Engraved:

1. Character Height: 3/16 inch, minimum.
2. Filler: Black.

E. Weatherproof:

1. For Receptacles, Damp Locations:
   a. Gasketed, cast-aluminum, with individual cap over each receptacle opening.
   b. Mounting Screw and Cap Spring: Stainless steel.
   c. Manufacturers and Products:
      1) Crouse-Hinds; Type WLRD-1.
      2) Appleton; Type FSK-WRD.
2. For Receptacles, Wet Locations:
   a. Impact-resistant, nonmetallic, single-gang, horizontal-mounting, providing, while in-use, NEMA 3R rating.
   b. Stainless steel mounting and hinge hardware.
   c. Lockable, paintable.
   d. Color: Gray.
   e. Manufacturers:
      1) Carlon.
      2) Leviton.
3. For Switches:
   a. Gasketed, cast-metal or cast-aluminum, incorporating external operator for internal switch.
   b. Mounting Screw: Stainless steel.
   c. Manufacturers and Products:
      1) Crouse-Hinds; DS-181 or DS-185.
      2) Appleton; FSK-1VTS or FSK-1VS.

2.06 TERMINAL BLOCKS

A. Type: UL 1059. Compression screw clamp, with current bar providing direct contact with wire and yoke, with individual rail mounted terminals. Marking system shall permit use of preprinted or field-marked tags.

B. Yokes and Clamping Screws: Zinc-plated, hardened steel.

C. Rating: 600V ac.

D. Manufacturers:

1. Weidmuller, Inc.
2. Ideal.

2.07 SUPPORT AND FRAMING CHANNELS

A. Carbon Steel Framing Channel:

1. Material: Rolled, mild strip steel, 12-gauge, ASTM A1011/A1011M, Grade 33.
2. Finish: Hot-dip galvanized after fabrication.

B. Manufacturers:

1. B-Line Systems, Inc.
2. Unistrut Corp.

2.08 NAMEPLATES

A. Material: Laminated plastic.

B. Attachment: Adhesive.

C. Color: White, engraved to a black core, or as shown.

D. Engraving:

1. Devices and Equipment: Name or tag shown, or as required.
2. Panelboards:
   a. Designation.
   b. Service voltage.
   c. Phases.
3. Equipment Disconnect switches:
   a. Load served.
   b. Source of power.
4. Minimum Requirement: Label metering and power distribution equipment, local control panels, junction boxes, motor controls, and transformers.

E. Letter Height:

1. Pushbuttons, Selector Switches, and Other Devices: 1/8 inch.
2. Equipment and Panelboards: 1/4 inch.

2.09 CONDUIT AND FITTINGS

A. Rigid Galvanized Steel Conduit (RGS):

1. Meet requirements of NEMA C80.1 and UL 6.
2. Material: Hot-dip galvanized, with chromated protective layer.

B. Electrical Metallic Tubing (EMT):

1. Meet requirements of NEMA C80.3 and UL 797.
2. Material: Hot-dip galvanized, with chromated and lacquered protective layer.

C. Flexible Metal, Liquid-Tight Conduit:

1. UL 360 listed for 105 degrees C insulated conductors.
2. Material: Galvanized steel, with an extruded PVC jacket.

D. Fittings:

1. Provide bushings, grounding bushings, conduit hubs, conduit bodies, couplings, unions, conduit sealing fittings, drain seals, drain/breather fittings, expansion fittings, and cable sealing fittings, as applicable.
2. Rigid Galvanized Steel:
   a. Meet requirements of UL 514B.
   b. Type: Threaded, galvanized.
3. Electrical Metallic Tubing:
   a. Meet requirements of UL 514B.
   b. Type: Steel body and locknuts with steel or malleable iron compression nuts. Setscrew and drive-on fittings not permitted.
   c. Electro zinc-plated inside and out.
   d. Raintight.
4. Flexible Metal, Liquid-Tight Conduit:
   a. Metal insulated throat connectors with integral nylon or plastic bushing rated for 105 degrees C.
   b. Insulated throat and sealing O-rings.

2.10 CONDUIT ACCESSORIES

A. Identification Devices:

1. Raceway Tags:
   a. Material: Permanent, nylon or polyethylene.
   b. Shape: Round.
   c. Raceway Designation: Pressure stamped, embossed, or engraved.
   d. Tags relying on adhesives or taped-on markers not permitted.

2. Warning Tape:
   a. Material: Polyethylene, 4-mil gauge with detectable strip.
   b. Color: Red.
   c. Width: Minimum 6 inches.
   d. Designation: Warning on tape that electric circuit is located below tape.
   e. Identifying Letters: Minimum 1-inch high permanent black lettering imprinted continuously over entire length.

B. Raceway Band:

1. Slip-on Type:
   a. Provide heat-shrinkable, black, medium-wall polyolefin tubing with factory-applied adhesive/sealant. Select product size based upon raceway outside diameter.
   b. Manufacturer and Product: 3M; Type IMCSN, medium wall cable sleeve.
2. Wrap-around Type:
   a. Provide 4-inch width, 20-mil thickness, nonprinted black PVC corrosion protection tape with primer.
   b. Manufacturer and Product: 3M; Type Scotchrap 51 with Scotchrap Pipe Primer.

2.11 CONDUCTORS AND CABLES

A. Conductors 600 Volts and Below:

1. Conform to applicable requirements of NEMA WC 71, WC 72, and WC 74.
2. Conductor Type:
   a. 120- and 277-Volt Lighting, 10 AWG and Smaller: Solid copper.
   b. 120-Volt Receptacle Circuits, 10 AWG and Smaller: Solid copper.
   c. All Other Circuits: Stranded copper.
3. Insulation: Type THHN/THWN, except for sizes No. 6 and larger, with XHHW-2 insulation.

B. 600-Volt Rated Cable:

1. General:
   a. Type TC, meeting requirements of UL 1277, including Vertical Tray Flame Test at 20,000 Btu per hour, and NFPA 70, Article 340, or UL 13 meeting requirements of NFPA 70, Article 725.
   b. Permanently and legibly marked with manufacturer’s name, maximum working voltage for which cable was tested, type of cable, and UL listing mark.

c. Suitable for installation in open air, in cable trays, or conduit.
d. Minimum Temperature Rating: 90 degrees C dry locations, 75 degrees C wet locations.
e. Overall Outer Jacket: PVC, flame-retardant, sunlight- and oil-resistant.

2. Type 3, TSP, 18 AWG, Twisted, Shielded Pair, Instrumentation Cable: Single pair, designed for noise rejection for process control, computer, or data log applications meeting NEMA WC 57 requirements.
   a. Outer Jacket: 45 mils nominal thickness.
   b. Individual Pair Shield: 1.35 mils, double-faced aluminum/synthetic polymer overlapped to provide 100 percent coverage.
   c. Dimension: 0.31-inch nominal outside diameter.
   d. Conductors:
      1) Bare soft annealed copper, Class B, seven-strand concentric, meeting requirements of ASTM B8.
      2) 20 AWG, seven-strand tinned copper drain wire.
      3) Insulation: 15 mils nominal PVC.
      4) Jacket: 4 mils nominal nylon.
      5) Color Code: Pair conductors black and red.
   e. Manufacturers:
      1) Belden.
      2) Okonite Co.
3. Specialty Festoon Flat Power and Control Cables: Supplied under Section 44 43 15, Automatic Backwash Filter Rehabilitation and installed terminated and tested by the electrical contractor.
4. Accessories:
   a. Tape:
      1) General Purpose, Flame Retardant: 7 mils, vinyl plastic, Scotch Brand 33, rated for 90 degrees C minimum, meeting requirements of UL 510.
      2) Flame Retardant, Cold and Weather Resistant: 8.5 mils, vinyl plastic, Scotch Brand 88.
      3) Arc and Fireproofing:
         a) 30 mils, elastomer.
         b) Manufacturers and Products:
            (1) 3M; Scotch Brand 77, with Scotch Brand 69 glass cloth tapebinder.
            (2) Plymount; Plyarc 53, with Plyglas 77 glass cloth tapebinder.
   b. Identification Devices:
      1) Sleeve-type, permanent, PVC, yellow or white, with legible machine-printed black markings.
      2) Manufacturer and Products: Raychem; Type D-SCE or ZH-SCE.

c. Connectors and Terminations:
   1) Nylon, Self-Insulated Crimp Connectors:
      a) Manufacturers and Products:
         (1) Thomas & Betts; Sta-Kon.
         (2) Burndy; Insulug.
         (3) ILSCO.

d. Self-Insulated, Freespring Wire Connector (Wire Nuts):
   1) Plated steel, square wire springs.
   2) UL Standard 486C.
   3) Manufacturers and Products:
      a) Thomas & Betts.
      b) Ideal; Twister.

e. Cable Lugs:
   1) In accordance with NEMA CC 1.
   2) Rated 600 volts of same material as conductor metal.
   3) Uninsulated Crimp Connectors and Terminators:
      a) Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
      b) Manufacturers and Products:
         (1) Thomas & Betts; Color-Keyed.
         (2) Burndy; Hydent.
         (3) ILSCO.
   4) Uninsulated, Bolted, Two-Way Connectors and Terminators:
      a) Manufacturers and Products:
         (1) Thomas & Betts; Locktite.
         (2) Burndy; Quiklug.
         (3) ILSCO.

f. Cable Ties:
   1) Nylon, adjustable, self-locking, and reusable.
   2) Manufacturer and Product: Thomas & Betts; TY-RAP.

g. Heat Shrinkable Insulation:
   1) Thermally stabilized, crosslinked polyolefin.
   2) Manufacturer and Product: Thomas & Betts; SHRINK-KON.

2.12 GROUNDING

A. Equipment Grounding Conductors: Bare Copper, unless otherwise noted on Drawings. Provide green colored insulation for insulated ground conductors. Refer to Article Conductors and Cable for additional requirements.

B. Connectors:

1. Exothermic Weld Type:
   a. Outdoor Weld: Suitable for exposure to elements or direct burial.

b. Indoor Weld: Utilize low-smoke, low-emission process.
c. Manufacturers:
1) Erico Products, Inc.; Cadweld and Cadweld Exolon.

2. Compression Type:
a. Compress-deforming type; wrought copper extrusion material for use with copper conductors.
b. Single indentation for conductors 6 AWG and smaller.
c. Double indentation with extended barrel for conductors 4 AWG and larger.
d. Manufacturers:
1) Burndy Corp.
2) Thomas and Betts Co.
3) ILSCO.

3. Mechanical Type:
a. Split-bolt, saddle, or cone screw type; copper alloy material.
b. Manufacturers:
1) Burndy Corp.
2) Thomas and Betts Co.

2.13 TIMERS AND COUNTERS

A. Furnish, install, and wire replacement timers and counters in the existing control panels for filters #6 and #7. These control components shall match existing make and model numbers as shown and specified in Section 40 90 00, Process Instrumentation and Control Systems (PICS) and Section 40 90 11, Instruments and Panels Subsystem (IPS).

PART 3 EXECUTION

3.01 GENERAL

A. Install materials and equipment in accordance with manufacturer’s instructions and recommendations.

B. Work shall comply with all applicable provisions of NECA 1.

C. Electrical Drawings show general locations of equipment, devices, and raceway, unless specifically dimensioned.

3.02 PROTECTION FOLLOWING INSTALLATION

A. Protect materials and equipment from corrosion, physical damage, and effects of moisture on insulation.

B. Cap conduit runs during construction with manufactured seals.

C. Close openings in boxes or equipment during construction.

D. Energize space heaters furnished with equipment.

3.03 OUTLET AND DEVICE BOXES

A. Install suitable for conditions encountered at each outlet or device in wiring or raceway system, sized to meet NFPA 70 requirements.

B. Size:

1. Depth: Minimum 2 inches, unless otherwise required by structural conditions. Box extensions not permitted.
   a. Hollow Masonry Construction: Install with sufficient depth such that conduit knockouts or hubs are in masonry void space.
2. Ceiling Outlet: Minimum 4-inch octagonal sheet steel device box, unless otherwise required for installed fixture.
3. Switch and Receptacle: Minimum 2-inch by 4-inch sheet steel device box.

C. Locations:

1. To avoid interference with mechanical equipment or structural features, relocate outlets as directed by Engineer.
2. Light Switch: Install on lock side of doors.

D. Mounting Height:

1. General:
   a. Dimensions given to centerline of box.
   b. Where specified heights do not suit building construction or finish, mount as directed by Engineer.
2. Receptacles:
   a. General Indoor Areas: 15 inches above floor.
   b. General Indoor Areas (Counter Tops): Install device plate bottom or side flush with top of splashback, or 6 inches above counter tops without splashback.
   c. Industrial Areas: 48 inches above floor.

E. Install plumb and level.

F. Flush Mounted:

1. Install with concealed conduit.
2. Install proper type extension rings or plaster covers to make edges of boxes flush with finished surface.

G. Support boxes independently of conduit by attachment to building structure or structural member.

H. Box Type (Steel Raceway System):

1. Indoor Dry Locations:
   a. Exposed Rigid Conduit or IMC: Cast metal.
   b. Exposed EMT: Sheet steel.
   c. Concealed Raceways: Sheet steel.
2. Indoor Wet Locations:
   a. Exposed Raceways: Cast metal.
   b. Concealed Raceways: Cast metal.

3.04 JUNCTION AND PULL BOXES

A. Install where shown and where necessary to terminate, tap-off, or redirect multiple conduit runs.

B. Install pull boxes where necessary in raceway system to facilitate conductor installation.

C. Install in conduit runs at least every 150 feet or after the equivalent of three right-angle bends.

D. Use outlet boxes as junction and pull boxes wherever possible and allowed by applicable codes.

E. Use conduit bodies as junction and pull boxes where no splices are required and their use is allowed by applicable codes.

F. Installed boxes shall be accessible.

G. Do not install on finished surfaces.

H. Install plumb and level.

I. Support boxes independently of conduit by attachment to building structure or structural member.

J. Mounting Hardware:

1. Noncorrosive Indoor Dry Areas: Galvanized.
2. Outdoor or Noncorrosive Indoor Wet Areas: Stainless steel.
3. Corrosive Areas: Stainless steel.

K. Location/Type:

1. Indoor, Dry: NEMA 250, Type 1.
2. Indoor and Outdoor, Wet: NEMA 250, Type 4.
3. Indoor and Outdoor, Wet and Corrosive: NEMA 250, Type 4X, stainless steel.

4. Corrosive: NEMA 250, Type 4X, stainless steel.
5. Industrial Use in Areas Not Otherwise Classified: NEMA 250, Type 12, unless otherwise shown.

3.05 WIRING DEVICES

A. Switches:

1. Mounting Height: See Article Outlet and Device Boxes.
2. Install with switch operation in vertical position.
3. Install single-pole, two-way switches such that toggle is in up position when switch is on.

B. Receptacles:

1. Install with grounding slot down, except where horizontal mounting is shown, in which case install with neutral slot up.
2. Ground receptacles to boxes with grounding wire only.
3. Weatherproof Receptacles:
   a. Install in cast metal box.
   b. Install such that hinge for protective cover is above receptacle opening.
4. Special-Purpose Receptacles: Install in accordance with manufacturer's instructions.

3.06 DEVICE PLATES

A. Securely fasten to wiring device; ensure a tight fit to box.

B. Flush Mounted: Install with all four edges in continuous contact with finished wall surfaces without use of mats or similar materials. Plaster fillings will not be acceptable.

C. Surface Mounted: Plate shall not extend beyond sides of box, unless plates have no sharp corners or edges.

D. Install with alignment tolerance to box of 1/16 inch.

E. Types (Unless Otherwise Shown):

1. Outdoor: Weatherproof.
2. Indoor:
   a. Flush Mounted Boxes: Metal.
   b. Surface Mounted, Metal Boxes: Cast.

3.07 TERMINAL BLOCKS

A. Install for termination of control circuits entering or leaving equipment and local control panels.

3.08 SUPPORT AND FRAMING CHANNELS

A. Install where required for mounting and supporting electrical equipment and raceway systems.

B. Channel Type:

1. Interior, Wet or Dry Noncorrosive Locations: Carbon steel.
2. Outdoor, Noncorrosive Locations: Carbon steel.

C. Paint carbon steel channel cut ends prior to installation with zinc-rich primer.

3.09 NAMEPLATES

A. Arc Flash Protection Warning Signs:

1. Field mark panelboards to warn qualified persons of potential arc-flash hazards. Locate marking so to be clearly visible to persons before working on energized equipment.
2. Calculate arc flash boundary and energy in accordance with NFPA 70E. Determine level of personnel protective equipment (PPE) required. Warning label on equipment shall include flash hazard boundary, energy level, PPE level and description, shock hazard, bolted fault current, and equipment name.

B. Provide identifying nameplate on all equipment.

3.10 CONDUIT AND FITTINGS

A. General:

1. Crushed or deformed raceways not permitted.
2. Maintain raceway entirely free of obstructions and moisture.
3. Immediately after installation, plug or cap raceway ends with watertight and dust-tight seals until time for pulling in conductors.
4. Sealing Fittings: Provide drain seal in vertical raceways where condensate may collect above sealing fitting.
5. Avoid moisture traps where possible. When unavoidable in exposed conduit runs, provide junction box and drain fitting at conduit low point.
6. Group raceways installed in same area.
7. Follow structural surface contours when installing exposed raceways. Avoid obstruction of passageways.

