

IFBC NO. 21-TA003505AJ
SOUTHEAST MASTER
LIFT STATION 677E REHABILITATION
6022385
890-66
October 15, 2020

Manatee County BCC
Procurement Division
1112 Manatee Avenue West Ste 803
Bradenton, FL 34205
purchasing@mymanatee.org



ADVERTISEMENT

**INVITATION FOR BID CONSTRUCTION, NO. 21-TA003505AJ
SOUTHEAST MASTER LIFT STATION 677E REHABILITATION**

Manatee County, a political subdivision of the State of Florida (hereinafter referred to as County), will receive sealed bids from individuals, corporations, partnerships, and other legal entities authorized to do business in the State of Florida, to provide Southeast Master Lift Station 677E Rehabilitation, as specified in this Invitation for Bid Construction to include rehabilitation of master triplex submersible lift station.

DATE, TIME AND PLACE DUE:

The Due Date and Time for submission of Bids in response to this IFBC is **November 17, 2020 at 3:00 P.M. ET**. Bids must be delivered to the following location: Manatee County Administration Building, 1112 Manatee Ave. W., Suite 803, Bradenton, FL 34205 prior to the Due Date and Time.

SOLICITATION INFORMATION CONFERENCE:

A non-mandatory Virtual Information Conference will be held at 1:00 PM on October 23, 2020, by accessing the following link: <https://manateecounty.zoom.us/j/87137992411>. Attendance to non-mandatory virtual information conferences is not required but is strongly encouraged.

No County escorted Site Visit will be conducted for this solicitation.

The inspection of the project site is a minimum requirement of this IFBC. Prior to submission, Bidder, or its representative(s), has inspected the construction site for work specified in this IFBC on or after the date of advertisement of this IFBC and before the Due Date and Time.

Bidder, or its representative(s), must contact JoLynn Schmitgen, Administrative Specialist, from the Manatee County Utilities Department at (941)748-4501 Ext. 5375 to coordinate an unescorted inspection of the construction site.

DEADLINE FOR QUESTIONS AND CLARIFICATION REQUESTS:

The deadline to submit all questions, inquiries, or requests concerning interpretation, clarification or additional information pertaining to this Invitation for Bid Construction to the Manatee County Procurement Division is October 30, 2020. Questions and inquiries should be submitted via email to the Designated Procurement Contact shown below.

Important: A prohibition of lobbying is in place. Review Section A.13 carefully to avoid violation and possible sanctions.

DESIGNATED PROCUREMENT CONTACT: Abby Jenkins, Senior Procurement Agent, Construction
(941) 749 3014 X 3062, Fax (941) 749-3034
Email: abigail.jenkins@mymanatee.org
Manatee County Financial Management Department
Procurement Division

AUTHORIZED FOR RELEASE: _____

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SECTION A, INFORMATION FOR BIDDERS

To receive consideration, entities who submit a response to this Invitation for Bid Construction (Bidders) must meet the minimum qualification requirements and comply with the following instructions. Bid responses (Bids) will be accepted from single business entities, joint ventures, partnerships or corporations.

A.01 BID DUE DATE

The Due Date and Time for submission of Bids in response to this Invitation for Bid Construction (IFBC) is **November 17, 2020, at 3:00 P.M. ET**. Bids must be delivered to the following location: Manatee County Administration Building, 1112 Manatee Ave. W., Suite 803, Bradenton, FL 34205 and time stamped by a Procurement representative prior to the Due Date and Time.

Bids received after the Due Date and Time will not be considered. It will be the sole responsibility of the Bidder to deliver its Bid to the Manatee County Procurement Division for receipt on or before the Due Date and Time. If a Bid is sent by U.S. Mail, courier or other delivery services, the Bidder will be responsible for its timely delivery to the Procurement Division. Bids delayed in delivery will not be considered, will not be opened at the public opening, and arrangements will be made for their return at the Bidder's request and expense.

A.02 SOLICITATION INFORMATION CONFERENCE:

A non-mandatory Virtual Information Conference will be held at 1:00 PM on October 23, 2020, by accessing the following link: <https://manateecounty.zoom.us/j/87137992411>. Attendance to non-mandatory virtual information conferences is not required but is strongly encouraged.

No County escorted Site Visit will be conducted for this solicitation.

The inspection of the project site is a minimum requirement of this IFBC. Prior to submission, Bidder, or its representative(s), has inspected the construction site for work specified in this IFBC on or after the date of advertisement of this IFBC and before the Due Date and Time.

Bidder, or its representative(s), must contact JoLynn Schmitgen, Administrative Specialist, from the Manatee County Utilities Department at (941)748-4501 Ext. 5375 to coordinate an unescorted inspection of the construction site.

Attendance to mandatory information conferences and/or site visits are required to meet the minimum qualification requirements of the IFBC. Attendance to non-mandatory information conferences is not required, but is strongly encouraged.

A.03 PUBLIC OPENING OF BIDS

Bids will be opened immediately following the Due Date and Time at the Manatee County Administration Building, Suite 803 in the presence of County officials. Bidders or their representatives may attend the Bid opening.

Manatee County will make public at the opening the names of the business entities which submitted a Bid and the total bid price submitted. No review or analysis of the Bids will be conducted at the Bid opening.

A.04 SUBMISSION OF BIDS

The contents of the Bid sealed package must include:

- One (1) bound original clearly identifying Bidder and marked "ORIGINAL".
- One (1) electronic format copy clearly identifying Bidder.
- Electronic format copy should be submitted on a Universal Serial Bus (USB) portable flash memory drive or compact disc (CD) in Microsoft Office® or Adobe Acrobat® portable document format (PDF) in one continuous file. Do not password protect or otherwise encrypt electronic Bid copies. Electronic copies must be searchable and contain an identical Bid to the original.

Submit the Bid package in a sealed container with the following information clearly marked on the outside of the package: IFBC NO. 21-TA003505AJ, Southeast Master Lift Station 677E Rehabilitation, Bidder's name, and Bidder's address. Bids must be delivered to the Manatee County Procurement Division prior to the Due Date and Time at the following address:

Manatee County Procurement Division
1112 Manatee Ave. West, Ste. 803
Bradenton, FL 34205

A.05 DISTRIBUTION OF SOLICITATION DOCUMENTS

All documents issued pursuant to this IFBC are distributed electronically and available for download at no charge at www.mymanatee.org > *Bids and Proposals*. Documents may be viewed and downloaded for printing using Adobe Reader® software.

At its sole discretion, the County may utilize third-party providers to distribute proposals. Visit the third-party's website for more information regarding this service. Participation in the third-party system is not a requirement for doing business with Manatee County.

Additionally, the IFBC and all related documents are available for public inspection at the Manatee County Procurement Division, 1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205. Call (941) 749-3014 to schedule an appointment. Documents are available between the hours of 8:00 A.M. and 5:00 P.M., Monday through Friday, with the exception of County holidays.

As a courtesy, Manatee County notifies the Manatee County Chamber of Commerce and the Manatee County Black Chamber of Commerce of all active solicitations, who then distributes the information to its members.

A.06 EXAMINATION OF BID DOCUMENTS AND SITE(S)

It is the responsibility of each bidder before submitting a bid, to (a) examine the IFBC documents thoroughly; (b) visit the Project 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 IFBC documents; and (e) notify County in writing of all conflicts, errors, or discrepancies in the IFBC 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 Project 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 IFBC 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 Project 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 IFBC 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 IFBC documents.

Inspection of the Project Site(s) is a requirement to be considered for award of this bid. Prior to submitting a bid, each bidder shall examine the Project Site(s) and all conditions thereon fully familiarizing themselves with the full scope of the Work. Failure to become familiar with Project 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 Project Plans and Specifications. Bidder shall acknowledge inspection of the Project Site(s) on his/her signed, submitted Bid Form.

A.07 ADDENDA

Any interpretations, corrections or changes to this IFBC will be made by addenda. Addenda will be posted on the Procurement Division's web page of the County website at <http://www.mymanatee.org/purchasing> > *Bids and Proposals*. For those solicitations that are advertised on a third-party website, addenda will also be posted on the third-party's distribution system on the 'Planholders' link.

All addenda are a part of the IFBC and each Bidder will be bound by such addenda. It is the responsibility of each Bidder to read and comprehend all addenda issued. Failure of any Bidder to acknowledge an issued addendum in its Bid will not relieve the Bidder from any obligation contained therein.

A.08 BID FORMS

Bids must include the forms provided in this IFBC. If needed, additional pages may be attached to a form. Bidders must fully complete and execute all Bid Forms. Bid Forms must be executed by an authorized official of the company who has the legal authority to bind the company.

A.09 BID EXPENSES

All costs incurred by Bidder in responding to this IFBC will be the sole responsibility of the Bidder.

A.10 QUESTION AND CLARIFICATION PERIOD

Each Bidder shall examine all IFBC documents and will judge all matters relating to the adequacy and accuracy of such documents. Any questions or requests concerning interpretation, clarification or additional information pertaining to this IFBC, including the sample Agreement, shall be made in writing via email to the Manatee County Procurement Division to the Designated Procurement Contact or to purchasing@mymanatee.org. All questions received and responses given will be provided to potential bidders via an addendum to this IFBC.

Manatee County will not be responsible for oral interpretations given by other sources including County staff, representative, or others. The issuance of a written addendum by the Procurement Division is the only official method whereby interpretation, clarification or additional information will be given.

A.11 FALSE OR MISLEADING STATEMENTS

Bids which contain false or misleading statements, or which provide references which do not support an attribute or condition claimed by the Bidder, may be rejected. If, in the opinion of the County, such information was intended to mislead the County in its evaluation of the Bid, and the attribute, condition or capability is a requirement of this IFBC. Such Bidder will be disqualified from consideration for this IFBC and may be disqualified from submitting a response on future solicitation opportunities with the County.

A.12 CONFIDENTIALITY OF SECURITY RELATED RECORDS

- a. Pursuant to Florida Statutes § 119.071(3), the following records (hereinafter referred to collectively as “the Confidential Security Records”) are confidential and exempt from the disclosure requirements of Florida Statutes § 119.07(1):
 - i. A Security System Plan or portion thereof for any property owned by or leased to County or any privately owned or leased property held by County.
 - ii. Building plans, blueprints, schematic drawings, and diagrams, including draft, preliminary, and final formats, which depict the internal layout and structural elements of a building, arena, stadium, water treatment facility, or other structure owned or operated by County.
 - iii. Building plans, blueprints, schematic drawings, and diagrams, including draft, preliminary, and final formats, which depict the internal layout or structural elements of an attractions and recreation facility, entertainment or resort complex, industrial complex, retail and service development, office development, or hotel or motel development in the possession of, submitted to County.
- b. Successful Bidder agrees that, as provided by Florida Statute, it shall not, as a result of a public records request, or for other reason disclose the contents of, or release or provide copies of the Confidential Security Records to any other party absent the express written authorization of County’s Property Management Director or to comply with a court order requiring such release or disclosure. To the extent successful Bidder receives a request for such records, it shall immediately contact the County’s designated Contract administrator who shall coordinate County’s response to the request.

A.13 LOBBYING

After the issuance of any IFBC, prospective bidders, bidders, or their agents, representatives or persons acting at the request of such bidder shall not contact, communicate with or discuss any matter relating to the IFBC with any officer, agent or employee of Manatee County other than the Procurement Official or the contact identified in this IFBC, pursuant to the Manatee County Code of Laws. This prohibition includes copying such persons on all written communication, including email correspondence. This requirement begins with the issuance of an IFBC and ends upon execution of the final Agreement or when the IFBC has been cancelled. Violators of this prohibition shall be subject to sanctions as provided in the Manatee County Code of Laws.

A.14 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 the 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, and other supporting documentation which the Bidder obtained and upon which the Bidder relied upon to develop its Bid. County reserves the right to deem any presumptive unbalanced Bid where the Bidder is unable to demonstrate the validity and/or necessity of the unbalanced unit costs as non-responsive.

A.15 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, and other documents which the bidder obtained and upon which the bidder relied IFBC

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.16 WITHDRAWAL OR REVISION OF BIDS

Bidders may withdraw Bids under the following circumstances:

- a. If Bidder discovers a mistake(s) prior to the Due Date and Time. Bidder may withdraw its Bid by submitting a written notice to the Procurement Division. The notice must be received in the Procurement Division prior to the Due Date and Time for receiving Bids. A copy of the request shall be retained, and the unopened Bid returned to the Bidder; or
- b. After the Bids are opened but before a contract is signed, Bidder alleges a material mistake of fact if:
 - i. The mistake is clearly evident in the solicitation document; or
 - ii. Bidder submits evidence which clearly and convincingly demonstrates that a mistake was made in the Bid. Request to withdraw a Bid must be in writing and approved by the Procurement Official.

A.17 IRREVOCABLE OFFER

Any Bid may be withdrawn up until the Due Date and Time. Any Bid not so withdrawn shall, upon opening, constitute an irrevocable offer for a period of ninety (90) days to provide the goods or services set forth in this IFBC or until one or more of the Bids have been duly accepted by County, whichever occurs first.

A.18 RESERVED RIGHTS

County reserves the right to accept or reject any and/or all bids, to waive irregularities and minor 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 IFBC 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 IFBC.

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.19 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 Procurement Division shall be in accordance with the Manatee County Procurement Ordinance as amended.

A.20 COLLUSION

By submitting a bid in response to this IFBC, 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. Further, Bidder, and in the case of a joint bid each party thereto, certifies as to their own organization, that in connection with this IFBC that:

- a. All 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. All 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 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 is/are named in Bidder's Bid and that no person other than those identified has any interest in the Bid or in the resulting Agreement to be entered into.
- 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.21 CODE OF ETHICS

With respect to this and any bid, if a Bidder violates, directly or indirectly, the ethics provisions of the Manatee County Procurement Code and/or Florida criminal or civil laws related to public procurement, including but not limited to Florida Statutes Chapter 112, Part II, Code of Ethics for Public Officers and Employees, such Bidder will be ineligible for award to perform the work described in this IFBC, and may be disqualified from submitting on any future quote or bid requests 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.

A.22 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 Section 287.133, Florida Statutes, 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 Section 287.017, Florida Statutes, 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 Procurement 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.23 SCRUTINIZED COMPANIES

Florida Statutes § 287.135, as amended from time to time, may contain limitations on the part of a company to conduct business with the County. Submission of a response to this solicitation shall be subject to all procedural requirements contained within that statute including the submission of any required certification of eligibility to contract with the County. It shall be the responsibility of the company responding to this solicitation to concurrently review the current version of the statute and ensure it is compliant. To the extent a certification is required, it shall be provided on the form located at Appendix F *Vendor Certification Regarding Scrutinized Companies Lists*.

A.24 AGREEMENT

The successful Bidder will be required to execute the Agreement, a sample of which is attached hereto and made a part hereof. The County will transmit the Agreement to the successful Bidder for execution. The successful Bidder agrees to deliver the required number of duly executed copies of the Agreement, with any other required documents, to the County within ten calendar days of receipt.

A.25 LEGAL NAME

Bidders shall clearly indicate the full legal name, including any d/b/a, address, email address, and telephone number on the Bid Form. Bid Forms shall be signed above the typed or printed name and title of the signer. The signer must be an official of the organization and 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.26 DISCOUNTS

All discounts must be incorporated in the prices contained in the bid and not shown separately. Unless otherwise specified in this IFBC, pricing must be all inclusive, including delivery costs. The prices indicated on the Pricing Form shall be the prices used in determining award.

A.27 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 its bid for any sales or service taxes.

The successful Bidder will be responsible for the payment of taxes of any kind, including but not limited to sales, consumer, use, and other similar taxes payable on account of the work performed and/or materials furnished under the award in accordance with all applicable laws and regulations.

A.28 QUALITY

Unless otherwise specifically provided in the IFBC documents, all goods provided shall be new, the latest make or model, of the best quality, of the highest grade of workmanship, and of the most suitable for the purpose intended.

Unless otherwise specifically provided in the IFBC 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.29 AUTHORIZED PRODUCT REPRESENTATION

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 do so may, in the 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.

A.30 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.

A.31 AMERICANS WITH DISABILITIES ACT

Manatee 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 document at least twenty-four (24) hours in advance of either activity.

A.32 EQUAL EMPLOYMENT OPPORTUNITY

In accordance with Title VI of the Civil Rights Act of 1964, Title 15, Part 8 of the Code of Federal Regulations and the Civil Rights Act of 1992, Manatee County hereby notifies all Bidders that it will affirmatively ensure minority business enterprises are afforded full opportunity to participate in response to this IFBC and will not be discriminated against on the grounds of race, color, national origin, religion, sex, age, handicap, or marital status in consideration of award.

A.33 MINORITY AND/OR DISADVANTAGED BUSINESS ENTERPRISES

The State of Florida Office of Supplier Diversity provides the certification process and maintains the database of certified MBE/DBE firms. Additional information may be obtained at https://www.dms.myflorida.com/agency_administration/office_of_supplier_diversity_osd or by calling (850) 487-0915.

A.34 DELIVERY

Unless otherwise specified, all prices shall include all delivery cost (FOB Destination).

A.35 MATHEMATICAL ERRORS

- a. Bid pricing forms without imbedded mathematical formulas: 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. In the event the dollar amount for contract contingency is omitted, it will be added to the total price of the Bid.
- b. Bid pricing forms with imbedded mathematical formulas: Interactive bid pricing forms that contain mathematical formulas may be provided to automate lengthy and complex bid forms. In the event bid pricing forms with imbedded formulas are used and a multiplication/extension error(s) is discovered in the formula, the unit price entered by the Bidder shall prevail.
- c. Bidder shall assume the responsibility and accuracy of the information input in the bid pricing form and therefore shall verify that the calculations are correct before submitting its Bid.
- d. Regardless of the type of bid pricing form used, all Bids shall be reviewed mathematically by the County using these standards.

A.36 SUBCONTRACTORS

The successful bidder will obtain prior written approval from the County for any subcontractor(s) and the work each will perform. A subcontractor is defined as any entity performing work within the scope of the project who is not an employee of the successful Bidder.