8. Run exposed raceways parallel or perpendicular to walls, structural members, or intersections of vertical planes.
9. Block Walls: Do not install raceways in same horizontal course with reinforcing steel.
10. Install watertight fittings in outdoor, underground, or wet locations.
11. Paint threads and cut ends, before assembly of fittings, galvanized conduit, PVC-coated galvanized conduit, or IMC installed in exposed or damp locations with zinc-rich paint or liquid galvanizing compound.
12. Metal conduit to be reamed, burrs removed, and cleaned before installation of conductors, wires, or cables.
13. Do not install raceways in concrete equipment pads, foundations, or beams.
14. Horizontal raceways installed under floor slabs shall lie completely under slab, with no part embedded within slab.
15. Install concealed, embedded, and buried raceways so that they emerge at right angles to surface and have no curved portion exposed.
16. Install conduits for fiber optic cables, telephone cables, and Category 5 data cables in strict conformance with the requirements of EIA/TIA 569.

B. Conduit Application:

1. Diameter:
   a. Minimum: 3/4 inch.
2. Indoor, Exposed:
   a. Electric metallic tubing.
   b. PVC Schedule 40.
   c. Flexible metal water-tight.
3. Outdoor Exposed: Aluminum.

C. Connections:

1. For motors-, wall-, or ceiling-mounted fans and unit heaters, dry type transformers, electrically operated valves, instrumentation, and other equipment where flexible connection is required to minimize vibration:
   a. General: Flexible metal, liquid-tight conduit.
   b. Wet or Corrosive Areas: Flexible metal liquid-tight.
   c. Length: 18 inches minimum, 60 inches maximum, sufficient to allow movement or adjustment of equipment.
2. Outdoor areas, process areas exposed to moisture, and areas required to be oiltight and dust-tight: Flexible metal, liquid-tight conduit.
3. Transition From Underground or Concrete Embedded to Exposed: Rigid galvanized steel conduit.
4. Under Equipment Mounting Pads: Rigid galvanized steel conduit.

D. Penetrations:

1. Make at right angles, unless otherwise shown.
2. Notching or penetration of structural members, including footings and beams, not permitted.
3. Fire-Rated Walls, Floors, or Ceilings: Firestop openings around penetrations to maintain fire-resistance rating using UL listed fire penetration seal.
4. Concrete Walls, Floors, or Ceilings (Aboveground): Provide nonshrink grout dry-pack.
5. Entering Structures:
    a. General: Seal raceway at the first box or outlet with oakum or expandable plastic compound to prevent the entrance of gases or liquids from one area to another.
    b. Concrete Roof or Membrane Waterproofed Wall or Floor: Provide watertight seal.
    c. Heating, Ventilating, and Air Conditioning Equipment:
        1) Penetrate equipment in area established by manufacturer.
        2) Terminate conduit with flexible metal conduit at junction box or condulet attached to exterior surface of equipment prior to penetrating equipment.
        3) Seal penetration UL listed Joint Sealants.
    d. Corrosive-Sensitive Areas:
        1) Seal all conduit passing through chlorine room walls.
        2) Seal conduit entering equipment panelboards and field panels containing electronic equipment.
        3) Seal penetration with UL listed Joint Sealants.
    e. Existing or Precast Wall (Underground): Core drill wall and install watertight entrance seal device.
    f. Nonwaterproofed Wall or Floor (Underground, without Concrete Encasement):
        1) Provide Schedule 40 galvanized pipe sleeve or watertight entrance seal device.
        2) Fill space between raceway and sleeve with expandable plastic compound or oakum and lead joint on each side.

E. Support:

1. Support from structural members only, at intervals not exceeding NFPA 70 requirements, and in any case not exceeding 10 feet. Do not support from piping, pipe supports, or other raceways.
2. Multiple Adjacent Raceways: Provide ceiling trapeze.
3. Application/Type of Conduit Strap:
    a. Steel Conduit: Zinc-coated steel, pregalvanized steel, or malleable iron.
    b. Nonmetallic Conduit: Nonmetallic or PVC-coated metal.

4. Provide and attach wall brackets, strap hangers, or ceiling trapeze as follows:
    a. Wood: Wood screws.
    b. Hollow Masonry Units: Toggle bolts.
    c. Concrete or Brick: Expansion shields, or threaded studs driven in by powder charge, with lock washers and nuts.
    d. Steelwork: Machine screws.
    e. Location/Type of Hardware:
        1) Dry, Noncorrosive Areas: Galvanized.
        2) Wet, Noncorrosive Areas: Stainless steel.
        3) Corrosive Areas: Stainless steel.

F. Bends:

1. Install concealed raceways with a minimum of bends in the shortest practical distance.
2. Make bends and offsets of longest practical radius. Bends in conduits and ducts being installed for fiber optic cables shall be not less than 20 times cable diameter, 15 inches minimum.
3. Install with symmetrical bends or cast metal fittings.
4. Avoid field-made bends and offsets, but where necessary, make with acceptable hickey or bending machine. Do not heat metal raceways to facilitate bending.
5. Make bends in parallel or banked runs from same center or centerline with same radius so that bends are parallel.
6. Factory elbows may be installed in parallel or banked raceways if there is change in plane of run and raceways are same size.
7. Flexible Conduit: Do not make bends that exceed allowable conductor bending radius of cable to be installed or that significantly restricts conduit flexibility.

G. Expansion and Deflection Fittings: Provide on all raceways at structural expansion joints and in long tangential runs.

H. Termination at Enclosures:

1. Cast Metal Enclosure: Provide manufacturer’s premolded insulating sleeve inside metallic conduit terminating in threaded hubs.
2. Nonmetallic, Cabinets, and Enclosures: Terminate conduit in threaded conduit hubs, maintaining enclosure integrity.
3. Sheet Metal Boxes, Cabinets, and Enclosures:
    a. Rigid Galvanized Conduit:
        1) Provide one lock nut each on inside and outside of enclosure.
        2) Install grounding bushing.

3) Provide bonding jumper from grounding bushing to equipment ground bus or ground pad; if neither ground bus nor pad exists, connect jumper to lag bolt attached to metal enclosure.
4) Install insulated bushing on ends of conduit where grounding is not required.
5) Provide insulated throat when conduit terminates in sheet metal boxes having threaded hubs.
6) Utilize sealing locknuts or threaded hubs on outside of NEMA 3R and NEMA 12 enclosures.
7) Terminate conduits with threaded conduit hubs at NEMA 4 and 4X boxes and enclosures.

b. Electric Metallic Tubing: Provide gland compression, insulated connectors.
c. Flexible Metal Conduit: Provide two-screw type, insulated, malleable iron connectors.

I. Empty Raceways:

1. Provide permanent, removable cap over each end.
2. Provide PVC plug with pull tab for underground raceways with end bells.
3. Provide nylon pull cord.
4. Identify, as specified in Article Identification Devices, with waterproof tags attached to pull cord at each end, and at intermediate pull point.

J. Identification Devices:

1. Raceway Tags:
   a. Identify origin and destination.
   b. Install at each terminus, near midpoint, and at minimum intervals of every 50 feet of exposed raceway, whether in ceiling space or surface mounted.
   c. Provide nylon strap for attachment.
2. Warning Tape: Install approximately 12 inches above underground or concrete-encased raceways. Align parallel to, and within 12 inches of, centerline of runs.

K. Raceway Band:

1. Install wherever metallic conduit emerges from concrete slabs. Not required with PVC-coated RGS conduit. Center band at slab surface and install according to manufacturer’s instructions.
   a. Slip-on Type: Clean conduit surface at installation location. Cut tubing to 4-inch minimum lengths and slip onto raceway prior to slab placement and termination of conduit. Heat-shrink onto conduit.

b. Wrap-around Type: Use where slip-on access to conduit is not possible. Clean conduit surface at installation location. Apply primer. Apply wraps to provide two layers of tape. Neatly finish tape end to prevent unraveling.

L. Reuse of Existing Conduit:

1. Where Drawings indicate existing conduits may be reused, they may be reused only where they meet the following criteria.
   a. Conduit is in useable condition with no deformation, corrosion, or damage to exterior surface.
   b. Conduit is sized per the NEC.
   c. Conduit is of the type specified in Contract Documents.
   d. Conduit is supported as specified in Contract Documents.
2. Conduit shall be reamed with wire brush, then with a mandrel approximately 1/4-inch smaller than raceway inside diameter then cleaned prior to pulling new conductors.

3.11 METAL WIREWAYS

A. Install in accordance with manufacturer's instructions.

B. Locate with cover on accessible vertical face of wireway, unless otherwise shown.

3.12 SPECIALTY MANUFACTURER SUPPLIED FLAT POWER AND CONTROL CABLES

A. Use existing festoon arrangements and trays for installing new cables following removal of existing cables. Provide estimated lengths to the General Contractor for procurement.

3.13 REPAIR AND REHAB WORK ON FILTER #6 AND #7 EXISTING CONTROL PANELS

A. The repair and modification work on the two existing control panels is specified under Section 40 90 00, Process Instrumentation and Control Systems (PICS) and Section 40 90 11, Instruments and Panels Subsystem (IPS). Provide all modifications and interconnecting wiring as shown. Assist the filter rehab contractor to provide a completely operational system.

3.14 CONDUCTORS AND CABLES

A. Conductor storage, handling, and installation shall be in accordance with manufacturer's recommendations.

B. Do not exceed manufacturer's recommendations for maximum pulling tensions and minimum bending radii.

C. Conduit system shall be complete prior to drawing conductors. Lubricate prior to pulling into conduit. Lubrication type shall be as approved by conductor manufacturer.

D. Terminate all conductors and cables, unless otherwise shown.

E. Do not splice conductors, unless specifically indicated or approved by Engineer.

F. Bundling: Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not wrapped together by some other means, bundle conductors from each conduit throughout their exposed length with cable ties placed at intervals not exceeding 12 inches.

G. Wiring within Equipment and Local Control Panels: Remove surplus wire, dress, bundle, and secure.

H. Power Conductor Color Coding:

1. 6 AWG and Larger: Apply general purpose, flame retardant tape at each end, and at accessible locations wrapped at least six full overlapping turns, covering an area 1-1/2 to 2 inches wide.
2. 8 AWG and Smaller: Provide colored conductors.
3. Colors:
    a. Neutral Wire: White.
    b. Live Wires, 120/240-Volt, Single-Phase System: Black, red.
    c. Live Wires, 120/208-Volt, Three-Phase System: Black, red, or blue.
    d. Live Wires, 277/480-Volt, Three-Phase System: Brown, orange, or yellow.
    e. Ground Wire: Green.

I. Circuit Identification:

1. Circuits Appearing in Circuit Schedules: Identify power, instrumentation, and control conductor circuits, using circuit schedule designations, at each termination and in accessible locations such as manholes, handholes, panels, switchboards, motor control centers, pull boxes, and terminal boxes.
2. Circuits Not Appearing in Circuit Schedules: Assign circuit name based on device or equipment at load end of circuit. Where this would result in same name being assigned to more than one circuit, add number or letter to each otherwise identical circuit name to make it unique.
3. Method: Identify with sleeves. Taped-on markers or tags relying on adhesives not permitted.

J. Connections and Terminations:

1. Install wire nuts only on solid conductors.
2. Install nylon self-insulated crimp connectors and terminators for instrumentation and control circuit conductors.
3. Tape insulate all uninsulated connections.
4. Install crimp connectors and compression lugs with tools approved by connector manufacturer.

K. Specialty Multi Conductor Flat Power and Control Cable:

1. General Contractor shall procure 4/C #6 flat power cable and 8/C #14 flat control cable based on cable lengths estimated. Provide by electrical subcontractor who will install, terminate, and test these cables.

3.15 GROUNDING

A. Grounding shall be in compliance with NFPA 70 and as shown.

B. Ground electrical service neutral at service entrance equipment to supplementary grounding electrodes.

C. Bond together system neutrals, service equipment enclosures, exposed noncurrent-carrying metal parts of electrical equipment, metal raceways, ground conductor in raceways and cables, receptacle ground connections, and metal piping systems.

D. Shielded Instrumentation Cables:

1. Ground shield to ground bus at power supply for analog signal.
2. Expose shield minimum 1 inch at termination to field instrument and apply heat shrink tube.
3. Do not ground instrumentation cable shield at more than one point.

E. Equipment Grounding Conductors: Provide in all conduits containing power conductors and control circuits above 50 volts.

F. Where shown connect skid and equipment frames to existing plant ground grid.

3.16 ELECTRICAL SYSTEMS ANALYSIS

A. Arc Flash Study:

1. Perform arc flash study in accordance with NFPA 70E, OSHA 29 CFR, Part 1910 Subpart S, and IEEE 1584.

2. Base Calculation: For each major part of the electrical power system, determine the following:
   a. Flash hazard protection boundary.
   b. Limited approach boundary.
   c. Restricted approach boundary.
   d. Prohibited approach boundary.
   e. Incident energy level.
   f. Personal protection equipment (PPE) hazard/risk category.
   g. Type of PPE required.
3. Produce arc flash warning labels that list items in Paragraph Base Calculation and the following additional items.
   a. Bus name.
   b. Bus voltage.
4. Produce bus detail sheets that list items in Paragraph Base Calculation and the following additional items:
   a. Bus name.
   b. Upstream protective device name, type, and settings.
   c. Bus line to line voltage.
5. Produce arc flash evaluation summary sheet listing the following additional items:
   a. Bus name.
   b. Upstream protective device name, type, settings.
   c. Bus line to line voltage.
   d. Bus bolted fault.
   e. Protective device bolted fault current.
   f. Arcing fault current.
   g. Protective device trip/delay time.
   h. Breaker opening time.
   i. Solidly grounded column.
   j. Equipment type.
   k. Gap.
   l. Arc flash boundary.
   m. Working distance.
   n. Incident energy.
   o. Required protective fire rated clothing type and class.
6. Analyze short circuit, protective device coordination, and arc flash calculations and highlight equipment that is determined to be underrated or causes incident energy values greater than 8 cal/cm^2. Propose approaches to reduce the energy levels.
7. Prepare a report summarizing the arc flash study with conclusions and recommendations which may affect the integrity of electric power distribution system. As a minimum, include the following in the report:
   a. Equipment manufacturer’s information used to prepare study.
   b. Assumptions made during study.
   c. Reduced copy of one-line drawing; 11 inches by 17 inches maximum.

d. Arc flash evaluations summary spreadsheet.
e. Bus detail sheets.
f. Arc flash warning labels printed in color on adhesive backed labels.

3.17 FIELD QUALITY CONTROL

A. General:

1. Submit sample test forms for approval before performing tests.
2. Record test results on approved test forms and submit for final approval.
3. Test equipment shall have an operating accuracy equal to, or greater than, requirements established by NETA ATS.
4. Test instrument calibration shall be in accordance with NETA ATS.
5. Perform inspection and electrical tests after equipment has been installed.
6. Perform tests with apparatus de-energized whenever feasible.
7. Inspection and electrical tests on energized equipment are to be:
   a. Scheduled with Engineer and Tyco prior to de-energization.
   b. Minimized to avoid extended period of interruption to the operating plant equipment.

B. Tests and inspection shall establish that:

1. Electrical equipment is operational within industry and manufacturer's tolerances.
2. Installation operates properly.
3. Equipment is suitable for energization.
4. Installation conforms to requirements of Contract Documents and NFPA 70.

C. Perform inspection and testing in accordance with NETA ATS, industry standards, and manufacturer's recommendations.

D. Adjust mechanisms and moving parts for free mechanical movement.

E. Adjust adjustable relays and sensors to correspond to operating conditions, or as recommended by manufacturer.

F. Verify nameplate data for conformance to Contract Documents.

G. Realign equipment not properly aligned and correct unlevelness.

H. Properly anchor electrical equipment found to be inadequately anchored.

I. Tighten accessible bolted connections, including wiring connections, with calibrated torque wrench to manufacturer's recommendations, or as otherwise specified.

J. Clean contaminated surfaces with cleaning solvents as recommended by manufacturer.

K. Provide proper lubrication of applicable moving parts.

L. Investigate and repair or replace:

1. Electrical items that fail tests.
2. Active components not operating in accordance with manufacturer's instructions.
3. Damaged electrical equipment.

M. Electrical Enclosures:

1. Remove foreign material and moisture from enclosure interior.
2. Vacuum and wipe clean enclosure interior.
3. Remove corrosion found on metal surfaces.
4. Replace door and panel sections having damaged surfaces.
5. Replace missing or damaged hardware.

N. Provide certified test report(s) documenting the successful completion of specified testing. Include field test measurement data.

O. Test the following equipment and materials:

1. Conductors: Insulation resistance, No. 6 and larger only.
2. Switchboards, Panelboards, switches, and circuit breakers.
3. Transformers.
4. Motor controls and electrical system interlocks such as shunt-trips and ground-fault protection.
5. Grounding electrode system.
6. General Electrical System.
7. Test motors in accordance with manufacturer's instructions.

P. Low Voltage Conductors:

1. Inspect each individual exposed power conductor No. 6 and larger for:
   a. Physical damage.
   b. Proper connections in accordance with single-line diagram.
   c. Conductor bends not in conformance with manufacturer's minimum allowable bending radius where applicable.

d. Color coding conformance with Specifications.
e. Proper circuit identification.