Bidders subcontracting any portion of the work shall include a list of subcontractors along with their bid. The list shall include: name and address of subcontractor, type of work to be performed and the percent of the contract amount to be subcontracted.

A.37 E-Verify

Prior to the employment of any person under this contract, the successful Bidder shall utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of (a) all persons employed during the contract term by the successful Bidder to perform employment duties within Florida and (b) all persons, including subcontractors, assigned by the successful Bidder to perform work pursuant to the contract with Manatee County. For more information on this process, please refer to United States Citizenship and Immigration Service site at: <http://www.uscis.gov/>.

Only those individuals determined eligible to work in the United States shall be employed under this contract.

By submission of a bid in response to this IFBC, the successful Bidder commits that all employees and subcontractors will undergo e-verification before placement on this contract.

The successful Bidder shall maintain sole responsibility for the actions of its employees and subcontractors. For the life of the contract, all employees and new employees brought in after contract award shall be verified under the same requirement stated above.

A.38 DISCLOSURE

Upon receipt, all inquiries and responses to inquiries related to this IFBC become "Public Records," and shall be subject to public disclosure consistent with Florida Statutes, 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 bids shall be conducted at the public 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.

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 the County, successful Bidder must:

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

IF THE SUCCESSFUL BIDDER HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE SUCCESSFUL BIDDER'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO ANY RESULTING CONTRACT, CONTACT COUNTY'S CUSTODIAN OF PUBLIC RECORDS AT:

Phone: (941) 742-5845

Email: debbie.scaccianoce@mymanatee.org

Mail: Manatee County BCC

Attn: Records Manager

1112 Manatee Ave W.

Bradenton, FL 34205.

A.39 LOCAL PREFERENCE

Local business is defined as a business legally authorized to engage in the sale of the goods and/or services, and which certifies within its Bid that for at least six (6) full months prior to the advertisement of this IFBC 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:

- a. Purchases or agreements which are funded, in whole or in part, by a governmental or other funding entity, where the terms and conditions governing the funds prohibit the preference.
- b. Any bid announcement which specifically provides that local preference, as set forth in this section, is 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.
- c. For a competitive solicitation for construction services in which fifty percent (50%) or more of the cost will be paid from state.

- d. 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 Procurement Division, 1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205.
- e. 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.40 VENDOR REGISTRATION

Registering your business will provide Manatee County a sourcing opportunity to identify suppliers of needed goods and services and identify local businesses. To register as a supplier with the County go to www.mymanatee.org/vendor. For assistance with supplier registration, call the Procurement Division main number at (941) 749-3014. Office hours are Monday – Friday, 8:00 A.M. to 5:00 P.M., excluding County holidays.

A link to Vendor Registration is listed on the Procurement Division’s web page at <http://www.mymanatee.org/home/government/departments/financial-management/purchasing.html>. Click on “Register as a Vendor”, then “Vendor Registration Form”. Registration is not mandatory to submit a Bid.

A.41 ENVIRONMENTAL SUSTAINABILITY

All bidders are encouraged to use as many environmentally preferable "green" products, materials, as supplies, as possible to promote a safe and healthy environment. Environmentally preferable are products or services that have a reduced adverse effect on the environment.

Bidder shall acknowledge in its Bid if Bidder has an environmental sustainability initiative. In addition, Bidder shall submit with its Bid a brief summary of Bidder’s environmental sustainability initiative. This information will be used as a determining factor in the award decision when all other factors, including local preference, are otherwise equal.

A.42 ePAYABLES

Manatee County Board of County Commissioners and the Manatee County 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 of the Circuit Court will issue a unique credit card number to vendor after goods are delivered or services rendered, vendors submit invoices to the remit to address on the purchase order. 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 Bidder is interested in participating in this program, complete the ePayables Application attached herein and return the completed form via email to lori.bryan@manateeclerk.com.

A.43 BASIS OF AWARD

County will not make award to a Bidder who is delinquent in payment of any taxes, fees, fines, contractual debts, judgments, or any other debts due and owed to the County, or is in default on any contractual or regulatory obligation to the County. By submitting this solicitation response, Bidder attests that it is not delinquent in payment of any such debts due and owed to the County, nor is it in default on any contractual or regulatory obligation to the County. In the event the Bidder's statement is discovered to be false, bidder will be subject to suspension and/or debarment and the County may terminate any award it has with bidder.

Award shall be to the lowest, responsive, responsible bidder(s) meeting specifications which includes delivery time requirements, qualification requirements, and having the lowest total offer for requirements listed on the Bid Form for the Work as set forth in this IFBC. Bid prices shall include costs for furnishing all labor, equipment and/or materials for the completion of the Work to the County's satisfaction, in accordance with and in the manner set forth and described in the IFBC documents and within the prescribed time.

Multiple schedules for completion of Work shall be considered. Two bids shall be submitted and considered, Bid 'A' based on 300 calendar days completion time and Bid 'B' based on 365 calendar days completion time. County, at its sole discretion, shall select either Bid 'A' or Bid 'B', whichever is in the best interest of the County. Only one (1) award will be made.

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 responsive, responsible bids which are equal with respect to price and all other evaluation factors are received, the bid from the local business shall be given preference in award.

Whenever two or more responsive, responsible bids which are equal with respect to price are received, and both or neither of these bids are from a local business, the award shall be determined by a chance drawing, coin toss, or similar tie-breaking method conducted by the Procurement Division and open to the public.

Bidder acknowledges that County has, or may hire, others to perform work similar to or the same as that which is within the scope of work of this IFBC. In the event that the successful Bidder cannot meet the delivery time or availability requirements of materials, the County, at its sole discretion can obtain the goods and services from other sources.

A.44 SCOPE OF WORK

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

The successful Bidder shall furnish all shop drawings, work drawings, labor, materials, equipment, tools, services and incidentals necessary to complete all Work required by these Specifications.

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 the County.

The Scope of Work consist of rehabilitation of master triplex submersible lift station, including, but not be limited to, the following: installation, testing, and startup of three new submersible pumps provided by the County, installation of pump VFD's, wet well liner inspection and repair; wet well cleaning; new top slab and hatches; and the replacement of discharge piping, fittings, valves, swing check valves, guide rails, pipe bracings, base ells, and mounting plates.

A.45 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. Completion time shall be based on Bid 'A' for 300 calendar days or Bid 'B' based on 365 calendar days time at the County's sole discretion.

A.46 LIQUIDATED DAMAGES

If the successful Bidder fails to achieve substantial completion of the Work within the contract time and as otherwise required by the Agreement (to include not only the entire Work but any portion of the Work as set forth therein), the County shall be entitled to retain or recover from the successful Bidder, as liquidated damages and not as a penalty, the sum of \$704.00 per calendar day, commencing upon the first day following expiration of the contract time and continuing until the actual date of substantial completion.

Such liquidated damages are hereby agreed to be a reasonable estimate of damages the County will incur because of delayed completion of the Work. The County may deduct liquidated damages as described in this paragraph from any unpaid amounts then or thereafter due the successful bidder under this Agreement. Any liquidated damages not so deducted from any unpaid amounts due the successful bidder shall be payable to the County at the demand of the County, together with interest from the date of the demand at the maximum allowable rate.

A.47 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 IFBC 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 County 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 Sum and Contract Time, and adding bid items not previously contemplated that change the initial scope of Work.

A.48 LICENSES AND PERMITS

The successful Bidder shall be solely responsible for obtaining all necessary license and permit fees, including, but not limited to, all license fees, permit fees, impact fees, or inspection fees, and responsible for the costs of such fees. Successful Bidder is solely responsible for ensuring all work complies with all Federal, State, local, and Manatee County ordinances, orders, codes, laws, rules, regulations, directives, and guidelines.

A.49 PROTEST

Any actual bidder, proposer, or contractor who is aggrieved in connection with the notice of intent to award of a contract with a value greater than \$250,000 where such grievance is asserted to be the result of a violation of the requirements of the Manatee County Procurement Code or any applicable provision of law by the officers, agents, or employees of the County, may file a protest to the Procurement Official.

Protest must be in writing and delivered via email at purchasing@mymanatee.org or by hand delivery to the Procurement Division at 1112 Manatee Avenue West, Suite 803, Bradenton, FL 34205 by 5:00 p.m. on the fifth business day following the date of posting of the Notice of Intent to Award on the County website. There is no stay of the procurement process during a protest. The Procurement Official shall have the authority to settle and resolve a protest concerning the intended award of a contract.

For additional information regarding the County protest process, visit the Procurement Division webpage on the County website.

A.50 ACCESSIBILITY

The County is committed to making its documents and information technologies accessible to individuals with disabilities by meeting the requirements of Section 504 of the Rehabilitation Act and best practices (w3C WCAG 2). **For assistance with accessibility regarding this solicitation, contact the Manatee County Procurement Division via email at purchasing@mymanatee.org or by phone at 941-748-4501 X3014.**

Successful Bidder shall ensure all its electronic information, documents, applications, reports, and deliverables required under this Agreement are in a format that meets the requirements of Section 504 of the Rehabilitation Act and best practices (w3C WCAG 2).

Where not fully compliant with these requirements and best practices, Successful Bidder shall provide clear points of contact for each document and information technology to direct users in how to obtain alternate formats. Further, successful Bidder shall develop accommodation strategies for those non-compliant resources and implement strategies to resolve the discrepancies.

A.51 SOLICITATION SCHEDULE

The following schedule has been established for this Solicitation process. Refer to the County’s website (www.mymanatee.org > Business > *Bids & Proposals*) for meeting locations and updated information pertaining to any revisions to this schedule.

Scheduled Item	Scheduled Date
Non-Mandatory Virtual Information Conference https://manateecounty.zoom.us/j/87137992411	October 23, 2020, @ 1:00 PM
Question and Clarification Deadline	October 30, 2020
Final Addendum Posted	November 10, 2020
Bid Response Due Date and Time	November 17, 2020, 3:00 PM, ET
Due Diligence Review Completed	November, 2020
Projected Award	December, 2020

NOTE: Any statements contained in the Scope of Work, Bid Summary, Construction Agreement, General Conditions of the Construction Agreement and/or Exhibits which vary from the information in Section A, Information for Bidders, shall have precedence over the Information for Bidders.

END OF SECTION A

SECTION B, BID FORMS

(To be completed and returned with Bid)

APPENDIX A, MINIMUM QUALIFICATIONS

APPENDIX A, MINIMUM QUALIFICATIONS

IFBC No. 21-TA003505AJ

Bidders must submit the information and documentation requested in this Attachment that confirms Bidder meets the following minimum qualification requirement(s):

1. Must have been registered with the State of Florida, Division of Corporations to do business in Florida.

No documentation is required. The County will verify registration.

2. Bidder, or its representative(s), has made an inspection of the construction site for work specified in this IFBC on or after the date of advertisement of this IFBC and prior to the Due Date and Time.

Bidder must submit a statement on company letterhead and signed by an authorized official of Bidder that Bidder, or its representative(s), has made an inspection of the construction site, listing the date of the inspection and the individuals, by name, who conducted the inspection.

3. Must have possessed a General Contractor's license issued by the Florida Department of Business and Professional Regulation for a period of at least three consecutive years since October 1, 2017. License must be current and valid through the Due Date for submission of bids for this IFBC.

Provide a copy of Bidder's General Contractor's license issued by the Florida Department of Business and Professional Regulation and documentation confirming Bidder has been licensed and/or certified for the period of October 1, 2017, through the date of submission of the Bid.

4. Bidder has provided lift station rehabilitation for at least three projects since October 1, 2017, which each project included the following components: (i) lift station rehabilitation; (ii) installation, testing, and startup of new submersible pumps, (iii) construction, plumbing, electrical and mechanical.

Provide the following information for the three qualifying projects.

- a) Name of client
- b) Project name
- c) Location (City/State)
- d) Client contact name
- e) Contact phone
- f) Contact email
- g) Service dates (Start/End)

5. Bidder, on the day the bid is submitted, has a certified or registered Qualifying Agent, as required by Section 489.119, Florida Statutes, and that Qualifying Agent has been the same Qualifying Agent of Bidder for a period of at least three consecutive years, since October 1, 2017.

Submit a copy of Bidder's Qualifying Agent's registration or certification along with supporting documentation confirming Qualifying Agent has been the Qualifying Agent for Bidder for three years, since October 1, 2017.

6. Bidder is not on the Florida Department of Management Services Suspended, Debarred, Convicted Vendor Lists.

No documentation is required. The County will verify

7. If Bidder is submitting as a joint venture must file the required documents with the Florida Department of Business and Professional Regulation as required by Florida Statute Section 489.119, prior to the Due Date and Time.

If Bidder is not a joint venture, provide a statement to that effect. If Bidder is a joint venture, provide a copy of Bidder's approved filing with the Florida Department of Business and Professional Regulation.

8. Bidder has no reported conflict of interests in relation to this IFBC.

Submit a fully completed copy of Appendix J. If applicable, on a separate page disclose the name of any officer, director or agent who is also an employee of the County. Disclose the name of any County employee who owns, directly or indirectly, any interest in the Bidder's firm or any of its branches. If no conflicts of interests are present, Bidder must submit a statement to that affect.

END OF APPENDIX A

APPENDIX B, BIDDER'S QUESTIONNAIRE

Bidder must fully complete and return this form with its Bid. Bidder warrants the truth and accuracy of all statements and answers herein contained. (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.

12. If any part of work will be subcontracted, list MBE/DBE/WBE/VETERAN to be utilized. Include the estimated dollar amount of the portion of Work each will perform.

BIDDER: _____

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. If applicable to the Work for this IFBC, Drilling Supervisor Qualifications: Contractor shall provide a boring specialist who shall remain on the project site during the entirety of the directional boring operation. This includes, but is not limited to, drilling fluid preparation, seaming, boring and pulling. The boring specialist shall have a minimum of five (5) years' experience in supervising directional bores of similar nature, diameter, materials and lengths. (Reference: Specification Section 02619, Horizontal Directional Drilling).

Provide the contact information for a minimum of three (3) projects wherein the boring specialist has performed this type of work, diameter, materials and lengths.

Boring specialist's name: _____

Boring specialist's years of experience in supervising directional bores _____

Provide contact name, and contact number for projects:

16. If applicable to the Work for this IFBC, Pipe Fusion Qualifications: All boring and fusing equipment shall be certified for operation. The Contractor responsible for thermal butt fusing pipe and fittings shall have manufacturer certification for performing such work or a minimum of five (5) years of experience performing this type of work.

Thermal butt fusing pipe and fittings contractor or subcontractor's name: _____

Attach a copy of contractor's/subcontractor's manufacturer certification to this Questionnaire

OR

Provide contractor's/subcontractor's years of experience in thermal butt fusing pipe and fittings _____

If manufacturer certification is not provided, include contact name, and contact number for projects that confirms five years of experience:

BIDDER: _____

17. If applicable to the Work for this IFB, Pipe Bursting Qualifications: The Contractor shall be certified by the manufacturer of the pipe bursting system that they are fully trained licensed installer of the manufacturer's pipe bursting system. Contractor shall provide a letter to the County documenting this requirement. (Reference: Specification Section 02619A, Pipe Bursting (PB) of Existing Mains).

18. List the following regarding 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: _____

19. Is Bidder a local business as defined in Section A.38, Local Preference?

Yes No

If yes, by signing below Bidder certifies that for at least six months prior to the advertisement date of this IFB it has maintained a physical place of business in Manatee, Desoto, Hardee, Hillsborough, Pinellas or Sarasota counties with at least one full-time employee at that location.

BIDDER: _____

BY: _____

PRINTED NAME: _____

TITLE/DATE: _____

PHYSICAL ADDRESS OF QUALIFYING LOCAL LOCATION: _____

NAME OF QUALIFYING EMPLOYEE AT LOCAL LOCATION: _____

BIDDER: _____

20. Confirm if Bidder has an environmental sustainability initiative as defined in Section A.41.

Yes No

If yes, submit a brief summary (2-3 paragraphs) of the environmental sustainability initiative.

BIDDER: _____

APPENDIX C, ENVIRONMENTAL CRIMES CERTIFICATION

SWORN STATEMENT PURSUANT TO ARTICLE V, MANATEE COUNTY PROCUREMENT CODE

Bidder must fully complete and return this form with its Bid. 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 an Owner’s Agreement for public improvements, procurement of goods or services (including professional services) or an Owner’s lease, franchise, concession or management agreement, or shall receive a grant of Owner’s monies unless such person or entity has submitted a written certification to Owner 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 Owner’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 Owner’s Purchasing Official. Upon presentation of such satisfactory proof, the person or entity shall be allowed to contract with Owner.

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 AGREEMENT 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 _____
COUNTY OF _____

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

Who is personally known / has produced _____ as 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.

APPENDIX D, FLORIDA TRENCH SAFETY ACT

Bidder must fully complete and return this form with its Bid. 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 **IFBC NO. 21-TA003505AJ**.
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 the County and Engineer of Record, 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:

<u>Trench Safety Measure (Description)</u>	<u>Units of MeasureUnit (LF, SY)</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Extended Cost</u>
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: _____



Angelina M. Colonnese

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

Bidder must fully complete and return this form with its Bid.

APPENDIX E: ePAYABLES 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 _____

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

Revised: September 30, 2015

“Pride in Service with a Vision to the Future”

Clerk of the Circuit Court – Clerk of Board of County Commissioners – County Comptroller – Auditor and Recorder

APPENDIX F, SCRUTINIZED COMPANY CERTIFICATION

This certification is required pursuant to Florida State Statute Section 287.135.

As of July 1, 2011, a company that, at the time of bidding or submitting a proposal for a new contract or renewal of an existing contract, is on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List is ineligible for, and may not bid on, submit a proposal for, or enter into or renew a contract with an agency or local governmental entity for goods or services of \$1 million or more.

Bidder must fully complete and return this form with its Bid.

Company _____ FID or EIN No. _____

Address _____

City _____ State _____ Zip _____

I, _____, as a representative of _____
certify and affirm that this company is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List.

Signature

Title

Printed Name

Date

APPENDIX G
MANATEE COUNTY, A POLITICAL SUBDIVISION OF THE STATE OF FLORIDA
INDEMNITY AND HOLD HARMLESS
 IFBC No. 21-TA003505AJ

Bidder must fully complete and return this form with its Bid.

Bidder shall defend, indemnify and hold harmless the County and all of the County’s officers, agents, employees, and volunteers from and against all claims, liability, loss and expense, including reasonable costs, collection expenses, attorneys’ fees, and court costs which may arise because of the negligence (whether active or passive), misconduct, or other fault, in whole or in part (whether joint, concurrent, or contributing), of Respondent, its officers, employees, representatives and agents in performance or non-performance of its obligations under the Contract/Agreement. Bidder recognizes the broad nature of this indemnification and hold harmless clause, as well as the provision of a legal defense to the County when necessary, and voluntarily makes this covenant and expressly acknowledges the receipt of such good and valuable consideration provided by the County in support of these indemnification, legal defense and hold harmless contractual obligations in accordance with the laws of the State of Florida. This clause shall survive the termination of this Contract/Agreement. Compliance with any insurance requirements required elsewhere within this Contract/Agreement shall not relieve Bidder of its liability and obligation to defend, hold harmless and indemnify the County as set forth in this article of the Contract/Agreement.

Nothing herein shall be construed to extend the County’s liability beyond that provided in section 768.28, Florida Statutes.

PROJECT NUMBER AND/OR NAME	
INSURANCE AGENT	
RESPONDENT SIGNATURE	DATE

Acknowledgement:

STATE OF _____ COUNTY OF _____

The foregoing instrument was acknowledged before me this ____ day of _____,

20____ by _____ [FULL LEGAL NAME], who is

personally known to me / has produced _____ as
 identification.

Notary Signature _____

Print Name _____

APPENDIX H, INSURANCE STATEMENT

Bidder must fully complete and return this form with its Bid.

THE UNDERSIGNED has read and understands the insurance requirements of this IFBC applicable to any contract resulting from this solicitation and shall provide the insurances required by this Appendix within ten (10) days from the date of Notice of Intent to Award.

Bidder Name: _____ Date: _____

Signature
(Authorized
Official): _____

Printed Name/Title: _____

Insurance Agency: _____

Agent Name: _____ Agent Phone: _____

APPENDIX I, ACKNOWLEDGMENT OF ADDENDA

The undersigned acknowledges receipt of the following addenda:

Addendum No. _____	Date Received:

Print or type Bidder's information below:

_____	_____
Name of Bidder	Telephone Number
_____	_____
Street Address	City/State/Zip
_____	_____
Email Address	
_____	_____
Print Name & Title of Authorized Officer	Signature of Authorized Official Date

APPENDIX J, AFFIDAVIT OF NO CONFLICT

COUNTY OF _____
STATE OF _____

BEFORE ME, the undersigned authority, this ____ day of _____, 20____ personally appeared, _____, a principal with full authority to bind _____ (hereinafter the "Affiant"), who being first duly sworn, deposes and says:

(a) is not currently engaged or will not become engaged in any obligations, undertakings or contracts that will require the Affiant to maintain an adversarial role against the County or that will impair or influence the advice, recommendations or quality of work provided to the County; and

(b) has provided full disclosure of all potentially conflicting contractual relationships and full disclosure of contractual relationships deemed to raise a question of conflict(s); and

(c) has provided full disclosure of prior work history and qualifications that may be deemed to raise possible question of conflict(s).

Affiant makes this affidavit for the purpose of inducing Manatee County, a political subdivision of the State of Florida, to enter into an Agreement for Southeast Master Lift Station 677E Rehabilitation.

If applicable, on a separate page Bidder shall disclose the name of any officer, director or agent of Bidder who is also an employee of the County and the name of any County employee who owns, directly or indirectly, any interest in the Bidder's firm or any of its branches. If no conflicts of interest are present, submit a statement to that affect.

Signature

Print Name

SUBSCRIBED to and sworn before me this ____ day of _____, 20__.

[Notary Seal]

Notary Public

My commission expires: _____

Notary Signature

Print Name

Personally known OR produced identification. Type of identification produced _____

_____.

APPENDIX K, BID PRICING FORM

IFBC No. 21-TA003505AJ SOUTHEAST MASTER LIFT STATION 677E REHABILITATION

Total Bid Price/Offer for Bid "A": \$ _____ Complete. Based on a completion time of 300 calendar days.

Total Bid Price/Offer for Bid "B": \$ _____ Complete. Based on a completion time of 365 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 Bid information and all its requirements, submit this Bid, which is complete in meeting each specification, term, and condition contained therein.

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

Authorized Signature(s): _____

**Name and Title of Above
Signer(s):**

Date: _____

APPENDIX K, BID PRICING FORM**IFBC NO. 21-TA003505AJ****BID "A" BASED ON A COMPLETION TIME OF 300 CALENDAR DAYS****MANATEE COUNTY SOUTHEAST MASTER LIFT STATION 677E**

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	AMOUNT
I. MISCELLANEOUS					
1	Mobilization (10%)	1.0	LS		
2	Bypass Pumping	1.0	LS		
3	Erosion and Sediment Control	1.0	LS		
4	Demolition, Clearing and Grubbing	1.0	LS		
5	Project Signs	1.0	LS		
6	Record Drawings	1.0	LS		
SUBTOTAL					
II. PROPOSED IMPROVEMENTS					
7	12" PVC C900-16 DR18 Pipe	30.0	LF		
8	8" DI CL 53 Pipe, PE	5.0	LF		
9	8" DI CL 53 Pipe, FLxPE	5.0	LF		
10	8" DI CL 53 Pipe, FL	15.0	LF		
11	8" HDPE DR 11 Pipe	90.0	LF		
12	12" x 8" DI Fitting - Eccentric Reducer MJ	1.0	EA		
13	8" DI Fitting - Cross FL	1.0	EA		
14	8" DI Fitting - Tee FL	1.0	EA		
15	8" DI Fitting - 45 deg FL	2.0	EA		
16	8" DI Fitting - 45 deg MJ	1.0	EA		
17	8" DI Fitting - 90 deg FL	2.0	EA		
18	8" x 6" DI Fitting - Reducer FL	1.0	EA		
19	8" x 6" HDPE DR 11 Fabricated Fitting - Eccentric Reducer	3.0	EA		
20	8" HDPE DR 11 Molded Fitting - 90 deg	3.0	EA		
21	8" Swing Check Valve FL	3.0	EA		
22	8" Gate Valve FL	3.0	EA		
23	6" Gate Valve FL	1.0	EA		
24	Connection to Existing 12" Force Main	1.0	LS		
25	16" x 2" Repair Saddle	1.0	EA		
26	8" HDPE Flange Adapter with 316 SS Backup Ring	6.0	EA		
27	6" Camlock Connection	1.0	EA		
28	2" Camlock and 3/4" Hose Bib Assembly	2.0	EA		
29	8" McCrometer Ultra Mag UM08	1.0	EA		
30	Flange Pipe Support	1.0	LS		
31	6" Pump Base Elbow	3.0	EA		
32	21" Influent Drop Pipe	1.0	LS		
33	8" PVC Sch 80 Duct and Fittings	1.0	LS		
34	Lift Station Equipment	1.0	LS		
35	Submersible Pump Installation and Start Up	1.0	LS		
36	Clean and Inspect Wet Well	1.0	LS		
37	Concrete Top Slab	15.6	CY		
38	Concrete Fillet	15.0	CY		
39	Miscellaneous Concrete	1.0	LS		
40	Overhead Bridge Crane	1.0	LS		
41	HVAC System	1.0	LS		

Bidder Name: _____

Authorized Signature: _____

Electronic signatures are accepted.

APPENDIX K, BID PRICING FORM
IFBC NO. 21-TA003505AJ
BID "A" BASED ON A COMPLETION TIME OF 300 CALENDAR DAYS

MANATEE COUNTY SOUTHEAST MASTER LIFT STATION 677E

42	Shell Restoration	100.0	SY		
43	Asphalt Restoration	20.0	SY		
44	Concrete Sidewalk Restoration	10.0	SY		
45	Sodding	120.0	SY		
46	Electrical & SCADA Systems	1.0	LS		
SUBTOTAL					
TOTAL BID "A" BASE ON COMPLETION TIME OF 300 CALENDAR DAYS					
47	Contract Contingency (10%)	0.1	LS	10%	
TOTAL BID "A" WITH CONTRACT CONTINGENCY BASED ON COMPLETION TIME OF 300 CALENDAR DAYS					

Bidder Name: _____

Authorized Signature: _____

Electronic signatures are accepted.

APPENDIX K, BID PRICING FORM**IFBC NO. 21-TA003505AJ****BID "B" BASED ON A COMPLETION TIME OF 365 CALENDAR DAYS****MANATEE COUNTY SOUTHEAST MASTER LIFT STATION 677E**

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE	AMOUNT
I. MISCELLANEOUS					
1	Mobilization (10%)	1.0	LS		
2	Bypass Pumping	1.0	LS		
3	Erosion and Sediment Control	1.0	LS		
4	Demolition, Clearing and Grubbing	1.0	LS		
5	Project Signs	1.0	LS		
6	Record Drawings	1.0	LS		
SUBTOTAL					
II. PROPOSED IMPROVEMENTS					
7	12" PVC C900-16 DR18 Pipe	30.0	LF		
8	8" DI CL 53 Pipe, PE	5.0	LF		
9	8" DI CL 53 Pipe, FLxPE	5.0	LF		
10	8" DI CL 53 Pipe, FL	15.0	LF		
11	8" HDPE DR 11 Pipe	90.0	LF		
12	12" x 8" DI Fitting - Eccentric Reducer MJ	1.0	EA		
13	8" DI Fitting - Cross FL	1.0	EA		
14	8" DI Fitting - Tee FL	1.0	EA		
15	8" DI Fitting - 45 deg FL	2.0	EA		
16	8" DI Fitting - 45 deg MJ	1.0	EA		
17	8" DI Fitting - 90 deg FL	2.0	EA		
18	8" x 6" DI Fitting - Reducer FL	1.0	EA		
19	8" x 6" HDPE DR 11 Fabricated Fitting - Eccentric Reducer	3.0	EA		
20	8" HDPE DR 11 Molded Fitting - 90 deg	3.0	EA		
21	8" Swing Check Valve FL	3.0	EA		
22	8" Gate Valve FL	3.0	EA		
23	6" Gate Valve FL	1.0	EA		
24	Connection to Existing 12" Force Main	1.0	LS		
25	16" x 2" Repair Saddle	1.0	EA		
26	8" HDPE Flange Adapter with 316 SS Backup Ring	6.0	EA		
27	6" Camlock Connection	1.0	EA		
28	2" Camlock and 3/4" Hose Bib Assembly	2.0	EA		
29	8" McCrometer Ultra Mag UM08	1.0	EA		
30	Flange Pipe Support	1.0	LS		
31	6" Pump Base Elbow	3.0	EA		
32	21" Influent Drop Pipe	1.0	LS		
33	8" PVC Sch 80 Duct and Fittings	1.0	LS		
34	Lift Station Equipment	1.0	LS		
35	Submersible Pump Installation and Start Up	1.0	LS		
36	Clean and Inspect Wet Well	1.0	LS		
37	Concrete Top Slab	15.6	CY		
38	Concrete Fillet	15.0	CY		
39	Miscellaneous Concrete	1.0	LS		
40	Overhead Bridge Crane	1.0	LS		
41	HVAC System	1.0	LS		

Bidder Name: _____

Authorized Signature: _____

Electronic signatures are accepted.

APPENDIX K, BID PRICING FORM						
IFBC NO. 21-TA003505AJ						
BID "B" BASED ON A COMPLETION TIME OF 365 CALENDAR DAYS						
MANATEE COUNTY SOUTHEAST MASTER LIFT STATION 677E						
42	Shell Restoration	100.0	SY			
43	Asphalt Restoration	20.0	SY			
44	Concrete Sidewalk Restoration	10.0	SY			
45	Sodding	120.0	SY			
46	Electrical & SCADA Systems	1.0	LS			
SUBTOTAL						
TOTAL Bid "B" BASED ON COMPLETION TIME OF 365 CALENDAR DAYS						
47	Contract Contingency (10%)	0.1	LS		10%	
TOTAL BID "B" WITH CONTRACT CONTINGENCY BASED ON COMPLETION TIME OF 365 CALENDAR DAYS						

Bidder Name: _____

Authorized Signature: _____

Electronic signatures are accepted.

SECTION C, BID ATTACHMENTS

BID ATTACHMENT 1, INSURANCE AND BOND REQUIREMENTS

The CONTRACTOR will not commence work under the resulting Agreement until all insurance coverages indicated by an "X" herein have been obtained. The CONTRACTOR shall obtain and submit to the Procurement Division within ten (10) calendar days from the date of notice of intent to award, at its expense, the following minimum amounts of insurance (inclusive of any amounts provided by an umbrella or excess policy): Work under this Agreement cannot commence until all insurance coverages indicated herein have been obtained on a standard ACORD form (inclusive of any amounts provided by an umbrella or excess policy):

Automobile Liability Insurance Required Limits

Coverage must be afforded under a per occurrence policy form including coverage for all owned, hired and non-owned vehicles for bodily injury and property damage of not less than:

- \$1,000,000 Combined Single Limit; OR
- \$ 500,000 Bodily Injury and \$500,000 Property Damage
- \$10,000 Personal Injury Protection (No Fault)
- \$500,000 Hired, Non-Owned Liability
- \$10,000 Medical Payments

This policy shall contain severability of interests' provisions.

Commercial General Liability Insurance Required Limits (per Occurrence form only; claims-made form is not acceptable)

Coverage shall be afforded under a per occurrence policy form, policy shall be endorsed and name 'Manatee County, a political subdivision of the State of Florida' as an Additional Insured, and include limits not less than:

- \$1,000,000 Single Limit Per Occurrence
- \$2,000,000 Aggregate
- \$1,000,000 Products/Completed Operations Aggregate
- \$1,000,000 Personal and Advertising Injury Liability
- \$50,000 Fire Damage Liability
- \$10,000 Medical Expense, and
- \$1,000,000, Third Party Property Damage
- \$ Project Specific Aggregate (Required on projects valued at over \$10,000,000)

This policy shall contain severability of interests' provisions.

Employer's Liability Insurance

Coverage limits of not less than:

- \$100,000 Each Accident
- \$500,000 Disease Each Employee
- \$500,000 Disease Policy Limit

- Worker’s Compensation Insurance**
- US Longshoremen & Harbor Workers Act**
- Jones Act Coverage**

Coverage limits of not less than:

- Statutory workers’ compensation coverage shall apply for all employees in compliance with the laws and statutes of the State of Florida and the federal government.
- If any operations are to be undertaken on or about navigable waters, coverage must be included for the US Longshoremen & Harbor Workers Act and Jones Act.

Should ‘leased employees’ be retained for any part of the project or service, the employee leasing agency shall provide evidence of Workers’ Compensation coverage and Employer’s Liability coverage for all personnel on the worksite and in compliance with the above Workers’ Compensation requirements. NOTE: Workers’ Compensation coverage is a firm requirement. Elective exemptions are considered on a case-by-case basis and are approved in a very limited number of instances.

Aircraft Liability Insurance Required Limits

Coverage shall be afforded under a per occurrence policy form, policy shall be endorsed and name ‘Manatee County a political subdivision of the State of Florida’ as an Additional Insured, and include limits not less than:

- \$ Each Occurrence Property and Bodily Injury with no less than \$100,000 per passenger each occurrence or a ‘smooth’ limit.
- \$ General Aggregate.

Un-Manned Aircraft Liability Insurance (Drone)

Coverage shall be afforded under a per occurrence policy form, policy shall be endorsed and name ‘Manatee County a political subdivision of the State of Florida’ as an Additional Insured, and include limits not less than:

- \$ Each Occurrence Property and Bodily Injury; Coverage shall specifically include operation of Unmanned Aircraft Systems (UAS), including liability and property damage.
- \$ General Aggregate

Installation Floater Insurance

When the contract or agreement **does not** include construction of, or additions to, above ground building or structures, but does involve the installation of machinery or equipment, Installation Floater Insurance shall be afforded under a per occurrence policy form, policy shall be endorsed and name “Manatee County, a political subdivision of the State of Florida” as an Additional Insured, and include limits not less than:

- 100% of the completed value of such addition(s), building(s), or structure(s)

Professional Liability and/or Errors and Omissions (E&O) Liability Insurances

Coverage shall be afforded under either an occurrence policy form or a claims-made policy form. If the coverage form is on a claims-made basis, then coverage must be maintained for a minimum of three years from termination of date of the contract. Limits must not be less than:

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

Builder’s Risk Insurance

When the contract or agreement includes the construction of roadways and/or the addition of a permanent structure or building, including the installation of machinery and/or equipment, Builder’s Risk Insurance shall be afforded under a per occurrence policy form, policy shall be endorsed and name “Manatee County, a political subdivision of the State of Florida” as an Additional Insured, and include limits not less than:

- An amount equal to 100% of the completed value of the project, or the value of the equipment to be installed
- The policy shall not carry a self-insured retention/deductible greater than \$10,000

Coverage shall be for all risks and include, but not be limited to, storage and transport of materials, equipment, supplies of any kind whatsoever to be used on or incidental to the project, theft coverage, and Waiver of Occupancy Clause Endorsement, where applicable.

Cyber Liability Insurance

Coverage shall comply with Florida Statute 501.171, shall be afforded under a per occurrence policy form, policy shall be endorsed and name ‘Manatee County, a political subdivision of the State of Florida’ as an Additional Insured, and include limits not less than:

- \$ Security Breach Liability
- \$ Security Breach Expense Each Occurrence
- \$ Security Breach Expense Aggregate
- \$ Replacement or Restoration of Electronic Data
- \$ Extortion Threats
- \$ Business Income and Extra Expense
- \$ Public Relations Expense

NOTE: Policy must not carry a self-insured retention/deductible greater than \$25,000.

Hazardous Materials Insurance (As Noted Below)

Hazardous materials include all materials and substances that are currently designated or defined as hazardous by the law or rules of regulation by the State of Florida or federal government.