2. Mechanical Connections For:
   a. Proper lug type for conductor material.
   b. Proper lug installation.
   c. Bolt torque level in accordance with NETA ATS, Table 100.12, unless otherwise specified by manufacturer.
3. Shielded Instrumentation Cables For:
   a. Proper shield grounding.
   b. Proper terminations.
   c. Proper circuit identification.
4. Control Conductor For:
   a. Proper termination.
   b. Proper circuit identification.
5. Conductor Terminated Through Window Type CTs: Verify neutrals and grounds are terminated for correct operation of protective devices.
6. Insulation Resistance Tests:
   a. Utilize 1,000-volt dc megohmmeter for 600-volt insulated conductors and 500-volt dc megohmmeter for 300-volt insulated conductors.
   b. Test each conductor with respect to ground and to adjacent conductors for 1 minute.
   c. Evaluate ohmic values by comparison with conductors of same length and type.
   d. Investigate values less than 50 megohms.
7. Continuity test by ohmmeter method to ensure proper cable connections.

Q. Molded and Insulated Case Circuit Breakers

1. Proper mounting.
2. Proper conductor size.
3. Feeder designation according to nameplate and one-line diagram.
4. Cracked casings.
5. Connection bolt torque level in accordance with NETA ATS, Table 100.12.
6. Operate breaker to verify smooth operation.
7. Compare frame size and trip setting with circuit breaker schedules or one-line diagram.
8. Verify that terminals are suitable for 75 degrees C rated insulated conductors.

R. Grounding Systems:

1. Equipment and circuit grounds in panelboard and switchboard assemblies for proper connection and tightness.

2. Ground bus connections in panelboard and switchboard assemblies for proper termination and tightness.
3. Effective transformer core and equipment grounding.
4. Accessible connections to grounding electrodes for proper fit and tightness.
5. Accessible exothermic-weld grounding connections to verify that molds were fully filled and proper bonding was obtained.
6. Fall-of-Potential Test:
    a. In accordance with IEEE 81, Section 8.2.1.5 for measurement of main ground system's resistance.
    b. Main ground electrode system resistance to ground to be no greater than 5 ohm(s).
7. Two-Point Direct Method Test:
    a. In accordance with IEEE 81, Section 8.2.1.1 for measurement of ground resistance between main ground system, equipment frames, and system neutral and derived neutral points.
    b. Equipment ground resistance shall not exceed main ground system resistance by 0.50 ohm.

S. Filter Control Panel Field Testing: As specified in Section 40 90 00, Process Instrumentation and Control Systems (PICS) and Section 40 90 11, Instruments and Panels Subsystem (IPS).

T. General Electrical Testing:

1. Controls:
    a. Test control and signal wiring for proper termination and function.
    b. Test local control panels and other control devices for proper terminations, configuration and settings, and functions.
    c. Demonstrate control, monitoring, and indication functions in presence of Owner and Engineer.
2. Balance electrical load between phases on panelboards after installation.
3. Voltage Testing:
    a. When installation is complete and facility is in operation, check voltage at point of termination of electric utility supply system to Project.
    b. Check voltage amplitude and balance between phases for loaded and unloaded conditions.
    c. If unbalance exceeds 1 percent, or if voltage varies throughout the day and from loaded to unloaded conditions more than plus or minus 4 percent of nominal, make written request to electric utility to correct condition.
    d. If corrections are not made, obtain written statement from a responsible electric utility official that voltage variations and/or unbalance are within their normal standards.

4. Equipment Line Current:
   a. Check line current in each phase for each piece of equipment.
   b. If electric utility makes adjustments to supply voltage magnitude or balance, make line current check after adjustments are made.

END OF SECTION

SECTION 40 90 00
PROCESS INSTRUMENTATION AND CONTROL SYSTEMS (PICS)

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Instrument Society of America (ISA):
   a. S5.1, Instrumentation Symbols and Identification (NRC ADOPTED).
   b. S50.1, Compatibility of Analog Signals for Electronic Industrial Process Instruments.
   c. RP55.1, Hardware Testing of Digital Process Computers, Recommended Practice. National Electrical
2. National Electrical Manufacturers Association (NEMA): NEMA 250-85, Enclosures for Electrical Equipment (1,000 Volts Maximum).
3. Underwriters Laboratory Inc. (UL): UL 508, Standards for Safety, Industrial Control Equipment.
4. Deutsche Industries-Norm (DIN), VDE 0611, Specification for modular terminal blocks for connection of copper conductors up to 1,000V ac and up to 1,200V dc.

B. This section does not stand alone. Read this section with Section 44 43 15, Automatic Backwash Filter Rehabilitation. The process instrumentation and control system specified herein shall be supplied as a package part of the Automatic Backwash Filter Rehabilitation work. The Contractor shall have single source responsibility for satisfactory operation of the Automatic Backwash Filter system specified in Section 44 43 15, Automatic Backwash Filter Rehabilitation.

C. All Work specified herein, is part of the Automatic Backwash Filter Rehabilitation contractor's scope of work. For electrical installation requirements see Division 26, Electrical Specifications.

1.02 SUMMARY

A. Related Sections: This section gives general requirements for the Process Instrumentation and Control System (PICS). The following sections expand on the requirements of this PICS section. Subsystems specified by these sections are referred to as PICS Subsystems.

1. Section 40 90 11, Instruments and Panels Subsystem (IPS).

B. Work Includes: Engineering, furnishing, installing, calibrating, adjusting, testing, documenting, starting up, and Owner training for a complete Process Instrumentation and Control System (PICS) for the rehabilitation of the automatic filter backwash system to be installed at the Manatee County SWWRF Plant. See major parts are:

1. Furnish Filter Control Panels as specified and shown on the Drawings.
2. Work with electrical subcontractor in checking out of all power and control interconnecting wiring.
3. Work with general contractor and electrical subcontractor in performing operational readiness tests and performance acceptance tests.
4. PICS Supplier's support shall include the following activities as further specified in respective PICS subsystem sections:
   a. Demonstration testing at the Supplier's factory.
   b. Delivery and installation of IPS equipment to Project Site.
   c. Onsite checkout of control functions and field testing.
   d. As specified in Article Sequencing and Scheduling. Factory testing and performance testing as specified.
6. Startup and training as specified.

C. Furnish, install, and wire filter control panels for filter #2, 3, 4, and 5 as per requirements shown on the reference drawings part of Supplement-1 in the set of Contract Drawings.

D. Modify filter #6 and #7 control as shown on the Drawings.

E. Detailed Design: The PICS design as shown and specified includes functional and performance requirements. Complete detailed PICS design.

F. Supplier's Work Scope:

1. For I&C equipment and ancillaries required under PICS Subsystem sections:
   a. Completing detail design.
   b. Required submittals.
   c. Equipment and ancillaries. (Including all field panels, PICS control hardware).
   d. Instructions, details, and recommendations to, and coordination with, Contractor for Certificate of Proper Installation.
   e. Verify readiness for operation.
   f. Verify the correctness of final power and signal connections (lugging and connecting).
   g. Adjusting and calibrating.
   h. Starting up.
   i. Testing and coordination of testing.
   j. Training.

2. Verify following Work:
   a. Correct type, size, and number of signal wires with their raceways.
   b. Correct electrical power circuits and raceways.
   c. Correct size, type, and number of PICS related pipes, valves, fittings, and tubes.
   d. Correct size, type, materials, and connections of process mechanical piping for in-line primary elements.
3. All interconnecting signal and power wiring and raceways internal to the control panels shall be factory installed by the Supplier.

G. Electrical Raceways: Interconnect raceways outside of the pilot skids, as specified in Section 26 05 01, Electrical and schematically shown on the Drawings. Wiring external to the panels by electrical subcontractor.

1.03 DEFINITIONS

A. Abbreviations:

1. FDT: Factory Demonstration Test.
2. ISA: Instrument Society of America.
3. I&C: Instrumentation and Control.
4. I/O: Inputs and Outputs.
5. IPS: Instrument and Panel Subsystem.
6. O&M: Operation and Maintenance.
7. ORT: Operational Readiness Test.
8. PAT: Performance Acceptance Test.

B. Enclosure: Control panel, console, cabinet, or instrument housing.

C. Instructor Day: 8 hours of actual instruction time.

D. Rising/Falling: Terms used to define action of discrete devices about their set point.

1. Rising: Contacts close when an increasing process variable rises through set point
2. Falling: Contacts close when a decreasing process variable falls through set point.

E. Signal Types:

1. Analog Signals, Current Type:
   a. 4 to 20 mA dc signals conforming to ISA S50.1.
   b. Unless otherwise indicated for specific PICS Subsystem components, use the following ISA 50.1 options:
      1) Transmitter Type: Number 2, two-wire.

2) Transmitter Load Resistance Capacity: Class L.
3) Fully isolated transmitters and receivers.

2. Analog Signals, Voltage Type: 1 to 5 volts dc within panels where a common high precision dropping resistor is used.
3. Discrete signals, two-state logic signals using dc or 120V ac sources as indicated.

F. Instrument Tag Numbers:

1. A shorthand tag number notation is used herein. For example: AI-1-12(2)(3)[pH].

Notation	Explanation
AI	ISA designator for Analysis Indicator
1	Unit process number
12	Loop number
(2)	First unit number; number of same component types in a given loop; -1 and -2 in this example
(3)	Second unit number; number of same component types with same first unit number in a given loop; -1, -2, and -3 in this example
[pH]	Same notation shown at 2 o'clock position on ISA circle symbol on P&ID

2. In this example, AI-1-12(2)(3)[pH] is shorthand for:
AI-1-12-1-1[pH], AI-1-12-1-2[pH], AI-1-12-1-3[pH]
AI-1-12-2-1[pH], AI-1-12-2-2[pH], AI-1-12-2-3[pH]

1.04 SUBMITTALS

A. In accordance with Division 01, General Requirements, unless otherwise specified in this section or other PICS Subsystem sections.

B. Submittal Breakdown: With Engineer’s approval, Submittals may be broken down into smaller packages than listed in Paragraph Sequencing and Scheduling. Show proposed breakdown in PICS Schedule of Values and PICS Progress Schedule.

C. Partial Submittals not in accordance with PICS Progress Schedule will not be accepted.

D. Excessive Resubmission of Shop Drawings, Training Plans, Operations and Maintenance Manuals, and Test Procedures:

1. The Engineer will review one resubmittal. Any additional resubmittal review time shall be charged to the PICS Subcontractor.

E. Administrative Submittals:

1. PICS Schedule of Values and PICS Progress Schedule:
   a. Submit within 30 days after first Preconstruction Conference.
   b. Upon acceptance by the Engineer and Owner, will form basis and schedule for all Submittal reviews, test witnessing, and partial payments relating to PICS Work.
   c. Prior to this acceptance, Engineer will not review Submittals, witness tests, or consider requests for partial payment related to PICS Work.
2. Owner Training Plan: In accordance with Division 01, General Requirements.

F. Shop Drawings:

1. General:
   a. Shop Drawings, full-scaled details, wiring diagrams, catalog cuts and descriptive literature.
   b. Identify proposed items and options. Identify installed spares and other provisions for future work (e.g., reserved panel space; unused components, wiring, and terminals).
   c. Legends and Abbreviation Lists: As part of first Submittals for each PICS Subsystem, submit complete definition of symbols and abbreviations used on this Project. For example, engineering units, flowstreams, instruments, structures, and other process items used in nameplates, legends, data sheets. Use identical abbreviations for all PICS Subsystems. Submit updated versions with subsequent Submittals.
2. Submittals Required for PICS Subsystems:
   a. Instrumentation and Panels Subsystem.
   b. Select instrument ranges, set points and related parameters to suit the design requirements. Prepare an Instrument List as part of submittal.
   c. List of Spares, Expendables, and Test Equipment Proposed for Project.

G. Quality Control Submittals:

1. Certificates: For all PICS equipment, require Supplier to provide Manufacturer's Certificate of Proper Installation and readiness for operation, using ORT forms.
2. Operation and Maintenance (O&M) Manuals:
   a. Capacity, Timing, and Simulation: Describe in test procedures simulation and monitoring methods used to demonstrate compliance with capacity and timing requirements. Cover capacity and timing requirements to support both equipment

provided under Contract Documents and designated future components. Include calculations to support these proposed test procedures.

b. Content and Format:
   1) Complete sets of separately bound and one electronic copy of O&M Manuals for complete PICS Subsystem for the Automatic Filter Backwash Panels.
   2) Sufficient detail to allow operation, removal, installation, adjustment, calibration, maintenance and purchasing replacements for each PICS component.
   3) Final versions of Legend and Abbreviation Lists.
c. Manual Submission Requirements:
   1) O&M Manual Outline.
   2) Preliminary O&M Manuals.
   3) Final O&M Manuals

3. Testing Related Submittals:
   a. Unwitnessed Factory Test: No Submittals required.
   b. Factory Demonstration Test at the Suppliers Facility:
      1) Preliminary Test Procedures: Outlines of proposed tests, forms, and checklists.
      2) Final Test Plan and Procedures: Proposed test plan and procedures, forms, and checklists. An approved test plan is a pre-requisite to scheduling a factory test.
      3) Test Documentation: Copy of signed off test procedures when tests are completed.
   c. Operational Readiness Tests:
      1) Preliminary Test Procedures: Outlines of proposed tests, forms, and checklists.
      2) Final Test Procedures: Proposed forms and checklists.
      3) Test Documentation: Completed component calibration sheets with O&M Manuals.
   d. Performance Acceptance Tests:
      1) Preliminary Test Procedures: Outlines of proposed tests, forms, and checklists.
      2) Final Test Procedures: Proposed tests, forms, and checklists.
      3) Test Documentation: Copy of signed off test procedures when tests are completed.

H. Closeout Submittals: Prior to Substantial Completion, submit service agreements signed by Owner and maintenance provider for all work required under Paragraph Maintenance Service.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Minimum of 5 years' experience providing, integrating, installing, and starting up similar systems as required for this Project.
2. Automatic Filter Backwash Supplier Site Representative: Minimum of 5 years' experience installing systems similar to PICS as required for this Project.

B. Coordination Meetings:

1. General:
   a. In accordance with Division 01, General Requirements.
   b. Location: Plant.
   c. Attended By: Engineer, Owner, Contractor, and Control Panels Supplier.
   d. Meeting Frequency: Monthly. Specific dates shall be noted on Progress Schedule. All meetings shall be coordinated with the Owner. Once the system installation starts, meetings shall be held on weekly basis.
   e. First Meeting: Within 30 days after Notice to Proceed.
2. Training Coordination Meeting:
   a. Timing: Following Engineer review of preliminary training plan.
   b. Purpose:
      1) Resolve required changes to proposed training plan.
      2) Identify specific Owner personnel to attend training.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Coordinate with the Owner for delivery, temporary storage, and handling prior to shipment.

B. Prior to shipment, include corrosive-inhibitive vapor capsules in shipping containers, and related equipment as recommended by the capsule manufacturer.

C. Prior to installation, store items in dry indoor locations. Provide heating in storage areas for items subject to corrosion under damp conditions.

D. Cover panels and other elements that are exposed to dusty construction environments.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Environmental Design Requirements: The following defines certain types of environments. PICS Subsystems refer to these definitions by name to specify the environments requirements for individual equipment units.

1. Automatic Filter Backwash Control Panel: NEMA 4X, Type 316 stainless steel.

1.08 SEQUENCING AND SCHEDULING

A. PICS Schedule of Values:

1. Purpose: Supplements the overall Project Schedule of Values and Progress Schedule to provide a basis for partial payment for Work completed.
2. Content: Summary of major Milestones and associated partial payments for Work provided under PICS Subsystems.
3. Requests for partial payment shall be considered providing:
   a. Milestone activity is completed in accordance with criteria in paragraph Activity Completion
   b. Prerequisite activities are completed in accordance with criteria in paragraph Prerequisite Activities and Lead Times, and in conformance with Progress Schedule.

B. PICS Progress Schedule:

1. Purpose: Supplement the overall Project Progress Schedule to:
   a. Coordinate activities with the Supplier of Control Panels Supplier.
   b. Clarify required Work sequences and major Milestone prerequisites.
2. Content:
   a. Include All:
      1) Design activities.
      2) Preparation of submittals.
      3) Submittal submission.
      4) Review of submittals.
      5) Purchasing, fabricating, and assembly activities.
      6) Shipment and delivery.
      7) Installation.
      8) Testing.
      9) Startup.
      10) Training.
      11) Coordination meetings.
      12) Substantial Completion.
      13) Acceptance.

3. Activity prerequisites (by symbol).
4. Required lead times.
5. Identify by special symbol Milestones where a request for partial payment is planned.
6. Obtain Engineer's approval if Submittals for a PICS Subsystem are proposed to be made in multiple packages, show each package.
7. For an example of a Progress Schedule, refer to Paragraph Supplements.

C. Activity Completion: The following is a list of key activities and their completion criteria:

1. Administrative Submittals: Reviewed and accepted.
2. Shop Drawings: Reviewed and approved.
3. Quality Control Submittals: Reviewed and accepted.
4. Tests (Except ORT): Tests have been completed and required test documentation has been accepted.
5. Factory Demonstration testing has been completed and all forms are signed.
6. ORT: ORT has been completed and the Engineer has spot-checked associated test forms and checklists in field.
7. Hardware Delivery: Hardware has been delivered to site and inventoried by Owner or Owner's representative.
8. Ready for Operation: ORT has been completed.

D. Payment limits for certain PICS work items.

PICS Work Item	Limit As a Percent of Lump Sum Item Amount
Administrative and Shop Drawing Submittals	10 percent, maximum
ORT Tests	10 percent, minimum
Performance Acceptance Tests	10 percent, minimum
PICS O&M Manuals	5 percent, minimum

E. Prerequisite Activities and Lead Times: Do not start following key Project activities until prerequisite activities and schedules listed below have been completed and satisfied:

1. Submittal Reviews by Engineer/Owner:
   a. Prerequisite: Engineer acceptance of PICS Schedule of Values and PICS Progress Schedule.
   b. Schedule: IPS hardware, and training Submittals, within 90 days after award of contract.
2. Hardware Purchasing, Fabrication, and Assembly:
   a. Prerequisite: Associated Shop Drawing Submittals completed.

3. Factory Demonstration Test:
    a. The factory demonstration test shall take place at the Suppliers factory with Engineer and Owner participation. The Supplier shall set up all hardware, in the factory for this test.
4. Equipment Delivered to Project Site:
    a. Prerequisite: Completion of PICS shop drawing submittals, preliminary O&M Manuals, and the factory tests for the equipment successfully completed.
5. Equipment Installation:
    a. Prerequisite: Equipment delivered to Project Site.
6. ORT:
    a. Prerequisite: Completion of equipment installation.
7. PAT:
    a. Prerequisite: Completion of ORTs.
8. Training:
    a. Prerequisite: Associated training plan submittal completed, and approved.
9. PICS Substantial Completion: Prerequisites for Substantial Completion include:
    a. PICS submittals have been accepted or approved, as specified.
    b. PICS has successfully completed PAT.
    c. Owner training plan is on schedule.
    d. Spares, expendables, and test equipment have been delivered to Owner.
    e. Service and maintenance agreements submitted for Work required under Paragraph Maintenance Service.

F. PICS Acceptance:

1. When Engineer issues a written notice of acceptance, the following prerequisites shall have been met:
    a. PICS Certificate of Substantial Completion.
    b. Punch list items completed.
    c. Final revisions to O&M Manuals accepted.
    d. Maintenance service agreements for PICS accepted by Owner.
    e. Completion of Owner training.

1.09 MAINTENANCE SERVICE

A. Maintenance Service Agreement:

1. Duration of 1 year, unless otherwise noted in PICS Subsystems.
2. Start on date of Substantial Completion.
3. Performed by factory trained service engineers with experience of PICS Subsystems to be maintained.
4. PICS Subsystems Covered: Control Panels, starters, relays, timers and other control devices and field instruments.

5. The Agreement shall cover as a minimum:
   a. Onsite presence for two months following acceptance.
   b. Monthly preventive maintenance visits.
   c. Unlimited emergency maintenance during coverage hours. Coverage hours shall be 8 AM to 5 PM, Monday through Friday.
   d. All materials and labor required for maintenance visits.
6. Response Time: Service engineer shall be onsite within 24 hours of request by Owner.
7. Spare Parts: If not stocked onsite, delivered to site within 24 hours from time of request.
8. Repair or replace all components found to be faulty.
9. Replace and restock within 2 weeks, onsite spare parts and expendables used for maintenance. Provide list of items used and replaced.
10. Submit records of inspection, maintenance, calibration, repair, and replacement within 2 weeks after each visit to site.

B. Telephone Support:

1. 40 hours with one calendar year, following acceptance.
2. Calendar year starts on date of Substantial Completion.

PART 2 PRODUCTS

2.01 GENERAL

A. IPS Systems as shown on Drawings are diagrammatic and supplement PICS performance requirements.

B. PICS performance requirements are as shown on Drawings and as required in PICS sections. Furnish equipment items as required in PICS sections. Furnish all materials, and equipment, whether indicated or not, necessary to effect required subsystem and loop performance.

C. First Named Manufacturer: PICS design is based on first named manufacturers of equipment, materials, and software required in PICS Subsystems.

1. Substitutions are not permitted for items with the words "NO SUBSTITUTIONS" following the manufacturer's name.
2. Otherwise, if an item is proposed from other than first named manufacturer, obtain approval from the Engineer for such changes prior to making change.
3. In general, only first named manufacturers are acceptable, however, exceptions can be made on a case-by-case basis with Engineer/Owner’s approval.
4. If proposed item requires different installation, wiring, raceway, enclosures, intrinsically safe barriers, and accessories, provide such equipment and work at no additional cost to the Owner.

D. Like Equipment Items:

1. Use products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's services.
2. Implement all same or similar functions in same or similar manner. For example, but not limited to, control logic, sequence controls and display layouts.
3. Control panels shall be designed, constructed, and installed to provide controls as specified and similar to existing automatic filter backwash system control panels.

2.02 SYSTEM PERFORMANCE

A. For the Automatic Filter Backwash Panels provide specified external signal interfaces to allow remote monitoring.

B. Provide means for Plant operators to control filter backwash processes, both automatically and manually.

2.03 FUNCTIONAL REQUIREMENTS

A. Functional Requirements for Control Loops:

1. Shown on Drawings. A supplement part of the Contract Drawings provide the reference drawings that includes control schematics of the existing control panel. Provide new control panels for filters #2 through #5 to meet the same control logic requirements. Accuracy of these reference drawings is not known. Field verify all information.
2. Supplemented by written Functional Requirements included as a supplement to this section. The written functional requirements describe requirements not obvious on Drawings. Meet all functional requirements specified in the supplement.
3. Modify existing control panels for filter #6 and #7 to accommodate skimmer controls as shown on the Drawings.

2.04 ELECTRICAL REQUIREMENTS

A. I&C and electrical components, terminals, wires, and enclosures UL recognized or UL listed for additional control panel electrical requirements, see Section 40 90 11, Instrument and Panels Subsystem.

B. Grounding of Enclosures:

1. Furnish isolated copper grounding bus for signal and shield ground connections.

2. Bond this isolated ground bus to the bare copper electrical ground bus in the panel, in accordance with National Electrical Code requirements, to create a single common ground within each panel.
3. Single point ground for each analog loop.
4. Ground terminal block rails and metallic panel/subpanel to ground bus.

C. Grounding of all skid mounted electrical panels, drives and starters: Ground all skid mounted electrical panels, drives and starter enclosures to each skid at a common grounding point. The grounding point shall be connected to the nearest plant ground grid by the electrical subcontractor.

2.05 ELECTRICAL TRANSIENT PROTECTION

A. General:

1. Function: Protect elements of PICS against damage due to electrical transients induced in interconnecting lines by lightning and nearby electrical systems.
2. Implementation: Provide, install, coordinate, and inspect grounding of surge suppressors at:
   a. Connection of ac power to PICS equipment including panels, console assemblies, and field mounted analog transmitters and receivers.
   b. At the field and panel, console, or assembly connection of signal circuits including analog and data lines.
3. Construction: First-stage high energy metal oxide varistor and second-stage bipolar silicon avalanche device separated by series impedance. Includes grounding wire, stud, or terminal.
4. Response: 5 nanoseconds maximum.
5. Recovery: Automatic.
6. Temperature Range: Minus 20 degrees C to plus 85 degrees C.

B. Suppressors on 120V ac Power Supply Connections:

1. Occurrences: Tested and rated for a minimum of 50 occurrences of IEEE 587 Category B test waveform.
2. First-Stage Clamping Voltage: 350 volts or less.
3. Second-Stage Clamping Voltage: 210 volts or less.
4. Continuous Operation: Power supplies for one four-wire transmitter or receiver: 5 amps minimum at 130V ac. All other applications: 30 amps minimum at 130V ac.

C. Suppressors on Analog Signal Lines:

1. Test Waveform: Linear 8 microsecond rise in current form 0 amp to a peak current value followed by an exponential decay of current reaching one-half the peak value in 20 microseconds.

2. Surge Rating: Tested and rated for 50 occurrences of 2,000-amp peak test waveform.
    a. dc Clamping Voltage: 20 to 40 percent above operating voltage for circuit.
    b. dc Clamping Voltage Tolerance: Less than plus or minus 10 percent.
    c. Maximum Loop Resistance: 18 ohms per conductor.

D. Physical Characteristics:

1. Mounted in Enclosures: Encapsulated inflame retardant epoxy.
2. For Analog Signals Lines: EDCO PC 642 or SRA-64 Series.
3. For 120V ac Lines: EDCO HSP-121.
4. Field Mounted at Two-Wire Instruments: Encapsulated in stainless steel pipe nipples. EDCO SS64 Series.
5. Field Mounted at Four-Wire Instruments: With 120V ac outlet, ac circuit breaker, including surge suppressor for signal as well as 120V power line, all in enclosure.
    a. Enclosure:
        1) NEMA 4X fiberglass or Type 316 stainless steel with door.
        2) Maximum Size: 12 inches by 12 inches by 8 inches deep.
    b. Manufacturer and Product: EDCO; SLAC Series.

E. Installation and Grounding of Suppressors: Per manufacturer’s instructions. Grounding equipment, installation of grounding equipment, and terminations for field mounted devices are provided under Division 26, Electrical.

2.06 FABRICATION

A. See Section 40 90 11, Instrument and Panel Subsystem.

2.07 CORROSION PROTECTION

A. Corrosion-Inhibiting Vapor Capsule Manufacturers:

1. Northern Instruments; Model Zerust VC.
2. Hoffmann Engineering; Model A-HCI.

2.08 SOURCE QUALITY CONTROL

A. General:

1. Perform the following testing of the PICS' elements, to demonstrate conformance to the Specifications and Drawings.
    a. Factory tests described under this article:
        1) Unwitnessed Factory Test (UFT).
        2) Factory Demonstration Tests (FDT).

b. Onsite Tests Described Under Part 3, Execution:
   1) Operational Readiness Tests (ORT).
   2) Performance Acceptance Tests (PAT).
c. Submission and approval of a test plan is a prerequisite to scheduling any test.

2. Test Format: Cause and effect:
   a. Person conducting test initiates an input (cause).
   b. Specific test requirement is satisfied if correct result (effect), occurs.
3. Procedures, Forms, and Checklists:
   a. Except for UFT, conduct tests in accordance with, and documented on, Engineer accepted procedures, forms, and checklists.
   b. Describe each test item to be performed.
   c. Have space after each test item description for sign off by appropriate party after satisfactory completion.
4. Required Test Documentation: Test procedures, forms, and checklists. Signed by Engineer, and Contractor, except for ORT1 items signed only by Contractor.
5. Conducting Tests:
   a. Special testing materials and equipment.
   b. Wherever possible, perform tests using actual process variables, equipment, and data.
   c. If not practical to test with real process variables, equipment, and data, provide suitable means of simulation.
   d. Define simulation techniques in test procedures.
6. Coordinate PICS testing with Engineer, and Owner.
7. Engineer will actively participate in many of the tests.
8. Engineer reserves right to test or retest all specified functions whether or not explicitly stated test procedures.
9. Engineer 's decision shall be final regarding acceptability and completeness of all testing.
10. Excessive Test Witnessing: Engineer/Owner shall recover costs for witnessing retesting of corrected or replaced *defective* Work, and for return visits to manufacturing facilities to witness factory testing or retesting.

B. Unwitnessed Factory Test (UFT):

1. Scope: Inspect and test control panels to ensure they are operational.
2. Location: Supplier’s factory.
3. Integrated Test (PICS Supplier):
   a. Interconnect and test PICS, including all instruments and drives on each skid. Use a simulation panel for external signals.
   b. Exercise and test all functions.

c. The four new automatic filter backwash panels to be included in the tests.

C. Factory Demonstration Tests (FDT):

1. Scope: Test the three control panels including all instruments, starters and final control elements, mounted on each skid to demonstrate that they are operational. All control panel external interfaces shall be checked out for proper operation.
2. Location: Control Panel Supplier's factory.
3. Loop-Specific Functions: Demonstrate functions specified in the Supplement 1, Functional Control System Requirements.
4. Correct deficiencies found and complete prior to shipment to Site.
5. Failed Tests:
   a. Repeat and witnessed by Engineer.
6. Make following documentation available to Engineer at test site both before and during FDT:
   a. All Drawings, Specifications, Addenda, and Change Orders.
   b. Master copy of FDT procedures.
   c. List of equipment to be tested including make, model, and serial number.
   d. Shop Drawing hardware Submittals for equipment being tested.
7. Schedule for FDT:
   a. Begin the day meeting to review day's test schedule.
   b. End the day with meeting to review day's test results and to review corrections needed.
8. Refer to referenced examples of FDT procedures in Article Supplements.
9. The FDT is expected to be completed in one full working day and shall include all four control panels for filters #2 through #5.

PART 3 EXECUTION

3.01 EXAMINATION

A. Equipment furnished by the Control Panel Supplier and installed by Contractor, requires Supplier to observe and advise on installation to extent required to certify with ORT that equipment has been properly installed and will perform as required.

B. For equipment not provided by the Panel Supplier, but that directly interfaces with the control panels, verify the following conditions:

1. Proper installation.
2. Calibration and adjustment of all positioners and I/P transducers.
3. Correct control action.

4. Switch settings and dead bands.
5. Opening and closing speeds and travel stops.
6. Input and output signals.

3.02 INSTALLATION

A. Material and Equipment Installation:

1. Follow manufacturers' installation instructions, unless otherwise indicated or directed by the Engineer.
2. Retain a copy of manufacturers' instructions at site, available for review at all times.

B. Wiring connected to control panel components and assemblies, including power wiring in accordance with requirements in Section 26 05 01, Electrical.

C. Removal or Relocation of Materials and Equipment: Remove from site materials that were part of existing facility but are no longer used, unless otherwise requested by Engineer to deliver to Owner. Repair affected surfaces to conform to type, quality, and finish of surrounding surface.

3.03 FIELD QUALITY CONTROL

A. General: All requirements listed in paragraph General under Article Source Quality Control, also applies to this article.

B. Onsite Supervision:

1. Control Panel Supplier’s site representative to supervise and coordinate onsite PICS activities.
2. Panel Supplier’s site representative shall be onsite during total period required to complete onsite PICS activities.

C. Startup and Testing Team:

1. Thoroughly check installation, termination, and adjustment for control systems.
2. Complete onsite tests.
3. Complete onsite training.
4. Provide startup services.

D. Operational Readiness Tests (ORTs): Prior to startup test period and PAT for each facility, inspect, test, and document that associated PICS equipment is ready for operation.

1. ORT: Performed by Control Panel Supplier to test and document that PICS, is ready for operation.
    a. Loop/Component Inspections and Tests:
        1) Check PICS for proper installation, calibration, and adjustment on a loop-by-loop and component-by-component basis.
        2) Loop tests shall be performed for all new installed instrumentation and interfaces with existing field sensors and devices. Each loop test shall include actual actuation of the transmitter/pressure switch/limit switch with verification the actual signal is received at the panel. For analog I/O, verify calibration at 0, 10, 50, and 100 percent of span. For discrete I/O, verification of the contact actuation is required. Analog loop test shall use live process where practical, or simulated process by use of hand loaders and process simulators.
        3) Provide space on forms for signoff by Panel Supplier.
        4) Use loop status report to organize and track inspection, adjustment, and calibration of each loop and include the following:
            a) Project name.
            b) Loop number.
            c) Tag number for each component.
            d) Checkoffs/Signoffs for Each Component:
                (1) Tag/identification.
                (2) Installation.
                (3) Termination wiring.
                (4) Termination tubing.
                (5) Calibration/adjustment.
            e) Checkoffs/Signoffs for the Loop:
                (1) Panel interface terminations.
                (2) External interface terminations.
            f) Total loop operational.
            g) Space for comments.
        5) Component calibration sheet for each active IPS component (except simple hand switches, lights, gauges, and similar items):
            a) Project name.
            b) Loop number.
            c) Component tag number or I/O module number.
            d) Component code number for IPS elements.
            e) Manufacturer for IPS elements.

f) Model number/serial number for IPS elements.
g) Summary of Functional Requirements, for Example:
(1) Indicators and recorders, scale and chart ranges.
(2) Transmitters/converters, input and output ranges.
(3) Computing elements' function.
(4) Switching elements, unit range, differential (fixed/adjustable), reset (auto/manual).
h) Calibrations, for Example, but not Limited to:
(1) Analog Devices: Actual inputs and outputs at 0, 10, 50, and 100 percent of span, rising and falling.
(2) Discrete Devices: Actual trip points and reset points.
i) Space for comments.

6) Maintain loop status reports, valve adjustment sheets, and component calibration sheets at site and make them available to Engineer at all time.
7) These inspections and tests will be spot checked by Engineer.
8) Engineer reviews loop status sheets and component calibration sheets and spot-check their entries periodically, and upon completion of ORT. Correct deficiencies found.

b. Factory Demonstration Tests-Repeat:
1) Repeat FDT onsite with installed PICS equipment.
2) Use FDT test procedures as basis for this test.
3) In general, this test shall not require witnessing. However, portions of this test, as identified by Engineer during original FDT, shall be witnessed.

c. Field Documentation of the ORT Part 1 forms (Loop Status Reports, Component Calibration Sheets) shall be entered electronically by the PICS Supplier Field Representative.

d. ORT1 Forms: ORT-1 forms will be provided by the Contractor, example ORT forms referenced in Article Supplements.