All coverage shall be afforded under either an occurrence policy form or a claims-made policy form, and the policy shall be endorsed and name 'Manatee County, a political subdivision of the State of Florida' as an Additional Insured. If the coverage form is on a claims-made basis, then coverage must be maintained for a minimum of three years from termination of date of the contract. Limits must not be less than:

Pollution Liability

Amount equal to the value of the contract, subject to a \$1,000,000 minimum, for Bodily Injury and Property Damage to include sudden and gradual release, each claim and aggregate.

Asbestos Liability (If handling within scope of Contract)

Amount equal to the value of the contract, subject to a \$1,000,000 minimum, for Bodily Injury and Property Damage to include sudden and gradual release, each claim and aggregate.

Disposal

When applicable, CONTRACTOR shall designate the disposal site and furnish a Certificate of Insurance from the disposal facility for Environmental Impairment Liability Insurance covering liability.

- Amount equal to the value of the contract, subject to a \$1,000,000 minimum, for Liability for Sudden and Accidental Occurrences, each claim and an aggregate.
- Amount equal to the value of the contract, subject to a \$1,000,000 minimum, for Liability for Non-Sudden and Accidental Occurrences, each claim and an aggregate.

Hazardous Waste Transportation Insurance

CONTRACTOR shall designate the hauler and have the hauler furnish a Certificate of Insurance for Automobile Liability insurance with Endorsement MCS-90 for liability arising out of the transportation of hazardous materials. EPA identification number shall be provided.

All coverage shall be afforded under either an occurrence policy form or a claims-made policy form and the policy shall be endorsed and name "Manatee County, a political subdivision of the State of Florida" as an Additional Insured. If the coverage form is on a claims-made basis, then coverage must be maintained for a minimum of three years from termination of date of the contract. Limits must not be less than:

- Amount equal to the value of the contract, subject to a \$1,000,000 minimum, per accident.

Liquor Liability Insurance

Coverage shall be afforded under a per occurrence policy form, policy shall be endorsed and name "Manatee County, a political subdivision of the State of Florida" as an Additional Insured, and include limits not less than:

- \$1,000,000 Each Occurrence and Aggregate

Garage Keeper’s Liability Insurance

Coverage shall be required if the maintenance, servicing, cleaning or repairing of any County motor vehicles is inherent or implied within the provision of the contract.

Coverage shall be afforded under a per occurrence policy form, policy shall be endorsed and name “Manatee County, a political subdivision of the State of Florida” as an Additional Insured, and include limits not less than:

- Property and asset coverage in the full replacement value of the lot or garage.

Bailee’s Customer Liability Insurance

Coverage shall be required for damage and/or destruction when County property is temporarily under the care or custody of a person or organization, including property that is on, or in transit to and from the person or organization’s premises. Perils covered should include fire, lightning, theft, burglary, robbery, explosion, collision, flood, earthquake and damage or destruction during transportation by a carrier.

Coverage shall be afforded under a per occurrence policy form, policy shall be endorsed and name “Manatee County, a political subdivision of the State of Florida” as an Additional Insured, and include limits not less than:

- Property and asset coverage in the full replacement value of the County asset(s) in the CONTRACTOR’S care, custody and control.

Hull and Watercraft Liability Insurance

Coverage shall be afforded under a per occurrence policy form, policy shall be endorsed and name “Manatee County, a political subdivision of the State of Florida” as an Additional Insured, and include limits not less than:

- \$ Each Occurrence
- \$ General Aggregate
- \$ Fire Damage Liability
- \$10,000 Medical Expense, and
- \$ Third Party Property Damage
- \$ Project Specific Aggregate (Required on projects valued at over \$10,000,000)

Other [Specify]

BOND REQUIREMENTS

Bid Bond

A Bid Bond in the amount of 5% of the total offer. Bid bond shall be submitted with the sealed response and shall include project name, location, and / or address and project number. In lieu of the bond, the bidder may file an alternative form of security in the amount of 5% of the total offer. in the form of a money order, a certified check, a cashier's check, or an irrevocable letter of credit issued to Manatee County. NOTE: A construction project over \$200,000 requires a Bid Bond in the amount of 5% of the total bid offer.

Payment and Performance Bond

A Payment and Performance Bond shall be submitted by Successful Bidder for 100% of the award amount and shall be presented to Manatee County within ten (10) calendar days of issuance of the notice of intent to award. NOTE: A construction project over \$200,000 requires a Payment and Performance Bond.

INSURANCE REQUIREMENTS

I. THE POLICIES BELOW ARE TO CONTAIN, OR BE ENDORSED TO CONTAIN, THE FOLLOWING PROVISIONS:

1. Commercial General Liability and Automobile Liability Coverages

- a. **“Manatee County, a Political Subdivision of the State of Florida,” is to be named as an Additional Insured in respect to:** Liability arising out of activities performed by or on behalf of the successful Bidder, his agents, representatives, and employees; products and completed operations of the successful Bidder; or automobiles owned, leased, hired or borrowed by the successful Bidder. The coverage shall contain no special limitation(s) on the scope of protection afforded to the County, its officials, employees or volunteers.

In addition to furnishing a Certificate of Insurance, the successful Bidder shall provide the endorsement that evidences Manatee County being listed as an Additional Insured. This can be done in one of two ways: (1) an endorsement can be issued that specifically lists “Manatee County, a Political Subdivision of the State of Florida,” as Additional Insured; or, (2) an endorsement can be issued that states that all Certificate Holders are Additional Insured with respect to the policy.

- b. The successful Bidder's insurance coverage shall be primary insurance with respect to the County, its officials, employees and volunteers. Any insurance or self-insurance maintained by the County, its officials, employees or volunteers shall be excess of successful Bidder's insurance and shall be non-contributory.
- c. The insurance policies must be on an occurrence form.

2. Workers' Compensation and Employers' Liability Coverages

The insurer shall agree to waive all rights of subrogation against the County, its officials, employees and volunteers for losses arising from work performed by the successful Bidder for the County.

II. GENERAL INSURANCE PROVISIONS APPLICABLE TO ALL POLICIES:

1. Prior to the execution of contract, or issuance of a Purchase Order, and then annually upon the anniversary date(s) of the insurance policy's renewal date(s) for as long as this contract remains in effect, successful Bidder shall furnish the County with a Certificate(s) of Insurance (using an industry accepted certificate form, signed by the Issuer, with applicable endorsements, and containing the solicitation or contract number, and title or description) evidencing the coverage set forth above and naming “Manatee County, a Political Subdivision of the State of Florida” as an Additional Insured on the applicable coverage(s) set forth above.
2. If the policy contains an aggregate limit, confirmation is needed in writing (letter, email, etc.) that the aggregate limit has not been eroded to procurement representative when supplying Certificate of Insurance.

In addition, when requested in writing from the County, successful Bidder will provide the County with a certified copy of all applicable policies. The address where such certificates and certified policies shall be sent or delivered is as follows:

Manatee County, a Political Subdivision of the State of Florida
Attn: Risk Management Division
1112 Manatee Avenue West, Suite 969
Bradenton, FL 34205

3. The project's solicitation number and title shall be listed on each certificate.
 4. successful Bidder shall provide thirty (30) days written notice to the Risk Manager of any cancellation, non-renewal, termination, material change, or reduction in coverage of any insurance policies to procurement representative including solicitation number and title with all notices.
 5. successful Bidder agrees that should at any time successful Bidder fail to meet or maintain the required insurance coverage(s) as set forth herein, the County may terminate this contract.
 6. The successful Bidder waives all subrogation rights against Manatee County, a Political Subdivision of the State of Florida, for all losses or damages which occur during the contract and for any events occurring during the contract period, whether the suit is brought during the contract period or not.
 7. The successful Bidder has sole responsibility for all insurance premiums and policy deductibles.
 8. It is the successful Bidder's responsibility to ensure that his agents, representatives and subcontractors comply with the insurance requirements set forth herein. successful Bidder shall include his agents, representatives, and subcontractors working on the project or at the worksite as insured under its policies, or successful Bidder shall furnish separate certificates and endorsements for each agent, representative, and subcontractor working on the project or at the worksite. All coverages for agents, representatives, and subcontractors shall be subject to all of the requirements set forth to the procurement representative.
 9. All required insurance policies must be written with a carrier having a minimum A.M. Best rating of A- FSC VII or better. In addition, the County has the right to review the successful Bidder's deductible or self-insured retention and to require that it be reduced or eliminated.
- III. Successful Bidder understands and agrees that the stipulated limits of coverage listed herein in this insurance section shall not be construed as a limitation of any potential liability to the County, or to others, and the County's failure to request evidence of this insurance coverage shall not be construed as a waiver of successful Bidder's obligation to provide and maintain the insurance coverage specified.
- IV. The enclosed Hold Harmless Agreement shall be signed by the successful Bidder and shall become a part of the contract.

- V.** Successful Bidder understands and agrees that the County does not waive its immunity, and nothing herein shall be interpreted as a waiver of the County's rights, including the limitation of waiver of immunity, as set forth in Florida Statutes 768.28, or any other statutes, and the County expressly reserves these rights to the full extent allowed by law.

- VI.** No award shall be made until the Procurement Division has received the Certificate of Insurance and Hold Harmless Agreement in accordance with this section.

[Remainder of page intentionally left blank]

BID ATTACHMENT 2, TECHNICAL SPECIFICATIONS

CONTRACT DOCUMENTS
TECHNICAL SPECIFICATIONS
FOR



Manatee County
Southeast Master Lift Station

PROJECT #CIP6022385

September 2020

PROJECT OWNER:

County of Manatee, Florida
c/o Manatee County Procurement Division
1112 Manatee Avenue West
Bradenton, Florida 34205
(941) 748-3014

PREPARED BY:

Kimley-Horn and Associates
100 2nd Avenue South, Ste 105N
St. Petersburg, FL 33701
(727) 547-3999
CA# 00000696

CONTACT:

Mike Semago, P.E.
Mike.Semago@Kimley-Horn.com
100 2nd Avenue South, Ste 105N
St. Petersburg, FL 33701
(727) 498-3633

INFRASTRUCTURE ENGINEERING STANDARD SPECIFICATIONS

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This specification includes by reference the Manatee County Public Works Standards, Part I Utilities Standards Manual approved February 2020.

DIVISION 1 GENERAL REQUIREMENTS

SECTION 01005 GENERAL REQUIREMENTS

PART 1
1.01 **GENERAL**
 SCOPE AND INTENT

A. Description

The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract.

B. Work Included

The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, shop drawings, working drawings and other means of construction necessary or proper for performing and completing the work. The Contractor shall obtain and pay for all required permits necessary for the work, other than those permits such as the DEP permit and railroad permit, which may have already been obtained. The Contractor shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the County, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all incidental costs. The Contractor shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.

The cost of incidental work described in these General Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made.

The Contractor shall be solely responsible for the adequacy of his workmanship, materials and equipment.

C. Public Utility Installations and Structures

Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes and all other appurtenances and facilities pertaining thereto.

The Contractor shall protect all installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the County. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor, which are shown on the Plans or have been located in the field by the utility, shall be repaired by the Contractor, at his expense, as approved by the County. No separate payment shall be made for such protection or repairs to public utility installations or structures.

Public utility installations or structures owned or controlled by the County or other governmental body, which are required by this contract to be removed, relocated, replaced or rebuilt by the Contractor not identified in any separate bid item shall be considered as a

part of the general cost of doing the work and shall be included in the prices bid for the various contract items. No separate payment shall be made.

Where public utility installations or structures owned or controlled by the County or other governmental body are encountered during the course of the work, and are not indicated on the Plans or in the Specifications, and when, in the opinion of the County, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the County, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction, it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be in accordance with the General and Supplemental General Conditions.

The Contractor shall give written notice to County and other governmental utility departments and other owners of public utilities of the location of his proposed construction operations, at least forty-eight hours in advance of breaking ground in any area or on any unit of the work. This can be accomplished by making the appropriate contact with the "Sunshine State One-Call of Florida, Inc. Call Center ("Call Sunshine") and per all requirements provided for in the Florida Underground Facilities Damage Prevention and Safety Act (Florida Statutes, Title XXXIII, Chapter 556).

The maintenance, repair, removal, relocation or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the County.

1.02 PLANS AND SPECIFICATIONS

A. Plans

When obtaining data and information from the Plans, figures shall be used in preference to scaled dimensions, and large-scale drawings in preference to small-scale drawings.

B. Copies Furnished to Contractor

The Contractor shall furnish each of the subcontractors, manufacturers, and suppliers such copies of the Contract Documents as may be required for their work. Additional copies of the Plans and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.

C. Supplementary Drawings

When, in the opinion of the County, it becomes necessary to explain more fully the work to be done or to illustrate the work further or to show any changes which may be required, drawings known as Supplementary Drawings, with specifications pertaining thereto, will be prepared by the County and five paper prints thereof will be given to the Contractor.

D. Contractor to Check Plans and Data

The Contractor shall verify all dimensions, quantities and details shown on the Plans, Supplementary Drawings, Schedules, Specifications or other data received from the County, and shall notify the County of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not

relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at his own expense. The Contractor will not be allowed to take advantage of any errors or omissions, as full instructions will be furnished by the County, should such errors or omissions be discovered. All schedules are given for the convenience of the County and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quality of materials and equipment included in work to be done under the Contract.

E. Specifications

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

F. Intent

All work called for in the Specifications applicable to this Contract, but not shown on the Plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Plans or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

The inclusion of the Related Requirements (or work specified elsewhere) in the General part of the specifications is only for the convenience of the Contractor, and shall not be interpreted as a complete list of related Specification Sections.

1.03 MATERIALS AND EQUIPMENT

A. Manufacturer

All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the County, that the manufacturer or subcontractor deal directly with the County. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.

Any two or more pieces or material or equipment of the same kind, type or classification, and being used for identical types of services, shall be made by the same manufacturer.

B. Delivery

The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work to complete the work within the allotted time. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.

C. Tools and Accessories

The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

Spare parts shall be furnished as specified.

Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rating data.

D. Installation of Equipment.

The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the work and to handle all emergencies normally encountered in work of this character.

Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise by the County during installation. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.

The Contractor shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified. Anchor bolts shall be as approved by the County and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.

The Contractor shall furnish all materials and labor for, and shall properly bed in non-shrink grout, each piece of equipment on its supporting base that rests on masonry foundations.

Grout shall completely fill the space between the equipment base and the foundation. All metal surfaces coming in contact with concrete or grout shall receive a coat of coal tar epoxy per Specifications Section 09900 or provide a 1/32-inch neoprene gasket between the metal surface and the concrete or grout.

E. Service of Manufacturer's Engineer

The Contract prices for equipment shall include the cost of furnishing (as required by equipment specifications sections) a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation the equipment in conformity with the Contract Documents. After the equipment is placed in permanent operation by the County, such engineer or superintendent shall make all adjustments and tests required by the County to prove that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the County in the proper operation and maintenance of such equipment.

1.04 INSPECTION AND TESTING

A. General

Inspection and testing of materials will be performed by the County unless otherwise specified.

For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Three (3) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the County as a prerequisite for the acceptance of any material or equipment.

If, in the making of any test of any material or equipment, it is ascertained by the County that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the County.

Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.

The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have nor make any claim for damage which may occur to equipment prior to the time when the County formally takes over the operation thereof.

B. Costs

All inspection and testing of materials furnished under this Contract will be performed by the County or duly authorized inspection engineers or inspections bureaus without cost to the Contractor, unless otherwise expressly specified.

The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the Contract price.

Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the County for compliance. The Contractor shall reimburse the County for the expenditures incurred in making such tests on materials and equipment which are rejected for non-compliance.

C. Inspections of Materials

The Contractor shall give notice in writing to the County, at least two weeks in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the County will arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials or he will notify the Contractor that the inspection will be made at a point other than the point of manufacture, or he will notify the

Contractor that inspection will be waived. The Contractor must comply with these provisions before shipping any material. Such inspection shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

D. Certificate of Manufacture

When inspection is waived or when the County so requires, the Contractor shall furnish to him authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

E. Shop Tests of Operating Equipment

Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the work until the County notifies the Contractor, in writing, that the results of such tests are acceptable.

The cost of shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

F. Preliminary Field Tests

As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make preliminary field tests of equipment. If the preliminary field tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to the acceptance tests, make all changes, adjustments and replacements required. The furnishing Contractor shall assist in the preliminary field tests as applicable.

G. Final Field Tests

Upon completion of the work and prior to final payment, all equipment and piping installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment and instruments necessary for all acceptance tests, at no additional cost to the County. The Supplier shall assist in the final field tests as applicable.

H. Failure of Tests

Any defects in the materials and equipment or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor. The decision of the County as to whether the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make these corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees of specified requirements, the County, notwithstanding its partial payment for work, and

materials and equipment, may reject the materials and equipment and may order the Contractor to remove them from the site at his own expense.

In case the County rejects any materials and equipment, then the Contractor shall replace the rejected materials and equipment within a reasonable time. If the Contractor fails to do so, the County may, after the expiration of a period of thirty (30) calendar days after giving him notice in writing, proceed to replace such rejected materials and equipment, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under his Contract.

I. Final Inspection

During such final inspections, the work shall be clean and free from water. In no case will the final pay application be prepared until the Contractor has complied with all requirements set forth and the County has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Document.

1.05 TEMPORARY STRUCTURES

A. Temporary Fences

If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall, at his own expense, if so ordered by the County, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The County shall be solely responsible for the determination of the necessity for providing a temporary fence and the type of temporary fence to be used.

1.06 TEMPORARY SERVICES

A. First Aid

The Contractor shall keep upon the site, at each location where work is in progress, a completely equipped first aid kit and shall provide ready access thereto at all times when people are employed on the work.

1.07 LINES AND GRADES

A. Grade

All work under this Contract shall be constructed in accordance with the lines and grades shown on the Plans, or as given by the County. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

B. Safeguarding Marks

The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or removing without authorization such established points, stakes and marks.

The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

C. Datum Plane

All elevations indicated or specified refer to the Mean Sea Level Datum of the NAVD 1988 and/or NGVD 1929.