E. Performance Acceptance Tests (PAT): These are the activities that Division 01, General Requirements, refers to as performance testing.

1. Once a facility’s ORT has been completed and that facility has been started up, perform jointly with Owner and Engineer a witnessed PAT on the associated PICS equipment to demonstrate that it is operating as required by the Contract Documents. Demonstrate each required function on a paragraph-by-paragraph, loop-by-loop, and site-by-site basis. This includes all control panels and components part of this Project.

2. Loop-specific and non-loop-specific tests same as required for FDT except that entire installed PICS tested using actual process variables and all functions demonstrated.
3. Perform local and manual tests for each loop before proceeding to remote and automatic modes. Demonstrate MANUAL & AUTOMATIC Backwash Sequences.
4. Where possible, verify test results using visual confirmation of process equipment and actual process variable. Unless otherwise directed, exercise and observe devices supplied by others, as needed to verify correct signals to and from such devices and to confirm overall system functionality. Test verification by means of disconnecting wires or measuring signal levels is acceptable only where direct operation of plant equipment is not possible.
5. Verify that all remote monitoring signals from each panel are properly displayed at the remote location.
6. Make updated versions of documentation required for PAT available to Engineer at site, both before and during tests.
7. Make one copy of all O&M Manuals available to Engineer at the site both before and during testing.
8. Follow daily schedule required for FDT.
9. Refer to referenced examples of PAT procedures and forms in Article Supplements.

3.04 TRAINING

A. General:

1. Provide an integrated training program for Owner's personnel.
2. Perform training to meet specific needs of Owner's personnel.
3. Include training sessions, classroom and field, for managers, engineers, operators, and maintenance personnel.
4. Provide instruction on two working shifts as needed to accommodate the Owner's personnel schedule.
5. Owner reserves the right to make and reuse video tapes of all training sessions.

B. Operations and Maintenance Training:

1. Location: Onsite.
2. Length: One day.
3. Refer to specific requirements specified in PICS Subsystems.
4. Include a review of O&M manuals and survey of spares, expendables, and test equipment.
5. Use equipment similar to that provided or currently owned by Owner.

C. Components and Panels Subsystem Maintenance Training:

1. Training Session Duration: Total 1 instructor day.
2. Number of Training Sessions: Two.
3. Location: Project Site.
4. Content: Provide training for each type of component and function provided.
    a. Loop Functions: Understanding details of each loop and how they function.
    b. Component calibration.
    c. Adjustments: For example, controller tuning constants, current switch trip points, and similar items.
    d. Troubleshooting and diagnosis for and components.
    e. Replacing lamps, chart paper, fuses.
    f. Periodic maintenance.

3.05 COORDINATION WITH ELECTRICAL SUBCONTRACTOR

A. Coordinate all work with electrical subcontractor for completion of onsite installation of all mechanical and electrical equipment, interconnecting piping, raceways and cabling that is outside of the control panels. The automatic filter backwash filter rehabilitation Contractor has a total systems responsibility for all electrical, instrumentation and control work to provide fully operational automatic backwash filter system for all filters.

3.06 PROTECTION

A. Protect all enclosures and other equipment containing electrical, instrumentation and control devices, including spare parts, from corrosion through the use of corrosion-inhibiting vapor capsules.

B. Periodically replace capsules in accordance with capsule manufacturer's recommendations. Replace all capsules just prior to Final Payment and Acceptance.

3.07 STANDARD DETAILS

A. As shown on the Contract Drawings, including Reference Drawings.

3.08 SUPPLEMENTS

A. Supplements listed below, follows "END OF SECTION," are part of this Specification.

1. Supplement 1, Functional Control System Requirements.
2. System Problem Report Form: Use this form to record information about problems that are found during the testing of Computer Subsystem.
3. Operational Readiness Test (ORT) Forms:
    a. Loop Status Report: Each sheet shows the status of all instruments on a given loop. Also gives functional description for the loop.
    b. Instrument Calibration Sheet: Provides detailed information on each instrument (except simple hand switches, lights, and similar items).
    c. I&C Valve Adjustment Sheet: Each sheet shows detailed information for installation, adjustment, and calibration of a given valve.
4. Performance Acceptance Test Sheet: Describes the PAT for a given loop. The format is mostly free form.
    a. Lists the requirements of the loop.
    b. Briefly describes the test.
    c. Cites expedited results.
    d. Provides space for checkoff by witness.

END OF SECTION

SUPPLEMENT - 1
FILTER CONTROL SYSTEM
FUNCTIONAL REQUIREMENTS

SOUTHWEST REGIONAL WWTP
MANATEE COUNTY, FLORIDA

FILTER OPERATIONAL DESCRIPTION

1. BACKWASH FILTER CONTROL DEVICES & FUNCTIONS

1.1 Selector Switches (SS)

1.1.1 1SS (Power, Hand/Off/Auto) provided to activate control circuit power.

1.1.2 2SS (Bridge, Fwd/Auto/Rev.) Provided for manual control of bridge travel.

1.1.3 3SS (Backwash, Hand/Off/Auto) Provided for manual selection of backwash pump.

1.1.4 4SS (Washwater, Hand/Off/Auto) Provided for manual selection of washwater pumps.

1.1.5 5SS (Indexing, On/Off) Provided for manual selection of indexing.

1.1.6 6SS (Skimmer, Hand/Off/Auto) Provided for manual operation of skimmer pump.

1.1.7 7SS (Bridge Light ON/OFF) Provided to turn on or off bridge light.

1.2 Limit Switches (LS)

1.2.1 1LS, Limit switch provided for the initiation of the forward bridge drive.

1.2.2 2LS, Limit switch provided for the initiation of the reverse bridge drive.

1.2.3 3LS, Limit switch proided for the initiation of the dwell time over each cell.

NOTE: Bridge will stop at either limit switch after backwash cycle is complete. (1LS or2LS).

1.3 Motor Starters (M)

1.3.1 1MS-F provided for forward bridge drive motor.

1.3.2 1MS-R provided for reverse bridge drive motor.

1.3.3 2MS provided for backwash pump motor.

1.3.4 3MS provided for washwater pump motor.

1.3.5 4MS provided for skimmer pump motor.

1.4 Timers (TR)

1.4.1 1TR (timed interval: off cycle timer) provided for off time schedule of operation with a range of zero to nine hundred ninety nine (999) hours.

1.4.2 2TR (timed interval: on cycle timer)provided for on time bridge operation (up to nine hundred and ninety nine (999) minutes) after being initated by the 1TR timer (timed interval: off cycle timer).

1.4.3 1TDR (Drive & Washwaster Pump Delay) provided to allow the backwash pump to run for a period of time (set on 1TDR) before the drive and washwater pump start.

1.4.4 2TDR (Skimmer Pump Off Delay Timer) provided to permit operation of skimmer pump to continue after the carriage has completed its backwash cycle. Timing range is from 0-30 minutes.

1.4.5 3TR (timed interval: dwell cycle timer) provided to stop the unit over a cell for a predetermined period of time.

1.4.6 1CT provided to permit operation of skimmer after each backwash cycle or after preset number of cycles have occurred.

1.5 Indicator Lights (LT)

1.5.1 1LT (Hand-Off-Auto)) Lighted whenever automatic circuit is active. (Amber)

1.5.2 2LT (Bridge On) Lighted whenever forward or reverse drive is on. (GREEN)

1.5.3 3LT (Backwash On) Lighted whenever backwash pump is on. (Green)

1.5.4 4LT (Washwater On) Lighted whenever washwater pump is on (Green)

1.5.5 5LT (Indexing On) Lighted whenever indexing system is on. (Blue)

1.5.6 6LT (Skimmer On) Lighted whenever skimmer pump is on. (Green)

1.5.7 7LT (High Level Alarm) Lighted whenever a high water condition occurs. (Red)

1.5.8 8LT (Low Level Alarm) Lighted whenever a low level condition occurs. (Red)

2. BACKWASH FILTER OPERATIONAL MODES

2.1 Automatic Modes

2.1.1 Selector Switch Positions

a) 1SS - "AUTO" (Mode select)
b) 2SS - "AUTO" (Drive)
c) 3SS - "AUTO" (Backwash pump)
d) 4SS - "AUTO" (Washwater pump)
e) 5SS - "AUTO" (Skimmer)
f) 6SS - "ON OR OFF" (Indexing)
g) 7SS - "ON OR OFF" (Bridge light)

2.1.2 Automatic Operation (Backwashing)

With bridge at 1 LS.
Water level above high operating level energizes 2MS, starting the backwash pump. After a delay period of 10 seconds, 1TDR will energize 1MS-F & 3MS. Bridge travels forward to the end of the basin, 2LS is tripped energizing 1MS-R, which in turn starts the motor for reverse bridge travel, if low operating probe is still energized, backwash and washwater pumps will remain on.

Upon reaching reverse basin end, 1LS is tripped, stopping reverse bridge functions and energizes 1MF, which in turn starts the motor for forward bridge drive; backwash and washwater pumps remain on, if low operating probe remains energized. Upon reaching forward basin end, 2LS is tripped and the cycle repeats.

When the water level falls below the low operating probe, the unit will continue operating until the unit reaches 1LS.or 2LS. At that time the unit will shut down and wait for the next cycle to be called for.

If the water level does not reach the high water level probe before 1TR (timed interval: off cycle timer) times out, the unit will start backwashing. The unit will continue backwashing until 2TR (timed interval: on cycle timer) times out. The unit will then continue until reaching the basin end tripping 1LS.or 2LS. Thus initiating 1TR for the off cycle.

2.2 Manual Mode

2.2.1 Selector Switch Positions

a) 1SS - "HAND" (Mode select)
b) 2SS - "FWD/REV" (Drive)
c) 3SS - "HAND" (Backwash pump)
d) 4SS - "HAND" (Washwater pump)
e) 5SS - "HAND" (Skimmer)
f) 6SS - "ON or OFF" (Indexing)
g) 7SS - "ON OR OFF" (Bridge light)

2.3 Indexing Mode

When indexing is required, set 6SS to "ON". This will activate 3TR (interval timer: dwell cycle timer). The unit will continue to operate as started in Automatic Operation except the unit's drive will stop (dwell) for the period of time set on 3TR over each cell. When 3TR times out, the unit's drive will start and the unit will move to the next cell until 3LS is tripped, and then the indexing cycle will start again.

3. OTHER FUNCTIONS

3.1 Level Controls

3.1.1

Low Level Cut Off Probe - Auto operations stop when de-energized. Backwash and Washwater pumps shut off when probe is de-energized and bridge returns to either end of the basin. Manual override will be possible for the backwash and washwater pumps. A red indicator light will be on

at control panel and a common dry contact is supplied to transmit a general alarm signal to control building.

3.1.2 High Level Operating Probe - When the probe is energized, unit operates continuously until the water level falls below the low operating probe.

3.1.3 Low Operating Probe - Auto function stops when probe is de-energized. Backwash and washwater pump remain on and bridge returns to either end of the basin.

3.1.4 Emergency High Level Probe - A red indicator light will be on at control panel and a common dry contact is supplied to transmit a general alarm signal to control building.

3.1.5 Skimmer Cut Off Probe - Skimmer pump stops when probe is de-energized. A reset occurs at either end of the basin.

SYSTEM PROBLEM REPORT

Rev.06.05.92

Project Name:		Project No.:	
Test Name:		**SPR Number:**	
Test Number:		Problem Status:	
Problem Type: Hardware Software Documentation Unknown Other			
SYMPTOMS:	Time:	Date:	By:
Description:			
Can problem be reproduced at will? Y / N			
DIAGNOSIS:	Time:	Date:	By:
Description:			
CORRECTION:	Time:	Date:	By:
Description:			
FINAL SIGN OFF	Time:	Date:	By:

SYSTEM PROBLEM REPORT

Rev.06.05.92

EXAMPLE FORMAT

Project Name: *Reno Westpac SCADA*		Project No.: *RDD29876.B1*	
Test Name: *Functional Acceptance*		**SPR Number: *24***	
Test Number: *17.B.1*		Problem Status: *Fix before RAT*	
Problem Type: Hardware (Software) Documentation Unknown Other			
SYMPTOMS:	Time: *11:45 am*	Date: *Sep-9-91*	By: *W.M. Peterschmidt*
Description: *Following an automatic fail-over from processor A to processor B*			
it was noted that the control modes for the following locations were changed from			
Auto to Manual:			
Evergreen BPS, Sierra Way BPS, and College Hill Tank			
Can problem be reproduced at will? (Y) / N			
DIAGNOSIS:	Time: *4:30 pm*	Date: *Sep-10-91*	By: *R.J. Contractor*
Description: *It appears that the control status for type P-3 and T-2 facilities are*			
not correctly passed to the back up system. This may also be causing other problems			
that have not yet been detected.			
CORRECTION:	Time: *3:00 pm*	Date: *Sep-15-91*	By: *R.J. Contractor*
Description: *Modified XFRMAKE program that sets up transfer of Backup system.*			
Recompiled, reloaded, and tested program. Problem no longer occurs.			
FINAL SIGN OFF:	Time: *8:45 pm*	Date: *Sep-17-91*	By: *J. Nordal*

LOOP STATUS REPORT

Rev.06.05.92

Project Name:	Project No.

FUNCTIONAL REQUIREMENTS:

COMPONENT STATUS (Check & initial each item when complete)

Tag Number	Delivered	Tag ID Checked	Installation	Termination Wiring	Termination Tubing	Calibration	

REMARKS:

Loop Ready for Operation	By:	Date:	Loop No.:

LOOP STATUS REPORT

Rev.06.05.92

EXAMPLE FORMAT

Project Name: *Newport News WTP*	Project No. *WDC23456.C1*

FUNCTIONAL REQUIREMENTS:

1. Measure, locally indicate, and transmit RAS flow to LP-10.	
2. At LP-10 indicate flow and provide flow control by modulation of FCV-10-2.	
3. Provide high RAS flow alarm on LP-10.	

COMPONENT STATUS (Check & initial each item when complete)

Tag Number	Delivered	Tag ID Checked	Installation	Termination Wiring	Termination Tubing	Calibration	
FE/FIT-10-2	*Jan-12-90 DWM*	*Jan-12-90 DWM*	*Feb-7-90 DWM*	*Mar-5-90 DWM*	*N.A.*	*May-6-90 VDA*	
FIC-10-2	*Jan-12-90 DWM*	*Jan-12-90 DWM*	*Mar-5-90 DWM*	*Apr-4-90 DWM*		*May-4-90 VDA*	
FSH-10-2	*Jan-12-90 DWM*	*Jan-12-90 DWM*	*Mar-5-90 DWM*	*Apr-4-90 DWM*		*May-7-90 VDA*	
FAH-10-2	*Jan-12-90 DWM*	*Jan-12-90 DWM*	*Mar-5-90 DWM*	*Apr-4-90 DWM*		*May-7-90 VDA*	
FCV-10-2	*Mar-2-90 DWM*	*Mar-2-90 DWM*	*Apr-20-90 DWM*	*Apr-30-90 DWM*		*May-16-90 VDA*	

REMARKS: *None.*

Loop Ready for Operation	By: *D.W. Munzer*	Date: *May-18-90*	Loop No.: *10-2*

INSTRUMENT CALIBRATION SHEET

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COMPONENT	MANUFACTURER	PROJECT
Code:	Name:	Number:
Name:	Model:	Name:
	Serial #:	

FUNCTIONS

	RANGE	VALUE	UNITS	COMPUTING FUNCTIONS? Y / N	CONTROL? Y / N Action? direct / reverse Modes? P / I / D
Indicate? Y / N Record? Y / N	Chart:			Describe:	
	Scale:				SWITCH? Y / N Unit Range: Differential: fixed/adjustable Reset? automatic / manual
Transmit/ Convert? Y / N	Input:				
	Output:				

ANALOG CALIBRATIONS

REQUIRED			AS CALIBRATED			
Input	Indicated	Output	Increasing Input		Decreasing Input	
			Indicated	Output	Indicated	Output
CONTROL MODE SETTINGS:			P:	I:	D:	

DISCRETE CALIBRATIONS

REQUIRED			AS CALIBRATED		Note No.
Number	Trip Point	Reset Pt.	Trip Point	Reset Pt.	
	(note rising or falling)		(note rising or falling)		
1					
2					
3					
4					
5					
6					
7					

#	NOTES:	**Component Calibrated and Ready for Start-up**
		Date:
		Tag No.:

INSTRUMENT CALIBRATION SHEET

Rev.06.05.92

EXAMPLE - ANALYZER/TRANSMITTER

COMPONENT	MANUFACTURER	PROJECT
Code: *A7*	Name: *Leeds & Northrup*	Number: *WDC30715.B2*
Name: *pH Element & Analyzer/Transmitter*	Model: *12429-3-2-1-7*	Name: *UOSA AWT PHASE 3*
	Serial #: *11553322*	

FUNCTIONS

	RANGE	VALUE	UNITS	COMPUTING FUNCTIONS? N	CONTROL? N Action? direct / reverse Modes? P / I / D
Indicate? Y Record? N	Chart:			Describe:	
	Scale:	*1-14*	*pH units*		SWITCH? N Unit Range: Differential: fixed/adjustable Reset? automatic / manual
Transmit/ Convert? Y	Input:	*1-14*	*pH units*		
	Output:	*4-20*	*mA dc*		

ANALOG CALIBRATIONS

REQUIRED			AS CALIBRATED			
Input	Indicated	Output	Increasing Input		Decreasing Input	
			Indicated	Output	Indicated	Output
1.0	*1.0*	*4.0*	*1.0*	*4.0*	*1.0*	*3.9*
2.3	*2.3*	*5.6*	*2.2*	*5.5*	*2.3*	*5.6*
7.5	*7.5*	*12.0*	*7.5*	*11.9*	*7.5*	*12.0*
12.7	*12.7*	*18.4*	*12.7*	*18.3*	*12.6*	*18.3*
14.0	*14.0*	*20.0*	*14.0*	*20.0*	*14.0*	*20.0*
CONTROL MODE SETTINGS:			P: *N.A.*	I:	D:	

DISCRETE CALIBRATIONS

REQUIRED			AS CALIBRATED		Note No.
Number	Trip Point	Reset Pt.	Trip Point	Reset Pt.	
	(note rising or falling)		(note rising or falling)		
1	*N.A.*		*N.A.*		
2					*1.*
3					
4					
5					
6					
7					

#	NOTES:	**Component Calibrated and Ready for Start-up**
	1. Need to recheck low pH calibration solutions.	
		Date: *Jun-6-92*
		Tag No.: *AIT-12-*

I&C VALVE ADJUSTMENT SHEET

Rev.06.05.92

PARTS	Project Name:	Project Number:
Body	Type:	Mfr:
	Size:	Model:
	Line Connection:	Serial #:
Operator	Type:	Mfr:
	Action:	Model:
	Travel:	Serial #:
Positioner	Input Signal:	Mfr:
	Action:	Model:
	Cam:	Serial #:
Pilot Solenoid	Action:	Mfr:
	Rating:	Model:
		Serial #:
I/P Converter	Input:	Mfr:
	Output:	Model:
	Action:	Serial #:
Position Switch	Settings:	Mfr:
	Contacts:	Model:
		Serial #:
Power Supply	Type:	Air Set Mfr:
	Potential:	Model:
		Serial #:

ADJUSTMENTS	Initial	Date	**VERIFICATION**	Initial	Date
Air Set			Valve Action		
Positioner			Installation		
Position Switches			Wire Connection		
I/P Converter			Tube Connection		
Actual Speed					

REMARKS:	**Valve Ready for Start-up**
	By:
	Date:
	Tag No.:

I&C VALVE ADJUSTMENT SHEET

Rev.06.05.92

EXAMPLE

PARTS	Project Name: *SFO SEWPCP*	Project Number: *SFO10145.G2*
Body	Type: *Vee-Ball*	Mfr: *Fisher Controls*
	Size: *4-inch*	Model: *1049763-2*
	Line Connection: *159 # ANSI Flanges*	Serial #: *1003220*
Operator	Type: *Pneumatic Diaphragm*	Mfr: *Fisher Controls*
	Action: *Linear - Modulated*	Model: *4060D*
	Travel: *3-inch*	Serial #: *2007330*
Positioner	Input Signal: *3-15 psi*	Mfr: *Fisher Controls*
	Action: *Direct - air to open*	Model: *20472T*
	Cam: *Equal percentage*	Serial #: *102010*
Pilot Solenoid	Action:	Mfr:
	Rating: *None*	Model:
		Serial #:
I/P Converter	Input: *4-20 mA dc*	Mfr: *Taylor*
	Output: *3-15 psi*	Model: *10-T-576-3*
	Action: *Direct*	Serial #: *1057-330*
Position Switch	Settings: *Closed / Open 5 deg, rising*	Mfr: *National Switch*
	Contacts: *Close / Close*	Model: *1049-67-3*
		Serial #: *156 &157*
Power Supply	Type: *Pneumatic*	Air Set Mfr: *Air Products*
	Potential: *40 psi*	Model: *3210D*
		Serial #: *1107063*

ADJUSTMENTS	Initial	Date	**VERIFICATION**	Initial	Date
Air Set	*JDS*	*Jun-06-92*	Valve Action	*JDS*	*Jun-03-92*
Positioner	*JDS*	*Jun-06-92*	Installation	*JDS*	*Jun-03-92*
Position Switches	*JDS*	*Jun-06-92*	Wire Connection	*JDS*	*Jun-04-92*
I/P Converter	*JDS*	*Jun-07-92*	Tube Connection	*JDS*	*Jun-04-92*
Actual Speed	*JDS*	*Jun-07-92*			

REMARKS: *Valve was initially installed backwards.*	**Valve Ready for Start-up**
Observed to be correctly installed May-25-92	By: *J.D. Sewell*
	Date: *Jun-07-92*
	Tag No.: *FCV-10-2-1*

PERFORMANCE ACCEPTANCE TEST SHEET

Rev.06.05.92

Project Name:	Project No.:

Demonstration test(s): For each functional Requirement of the loop:
(a) List and number the requirement. (b) Briefly describe the demonstration test.
(c) Cite the results that will verify the required performance. (d) Provide space for signoff.

Forms/Sheets Verified	By	Date	**Loop Accepted By Owner**
Loop Status Report			By:
Instrument Calibration Sheet			Date:
I&C Valve Calibration Sheet			
Performance Acceptance Test	By	Date	
Performed			
Witnessed			Loop No.:

PERFORMANCE ACCEPTANCE TEST SHEET

Rev.06.05.92

EXAMPLE

Project Name: *SFO SEWPCP Plant Expansion*	Project No.: *SFO12345.C1*

Demonstration test(s): For each functional Requirement of the loop:
(a) List and number the requirement. (b) Briefly describe the demonstration test.
(c) Cite the results that will verify the required performance. (d) Provide space for signoff.

1. MEASURE EFFLUENT FLOW

1.a With no flow, water level over weir should be zero and

FIT indicator should read zero. *Jun-20-92 BD*

2. FLOW INDICATION AND TRANSMISSION TO LP & CCS

With flow, water level and FIT indicator should be related by expression

*Q(MGD) = 429*H**(2/3) (H = height in inches of water over weir).*

Vary H and observe that following.

2.a Reading of FIT indicator. *Jun-6-92 BD*

1.01 *2.B READING IS TRANSMITTED TO FI ON LP-521-JUN-6-92 BDG*

2.c Reading is transmitted and displayed to CCS. *Jun-6-92 BD*

H(measured)	*0*	*5*	*10*	*15*
Q(computed)	*0*	*47.96*	*135.7*	*251.7*
Q(FIT indicator)	*0*	*48.1*	*137*	*253*
Q(LI on LP-521-1)	*0*	*48.2*	*138*	*254*
Q(display by CCS)	*0*	*48.1*	*136.2*	*252.4*

Forms/Sheets Verified	By	Date	**Loop Accepted By Owner**
Loop Status Report	*J.D. Sewell*	*May-18-92*	By: *J.D. Smith*
Instrument Calibration Sheet	*J.D. Sewell*	*May-18-92*	Date: *Jun-6-92*
I&C Valve Calibration Sheet	*N.A.*		
Performance Acceptance Test	By	Date	
Performed	*J. Blow MPSDC Co.*	*Jun-6-92*	
Witnessed	*B.deGlanville*	*Jun-6-92*	Loop No.: *30-12*

SECTION 40 90 11
INSTRUMENTS AND PANELS SUBSYSTEM (IPS)

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Instrument Society of America (ISA):
   a. S5.4, Instrument Loop Diagrams.
   b. S20, Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves.
2. National Electrical Manufacturers Association (NEMA): 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
3. Underwriters Laboratories Inc.: UL 508, Standards for Safety, Industrial Control Equipment.

1.02 DEFINITIONS

A. Refer to Article Definitions in Section 40 90 00, Process Instrumentation and Control Systems (PICS).

B. IPS Components: Equipment listed under Component Specifications referenced in Paragraph Supplements.

1.03 SYSTEM DESCRIPTION

A. This section covers requirements for Instruments and Panels Subsystem (IPS) and is in addition to requirements in Section 40 90 00, Process Instrumentation and Control Systems (PICS).

B. These requirements apply to the four new filter control panels and field modifications of existing filters #6 and #7 Control Panels part of the scope of this upgrade project.

1.04 SUBMITTALS

A. Shop Drawings:

1. Bill-of-Materials: List of required IPS equipment.
   a. Group equipment items by enclosure and field, and within an enclosure, as follows:
      1) IPS Components: By component identification code.
      2) Other IPS Equipment: By equipment type.
   b. Data Included:
      1) Equipment tag number.
      2) Description.

3) Manufacturer, complete model number and all options not defined by model number.
4) Quantity supplied.
5) Component identification code where applicable.

2. Catalog Cuts: IPS components, electrical devices, and mechanical devices:
   a. Catalog information.
   b. Descriptive literature.
   c. External power and signal connections.
   d. Scaled Drawings showing exterior dimensions and locations of all electrical and mechanical interfaces.
3. Component Data Sheets: Data sheets for all IPS components.
   a. Format and Level of Detail: In accordance with ISA-S20.
   b. Include component type identification code on data sheet.
   c. Specific Features and Configuration Data for Each Component:
      1) Location or service.
      2) Manufacturer and complete model number.
      3) Size and scale range.
      4) Set points.
      5) Materials of construction.
      6) Options included.
   d. Name, address, and telephone number of manufacturer's local office, representative, distributor, or service facility.
4. Instrument List: Prepare a detailed Instrument List. The columns of the Instrument List shall include Tag Number, Component Code per Component Specifications, Instrument Title, and component options. For each instrument the component option column shall include scale range, materials of construction, line size etc. Submit Instrument List for approval. An approved instrument list is prerequisite to ordering instruments.
5. Panel Construction Drawings:
   a. Scale Drawings: Show dimensions and locations of panel mounted devices, doors, louvers, subpanels, internal and external.
   b. Panel Legend: List front of panel devices by tag numbers, nameplate inscriptions, service legends, and annunciator inscriptions.
   c. Bill of Materials: List devices mounted within panel that are not listed in panel legend. Include tag number, description, manufacturer, and model number.
   d. Construction Details: NEMA rating, materials, material thickness, structural stiffeners and brackets, lifting lugs, mounting brackets and tabs, door hinges and latches, and welding and other connection callouts and details.
   e. Construction Notes: Finishes, wire color schemes, wire ratings, wire, terminal block numbering, and labeling scheme.
6. Panel Control Diagrams: For discrete control and power circuits.
   a. Diagram Type: Ladder diagrams. Include devices, related to discrete functions, that are mounted in or on the panel and that require electrical connections. Show unique rung numbers on left side of each rung.

b. Item Identification: Identify each item with attributes listed.
   1) Wires: Wire number and color. Cable number if part of multiconductor cable.
   2) Terminals: Location (enclosure number, or terminal junction box number, terminal strip number, and terminal block number.
   3) Discrete Components:
      a) Tag number, terminal numbers, and location ("FIELD," enclosure number, or motor starter/VFD number).
      b) Switching action (open or close on rising or falling process variable), set point value and units, and process variable description (e.g. Sump Level High).
   4) Relay and Timer Coils:
      a) Tag number and its function.
      b) On right side of run where coil is located, list contact location by ladder number and sheet number. Underline normally closed contacts.
   5) Relay Contacts: Coil tag number, function, and coil location (ladder rung number and sheet number).
c. Show each circuit individually. No "typical" diagrams or "typical" wire lists will be allowed.
d. Ground wires, surge protectors, and connections.
e. Circuit Names: Show names corresponding to Circuit and Raceway Schedule for circuits entering and leaving a panel. Refer to Division 26, Electrical.

7. Motor Control Diagrams: Where applicable provide variable frequency drive and constant speed motor starter control diagrams showing external and internal signal interfaces. Include three line power distribution diagrams.
8. Panel Plumbing Diagrams: For each panel containing piping and tubing. Show type and size for:
   a. Pipes and Tubes: Thickness, pressure rating, and materials.
   b. Components: Valves, regulators, and filters.
   c. Connections to panel mounted devices.
   d. Panel and RIO interface connections.
9. Loop Diagrams: Individual wiring diagram for each Analog Subsystem analog or pulse frequency loop.
   a. Conform to the minimum requirements of ISA S5.4.
   b. Under paragraph 5.3 of ISA S5.4, include the information listed under subparagraphs 2 and 6.
   c. Drawing Size: Individual 11-inch by 17-inch sheet for each loop.
   d. Divide each loop diagram into areas for panel face, back-of-panel, and field.
   e. Show:
      1) Terminal numbers, location of dc power supply, and location of common dropping resistors.

2) Switching contacts in analog loops and output contacts of analog devices. Reference specific control diagrams where functions of these contacts are shown.
3) Tabular Summary on Each Diagram:
a) Transmitting Instruments: Output capability.
b) Receiving Instruments: Input impedance.
c) Loop Wiring Impedance: Estimate based on wire sizes and lengths shown.
d) Total loop impedance.
e) Reserve output capacity.
4) Circuit and raceway names.

10. Panel Power Requirements and Heat Dissipation: For control panels tabulate and summarize:
a. Required voltages, currents, and phases(s).
b. Maximum heat dissipations Btu per hour. Include solar radiation. Predict maximum panel temperature.
c. Certify maximum panel temperature does not exceed the maximum operating temperature for all panel mounted components.
d. All calculations.
11. Interconnecting Wiring Diagrams:
a. Diagrams, device designations, and symbols in accordance with NEMA ICS 250.
b. Diagrams shall bear electrical Subcontractor's mark showing that they have been coordinated.
c. Show:
1) Electrical connections between equipment, consoles, panels, terminal junction boxes, and field mounted components.
2) Component and panel terminal board identification numbers, and external wire and cable numbers.
3) Circuit names.
4) Intermediate terminations between field elements and panels for, but not limited to terminal junction boxes.
5) Pull boxes.
12. Installation Details: Include all modifications or further details required and adequately define installation of IPS components.
13. Spares, expendables, and test equipment.

B. Samples: Color schedule with color Samples for control panels.

C. Quality Control Submittals:

1. Testing Related Submittals: In accordance with Section 40 90 00, Process Instrumentation and Control Systems (PICS).
2. O&M Manuals:
a. Legends Abbreviation Lists: In accordance with Section 40 90 00, Process Instrumentation and Control Systems (PICS).
b. Refer to Paragraph Shop Drawings for the Following Items:
1) Bill-of-materials.

2) Catalog cuts.
3) Component data sheets.
4) Panel wiring diagrams, one reproducible copy.
5) Panel plumbing diagrams, one reproducible copy.
6) Loop diagrams, one reproducible copy.
7) Interconnecting wiring diagrams, one reproducible copy.

c. Device O&M manuals for IPS components, electrical devices, and mechanical devices shall include:
1) Operations procedures.
2) Installation requirements and procedures.
3) Maintenance requirements and procedures.
4) Troubleshooting procedures.
5) Calibration procedures.
6) Internal schematic and wiring diagrams.
7) ORT Component Calibration Sheets.

d. List of spares and expendables required and recommended.

1.05 DELIVERY, STORAGE, AND HANDLING

A. In accordance with Section 40 90 00, Process Instrumentation and Control Systems (PICS).

1.06 ENVIRONMENTAL REQUIREMENTS

A. General: Refer to paragraph Environmental Design Requirements for definitions of different environments in Section 40 90 00, Process Instrumentation and Control Systems (PICS).

B. Standard Environmental Requirements: Unless otherwise noted, design IPS equipment for continuous operation in these environments:

1. Panels and Assemblies:
   a. All Locations: NEMA 4X, Type 316 stainless steel.
2. Field Elements: Outside, corrosive.

1.07 SEQUENCING AND SCHEDULING

A. In accordance with Section 40 90 00, Process Instrumentation and Control Systems (PICS).

PART 2 PRODUCTS

2.01 NAMEPLATES AND TAGS

A. Panel Nameplates: Enclosure identification located on the enclosure face.

1. Location and Inscription: As shown on Drawings, FP-Filter No. XXX.
2. Materials: Screwed or riveted, laminated plastic.
3. Letters: 1/2-inch white on black background, unless otherwise noted.

B. Component Nameplates-Panel Face: Component identification located on panel face under or near component.

1. Location and Inscription: As shown on panel Reference Drawing including in the Drawing set.
2. Materials: Screwed or riveted, laminated plastic.
3. Letters: 3/16-inch white on black background, unless otherwise noted.

C. Component Nameplates-Back of Panel: Component identification located on or near component inside of enclosure.

1. Inscription: Component tag number.
2. Materials: Adhesive backed, laminated plastic.
3. Letters: 3/16-inch white on black background, unless otherwise noted.

D. Service Legends: Component identification nameplate located on face of component.

1. Inscription: As shown on panel Reference Drawing including in the Drawing set.
2. Materials: Adhesive backed, laminated plastic.
3. Letters: 3/16-inch white on black background, unless otherwise noted.

E. Nametags: Component identification for field devices.

1. Inscription: Component tag number.
2. Materials: 16-gauge, Type 304 stainless steel.
3. Letters: 3/16-inch imposed.
4. Mounting: Affix to component with 16- or 18-gauge stainless steel wire or stainless steel screws.