1.08 ADJACENT STRUCTURES AND LANDSCAPING

A. Responsibility

The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the work. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the work, whether or not shown on the Plans, and the removal, relocation and reconstruction of such items called for on the Plans or specified shall be included in the various Contract Items and no separate payments will be made therefore. Where such public and private property, structures of any kind and appurtenances thereto are not shown on the Plans and when, in the opinion of the County, additional work is deemed necessary to avoid interference with the work, payment therefore will be made as provided for in the General Conditions.

Contractor is expressly advised that the protection of buildings, structures, tunnels, tanks, pipelines, etc. and related work adjacent and in the vicinity of his operations, wherever they may be, is solely his responsibility. Conditional inspection of buildings or structures in the immediate vicinity of the project which may reasonably be expected to be affected by the Work shall be performed by and be the responsibility of the Contractor.

Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by notes, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the County. This does not preclude conforming to the requirements of the insurance underwriters. Copies of surveys, photographs, reports, etc., shall be given to the County.

Prior to the beginning of any excavations, the Contractor shall advise the County of all buildings or structures on which he intends to perform work or which performance of the project work will affect.

B. Protection of Trees

1. All trees and shrubs shall be adequately protected by the Contractor with boxes and otherwise and in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by him with new stock of similar size and age, at the proper season and at the sole expense of the Contractor.
2. Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or

- the trees or structures carefully supported and protected from damage.
3. The County may order the Contractor, for the convenience of the County, to remove trees along the line or trench excavation. If so ordered, the County will obtain any permits required for removal of trees. Such tree removal ordered shall be paid for under the appropriate Contract Items.

C. Lawn Areas

Lawn areas shall be left in as good condition as before the starting of the work. Where sod is to be removed, it shall be carefully removed, and later replaced, or the area where sod has been removed shall be restored with new sod.

D. Restoration of Fences

Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the Contractor and shall be left in as good a condition as before the starting of the work. The manner in which the fence is repaired or replaced and the materials used in such work shall be subject to the approval of the County. The cost of all labor, materials, equipment, and work for the replacement or repair of any fence shall be deemed included in the appropriate Contract Item or items, or if no specific Item is provided therefore, as part of the overhead cost of the work, and no additional payment will be made therefore.

1.09 PROTECTION OF WORK AND PUBLIC

A. Barriers and Lights

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

B. Smoke Prevention

A strict compliance with ordinances regulating the production and emission of smoke will be required. No open fires will be permitted.

C. Noise

The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all engines or other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

D. Access to Public Services

Neither the materials excavated, nor the materials or plant used in the construction of the work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.

E. Dust Prevention

The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the roads and/or construction areas sprinkled with water at all times.

1.10 CUTTING AND PATCHING

- A. The Contractor shall do all cutting, fitting or patching of his portion of the work that may be required to make the several parts thereof join and coordinate in a manner satisfactory to the County and in accordance with the Plans and Specifications. The work must be done by competent workmen skilled in the trade required by the restoration.

1.11 CLEANING

- A. During Construction

During construction of the work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site if, in the opinion of the County, such material, debris, or rubbish constitutes a nuisance or is objectionable. The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefore develops.

- B. Final Cleaning

At the conclusion of the work, all equipment, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished and new operating condition.

1.12 MISCELLANEOUS

- A. Protection Against Siltation and Bank Erosion

1. The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed water courses and drainage ditches.
2. The Contractor, at his own expense, shall remove any siltation deposits and correct any erosion problems as directed by the County which results from his construction operations.

- B. Protection of Wetland Areas

The Contractor shall properly dispose of all surplus material, including soil, in accordance with Local, State and Federal regulations. Under no circumstances shall surplus material be disposed of in wetland areas as defined by the Florida Department of Environmental Protection or Southwest Florida Water Management District.

C. Existing Facilities

The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in the Special Provisions.

D. Use of Chemicals

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

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01010 SUMMARY OF WORK

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS/REQUIREMENTS INCLUDED

- A. The work included in this contract consists of the construction of
- the necessary improvements to bring the Southeast Master Lift Station up to the County's standards. The improvements are as follows: wet well liner, mag meter, structural repairs, riser pipes, guide rails, base elbows, internal bracing, discharge piping, and HVAC system.**
- B. The Contractor shall furnish all shop drawings, working drawings, labor, materials, equipment, tools, services and incidentals necessary to complete all work required by these Specifications and as shown on the Contract Drawings.
- C. The Contractor 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 the County.
- D. The Contractor 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 Contract Documents or not.

1.02 CONTRACTS

Construct all the Work under a single contract.

1.03 WORK SEQUENCE

- A. All work done under this Contract shall be done with a minimum of inconvenience to the users of the system or facility. The Contractor shall coordinate his work with private property owners such that existing utility services are maintained to all users to the maximum extent possible.
- B. The Contractor shall, if necessary and feasible, construct the work in stages to accommodate the County's use of the premises during the construction period; coordinate the construction schedule and operations with the County's Representative.
- C. The Contractor shall, where feasible, construct the Work in stages to provide for public convenience and not close off public use of any facility until completion of construction to provide alternative usage.

1.04 CONSTRUCTION AREAS

- A. The Contractor shall: Limit his use of the construction areas for work and for storage, to allow for:
1. Work by other Contractors.
 2. County's Use.
 3. Public Use.

- B. Coordinate use of work site under direction of County's Representative.
- C. Assume full responsibility for the protection and safekeeping of products under this Contract, stored on the site.
- D. Move any stored products under the Contractor's control, which interfere with operations of the County or separate contractor.
- E. Obtain and pay for the use of additional storage of work areas needed for Contractor operations.

1.05 COUNTY OCCUPANCY

- A. It is assumed that portions of the Work will be completed prior to completion of the entire Work. Upon completion of construction of each individual facility, including testing, if the County, at its sole discretion, desires to accept the individual facility, the Contractor will be issued a dated certificate of completion and acceptance for each individual facility. The County will assume ownership and begin operation of the individual facility on that date and the three-year guaranty period shall commence on that date. The County has the option of not accepting the entire work as a whole until it is completed, tested and approved by the County.

1.06 PARTIAL COUNTY OCCUPANCY

The Contractor shall schedule his operations for completion of portions of the Work, as designated, for the County's occupancy prior to substantial completion of the entire work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01015 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, the County 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 Specification Section 01570.

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. The Contractor 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 and/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 01030 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 utility 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 ensure 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. All material and installation costs shall be 100% borne by the Contractor.
- 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 01045 CUTTING AND PATCHING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall be responsible for all cutting, fitting and patching, including excavation and backfill, required to complete the work or to:
1. Make its several parts fit together properly.
 2. Uncover portions of the work to provide for installation of ill-timed work.
 3. Remove and replace defective work.
 4. Remove and replace work not conforming to requirements of Contract Documents.
 5. Provide penetrations of non-structural surfaces for installation of piping and electrical conduit.

PART 2 PRODUCTS

2.01 MATERIALS

Comply with specifications and standards for each specific product involved.

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect existing conditions of project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of work.
- C. Report unsatisfactory or questionable conditions to County. Do not proceed with work until County has provided further instructions.

3.02 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value to integrity of affected portion of work.
- B. Provide devices and methods to protect other portions of project from damage.
- C. Provide protection from elements for that portion of the project which may be exposed by cutting and patching work and maintain excavations free from water.

3.03 PERFORMANCE

- A. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.

- C. Fit and adjust products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- D. Restore work which has been cut or removed; install new products to provide completed work in accordance with the requirements of the Contract Documents.
- E. Replace surfaces airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- F. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.

END OF SECTION

SECTION 01050 FIELD ENGINEERING AND SURVEYING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall provide and pay for field surveying service required for the project.
- B. The Contractor shall furnish and set all necessary stakes to establish the lines and grades as shown on the Contract Drawings and layout each portion of the Work of the Contract.

1.02 QUALIFICATION OF SURVEYOR AND ENGINEER

All construction staking shall be conducted by or under the supervision of a Florida Registered Professional Surveyor and Mapper. The Contractor shall be responsible for the layout of all such lines and grades, which will be subject to verification by the County.

1.03 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the Project are designated on the Contract Drawings.
- B. Locate and protect all survey monumentation, property corners and project control points prior to starting work and preserve all permanent reference points during construction. All costs associated with the replacement of all survey monumentation, property corners and project control points shall be borne by the Contractor.
- C. Make no changes or relocations without prior written notice to County.
- D. Report to County when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- E. Require surveyor to replace project control points which may be lost or destroyed.
- F. Establish replacements based on original survey control.

1.04 PROJECT SURVEY REQUIREMENTS

The Contractor shall establish temporary bench marks as needed, referenced to data established by survey control points.

1.05 RECORDS

The Contractor shall employ a Professional Engineer or Surveyor registered in the State of Florida to verify survey data and properly prepare record drawings per Specification Section 01720.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01090 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.

1.02 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 179I 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 01150 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. Actual quantities of each item bid on a unit price basis will be determined upon completion of the construction in the manner set up for each item in this section of the Specifications. Payment for all items listed in the Bid Form will constitute full compensation for all work shown and/or specified to be performed under this Contract.

1.02 ESTIMATED QUANTITIES

The quantities shown are approximate and are given only as a basis of calculation upon which the award of the Contract is to be made. The County does not assume any responsibility for the final quantities, nor shall the Contractor claim misunderstanding because of such estimate of quantities. Final payment will be made only for satisfactorily completed quantity of each item.

1.03 WORK OUTSIDE AUTHORIZED LIMITS

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

1.04 MEASUREMENT STANDARDS

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

1.05 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.

1.06 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 may be required to provide a break-down of the lump sum totals.

1.07 UNIT PRICE ITEM

Separate payment will be made for the items of work described herein and listed on the Bid Form. Any related work not specifically listed, but required for satisfactory completion of the

work shall be considered to be included in the scope of the appropriate listed work items.

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. Seeding and hydromulching.
16. As-built Record Drawings.

BID ITEM NO. 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 and demobilization costs as shown in the Bid Form. Mobilization includes, but is 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/Demobilization 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 NO. 2 - BYPASS PUMPING

Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the lump sum price bid for proposed connections to existing force mains, proposed force mains, and existing manholes and/or lift stations. Payment for all work included, but is not limited to, under this Bid Item shall also represent full compensation in accordance with the lump sum price bid for all labor, bypass pumps, temporary electrical, temporary power, temporary piping, fittings, pipe restraints, excavation, dewatering, bedding, backfill, compaction, testing, equipment, temporary line stops, pumper tanks, and the bypassing of the existing lift station in order to complete the proposed improvements, including any bypass pumping during the construction.

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 NO. 3 - EROSION AND SEDIMENT CONTROL

Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the lump sum price bid for erosion and sediment control, including permitting if required, coordination with federal, state and local agencies and all equipment and manpower necessary to comply with necessary agencies.

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 NO. 4 - DEMOLITION, CLEARING AND GRUBBING

Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the lump sum price bid demolition and clearing and grubbing in accordance with the plans and specifications. Clearing and grubbing shall include the removal and disposal of trees, tree roots, rock, abandoned pipe and other features not part of the proposed improvements. The Contractor shall include the cost of any and all permitting required for the burning or disposal of removed trees and vegetation. Demolition to include all work and equipment necessary to remove the materials, including removal of existing abandoned pipelines that may be in conflict. All demolished materials will be removed from the site at no additional expense to the County. Any damage to materials to be retained on site due to the demolition work is the sole responsibility of the contractor.

The Contractor will be responsible for making their own determination as to the acreage and quantity of clearing and grubbing.

BID ITEM NO. 5 - PROJECT SIGNS

Payment for all work included in this Bid Item will be made at the applicable Contract lump sum bid for the necessary signage required during construction. At least two (2) project signs should be used per project. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work, 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 NO. 6 - RECORD DRAWINGS

Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the lump sum price bid for as-built record drawings or any other required certifications to put proposed project into service. All items are subject to approval by the Engineer and 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 NO. 7 - 12" PVC C900-16 DR 18 PIPE

Payment for all work included in these Bid Items shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the 12" PVC AWWA C900-16 pipe as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made for the actual length of the pipe installed and will represent full compensation for all labor and equipment necessary to complete the installation, physical verification of utilities in the project area, pipe, mechanical joint bell restraints, appurtenant materials, excavation, including rock, dewatering, bedding, backfill, compaction, testing and equipment required to complete this Bid Item. No additional compensation shall be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement.

BID ITEM - DUCTILE IRON PIPING, WASTEWATER

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the listed diameter Ductile Iron force main pipe (Permax CTF or Tnemec Series 431 Perma-Shield PL epoxy lined) as shown on the Contract Drawings and listed on the Bid Form. The thickness of the pipe shall be shall be class 53. Measurement and Payment shall be made for the actual length of the listed diameter pipe and installed and will represent full compensation for all labor and equipment necessary to complete the installation, coating of above ground piping, physical verification of utilities in the project area piping, appurtenant materials, spacers, testing, and equipment required to complete these Bid Items. All aboveground flanged pipe shall be fastened using 316 stainless steel hardware. No additional compensation shall be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement. No additional compensation shall be made for extensive dewatering or any water treatment services or equipment that may be required for contaminated groundwater.

BID ITEM	DESCRIPTION	UNITS
8	8" DI CL 53 Pipe, PE	LF
9	8" DI CL 53 Pipe, FLxPE	LF
10	8" DI CL 53 Pipe, FL	LF

BID ITEM NO. 11 - 8" HDPE DR 11 PIPE

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing the 8" diameter AWWA C906 HDPE DR 11 riser pipe as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made for the actual length of the listed diameter pipe and installed and will represent full compensation for all labor, materials, spacers, bracket supports, testing, and equipment required to complete this Bid Item. No additional compensation shall be made for extensive dewatering or any water treatment services or equipment that may be required for contaminated groundwater.

BID ITEM - FLANGED DUCTILE IRON FITTINGS, WASTEWATER

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid for furnishing and installing each listed aboveground flanged ductile iron fitting (Permax CTF or Tnemec Series 431 Perma-Shield PL epoxy lined) as shown on the Contract Drawings and listed on the Bid Form. Payment will be made for each fitting installed and will represent full compensation for all labor, material, excavation, 316 stainless steel hardware, thrust restraints, including rock, bedding, backfill, compaction, testing and equipment required to complete these Bid Items.

BID ITEM	DESCRIPTION	UNITS
12	12" x 8" DI Fitting - Eccentric Reducer, MJ	EA
13	8" DI Fitting - Cross, FL	EA
14	8" DI Fitting - Tee, FL	EA
15	8" DI Fitting - 45° Bend, FL	EA
16	8" DI Fitting - 90° Bend, MJ	EA
17	8" DI Fitting - 90° Bend, FL	EA
18	8" x 6" DI Fitting -Reducer, FL	EA

BID ITEM- HDPE FITTINGS

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing each of the listed AWWA C906 HDPE DR 11 fittings as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made for the bends installed and will represent full compensation for all labor, materials including approved welding material, testing, and equipment required to complete these Bid Items.

BID ITEM	DESCRIPTION	UNITS
19	8" x 6" HDPE DR 11 Fabricated Fitting - Eccentric Reducer	EA
20	8" HDPE DR 11 Molded Fitting - 90° Bend	EA

BID ITEM NO. 21 -- 8" SWING CHECK VALVE, FL

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per the schedule of prices for furnishing and installing each 8" swing check valve with 316 stainless steel hardware as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made for each valve installed and will represent full compensation for all labor, materials including approved welding, material, testing, and equipment required to complete these Bid Items.

BID ITEM - GATE VALVES, FL

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid for furnishing and installing each listed gate valve as shown on the Contract Drawings and listed on the Bid Form. Payment will be made for each valve installed and will represent full compensation for all labor, material including 316 stainless steel hardware and nonrising stem, testing and equipment required to complete these Bid Items.

BID ITEM	DESCRIPTION	UNITS
22	8" Gate Valve, FL	EA
23	6" Gate Valve, FL	EA

BID ITEM NO. 24 - CONNECTION TO EXISTING 12" FORCE MAIN

Payment for all work included, but is not limited to, under these Bid Items shall be made at the applicable Contract lump sum price for the 12" force main connection. Payment for all work included, but is not limited to, under this Bid Item shall represent full compensation in accordance with the lump sum price bid for all labor, sleeve couplings, blue fluoropolymer coated high-strength low alloy steel or uncoated 316 stainless steel hardware, grout, excavation, dewatering, bedding, backfill, compaction, testing, equipment, restraints, or thrust blocks for force main connections. Contractor shall make provisions to have an adequate number of septage trucks available to make the necessary force main connections.

BID ITEM NO. 25 - 16" x 2" REPAIR SADDLE

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid for furnishing and installing the 316 stainless steel 16" x2" repair saddle as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made for the repair saddle installed and will represent full compensation for all labor, material, testing, soil compaction, core holes within vault, restoration and equipment required to complete this Bid Item.

BID ITEM NO. 26 - 8" HDPE FLANGE ADAPTER WITH 316 SS BACKUP RING

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for furnishing and installing each 8" HDPE flange adapter with 316 SS backup ring as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made for each flange adapter installed and will represent full compensation for all labor, material, testing, and equipment required to complete this Bid Items.

BID ITEM NO. 27 - 6" CAMLOCK CONNECTION

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for furnishing and installing the 6" threaded ductile iron blind flange with aluminum camlock connection with dust cap and chain as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made for the camlock assembly installed and will represent full compensation for all labor, material, testing, and equipment required to complete this Bid Items.

BID ITEM NO. 28 - 2" CAMLOCK AND 3/4" HOSE BIB ASSEMBLY

Payment for all work included in this Bid Item will be made at the applicable Contract lump sum price for furnishing and installing both of the 2" camlock and 3/4" hose bib assembly as shown on the Contract Drawings. Payment shall represent full compensation for all labor, materials including but not limited to removal of existing hose bibs and pipe, aboveground piping, fittings, valves, appurtenances, 316 stainless steel camlock and dust cap, 3/4" hose bibs, concrete filled PVC pipes, and 316 stainless steel pipe straps, necessary equipment, and incidentals necessary to complete the work for a fully operational system, ready for approval and acceptance by the County.