2.02 PANEL FABRICATION

A. General:

1. The PICS subcontractor shall size and select the panel within the requirements of these Specifications. Panel mounting shall be on each filter travelling bridge.
2. Panel Construction and Interior Wiring: In accordance with the National Electrical Code (NEC), state and local codes, and applicable sections of NEMA, ANSI, UL, and ICECA.
3. Fabricate panels, install instruments, wire, and plumb, all at the Contractor's factory.
4. All panels shall bear UL label stating "LISTED ENCLOSED INDUSTRIAL CONTROL PANELS."
5. Electrical Work: In accordance with the applicable requirements of Division 26, Electrical.

B. Panel Temperature Control: Size, shade, or air condition to adequately dissipate solar radiant heat and heat from equipment mounted inside panel or in panel face.

C. Panel Construction:

1. For all Panels:
   a. Enclosure Type: NEMA 4X.
   b. Materials: Type 316 stainless steel.
2. Metal Thickness: 14-gauge, minimum.
3. Doors:
   a. Rubber-gasketed with continuous hinge.
   b. Stainless steel lockable quick-release clamps.
4. Manufacturers:
   1) Hoffman Engineering Co.
   2) H. F. Cox.

D. Control Panel Electrical:

1. Power Distribution within Panels:
   a. Feeder Circuits:
      1) Main incoming feeder for each control panels shall be 480V ac, 3-phase, 60-Hz. Provide appropriately sized incoming main breaker for each panel.
      2) Make provisions for feeder circuit conduit entry.
      3) Furnish terminal board for termination of wires.
   b. Power Panel: Furnish main circuit breaker and a circuit breaker on each individual branch circuit distributed from power panel.
      1) Locate to provide clear view of and access to breakers when door is open.
      2) Breaker Sizes: Coordinate such that fault in branch circuit will blow only branch breaker but not trip the main breaker.
      3) Breaker Manufacturers and Products: Square D; Type QO.
      4) Provide combination motor starters as shown and specified.
      5) Provide adequately sized control power transformer for 120V ac control circuits.
   c. Circuit Wiring: As shown on the Drawings.
2. Signal Distribution:
   a. Within Panels: 4 to 20 mA dc signals may be distributed as 1 to 5V dc.
   b. Outside Panels: Isolated 4 to 20 mA dc only.
   c. All signal wiring shall be twisted, shielded pairs.
3. Relays:
   a. General:
      1) Relay Mounting: Plug-in type socket.
      2) Relay Enclosure: Furnish dust cover.
      3) Socket Type: Screw terminal interface with wiring.
      4) Socket Mounting: Rail.
      5) Provide holddown clips.

b. Control Circuit Switching Relay, Nonlatching:
   1) Type: Compact general purpose plug-in.
   2) Contact Arrangement: 3 Form C contacts.
   3) Contact Rating: 10A at 28V dc or 240V ac.
   4) Contact Material: Silver cadmium oxide alloy.
   5) Coil Voltage: As noted or shown.
   6) Coil Power: 1.8 watts (dc), 2.7VA (ac).
   7) Expected Mechanical Life: 10,000,000 operations.
   8) Expected Electrical Life at Rated Load: 100,000 operations.
   9) Indication Type: Neon or LED indicator lamp.
   10) Push-to-test button.
   11) Manufacturer and Product: Potter and Brumfield; Series KUP.

c. Control Circuit Switching Relay, Latching:
   1) Type: Dual coil mechanical latching relay.
   2) Contact Arrangement: 2 Form C contacts.
   3) Contact Rating: 10A at 28V dc or 120V ac.
   4) Contact Material: Silver cadmium oxide alloy.
   5) Coil Voltage: As noted or shown.
   6) Coil Power: 2.7 watts (dc), 5.3VA (ac).
   7) Expected Mechanical Life: 500,000 operations.
   8) Expected Electrical Life at Rated Load: 50,000 operations.
   9) Manufacturer and Product: Potter and Brumfield; Series KB/KBP.

d. Control Circuit Switching Relay, Time Delay:
   1) Type: Adjustable time delay relay.
   2) Contact Arrangement: 2 Form C contacts.
   3) Contact Rating: 10A at 240V ac.
   4) Contact Material: Silver cadmium oxide alloy.
   5) Coil Voltage: As noted or shown.
   6) Operating Temperature: Minus 10 to 55 degrees C.
   7) Repeatability: Plus or minus 2 percent.
   8) Delay Time Range: Select range such that time delay set point fall between 20 to 80 percent of range.
   9) Time Delay Set Point: As noted or shown.
   10) Mode of Operation: As noted or shown.
   11) Adjustment Type: Integral potentiometer with knob external to dust cover.
   12) Manufacturer and Products: As shown on the Drawings ATC #305A or equal.

e. Counters: As needed for the application and shown on the Drawings. Counters shall be ATC #355A or equal.

4. Power Supplies:
   a. Furnish as required to power instruments requiring external dc power, including two-wire transmitters and dc relays. Provide individual fused 24V dc power circuits for each loop powered transmitter.

b. Convert 120V ac, 60-Hz power to dc power of appropriate voltage(s) with sufficient voltage regulation and ripple control to assure that instruments being supplied can operate within their required tolerances.
c. Provide output over voltage and over current protective devices to:
    1) Protect instruments from damage due to power supply failure.
    2) Protect power supply from damage due to external failure.
d. Enclosures: NEMA 1.
e. Mount such that dissipated heat does not adversely affect other components.
f. Fuses: For each dc supply line to each individual two-wire transmitter.
    1) Type: Indicating.
    2) Mount so fuses can be easily seen and replaced.

5. Internal Panel Lights for Freestanding Panels:
    a. Type: Switched 100-watt incandescent back-of-panel lights.
    b. Quantity: One light for every 4 feet of panel width.
    c. Mounting: Inside and in the top of back-of-panel area.
    d. Protective metal shield for lights.
6. Service Outlets for Freestanding Panels:
    a. Type: Three-wire, 120-volt, 15-ampere, duplex receptacles.
    b. Quantity:
        1) For Panels 4 Feet Wide and Smaller: One.
        2) For Panels Wider than 4 Feet: One for every 4 feet of panel width, two minimum per panel.
    c. Mounting: Evenly spaced along back-of-panel area.
7. Internal Panel Lights and Service Outlets for Smaller Panels:
    a. Internal Panel Light: Switched 100-watt incandescent light.
    b. Service Outlet: Breaker protected 120-volt, 15-amp, duplex receptacle:
8. Standard Pushbutton Colors and Inscriptions:
    a. Use color code and inscriptions for pushbuttons as shown in Supplement 1 of Section 40 90 00, Process Instrumentation and Control Systems.
    b. Unused or Noninscribed Buttons: Black.
    c. Lettering Color:
        1) Black on white and yellow buttons.
        2) White on black, red and green buttons.
    d. All pushbuttons and switches are Square D or Allen-Bradley.
9. Standard Light Colors and Inscriptions:
    a. Use color code and inscriptions for service legends and lens colors for indicating lights as shown in Supplement 1 of Section 40 90 00, Process Instrumentation and Control Systems.
    b. Lettering Color:
        1) Black on white and amber lenses.
        2) White on red and green lenses.
        3) All indicating lights are Square D or Allen-Bradley.
10. Standard Wiring Details: As shown on the Reference Drawings.

E. Factory Finishing:

1. Stainless Steel and Aluminum: Power epoxy white.
2. Nonmetallic Panels: Not painted.

2.03 FILTER CONTROL PANEL MOTOR STARTERS

A. As shown on Reference Drawings the Control Panel Supplier shall factory install stand alone motor starters in NEMA 4X, Type 316 stainless steel control panels. Install and terminate flat festoon multi-conductor power and control cables furnished under Section 44 43 15, Automatic Backwash Filter Rehabilitation.

B. Combination Starter Units:

1. Provide a standard combination motor starter units which consists of a motor circuit protector (MCP), a magnetic motor starter, and control power transformer. Install starter and circuit protective device and control power transformer in a plug-in unit. The ratings of the components are shown on the one-line diagram. Short circuit with stand rating: 22,000 amps symmetrical at 480V, 3-phase, 60-Hz incoming power.
2. Provide motor starters conforming to NEMA standards for the horsepower of the motors with which they are to be used and which are suitable for full voltage, across-the-line starting. Select starters with pickup and dropout voltages of not greater than 85 percent and 60 percent of rated voltage, respectively. Do not use a starter smaller than NEMA size 1.
3. Select overload relays designed so that any attempt for reset immediately after operation cannot result in damage to the unit. Provide running protection for the motor and all other series components, based upon the tripping characteristics of the overload relay.
4. Utilize motor overload relays of the solid state type with adjustable overload, phase unbalance and phase failure sensitivity.
5. Starters shall have a minimum of two NC and two NO auxiliary contacts in addition to the seal-in contact.
6. Provide an MCP of the magnetic type with adjustable trips on each pole. Include a fault interrupting capability suitable for the complete starter unit.
7. Provide each combination starter unit with its own control power transformer with Class B insulation and 120 volt secondary.
8. Place fuses on the secondary side of control power transformers with one dual element fuse. Have control transformers separately fused on the primary side with two dual element fuses.
9. Connect the control power transformer to that it is de-energized when the circuit breaker is opened.
10. Number of starters required for each panel and their ratings are shown on the Reference Drawings.

C. Manufacturer: Rockwell Automation/Allen-Bradley with model numbers shown on the Drawings.

2.04 SPARE PARTS

Description	Percent of Each Type and Size Used	No Less Than
dc power supplies	20	2
Fuses	20	5
Indicating light bulb	20	10
Relays/Counters	20	3
Terminal Blocks	10	10
Hand Switches	10	5

2.05 EXPENDABLES

Item	Quality
Corrosion-inhibiting vapor capsules	Manufacturer's recommended 2-year supply

2.06 FIELD MODIFICATION OF EXISTING FILTER #6 AND #7 CONTROL PANELS

A. Skimmer controls for existing filters #6 and #7 do not work. The Contractor shall field modify the control panels for filter #6 and #7 as shown on the Drawings.

B. Replace the existing timer and counters in each existing control panel and re-wire the control circuits to make the skimmer controls operational as specified.

C. Perform ORT and PAT tests to prove that the Automatic Backwash System for each filter works to meet the functional control system requirements.

PART 3 EXECUTION

3.01 GENERAL

A. Drawings for PICS Mechanical Systems are diagrammatic and not intended to specifically define element locations or piping and tubing run lengths. Base materials and installations on field measurements.

B. Coordinate Work with Section 44 43 15, Automatic Backwash Filter Rehabilitation, and Division 26, Electrical.

3.02 INSTALLATION

A. Mechanical Systems:

1. Stainless Steel Tubing Support: Continuously supported by an aluminum tubing raceway system.
2. All instrument tubing shall be Type 316 stainless steel.
3. Conduit Bends: Follow NEC guidelines.
   a. Bend Radius: Equal to or larger than conduit manufacturer's recommended minimum bend radius.

b. Use lubricating compound or TFE tape on stainless steel threads to prevent seizing or galling.
c. Keep conduit runs at least 12 inches from hot pipes.

4. Enclosure Lifting Rings: Remove rings following installation and plug holes.

B. Instruments and Control Panels: Follow installation and wiring details as shown and specified.

C. Wiring: Refer to Section 40 90 00, Process Instrumentation and Control Systems (PICS) and Division 26, Electrical. For internal and external wiring details of control panels, surge suppressors, control valves, and field instruments, see installation details shown on the Drawings.

3.03 FIELD QUALITY CONTROL

A. Refer to Section 40 90 00, Process Instrumentation and Control Systems (PICS), for the following:

1. Onsite services.
2. Startup and testing.
3. Performance acceptance test.

B. Operational Readiness Test: Refer to Section 40 90 00, Process Instrumentation and Control Systems (PICS).

3.04 TRAINING

A. Operation: For Owner's operations personnel on operation of IPS.

1. Training Session Duration: 1 instructor days.
2. Number of Training Sessions: Two.
   a. One 1-day training session after the control panel installation is complete and the filter backwash system is operational.
   b. One 1-day training session after the entire system is operational.
3. Location: Project site.
4. Content: Conduct training on loop-by-loop basis.
   a. Loop Functions: Understanding of loop functions, including interlocks for each loop.
   b. Loop Operation: For example, adjusting process variable set points, AUTO/MANUAL control transfer, AUTO and MANUAL control, annunciator acknowledgement and resetting.
   c. External interfaces with control panels for remote monitoring.

B. Maintenance Training:

1. Training Session Duration: 1 instructor day.
2. Number of Training Sessions: One.
3. Location: Project Site.

4. Content: Provide training for each type of component and function provided.
    a. Loop Functions: Understanding details of each loop and how they function.
    b. Component calibration.
    c. Adjustments: For example, controller tuning constants, current switch trip points, and similar items.
    d. Troubleshooting and diagnosis for and components.
    e. Replacing lamps, chart paper, fuses.
    f. IPS components removal and replacement.
    g. Periodic maintenance.

3.05 CLEANING

A. Prior to closing system using tubing, clear all tubing of interior moisture and debris.

3.06 SUPPLEMENTS

A. Supplement listed below, follows "END OF SECTION," is part of this Specification.

1. Component Specifications.

END OF SECTION

COMPONENT SPECIFICATIONS

A. M8 Potentiometer, Corrosion, Round:

1. General:
   a. Function: Adjust analog set point.
   b. Type: Heavy-duty, corrosion-resistant, industrial.
2. Performance:
   a. Resistance: 1,000 ohms, unless otherwise noted.
   b. Resolution: 1 percent.
   c. Linearity: Plus or minus 5 percent.
   d. Dissipation: 2 watts, unless otherwise noted.
3. Features:
   a. Mounting: 30.5 mm single round hole. Panel thickness 1/16 inch to ¼ inch.
   b. Dial Plate: Standard size square style laminate field and white markings, unless otherwise noted.
   c. Scale: 0 to 100 percent, unless otherwise noted.
   d. Terminals: Screw with strap clamp.
4. Signal Interface: Three-wire.
5. NEMA Rating: NEMA 4X, watertight and dusttight.
6. Manufacturers:
   a. Allen-Bradley, Bulletin 800H.
   b. Square D Co., Class 9001, Type SK.

B. M26 Hand Switch and Light, Corrosion, Round:

1. General:
   a. Function: Select, initiate, and display discrete control functions.
   b. Type: Heavy-duty, corrosion-resistant, industrial.
2. General Features:
   a. Mounting: 30.5 mm single round hole. Panel thickness 1/16 inch to 1/4 inch.
   b. Legend Plate: Standard size square style laminate with white field and black markings, unless otherwise noted. Markings as shown.
   c. Configuration: Light, pushbutton, or switch as noted or shown.
3. Light Features:
   a. Lights: Long life LED style with push-to-test and integral transformer for operation from 120V ac, unless otherwise noted.
   b. Lens Color: Color as specified under PANEL, STANDARD LIGHT COLOR AND INSCRIPTIONS, or as noted.
4. Pushbutton and Switch Features:
   a. Guard: Full guard with flush button, unless otherwise noted.
   b. Operator: Black pushbutton, black nonilluminated knob on switch, unless otherwise noted.
   c. Boot: None, unless otherwise noted.

5. Signal Interface:
   a. Contact Block:
      1) Type: Silver-coated butting, unless otherwise noted.
      2) Rating: 10 amps continuous at 120V ac or as noted.
      3) Sequence: Break-before-make, unless otherwise shown.
      4) Arrangement: Normally open or normally closed as shown, or to perform the functions noted.
      5) Terminals: Screw with strap clamp, unless otherwise noted.
6. NEMA Rating: NEMA 4X, corrosion-resistant.
7. Manufacturers: Allen-Bradley, Bulletin 800H.

C. Miscellaneous Panel Components: As shown on the Drawings.

END OF COMPONENT SUPPLEMENT

SECTION 44 43 15
AUTOMATIC BACKWASH FILTER REHABILITATION

PART 1 GENERAL

1.01 SUMMARY OF WORK

A. The Contractor shall furnish all labor, materials, tools, and equipment required to demolish the existing filter internal components of three existing filters in accordance with Section 02 41 00, Demolition, furnish and install three new filters internals and granular media in the existing concrete basins shown on the Drawings and as specified herein. Filters shall be of the traveling bridge type; Filters No. 2 through 5 with dimensions of 16 feet 0-inch wide by 70 feet 0-inch long with 66 feet 0-inch bed length; Filters No. 6 and 7 with dimension of 16 feet 0-inch wide by 90 feet 0-inch long with 86 feet 0-inch bed length.

B. The Contractor shall furnish all labor, materials, tools, and equipment required to repair existing concrete structure of Filters No.2 through 5 in accordance with Section 03 01 32, Repair Concrete Surfaces.

C. The Contractor shall furnish, install, and wire new control panels and field modify existing control panels as shown on Drawings and specified in Section 40 90 00, Process Instrumentation and Control Systems (PICS) and Section 40 90 11, Instruments and Panels Subsystem (IPS). All electrical work shall be performed as shown on Drawings and specified in Division 26, Electrical.

D. The Contractor shall furnish all labor, materials, tools, and equipment required to seal off bypass channels of Filters No.1 through 7 with stainless steel plates in accordance with Section 05 50 00, Metal Fabrications and as shown on Drawings.

E. The Contractor shall furnish all labor, materials, tools, and equipment required to install skimmer assemblies for Filters No. 2 through 7.

F. The Contractor shall furnish all labor, materials, tools, and equipment required to demolish existing and install new replacements of the following equipment. The demolition shall be conducted in accordance with Section 02 41 00, Demolition.

1. Replace porous plates, and media for Filters No. 3, 4, and 5.
2. Replace skimmer assemblies for Filters No. 2 through 7.
3. Replace control panels of Filters No. 2, 3, 4, and 5.
4. Modification of control panels of Filters No. 6 and 7 for the installation of new skimmer assemblies.

5. Replace all bridge drive assemblies, rails, rail caps, wheels, and shafts for Filters No. 3 through 5. Replace all rails, rail caps, and wheels for Filter No. 2.
6. Replace rail supports, concrete anchorages, and grout for Filters No.2 through 5.
7. Replace backwash shoe and tensioning assemblies for Filters No. 3 through 5.
8. Replace flat festoon electrical power and signal cables for Filters No. 2 through 7. Replace festoon cable tracks and cable trolleys for Filters No. 2 through No. 5.
9. Replacement of indexing peg systems on Filters No. 2 through 7.
10. Replace limit switches and level sensors for Filters No. 2 through No. 5. Replace limit switches for Filters No. 6 and 7.
11. Provide an un-installed spare skimmer pump.

G. Each filter component shall be designed to withstand with a prudent safety factor all stresses that may occur during fabrication, erection, intermittent, or continuous 24-hour per day operation. The equipment and controls shall be provided by a single supplier as a complete package to ensure coordination and compatibility.

H. Demolition of existing filter components shall be in accordance with the filter manufacturer's written instructions.

1.02 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Welding Society (AWS): D1.1, Structural Welding Code-Steel.
2. American Water Works Association (AWWA): B100, Filtering Materials.
3. National Electrical Manufacturers Association (NEMA):
   a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
   b. MG 1, Motors and Generators.
4. Underwriters Laboratories Inc. (UL).

1.03 SUBMITTALS

A. Shop Drawings:

1. Drawings showing dimensions, weights, and details of components, piping connections, and wiring for installation and operation.
2. Schematic Diagrams:
   a. Control console showing control logic using industry standard symbols.

b. Wiring diagrams of control panel showing location of control devices, panel front, back of front panel, and devices mounted internally within panel.
c. Line numbers where associated contacts for devices are shown in the schematic diagrams.
d. Detail the interface between field wiring and manufactured subsystems.

3. Product data for equipment, components, and accessories.

B. Information Submittals:

1. Manufacturer's Certificate of Proper Installation for equipment units.
2. Manufacturer's written installation instructions.
3. Statements of Qualification:
   a. Equipment manufacturer.
   b. Manufacturer's representative.
   c. Field welders.
4. Operation and Maintenance Data: As specified in Section 01 78 23, Operation and Maintenance Data.
   a. Operation and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, description, etc., that are required to instruct operation and maintenance personnel unfamiliar with such equipment.
5. Test Reports:
   a. Sieve analysis results on a representative sample of filter media.
   b. Factory inspections.
   c. Factory tests and adjustments.
   d. Performance test log.

1.04 QUALITY ASSURANCE

A. Equipment Manufacturer:

1. Experienced in design, construction, and operation of specified equipment.
2. Provided similar equipment in size and design to wastewater treatment plants in the USA and have been in successful operation for a period of not less than 5 years.
3. List five installations of similar type and size with plant addresses, name, title of reference contact, and telephone numbers.

B. Manufacturer's Representative: Minimum of 2 years' experience in the installation supervision of similar equipment specified in municipal wastewater treatment plants within the past 10 years.

C. Welders: Certified in accordance with AWS D1.1, Chapter 5.

D. Warranty: The Manufacturer shall provide a written warranty against defects in materials and workmanship. Manufacturer shall warrant the goods provided by the Manufacturer to be free from defects in materials and workmanship under normal conditions and use for a period of 3 years from the date the goods are put into service, or 42 months from shipment of equipment, whichever occurs first.

1.05 SPARE PARTS

A. Furnish the spare parts in accordance to Specification Section 01 61 00, Common Product Requirement.

B. For each of Filters No. 3, 4, and 5 provide:

1. One guide wheel.
2. One nonguide wheel.
3. 10 percent extra anthrocite, supplied in 100-pound bags.

C. An un-installed skimmer pump.

D. For Filter No. 2:

1. One guide wheel.
2. One nonguide wheel.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Materials, equipment, and accessories specified in this section shall be provided by a single manufacturer and be products of:

1. Aqua-Aerobics.
2. Or Engineer approved equal.
   a. Should Contractor select to propose a substitute for the named manufacturer, Contractor shall write the name of the offered Substitute on the Bid Form and list the differences between the Substitute and the named manufacturer.
   b. Should the proposed Substitute be determined “not equal” or otherwise declined, at Owner’s sole discretion, the Contractor shall provide the named manufacturer’s products at no additional cost to Owner.

2.02 MATERIALS AND EQUIPMENT

A. All structural steel used in the fabrication of the equipment shall be Type 304 or 316 stainless steel and conform to the requirements of "Specifications", ASTM A240. All welding shall conform to the latest standards of the American Welding Society.

B. All bolts and nuts shall be Type 316 stainless steel.

C. New ground rods shall be furnished and installed for each new control panel.

D. Hardware for mounting instruments such as limit switches and level sensors shall be furnished with the instrument.

2.03 SYSTEM DESCRIPTION

A. Underdrain System:

1. The underdrain materials, including porous plates, retaining angles, associated hardware for the retaining angles, caulk, and media shall be replaced in three Filters: No. 3, 4, and 5.
2. Filter Bed: The filter bed shall consist of a series of partitions which divide the filter into a multiple of 12-inch wide compartments.
3. Cell Dividers: The existing cell dividers shall be reused.
4. Influent and Effluent Headers: The existing influent and effluent headers shall be reused.
5. Filter Media Support System: The filter media support system shall consist of fused alumina oxide porous plates that meet the following requirements. Plates made of other materials are not allowed.
    a. Porosity: 30 percent to 40 percent.
    b. Flexural strength: 1,000 P.S.I. minimum.
    c. Air Permeability: 170 to 190 C.F.M. per ft^2 per 1.0-inch thick plate at 2-inch water column pressure.
    d. Thickness: 1 inch (nominal).
6. The porous plates shall be completely sealed in place with a gasket-forming type sealant such as polyurethane. The porous plates shall be held down by a fiberglass reinforced polyester retaining angle attached to the cell divider with 1/4 inch Type 316 stainless steel fasteners through factory pre-drilled holes.

B. Filter Media:

1. Furnish and install granular media in three Filters: No. 3, 4, and 5.
2. The sand media shall be a high-grade silica sand with a minimum of 85 percent silica dioxide complying with Sections 1, 2.2 and 5 of the Standard Specifications for Filtering Material (AWWA B100-09). The sand shall be well graded and materials showing abnormal grading will

be rejected. The particle size distribution shall be determined by screening through standard U.S. Series sieves. The percent size shall be determined from a plot of the percentages of the material passing each sieve, against the rated openings of the sieve. The 10 percent size or effective size shall be between 0.55 and 0.65 millimeters. The uniformity coefficient (ratio of 60 percent size to 10 percent size) shall not exceed 1.50. The sand media shall be shipped in 4,000 pound supersacks, without pallets.

3. The anthracite media shall be durable anthracite coal particles of various sizes complying with Sections 1, 2.3, 3 and 5 of the Standard Specification for Filtering Material (AWWA Designation B100-09). The 10 percent size or effective size shall be between 0.85 and 0.95 millimeters. The uniformity coefficient (ratio of 60 percent size to 10 percent size) shall not exceed 1.7. The anthracite media shall be shipped in 2,250 pound supersacks, without pallets.
4. The filter media shall have a combined nominal depth of 22 inches. The depth specified shall be obtained when the filter is completely submerged and after thorough backwashing to remove all media fines.

C. Carriage Drive and Wheels:

1. New shafts, wheels, bearings and drives shall be supplied for three Filters: No. 3, 4, and 5. In addition, new wheels shall be supplied for Filter 2.
2. Drive Mechanism: The bridge drive unit consists of one single speed, 1/2 HP (T.E.F.C.) motor with 1.15 service factor, a gear reducer having minimum torque rating of 5,100 inch-pounds, a drive shaft and self aligning, flanged bearings.
    a. All gearing shall be fully enclosed in an oil-tight cast housing with the gears running in oil and all bearings of anti-friction type.
    b. The drive shaft shall be, turned, ground, polished and shall have a rust inhibiting PVC covering.
    c. The drive shaft shall be supported by self-aligning anti-friction ball bearings. All bearings shall have lubrication fittings easily accessible from the bridge walkway.
    d. All bridge wheels shall be solid, double-flanged, Type 316 stainless steel. Both wheels on backwash end of the bridge shall be locked to the shafts to maintain proper alignment with backwash wear strip. The wheels on the influent end of the bridge shall be capable of compensating for minor misalignment of rails by sliding on the shafts.

D. Carriage Rails:

1. New rails shall be supplied for four Filters: No. 2, 3, 4, and 5.
2. Carriage rails shall be 30-pound ASCE rail with splice plates, rail clamps, and anchor bolts. The rails shall be painted in accordance to the filter manufacturer's written instruction.
3. A Type 304 stainless steel, 12-gauge rail cap and bridge stops. Bridge stop shall be field attached to the top surface of the rail cap. 12-gauge rail cap shall extend the full length and be welded to top of rail per manufacturer details.
4. Mounting plates, anchor bolts, and fasteners shall be Type 316 stainless steel.

E. Indexing:

1. New indexing peg systems and manufacturer's standard limit switches shall be supplied for six Filters: No. 2, 3, 4, 5, 6, and 7.
2. Type 316 stainless steel indexing pegs shall be provided at each filter cell. The indexing pegs shall be attached to a Type 316 stainless steel channel strut.

F. Floating Vertex Skimmer:

1. New skimmers shall be furnished and installed for six Filters: No. 2, 3, 4, 5, 6, and 7.
2. Skimmer: The automatic backwash system shall be fitted with a skimming device integral with the bridge and washwater hood supports. All structural members shall be fabricated from Type 316 stainless steel. Skimmer guide blades shall be fabricated from polypropylene and factory assembled to a Type 316 stainless steel frame for ease of installation. These skimmer guide blades shall direct all floating scum, grease or oils to two floating vertex collection points, from which it shall be pumped to the launder trough. Each collection point shall have direct piping to a submersible skimmer pump. Both floating vertex collection points shall skim in either direction and shall be capable of scum removal at a minimum rate of 50 GPM at a 10-foot TDH with a pump that has a 460 volt, three-phase, 60-Hz, motor.
3. Skimmer controls shall be provided in new control panels for four Filters: No. 2, 3, 4, and 5. Skimmer control shall be provided in existing panels with new components for two Filters: No. 6 and 7.
4. The skimmer pump shall be a heavy-duty cast-iron submersible type with a stainless steel motor shaft, 1/2 HP, sealed with class B insulation.

G. Backwash Assembly:

1. New backwash shoes and tensioning assemblies shall be supplied for three Filters: No. 3, 4, and 5.
   a. Backwash Shoe: The backwash shoe shall be mounted on the backwash frame such that it can independently follow any irregularities of the matching backwash wear strip. This flexible movement shall be controlled by 300 series stainless steel springs and fasteners. The shoe shall attach to Schedule 80 PVC piping by means of a flexible hose. A pivoting backwash frame is not allowed.
2. New wear strips shall be supplied for Filters 3, 4, and 5:
   a. Provide a replaceable wear strip against which the backwash shoe will slide. The strip shall be fastened to the effluent header sections by means of threaded 3/8-inch counter-sunk Type 304 stainless steel fasteners and internally threaded concrete insert anchors, formed within the effluent wall. The wear strip shall extend one foot beyond the headers on both ends of the basin. Its joints shall not superimpose the effluent header joints, but shall overlap the effluent header joints. The wear strip shall be recessed into the effluent wall with its face only exposed and flush with the outside of the wall.

H. Festoon Cable System:

1. New electrical and signal cable shall be furnished and installed for six Filters: No. 2 through 7. The cables shall connect the existing junction boxes to the control panels.
2. The electrical supply cable shall be four conductor, #6 gauge cable. The signal cable shall be twelve conductor, #14 gauge cable.
3. The festoon power and control cables shall be installed under Division 26, Electrical as specified. See Section 26 05 01, Electrical for detailed Electrical requirements.
4. New festoon cable tracks, track hangers, cable carriers, lead carriers, end clamps, frill fixtures and splice couplers shall be furnished and installed for four Filters: No. 2 through 5.

2.04 INSTRUMENTATION AND CONTROLS

A. New control panels and manufacturer’s standard level sensors shall be supplied for four Filters: No. 2, 3, 4, and 5. The automatic and manual controls for operation of the filter system shall be furnished fully assembled, wired in a NEMA rated and UL certified control enclosure.

B. Included in the panel shall be controls, a timing device, relays and motor starters for each pump motor and carriage motor, and the skimmer. These motors may be actuated automatically by a predetermined increase in hydraulic head, or by the timing device to control the interval between each cleaning cycle. The cleaning cycle is terminated by a low water level signal. The "off time" of the cleaning cycle shall be controlled by a reset timer with a range of one minute to sixty hours. When the timer times out, the motors shall be actuated. During the "on time," the timer shall be de-energized and reset for starting "off time" at the end of the cycle. Should high water occur during "off time," the motors shall be started by a relay actuated from the high water signal, with a corresponding resetting of the timer.

1. For detailed control panel design, construction and testing requirements see Sections 40 90 00, Process Instrumentation and Control Systems (PICS) and 40 90 11, Instruments and Panels Subsystem (IPS).

C. The control of new skimmers of Filters No. 6 and 7 shall be provided in the existing control panels with new components. For detailed control panel design, construction and testing requirements see Sections 40 90 00, Process Instrumentation and Control Systems (PICS) and 40 90 11, Instruments and Panels Subsystem (IPS). The Manufacturer’s Field Representative shall test the panels and identify components to be replaced during trips for the installation of panels at filters No. 2 through No. 5.

2.05 SPECIAL TOOLS

A. The filter manufacturer shall supply one pneumatic caulking gun per filter underdrain system, total of three.

2.06 FACTORY FINISHING

A. Shop painting (prime and finish) shall be carefully done by the filter manufacturer and all coatings applied in accordance with the paint manufacturer's published recommendation.

1. All ferrous metal purchase components including gear-motors, pumps, and bearings: apply an additional top coat of safety blue enamel over the manufactures original finish prior to assembly.

PART 3 EXECUTION

3.01 INSTALLATION

A. Equipment shall be installed in accordance with manufacturer's instructions.

1. Underdrain system:
   a. Before installation of any porous plates the entire cell ledge and chamber shall be inspected and thoroughly cleaned and shall be debris and dust free.
   b. Completely seal the entire perimeter of the porous plates with sealant.
   c. All sealant shall be supplied by the filter manufacturer. Use of sealant from other sources is not allowed.
   d. Install one cell at a time. Once a cell has been started it shall be completely finished with retaining angles and spacer rods bolted and secured in place, and all sealant applied. Temporary work stoppage is not allowed if any portion of the sealant has been applied.
   e. Walking on porous plates is not allowed.
   f. Walking on the cell dividers is not allowed without first laying down sheets of plywood or other equipment to support workmen.
2. Media:
   a. Sand media shall be installed directly into the filter bed from bags.
   b. Anthracite media level shall be maintained at 2.5 to 3 inches below top of cell divider at all times.
3. Rails:
   a. The rails shall be installed in the exact locations where the existing rails are located. Rail clamp locations shall be relocated as shown on the Drawings.
   b. The rails shall be straight to within plus or minus 1/8-inch longitudinally.
   c. The effluent wall rail must be parallel to the wear strip within plus or minus 1/8 inch.
   d. The two rails for each basin shall be parallel to within plus or minus 1/8 inch.

3.02 FIELD FINISHING

A. Equipment Manufactured Unit(s) Components Accessories: In accordance with manufacturer's instruction.

3.03 FIELD QUALITY CONTROL

A. Light Tests: A light test shall be conducted prior to installing media and after the entire underdrain system is completed installed, including the sealing/caulking of the porous plates and the retaining angles, and curing of the sealant. The Contractor shall conduct the test with a minimum of three man team and all required equipment and material in accordance with the manufacturer's written instruction and the manufacturer's representative's field instruction.

B. Functional Tests on Filters 2 through 7: Conduct on each filter assisted by manufacturer's representative, as follows:

1. Alignment: Prior to facility startup, test complete assemblies for correct rotation, proper alignment and connection, quiet operation, excessive vibration, and satisfactory specified performance.

3.04 MANUFACTURER'S SERVICES

A. The equipment manufacturer shall furnish the services of a competent field technician for a minimum of 45 working days on site and 22 separate trips. These trips shall consist of:

1. 1 preconstruction trip to discuss underdrain demolition and installation.
2. 3 plate installation trips to perform light tests.
3. 6 trips to review the mechanical installation of the equipment.
4. 6 trips for review of the control panel installations.
5. 6 trips for mechanical startup of the filters.
6. See Section 01 43 33, Manufacturers' Services, and Section 01 91 14, Equipment Testing and Facility Startup.

END OF SECTION

DRAWINGS
(BOUND SEPARATELY)