BID ITEM NO. 29 - 8" MCCROMETER ULTRA MAG UM08

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid for furnishing and installing the 8" McCrometer Ultra Mag UM08 as specified on the Contract Documents and listed on the Bid Form. Measurement and Payment shall be made for the meter installed and will represent full compensation for all labor, material, testing, and equipment required to complete these Bid Items.

BID ITEM NO. 30 - FLANGE PIPE SUPPORTS

Payment for all work included in this Bid Item shall be made at the applicable Contract lump sum price for furnishing and installing all 316 stainless steel flanged pipe support as shown on the Contract Drawings and listed on the Bid Form. Measurement and Payment shall be made for each pipe support installed and will represent full compensation for all labor, material, testing, and equipment required to complete these Bid Items.

BID ITEM NO. 31 - 6" PUMP BASE ELBOW

Payment for all work included in this Bid Item will be made at the applicable Contract price for furnishing and installing each 6" Barney's pump base elbow with concrete pad, mounting plate and 316 stainless steel hardware as shown on the Contract Drawings and Specifications. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work, ready for approval and acceptance by the County.

BID ITEM NO. 32 - 21" INFLUENT DROP PIPE

Payment for all work included in this Bid Item will be made on a lump sum basis and will include the cost for furnishing and installing the 21" PVC (SDR-26) angled drop pipe and the 316 stainless steel wall supports as shown on the Contract Drawings and Specifications. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work, ready for approval and acceptance by the

County.

BID ITEM NO. 33 -- 8" PVC SCH 80 DUCT AND FITTINGS

Payment for all work included in this Bid Item will be made on a lump sum basis and will include the cost of furnishing and installing the 8" diameter PVC SCH 80 Odor Control Duct and fittings as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, materials including approved primer and sealants, spacers, pipe, fittings, pipe supports, excavation, including rock, dewatering, bedding, backfill, compaction, testing, and equipment required to complete these Bid Items. No additional compensation shall be made for excavation below the bottom of the pipe, for rock removal or bedding and backfill material, or for repair of any trench settlement. No additional compensation shall be made for extensive dewatering or any water treatment services or equipment that may be required for contaminated groundwater.

BID ITEM NO. 34 - LIFT STATION EQUIPMENT

Payment for all work included in this Bid Item will be made on a lump sum basis and will include the cost for furnishing and installing the single door aluminum pump and float hatch covers, wet well floats and rack, and 3" 316 stainless steel pump rail system, which includes two (2) continuous lengths of 3" 316 stainless steel rails per pump, 316 stainless steel support brackets for the rail system and any 316 stainless steel hardware required for a fully functional rail system as shown on the Contract Drawings and Specifications. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work, ready for approval and acceptance by the County.

BID ITEM NO. 35 - SUBMERSIBLE PUMP INSTALLATION AND START UP

Payment for all work included in this Bid Item will be made on a lump sum basis and will include the cost for installing 3 submersible Flygt pumps, purchased by the County, into the existing wet well, and completing system testing and start up per Specification 11931 Part 3 - Execution. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work for a fully functional lift station, ready for approval and acceptance by the County.

BID ITEM NO. 36 - CLEAN AND INSPECT WET WELL

Payment for all work included in this Bid Item will be made on a lump sum basis and will include the cost of cleaning the wet well and inspecting the existing liner, in accordance with the Contract Drawings and Specifications. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work, ready for approval and acceptance by the County.

BID ITEM NO. 37 - CONCRETE TOP SLAB

Payment for all work under this Bid Item shall be made at the applicable Contract unit price bid per cubic yard of concrete as shown on the Bid Form for furnishing and installing the wet well concrete top with associated penetrations as shown on the Contract Drawings and as described in the Specifications. Measurement for the concrete top slab shall be per actual cubic yard of concrete furnished, placed and installed as shown on the Contract Drawings or as ordered by the County in writing. This Bid Item includes steel reinforcement, Agru liner and like work to complete the wet well top slab. Payment shall represent full compensation for all

labor, materials, and equipment for mixing, placing, forming and curing of the concrete, any required excavation, including rock as necessary, bedding, backfill, dewatering, sheeting, testing and any and all other items necessary to complete work.

BID ITEM NO. 38 -CONCRETE FILLET

Payment for all work under this Bid Item shall be made at the applicable Contract unit price bid per cubic yard of concrete as shown on the Bid Form to fillet the wet well floor as shown on the Contract Drawings and as described in the Specifications. Measurement for the concrete fillet shall be per actual cubic yard of concrete furnished, placed and installed as shown on the Contract Drawings or as ordered by the County in writing. Payment shall represent full compensation for all labor, materials, and equipment for mixing, placing, forming and curing of the concrete and all incidentals necessary to complete the concrete work, ready for approval and acceptance by the County.

BID ITEM NO. 39 - MICELLANEOUS CONCRETE

Payment for all work under this Bid Item will be made at the applicable Contract lump sum price for furnishing, placing and installing the miscellaneous concrete, measured in place, within the lines and grades, any required neoprene padding, all wet well penetration repairs including liner repair, and all electrical control room wall repairs as shown on the Contract Drawings and as described in the Specifications. All concrete placed outside these lines and grades to fill unauthorized excavation and all concrete for replacing defective work shall be at the expense of the Contractor. Concrete specifically included under any other Bid Item will not be measured or paid for under this Bid Item. This Bid Item includes steel reinforcement, encasements, nonreinforced pipe cradles, and like work. Payment shall represent full compensation for all labor, materials, and equipment for mixing, placing, forming and curing of the concrete and all incidentals necessary to complete the concrete work, ready for approval and acceptance by the County.

BID ITEM NO. 40 - OVERHEAD BRIDGE CRANE

Payment for all work included in this Bid Item will be made at the applicable Contract lump sum price for furnishing and installing the Overhead Bridge Crane assembly by J. Herbert Corp. or Material Handling Systems Inc. (MHS) as shown on the Contract Drawings and Specifications. Payment shall represent full compensation for all labor, materials, necessary equipment, maintenance service agreement, and incidentals necessary to complete the work, ready for approval and acceptance by the County. Included in this bid item, but not limited to, is the crane's structural steel, painted finishes, hoists, chain, trolley, hardware, and electrical components. Contractor shall test the crane to the full capacity rating as recommended by manufacturer.

BID ITEM NO. 41 - HVAC SYSTEM

Payment for all work included in this Bid Item will be made on a lump sum basis and will include the cost of furnishing and installing a ductless mini split HVAC unit in accordance with the applicable details on the Contract Drawings. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work for a fully operational HVAC system, ready for approval and acceptance by the County.

BID ITEM NO. 42 - SHELL RESTORATION

Payment for all work included in this bid item will be made at the applicable Contract unit price bid per square yard of shell restoration as listed on the Bid Form. Measurement of restoration will be per the actual number of square yards of FDOT bank run shell implemented. Payment shall represent full compensation for all labor, materials and equipment for compacting subgrade, furnishing and installing FDOT bank run shell including all incidentals necessary to complete the restoration as shown on the Contract Drawings and included in the Specifications, all ready for approval and acceptance by the County.

BID ITEM NO. 43 - ASPHALT RESTORATION

Payment for all work included in this bid item will be made at the applicable Contract unit price bid per square yard of asphalt restoration as listed on the Bid Form. Measurement of restoration will be per the actual number of square yards implemented. Payment shall represent full compensation for all labor, materials and equipment for compacting subgrade, furnishing and installing the asphalt including all incidentals necessary to complete the restoration as shown on the Contract Drawings and included in the Specifications, all ready for approval and acceptance by the County.

BID ITEM NO. 44 - CONCRETE SIDEWALK RESTORATION

Payment for all work included in this bid item will be made at the applicable Contract unit price bid per square yard of concrete restoration as listed on the Bid Form. Measurement of restoration will be per the actual number of square yards implemented. Payment shall represent full compensation for all labor, materials and equipment for compacting subgrade, furnishing and installing the concrete including all incidentals including steel reinforcement necessary to complete the restoration as shown on the Contract Drawings and included in the Specifications, all ready for approval and acceptance by the County.

BID ITEM NO. 45 - SODDING

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid per square yard for furnishing and installing sod at all disturbed areas and where shown in the Contract drawings. Payment shall represent full compensation for all labor, materials, necessary equipment, and incidentals necessary to complete the work, ready for approval and acceptance by the County.

BID ITEM NO. 46 - ELECTRICAL & SCADA SYSTEM

Payment for all work included in this Bid Item will be made at the applicable Contract lump sum bid for providing and installing the Variable Frequency Drives, Data Flow Systems TCU/VFD control panel, Data Flow Systems TCU 360 Bubbler System, disconnect switches, junction boxes, inground pull boxes, conduit, seals, conductors and all ancillary items. The lump sum bid shall also include the programming of the VFD controls and flow meter. Payment shall represent full compensation for all labor, materials, installation, necessary equipment, programming, testing, start up, and incidentals necessary to complete the work, ready for approval and acceptance by the County. Measurement for payments of this lump sum bid item will be in accordance with the Contract Documents.

BID ITEM NO. 47 - CONTRACT CONTINGENCY

Payment for all work under this Bid Item shall be made only at the County's discretion. This Bid Item shall not exceed 10% of the Bidders 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 01152 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 01153 CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.01 DEFINITION

- A. Change Order: A written order signed by the Owner, the Architect/Engineer and the Contractor authorizing a change in the Project Plans and/or Specifications and, if necessary, a corresponding adjustment in the Contract Sum and/or Contract Time, pursuant to Article V of the General Conditions of the Construction Agreement.
- 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: A written order issued by Owner which orders minor changes in the Work not involving a change in Contract Time, to be paid from the Owner's contingency funds.
- D. Field Order: Minor change to contract work that does not require adjustment of contract sum or expected date of completion.

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 ORDER CHANGE

- A. In lieu of a Change Order, the Project Manager may issue a Field Order for the Contractor to proceed with additional work within the original intent of the Project.
- B. Field Order 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 Order 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. Refer to Article V.5.6 of the General Conditions of the Construction Agreement.

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 01200 PROJECT MEETINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The County shall schedule the pre-construction meeting, periodic progress meetings and special meetings, if required, throughout progress of work.
- B. Representatives of contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- C. The Contractor shall attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules.

1.02 PRE-CONSTRUCTION MEETING

A. Attendance:

- 1. County's Engineer
- 2. County's Project Manager
- 3. Contractor
- 4. Resident Project Representative
- 5. Related Labor Contractor's Superintendent
- 6. Major Subcontractors
- 7. Major Suppliers
- 8. Others as appropriate

B. Suggested Agenda:

- 1. Distribution and discussion of:
 - a. List of major subcontractors.
 - b. Projected Construction Schedules.
 - c. Coordination of Utilities
- 2. Critical work sequencing
- 3. Project Coordination:
 - a. Designation of responsible personnel.
 - b. Emergency contact persons with phone numbers.
- 4. Procedures and processing of:
 - a. Field decisions.
 - b. Submittals.
 - c. Change Orders.
 - d. Applications for Payment.
- 5. Procedures for maintaining Record Documents
- 6. Use of premises:
 - a. Office, work and storage areas.
 - b. County's REQUIREMENTS.
- 7. Temporary utilities
- 8. Housekeeping procedures
- 9. Liquidated damages
- 10. Equal Opportunity Requirements
- 11. Laboratory testing
- 12. Project / Job meetings: Progress meeting, other special topics as needed.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01310 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 ensure 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 01340 SHOP DRAWINGS, PROJECT DATA AND SAMPLES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall submit to the County for review and approval: working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this section called data), and material samples (hereinafter in this section called samples) as are required for the proper control of work, including, but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.
- B. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the County. This log should include the following items:
 - 1. Submittal description and number assigned.
 - 2. Date to County.
 - 3. Date returned to Contractor (from County).
 - 4. Status of Submittal (No exceptions taken, returned for confirmation or resubmittal, rejected).
 - 5. Date of Resubmittal and Return (as applicable).
 - 6. Date material released (for fabrication).
 - 7. Projected date of fabrication.
 - 8. Projected date of delivery to site.
 - 9. Projected date and required lead time so that product installation does not delay contact.
 - 10. Status of O&M manuals submitted.

1.03 CONTRACTOR'S RESPONSIBILITY

- A. It is the duty of the Contractor to check all drawings, data and samples prepared by or for him before submitting them to the County for review. Each and every copy of the Drawings and data shall bear Contractor's stamp showing that they have been so checked. Shop drawings submitted to the County without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the contract Documents.
- B. Determine and verify:
 - 1. Field measurements.
 - 2. Field construction criteria.
 - 3. Catalog numbers and similar data.
 - 4. Conformance with Specifications and indicate all variances from the Specifications.
- C. The Contractor shall furnish the County a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.

- D. The Contractor shall not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the County, with No Exceptions Taken or Approved as Noted.
- E. The Contractor shall submit to the County all drawings and schedules sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for checking and appropriate action from the time the County receives them.
- F. All material & product submittals, other than samples, may be transmitted electronically as a pdf file. All returns to the contractor will be as a pdf file only unless specifically requested otherwise.
- G. The Contractor shall be responsible for and bear all cost of damages which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by County of the necessary Shop Drawings.

1.04 COUNTY'S REVIEW OF SHOP DRAWINGS AND WORKING DRAWINGS

- A. The County's review of drawings, data and samples submitted by the Contractor shall cover only general conformity to the Specifications, external connections and dimensions which affect the installation.
- B. The review of drawings and schedules shall be general and shall not be construed:
 - 1. As permitting any departure from the Contract requirements.
 - 2. As relieving the Contractor of responsibility for any errors, including details, dimensions and materials.
 - 3. As approving departures from details furnished by the County, except as otherwise provided herein.
- C. If the drawings or schedules as submitted describe variations and show a departure from the Contract requirements which the County finds to be in the interest of the County and to be so minor as not to involve a change in Contract Price or time for performance, the County may return the reviewed drawings without noting any exception.
- D. When reviewed by the County, each of the Shop and Working Drawings shall be identified as having received such review being so stamped and dated. Shop Drawings stamped "REJECTED" and with required corrections shown shall be returned to the Contractor for correction and resubmittal.
- E. Resubmittals will be handled in the same manner as first submittals. On resubmittals, the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the County on previous submissions. The Contractor shall make any corrections required by the County.
- F. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the County.
- G. The County shall review a submittal/resubmittal a maximum of three (3) times after which cost of review shall be borne by the Contractor. The cost of engineering shall be equal to the County's actual payroll cost.

- H. When the Shop and Working Drawings have been completed to the satisfaction of the County, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the County.
- I. No partial submittals shall be reviewed. Incomplete submittals shall be returned to the Contractor and shall be considered not approved until resubmitted.

1.05 SHOP DRAWINGS

- A. When used in the Contract Documents, the term "Shop Drawings" shall be considered to mean Contractor's plans for material and equipment which become an integral part of the Project. These drawings shall be complete and detailed. Shop Drawings shall consist of fabrication, drawings, setting drawings, schedule drawings, manufacturer's scale drawings and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature and performance and test data, shall be considered only as supportive to required Shop Drawings as defined above.
- B. Drawings and schedules shall be checked and coordinated with the work of all trades involved, before they are submitted for review by the County and shall bear the Contractor's stamp of approval and original signature as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval and original signature shall be returned to the Contractor for resubmission.
- C. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:
 - 1. Number and title of the drawing.
 - 2. Date of Drawing or revision.
 - 3. Name of project building or facility.
 - 4. Name of contractor and subcontractor submitting drawing.
 - 5. Clear identification of contents and location of the work.
 - 6. Specification title and number.
- D. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility of executing the work in accordance with the Contract, even though such drawings have been reviewed.
- E. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.
- F. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name and address and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.
- G. All manufacturers or equipment suppliers who proposed to furnish equipment or products shall submit an installation list to the County along with the required shop drawings. The

installation list shall include at least five installations where identical equipment has been installed and have been in operation for a period of at least one (1) year.

- H. Only the County will utilize the color "red" in marking shop drawing submittals.

1.06 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the Contractor's fabrication and erection drawings for structures such as roof trusses, steelwork, precast concrete elements, bulkheads, support of open cut excavation, support of utilities, groundwater control systems, forming and false work; underpinning; and for such other work as may be required for construction of the project.
- B. Copies of working drawings as noted above, shall be submitted to the County where required by the Contract Documents or requested by the County and shall be submitted at least thirty (30) days (unless otherwise specified by the County) in advance of their being required for work.
- C. Working drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of Florida and shall convey, or be accompanied by, calculation or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the County, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error are assumed by the Contractor; the County and Engineer shall not have responsibility therefor.

1.07 SAMPLES

- A. The Contractor shall furnish, for the review of the County, samples required by the Contract Documents or requested by the County. Samples shall be delivered to the County as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until reviewed by the County.
- B. Samples shall be of sufficient size and quantity to clearly illustrate:
 - 1. Functional characteristics of the product, with integrally related parts and attachment devices.
 - 2. Full range of color, texture and pattern.
 - 3. A minimum of two samples of each item shall be submitted.
- C. Each sample shall have a label indicating:
 - 1. Name of product.
 - 2. Name of Contractor and Subcontractor.
 - 3. Material or equipment represented.
 - 4. Place of origin.
 - 5. Name of Producer and Brand (if any).
 - 6. Location in project.
(Samples of finished materials shall have additional markings that will identify them under the finished schedules.)
 - 7. Reference specification paragraph.

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

- E. Reviewed samples not destroyed in testing shall be sent to the County or stored at the site of the work. Reviewed samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the reviewed samples. If requested at the time of submission, samples which failed testing or were rejected shall be returned to the Contractor at his expense.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01370 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 01380 CONSTRUCTION PHOTOGRAPHS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall employ a competent photographer to take construction record photographs or perform video, recording including furnishing all labor, materials, equipment and incidentals necessary to obtain photographs and/or video recordings of all construction areas.
- B. Preconstruction record information shall consist of video recordings on digital video disks (DVD).
- C. 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.

1.04 VIDEO RECORDINGS

- A. Video recording shall be done along all routes that are scheduled for construction. Video recording shall include full recording of both sides of all streets and the entire width of easements plus 10 feet on each side on which construction is to be performed. All video recording shall be in full color.
- B. A complete view, in sufficient detail with audio description of the exact location shall be provided.
- C. The engineering plans shall be used as a reference for stationing in the audio portion of the recordings for easy location identification.
- D. Two complete sets of video recordings shall be delivered to the County on digital video disks (DVD) for the permanent and exclusive use of the County prior to the start of any construction on the project. Included in this delivery shall be a printed video log which includes time stamps and project stationing.
- E. All video recordings shall contain the name of the project, the date and time of the video, recording, the name and address of the photographer and any other identifying information required.
- F. Construction shall not start until preconstruction video recordings are completed, submitted and accepted by the County. In addition, no progress payments shall be made until the preconstruction video recordings are accepted by the County.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01410 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 01510 TEMPORARY AND PERMANENT UTILITIES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

The Contractor shall be responsible for furnishing all requisite temporary utilities, i.e., power, water, sanitation, etc. The Contractor shall obtain and pay for all permits required as well as pay for all temporary usages. The Contractor shall remove all temporary facilities upon completion of work.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with Federal, State and Local codes and regulations and with utility company requirements.
- C. Comply with County Health Department regulations.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

Materials for temporary utilities may be "used". Materials for electrical utilities shall be adequate in capacity for the required usage, shall not create unsafe conditions and shall not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

Arrange with the applicable utility company for temporary power supply. Provide service required for temporary power and lighting and pay all costs for permits, service and for power used.

2.03 TEMPORARY WATER

- A. The Contractor shall arrange with Manatee County Utilities Customer Service office to provide water for construction purposes, i.e., meter, pay all costs for installation, maintenance and removal, and service charges for water used.
- B. The Contractor shall protect piping and fitting against freezing.

2.04 TEMPORARY SANITARY FACILITIES

- A. The Contractor shall provide sanitary facilities in compliance with all laws and regulations.
- B. The Contractor shall service, clean and maintain facilities and enclosures.

PART 3 EXECUTION

3.01 GENERAL

- A. The Contractor shall maintain and operate systems to assure continuous service.

- B. The Contractor shall modify and extend systems as work progress requires.

3.02 REMOVAL

- A. The Contractor shall completely remove temporary materials and equipment when their use is no longer required.
- B. The Contractor shall clean and repair damage caused by temporary installations or use of temporary facilities.

END OF SECTION

SECTION 01570 TRAFFIC REGULATION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor shall be responsible for providing safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the Contractor and which interfere with the driving or walking public.
- B. The Contractor shall remove temporary equipment and facilities when no longer required, restore grounds to original or to specified conditions.

1.02 TRAFFIC CONTROL

- A. The necessary traffic control shall include, but not be limited to, such items as proper construction warning signs, signals, lighting devices, markings, barricades, channelization and hand signaling devices. The Contractor shall be responsible for installation and maintenance of all devices and detour routes and signage for the duration of the construction period. The Contractor shall utilize the appropriate traffic plan from the FDOT Maintenance of Traffic Standards, Series 600 of the FDOT Roadway & Traffic Design Standards, Latest Edition.
- B. Should there be the necessity to close any portion of a roadway carrying vehicles or pedestrians the Contractor shall submit a Traffic Control Plan (TCP) at least 5 days before a partial or full day closure, and at least 8 days before a multi-day closure. TCP shall be submitted, along with a copy of their accreditation, by a certified IMSA or ATSA Traffic Control Specialist.
 - 1. At no time will more than one (1) lane of a roadway be closed to vehicles and pedestrians without an approved road closure from the County Transportation Department. With any such closings, adequate provision shall be made for the safe expeditious movement of each.
 - 2. All traffic control signs must be in place and inspected at least 1 day in advance of the closure. Multi-day closures notification signs shall be in place at least 3 days in advance of the closure. All signs must be covered when not in effect, and checked twice a day by the Worksite Traffic Supervisor when they are in effect.
- C. The Contractor shall be responsible for removal, relocation, or replacement of any traffic control device in the construction area which exists as part of the normal preconstruction traffic control scheme. Any such actions shall be performed by the Contractor under the supervision and in accordance with the instructions of the applicable highway department unless otherwise specified.
- D. The Contractor will consult with the County immediately on any vehicular or pedestrian safety or efficiency problem incurred as a result of construction of the project.
- E. The Contractor shall provide ready access to businesses and homes in the project area during construction. The Contractor shall be responsible for coordinating this work with affected homeowners.
- F. When conditions require the temporary installation of signs, pavement markings and traffic

barriers for the protection of workers and traffic, the entire array of such devices shall be depicted on working drawings for each separate stage of work. These drawings shall be submitted to the County for review and approval prior to commencement of work on the site.

- G. Precast concrete traffic barriers shall be placed adjacent to trenches and other excavations deeper than six inches below the adjacent pavement surface.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01580 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. Two painted signs, 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.
- B. Size of signs and lettering: as required by regulatory agencies, or as appropriate to usage.
- C. Colors: as required by regulatory agencies, otherwise of uniform colors throughout project.
- D. 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.

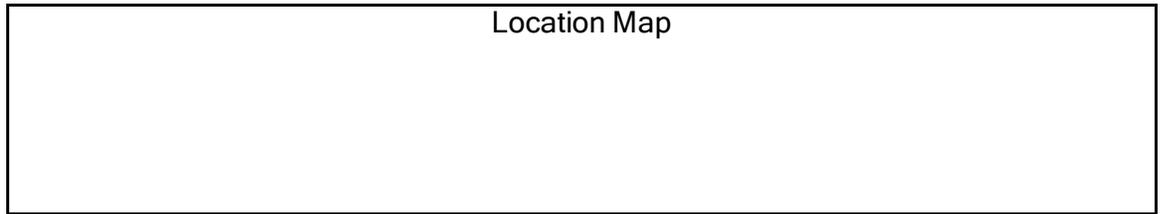
1. Residents impacted include anyone who resides inside, or within 500 feet of project limits of construction.

- 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, 20XX and be completed in July 20XX.



WE HOPE TO KEEP ANY INCONVENIENCE TO A MINIMUM. HOWEVER, IF YOU HAVE ANY PROBLEMS, PLEASE CONTACT THE FOLLOWING:

Contractor	Project Manager
Contractor Address	PM Address
Contractor Phone (Site Phone)	PM Phone No. & Ext.
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.
- C. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.
- D. Rough Hardware: Galvanized.
- E. Paint: Exterior quality, as specified in the Contract Documents.

PART 3 EXECUTION

3.01 PROJECT IDENTIFICATION SIGN

Paint exposed surface or supports, framing and surface material; one coat of primer and one coat of exterior paint.

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 01590 COUNTY'S FIELD OFFICE

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Contractor shall furnish, install and maintain one temporary field office during the entire construction period for the sole use of the County.

1.02 OTHER REQUIREMENTS

Prior to installation of the County's field office, the Contractor shall consult with the County on location, access and related facilities.

All site use approvals shall be obtained by the Contractor.

Upon completion of construction, the Contractor shall remove the field office and restore the site to its original condition.

1.03 REQUIREMENTS FOR FACILITIES

A. Construction:

1. The field office shall be structurally sound, weather tight, with floors raised aboveground.
2. At Contractor's option, portable or mobile buildings may be used.

B. Office for Field Engineer:

1. A separate office for sole use of the County with secure entrance doors, key and lock shall be provided.
2. Area: 250 sq. ft. minimum, with minimum dimension of 8 feet.
3. Windows:
 - a. Minimum of three (3).
 - b. Operable sash and insect screens.
 - c. Locate field office to provide maximum view of construction areas.
4. Furnishings:
 - a. Two standard size chairs and desks with three drawers each.
 - b. One drafting table: 39"x72"x36" high, with one equipment drawer.
 - c. One metal, double-door storage cabinet with lock and key.
 - d. One plan rack to hold a minimum of six sets of project drawings.
 - e. One standard four-drawer legal-size metal filing cabinet with lock and key.
 - f. Six linear feet of bookshelves.
 - g. One swivel arm chair.
 - h. Two straight chairs.
 - i. One drafting table stool.
 - j. One waste basket.
 - k. One tackboard, 36"x30".
 - l. One fire extinguisher.
 - m. One first aid kit.
5. Services:
 - a. Adequate lighting.

- b. Exterior lighting at entrance door.
 - c. Automatic heating and mechanical cooling equipment to maintain comfort conditions.
 - d. Minimum of four 110 volt duplex electric convenience outlets, at least one on each wall.
 - e. Electric distribution panel: Two circuits minimum 110 volt, 60 hertz service.
 - f. Convenient access to drinking water and toilet facilities.
- 6. Telephone: One private direct line instrument.
 - 7. Fax: combination fax/duplicator.

PART 2 PRODUCTS

2.01 MATERIALS, EQUIPMENT, FURNISHINGS

May be new or used, but must be serviceable, adequate for required purpose and must adhere to all applicable codes or regulations including the Manatee County Building Codes.

PART 3 EXECUTION

3.01 PREPARATION

Fill and grade site as necessary for temporary structure to provide positive surface drainage.

3.02 INSTALLATION

Construct temporary field office on proper foundation and provide connections for all utility services.

- 1. Secure portable or mobile building when used.
- 2. Provide steps and landings at entrance doors.

END OF SECTION

SECTION 01600 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.
- C. The Contractor shall take extreme care when handling pipe, valves, fittings to ensure the interior lining does not get damaged during construction. Lined pipe, valves, and fittings

must be handled only from the outside surfaces. No forks, chains, straps, hooks, etc. shall be placed inside the pipe, valves, and fittings for lifting, positioning, or laying. The materials shall not be dropped or unloaded by rolling.

- D. Care should be taken not to let the pipe, valves, and fittings strike sharp objects while swinging or being off loaded. Materials should never be placed on grade by use of hydraulic pressure from an excavator bucket or by banging with heavy hammers.
- E. A County representative shall have the right to deny any pipe/valve/fitting that shows cracking due to improper handling/storage.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01620 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, particularly any pipe, fittings, and valves, 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.
- C. 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 ensure 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 01700 CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the work.

1.02 SUBSTANTIAL COMPLETION

- A. The Contractor shall submit the following items when the Contractor considers the work to be substantially complete:
 - 1. A written notice that the work, or designated portion thereof, is substantially complete.
 - 2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, the County shall make an inspection to determine the status of completion.
- C. Project record documents and operations and maintenance manuals must be submitted before the project shall be considered substantially complete.
- D. If the County determines that the work is not substantially complete:
 - 1. The County shall notify the Contractor in writing, stating the reasons.
 - 2. The Contractor shall remedy the deficiencies in the work and send a second written notice of substantial completion to the County.
 - 3. The County shall reinspect the work.
- E. When the County finds that the work is substantially complete:
 - 1. The Engineer shall prepare and deliver to the County a tentative Certificate of Substantial Completion (Manatee County Project Management Form PMD-8) with a tentative list of the items to be completed or corrected before final payment.
 - 2. The Engineer shall consider any objections made by the County as provided in Conditions of the Contract. When the Engineer considers the work substantially complete, he will execute and deliver to the County a definite Certificate of Substantial Completion (Manatee County Project Management Form PMD-8) with a revised tentative list of items to be completed or corrected.

1.03 FINAL INSPECTION

- A. When the Contractor considered the work to be complete, he shall submit written certification stating that:
 - 1. The Contract Documents have been reviewed.
 - 2. The work has been inspected for compliance with Contract Documents.
 - 3. The work has been completed in accordance with Contract Documents.
 - 4. The equipment and systems have been tested in the presence of the County's representative and are operational.
 - 5. The work is completed and ready for final inspection.

- B. The County shall make an inspection to verify the status of completion after receipt of such certification.
- C. If the County determines that the work is incomplete or defective:
 - 1. The County shall promptly notify the Contractor in writing, listing the incomplete or defective work.
 - 2. The Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to County that the work is complete.
 - 3. The County shall reinspect the work.
- D. Upon finding the work to be acceptable under the Contract Documents, the County shall request the Contractor to make closeout submittals.
- E. For each additional inspection beyond a total of three (3) inspections for substantial and final completion due to the incompleteness of the work, the Contractor shall reimburse the County's fees.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO COUNTY

- A. Project Record Documents (prior to substantial completion).
- B. Operation and maintenance manuals (prior to substantial completion).
- C. Warranties and Bonds.
- D. Evidence of Payment and Release of Liens: In accordance with requirements of General and Supplementary Conditions.
- E. Certification letter from Florida Department of Transportation and Manatee County Department of Transportation, as applicable.
- F. Certificate of Insurance for Products and Completed Operations.
- G. Final Reconciliation, Warranty Period Declaration, and Contractor's Affidavit (Manatee County Project Management Form PMD-9).

1.05 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the County.
- B. Statement shall reflect all adjustments to the Contract Sum:
 - 1. The original Contract Sum.
 - 2. Additions and deductions resulting from:
 - a. Previous Change Orders
 - b. Unit Prices
 - c. Penalties and Bonuses
 - d. Deductions for Liquidated Damages
 - e. Other Adjustments
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.

5. Sum remaining due.

- C. Project Management shall prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.06 FINAL APPLICATION FOR PAYMENT

Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01710 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 01720 PROJECT RECORD DOCUMENTS

PART 1 STANDARDS

1.01 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. Record drawings shall meet the criteria of these specifications and the latest edition of Manatee County Public Works Standards, Part I Utilities Standards Manual.

PART 2 STANDARDS

2.01 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.

2.02 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.

2.03 MARKING DEVICES

- A. Provide felt tip marking pens for recording information in the color code designated by the County.

2.04 RECORDING DRAWINGS PREPARATION

- A. Record information concurrently with construction progress.

- B. Do not conceal any work until required information is recorded.
- C. Record drawings shall be legibly produced to record actual construction. It shall minimally include the following:
1. The Cover Sheet shall include a list of all contractors/subcontractors that performed work to complete the project and their specific role(s).
 2. Record drawings shall have a revision note such as "Record Drawing" in the revision block and a date corresponding to the date the record drawing was issued.
 3. Record drawing notes shall be notably bold, italicized, or boxed ([X]) to identify them as record information.
 4. The drawing scales used in the record drawings shall be the same as were used in the construction drawings, and the sheet number of each record drawing sheet shall be the same as the sheet numbers that were used on the construction drawings from which the record drawings originate. If additional sheets need to be added shall be numbered with a letter following the preceding sheet number: a sheet added between sheet 4 and 5 would be labeled 4a.
 5. All plan, profile, and detail sheets that were used to depict locations and elevations of utility structures in the construction drawings shall be included in the record drawing set.
 6. Record drawings shall accurately depict all existing improvements within the immediate vicinity of the constructed utilities. Existing improvements shall include, but not be limited to:
 1. Sidewalks, walls, fences, road surfaces, buildings, and other utilities,
 2. Areas within utility easements and areas within rights of way,
 3. Areas within 15 feet of potable water mains, reclaimed water mains, sanitary force mains, and gravity sewer mains,
 4. Areas within 10 feet of potable water meters, reclaimed water meters, backflow prevention assemblies, and fire hydrants.
 7. Rights of way, easements, and property corners shall be shown and shall be of sufficient detail as to determine if the constructed utilities are within the easements or rights of way. A reference to the recording document (O.R. Book or Plat Book and Page) shall be included with any depiction of a right-of-way or easement. O.R. Book or Plat Book and Page are not required to be shown on the record drawings of a project for proposed rights of way or proposed easements that will be identified on the proposed final plat for the said project.
 8. Each roadway depicted on the drawings shall have the correct roadway name noted on it.
 9. Horizontal locations required for valves, fittings, services, and other utility structures shall be to the center of each installation.
 - a. Horizontal locations of all features shall be reported to the nearest 0.1 feet.
 10. Vertical elevations of required valves, fittings, services, and other utility structures shall be reported as follows:
 - a. Top of ground or pavement elevations required along pipelines shall be reported to the nearest 0.1 feet.

- b. Top of pipe elevations shall be to the nearest 0.1 feet.
 - c. Elevations of manhole rims and manhole pipe inverts shall be reported to the nearest 0.01 feet.
- 11. Water distribution utility systems, reclaimed water (or irrigation) utility systems, and sanitary sewer collection utility systems shall be located and the locations shall be depicted and noted on the record drawings by Northing and Easting (NAD83 Florida State Planes, West Zone, US Foot), and by Swing-ties, with Elevations relative to established benchmarks. For “single point” installations, swing ties rather than station and offset may be allowed.
- 12. Elements of the utility systems that shall be located and noted by State Plane Northing and Easting and Swing-ties:
 - a. water services (center of meter or meter box),
 - b. reclaimed water (or irrigation) services (center of meter or meter box),
 - c. backflow prevention assembly (directly beneath the assembly),
 - d. other miscellaneous utility structures with features at or above the surface of the ground.
- 13. Elements of the utility systems that shall be located and noted by State Plane Northing and Easting, Swing-ties, and Elevation:
 - a. center of valve cover lids,
 - b. top of nut elevation,
 - c. center of sanitary sewer manhole covers (top of rim for elevations),
 - d. center of lift stations along with quadrant points of round tops / corners of rectangular tops (top of slab for elevations),
 - e. center of above-ground valve assembly slab, along with corners of slab (top of slab for elevation),
 - f. bottom center elevation of the lowest control panel cabinet,
 - g. all fittings, including water and reclaimed water service saddles,
 - h. center of sanitary sewer service clean-out cover (invert of 45° wye that is located directly below the clean-out cover for elevation),
 - i. center of fire hydrants, (center of 5-inch Storz connection nozzle for elevation).
- 14. At locations where a top-of-pipe elevation is required for pipeline, a top-of-ground or top-of-pavement elevation shall also be measured and noted on the drawings.
- 15. Elements of the utility systems that shall be located and noted by elevation only: sanitary sewer manhole inverts of individual sewer pipes where they enter and exit the manhole.
- 16. On record drawings, the actual positions of the pipelines or structures shall be measured, and they shall be depicted in their actual installed positions on the record drawings in all plan and profile views.
- 17. Record information shall include:
 - a. A thorough description of the pipes and all appurtenances that have been installed, including type of material or casing, size, class, diameter ratio, and other basic information, i.e., 45° Bend DI, or 6” PVC (DR18), etc.).

- b. The recalculated slopes of gravity sewer mains, based on the record survey of manhole inverts and lengths of pipes. Rounding up shall not be allowed.
 - c. A bold notation shall be placed on each sheet, near the title block, indicating the status of the electrically detectable path marking tape and/or tracer wire installations. "Electrically detectable path marking tape and tracer wire were installed and successfully tested"; and/or "No electrically detectable path marking tape was required"; and/or "No tracer wire was required." The notation shall also include the date of the successful test"
 - d. For new valves, the manufacture type (as in gate, plug, etc.), size (pipe nominal diameter) and make (manufacturer) of each valve shall be noted on the record drawings.
 - e. Pipelines shall be dimensioned every 200 feet (measured along the centerline) or alternate lot lines, whichever is closer, from the right-of-way to the centerline of the facility.
 - f. Changes made by Field Order or by Change Order.
 - g. Details not on original contract drawings.
 - h. Equipment and piping relocations.
 - i. 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.
 - j. Record drawings shall show bearings and distances for all right-of-way and easement lines, and property corners.
 - k. Sidewalks, fences and walls, if installed at the time of initial record drawing submittal, shall be dimensioned every 200 feet or alternate lot lines, whichever is closer, from the right-of-way line and the back of curb and lot line or easement line.
 - l. Sanitary sewer mainline wyes shall be located from the downstream manhole. These dimensions shall be provided by on-site inspections or televising of the sewer following installation.
18. If applicable, Lift station control and equipment elevations that were shown on the original construction drawing lift station detail sheet shall be measured and the record survey elevations shall be shown on the record drawing revision of the detail sheet. Record pump information, including pump make, model, year of manufacture, serial number, impeller diameter, voltage, horsepower and speed, shall be shown on the record drawing revision of the lift station detail sheet.
19. Also included shall be the "Lift Station Start-up Information Sheet" provided by the pump manufacturer shall be included in the record drawings.
20. Horizontal Directional Drilling (HDD) and Jack-and-Bore locations and elevations shall be shown on the Record Drawing. The Surveyor shall locate the beginning, ending and the surface tracking locations of the driller's log readings, and these locations shall be indicated on the record drawings. The HDD Contractor shall provide a certified report and bore log indicating the horizontal and vertical location at least every 25 lineal feet along the pipe. The horizontal locations on the bore log shall also indicate the location per the stationing of the construction baseline. The information provided by the HDD Contractor shall be depicted on the Record Drawing and identified as having been provided by the HDD Contractor.
21. Abandoned infrastructure shall also be depicted as record information and noted as

“abandoned”.

22. Each sheet of the record drawings shall have the title “RECORD DRAWING” printed on it in large, bold lettering, near the title block. Each sheet shall also have the words “COUNTY MAINTAINED - WATER”, “-SEWER” and/or “- RECLAIMED”, or “PRIVATELY MAINTAINED - WATER”, “- SEWER”, and/or “-RECLAIMED” in large, bold lettering near the title block, and shall clearly define the separation between Public and Private via a text box with a leader arrow.
23. Every set of record drawings shall have a cover sheet with a vicinity map, which shows where the project is located, and the address of the property.
24. Computer drawing files submitted shall be AutoCAD 2016 or later release date versions. All CAD files and referenced CAD files, fonts, plot styles, etc. used to create the signed and sealed record drawings shall be provided and are required to be included in the submitted digital files. Computer drawing files’ format submitted shall be compatible with the County’s current version of AutoCAD, shall be in a .DWG format only, and shall be Windows 10 compatible. (*Tip: Use the e-transmit function of the AutoCad program.*)
25. 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.

D. Monumentation Requirements:

1. Record information within the right-of-way shall be referenced by State Plane coordinates and swing-ties.
2. A minimum of one on-site benchmark shall be described including datum. All benchmarks shall be based upon NAVD88. All record drawings shall be in NAVD88.
3. All locations and elevations shall be field located by or under the direct supervision of a Florida Licensed Surveyor and Mapper.

E. Certification Requirements:

1. Record Drawings shall be certified by a Florida Licensed Surveyor and Mapper. The certification shall state that the Record Locations and Elevations depicted on the Record Drawing are true and correct and were collected in the field by the Surveyor and Mapper or by a representative under the direct supervision of the Surveyor and Mapper.
2. Record Drawings shall be certified by the Engineer-of-Record. The certification must state that the improvements have been constructed in substantial conformance with the approved plans.
3. All visible record features, including sewer inverts, must be measured and located by the Surveyor or by personnel under his or her direct supervision. The certifying Surveyor shall be fully responsible for the accuracy of the record locations and elevations shown on the record drawings. However, the Surveyor may include statements on the record drawings indicating the following:
 - a. With the exception of the beginning, ending and the surface locations of the Horizontal Directional Drilling (HDD) log readings, the Horizontal Directional Drilling (HDD) locations and elevations provided by the HDD Contractor have not been field verified.
 - b. State Plane coordinates and offset of pipe fittings are based on PVC pipe markers or 2” x 4” markers inserted by the Contractor on the top of pipe fittings.

- c. State Plane coordinates and elevation of potable water mains, reclaimed water mains, and sanitary force mains are based on PVC pipe markers or 2" x 4" markers inserted by the Contractor on the top of pipe.

- F. 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.
- G. Shop Drawings (after final review and approval):
 1. Five sets of record drawings for each process equipment, piping, electrical system and instrumentation system.

2.05 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 AutoCAD drawings. Computer drawing files submitted shall be AutoCAD 2016 or later release date versions. All CAD files and referenced CAD files, fonts, plot styles, etc. used to create the signed and sealed record drawings shall be provided and are required to be included in the submitted digital files. Computer drawing files' format submitted shall be compatible with the County's current version of AutoCAD, shall be in a .DWG format only, and shall be Windows 10 compatible.
- C. 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 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01730 OPERATING AND MAINTENANCE DATA

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Compile product data and related information appropriate for County's maintenance and operation of products furnished under Contract.
- B. Prepare operating and maintenance data as specified in this and as referenced in other pertinent sections of Specifications.
- C. Instruct County's personnel in maintenance of products and equipment and systems.
- D. Provide three (3) sets of operating and maintenance manuals for each piece of equipment provided within this Contract.

1.02 FORM OF SUBMITTALS

- A. Prepare data in form of an instructional manual for use by County's personnel.
- B. Format:
 - 1. Size: 8-1/2 inch x 11 inch
 - 2. Paper: 20 pound minimum, white, for typed pages
 - 3. Text: Manufacturer's printed data or neatly typewritten
 - 4. Drawings:
 - a. Provide reinforced punched binder tab, bind in with text.
 - b. Fold larger drawings to size of text pages.
 - 5. Provide fly-leaf for each separate product or each piece of operating equipment.
 - a. Provide typed description of product and major component parts of equipment.
 - b. Provide indexed tabs.
 - 6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List the following:
 - a. Title of Project.
 - b. Identity of separate structures as applicable.
 - c. Identity of general subject matter covered in the manual.
- C. Binders:
 - 1. Commercial quality three-ring binders with durable and cleanable plastic covers.
 - 2. Maximum ring size: 1 inch.
 - 3. When multiple binders are used, correlate the data into related consistent groupings.

1.03 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit three copies of complete manual in final form.
- B. Content for each unit of equipment and system, as appropriate:
 - 1. Description of unit and component parts.
 - a. Function, normal operating characteristics and limiting conditions.

- b. Performance curves, engineering data and tests.
- c. Complete nomenclature and commercial number of replaceable parts.
- 2. Operating Procedures:
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shut-down and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
- 3. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.
 - d. Alignment, adjusting and checking.
- 4. Servicing and lubricating schedule.
 - a. List of lubricants required.
- 5. Manufacturer's printed operating and maintenance instructions.
- 6. Description of sequence of operation by control manufacturer.
- 7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. List of predicted parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
- 8. As installed control diagrams by controls manufacturer.
- 9. Each contractor's coordination drawings.
 - a. As installed color coded piping diagrams.
- 10. Charts of valve tag numbers, with location and function of each valve.
- 11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
- 12. Other data as required under pertinent sections of specifications.

C. Content, for each electric and electronic system, as appropriate:

- 1. Description of system and component parts.
 - a. Function, normal operating characteristics and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
- 2. Circuit directories of panelboards.
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
- 3. As-installed color coded wiring diagrams.
- 4. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
- 5. Maintenance procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.
 - d. Adjustment and checking.
- 6. Manufacturer's printed operating and maintenance instructions.
- 7. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
- 8. Prepare and include additional data when the need for such data becomes apparent during instruction of County's personnel.

- D. Prepare and include additional data when the need for such data becomes apparent during instruction on County's personnel.
- E. Additional requirements for operating and maintenance data: Respective sections of Specifications.

1.04 SUBMITTAL SCHEDULE

- A. Submit one copy of completed data in final form fifteen days prior to substantial completion.
 - 1. Copy will be returned after substantial completion, with comments (if any).
- B. Submit two copies of approved data in final form. Final acceptance will not be provided until the completed manual is received and approved.

1.05 INSTRUCTION OF COUNTY'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct County's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.
- B. Operating and maintenance manual shall constitute the basis of instruction.
 - 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01740 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 the following:
 - 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

DIVISION 2 SITE WORK

SECTION 02064 MODIFICATION OF EXISTING STRUCTURES, PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to demolish, modify, alter and/or convert existing structures as shown or specified and as required for the installation of piping, mechanical equipment and appurtenances. Existing piping and equipment shall be removed and dismantled as necessary for the performance of facility alterations in accordance with the requirements herein specified.

PART 2 PRODUCTS

2.01 GENERAL

- A. Epoxy mortar shall be fiberglass fiber mixed with an epoxy filler.
- B. Non-shrink grout shall be a sand-cement, non-metallic formulation, having a minimum 28-day strength of 4,000 psi and 0.0 percent shrinkage per ASTM C1090.
- C. Liners to be installed in existing concrete manholes and wetwells shall be spray-applied, monolithic, reinforced urethane resin. Urethane resin-based manhole liner material shall be resistant to hydrogen sulfide gas, and other common contents found in a sanitary sewer environment.
- D. Refer to the County's Approved Products List for approved concrete manhole and wet well liner products.

PART 3 EXECUTION

3.01 GENERAL

- A. Cut, repair, reuse, excavate, demolish or otherwise remove parts of the existing structures or appurtenances, as indicated on the construction drawings, or as necessary to complete the work as required. Dispose of surplus materials resulting from the above work in an approved manner. The work shall include all necessary cutting and bending of reinforcing steel, structural steel, or miscellaneous metal work found embedded in the existing structures.
- B. Dismantle and remove all existing equipment, piping, and other appurtenances required for the completion of the work. Where called for or required, cut existing pipelines for the purpose of making connections thereto.
- C. Anchor bolts for equipment and structural steel to be removed shall be cut off one inch below the concrete surface. Surfaces shall then be refinished using non-shrink grout or epoxy mortar or as indicated on the construction drawings. Repairs to the interior surfaces of existing concrete structures in sanitary sewers shall be made with epoxy mortar. Repairs to be made on other existing concrete surfaces using non-shrink grout shall be made using a bonding agent such as Acrylbond by Concrete Producers Solutions or an equal approved by the County. Remove all dirt, curing compounds, sealers, paint, rust or other foreign

material, and etch with a muriatic acid solution. Flush with clean water and while still damp, apply a coating of the bonding agent. Place the new grout patch onto the treated area immediately.

- D. At the time that a new connection is made to an existing pipeline, additional new piping, extending to and including a new valve, shall be installed. Pipe restraint devices, if required, shall also be installed as required. At the time when a new potable or reclaimed water service is installed, a pipe locator tracer wire shall be installed and connected to the tracer wire at the main.
- E. No existing structure, equipment, or appurtenance shall be shifted, cut, removed, or otherwise altered except with the expressed approval of and only to the extent approved by the County. All existing valve boxes, fire hydrants, air release valve cabinets, and manholes shall be relocated to meet the new finished grade elevations after construction.
- F. When removing materials or portions of existing utility pipelines or structures or when making openings in walls and partitions, take all precautions and use all necessary barriers and other protective devices so as not to damage the structures beyond the limits necessary for the new work, and not to damage the structures or contents by falling or flying debris. Unless otherwise approved by the County, saw-cutting, rotary core-boring, or line drilling will be required in removing material from existing concrete structures or pipes.
- G. Materials and equipment removed in the course of making alterations and additions shall remain the property of the County, except that items not salvageable, as determined by the County, shall be disposed of off the work site.
- H. All alterations to existing utility pipes and structures shall be done at such time and in such a manner as to comply with the approved time schedule. Before any part of the work is started, all tools, equipment, and materials shall be assembled and made ready so that the work can be completed without delays.
- I. All cutting of existing concrete or other material to provide suitable bonding to new work shall be done in a manner to meet the requirements of the respective section of these Standards covering the new work. When not covered, the work shall be carried on in the manner and to the extent directed by the County or per the construction drawings.
- J. Surfaces of seals visible in the completed work shall be made to match as nearly as possible the adjacent surfaces.
- K. Non-shrink cementitious grout shall be used for setting wall castings, sleeves, leveling pump bases, doweling anchors into existing concrete and elsewhere as shown on the construction drawings. The surface to which grout is to be applied shall be wetted to facilitate good bonding.
- L. Where necessary or required for the purpose of making connections; cut existing pipelines in a manner to provide an approved joint. Where required, use flanges, couplings, or adapters, all as required.
- M. Provide flumes, hoses, piping, pumps and well points, and other related items to divert or provide suitable plugs, bulkheads, or other means to hold back the flow of water or other liquids, all as required in the performance of the work.

- N. Care shall be taken not to damage any part of existing buildings or foundations or outside structures.
- O. Prior to entering confined spaces in sanitary sewer structures, conduct an evaluation of the atmosphere within, in accordance with local, state, and federal regulations. Provide ventilation equipment and other equipment as required to assure safe working conditions.

3.02 CONNECTING TO EXISTING PIPING AND EQUIPMENT

The Contractor shall verify exact location, material, alignment, joint, etc. of existing piping and equipment prior to making the connections called out in the Drawings. The verifications shall be performed with adequate time to correct any potential alignment or other problems prior to the actual time of connection. A County Inspector must be present for all tie-ins for a visual inspection.

3.03 REMOVAL AND ABANDONMENT OF ASBESTOS CEMENT PIPE AND APPURTENANCES

- A. All work associated with the removal or abandonment of existing asbestos cement pipe and appurtenances shall be performed by a licensed asbestos removal Contractor registered in the State of Florida.
- B. The asbestos Contractor shall contact the appropriate regulatory agencies prior to removal or abandonment of any asbestos material and shall obtain all required permits and licenses and issue all required notices. The cost for all fees associated with permits, licenses and notices to the governing regulatory agencies shall be borne by the asbestos Contractor.
- C. All work associated with removal or abandonment of asbestos cement pipe and appurtenances shall be performed in accordance with the standards listed below and all other applicable local, State, or Federal standards.
 - (1) Florida Administrative Code, Chapter 62-257, ASBESTOS PROGRAM
 - (2) Title 40 CFR, Part 61, Subpart M, NATIONAL EMISSION STANDARD FOR ASBESTOS
 - (3) Occupational Safety and Health Act, Title 29 CFR
 - (4) Title 40 CFR, Part 763, ASBESTOS
 - (5) Florida Statute Title XXXII, Chapter 469, ASBESTOS ABATEMENT
- D. All asbestos cement pipe sections indicated on the construction drawings to be removed, and all related tees, valves, fittings and appurtenances shall be removed in their entirety and disposed of by the asbestos Contractor in accordance with this Section. Asbestos cement nipples between tees and valves shall be replaced. After removal of the pipelines, all excavations shall be backfilled in accordance with the applicable provisions of the Trenching and Excavation Section of these Standards. The cost of disposing of the removed materials shall be borne by the asbestos Contractor.
- E. The cutting of existing asbestos-cement (A/C, a.k.a. "Transite") pipe shall be by hand tools only. No powered machine cutting is allowed. Removal of all fragments of pipe shall be double bagged prior to shipment. Longer sections of pipe removed may be shipped without double bagging. An asbestos manifest form must accompany each shipment of such pipe or pipe material waste to the Manatee County Lena Road Landfill. Prior to each shipment, a minimum of 24 hours notice to the Landfill field office (telephone (941) 748-5543) is required.

3.04 IN-PLACE GROUTING OF EXISTING PIPE

- A. Where water and wastewater utility pipes are to be abandoned in place, they shall be filled with a nonshrinking sand-cement grout or cement slurry. When such pipes are made of asbestos-cement materials, the abandonment activities shall be performed by a licensed asbestos Contractor. It is completely the Contractor's responsibility to obtain all regulatory clearances and provide documentation in cases where they have determined that an asbestos-cement pipe abandonment activity by in-place grouting does not require a licensed asbestos Contractor.
- B. The ends of the pipe sections to be grout or slurry filled shall be capped or plugged with suitable pipe fittings. The pumping material shall be of suitable properties and the pumping pressure shall be such that the pipe sections are filled completely. All above ground features shall be removed: hydrants, meters, valve & meter boxes, pads, vaults, etc. Existing tees, crosses, and valves left in service shall be plugged and restrained.
- C. The County shall be given timely notice so that the County's representative may be present to monitor all pipe filling operations. Provide standpipes and/or additional means of visual inspection as required to determine if adequate grout/slurry material has filled the entire pipe sections.
- D. All tees, crosses, and valves left in service shall be plugged and restrained.

3.05 SPRAY-APPLIED LINERS

- A. Use a high-pressure water spray to remove all foreign material from the walls and bench of the structure. Loose or protruding masonry materials shall be removed using a hammer and chisel. Fill any voids, holes or cracks using a hand trowel with epoxy mortar to form a uniform surface. Place covers over all pipe openings to prevent extraneous material from entering the pipes. Block or divert sewer flow from entering the structure. Any infiltration leaks shall be stopped by using such methods as approved by the County.
- B. The liner material shall be sprayed onto the invert, bench and wall areas. The sprayed-on material shall be applied such that the entire structure is lined with a structurally enhanced monolithic liner. The thickness of the wall liner material shall be such that it will withstand the hydraulic load generated by the surrounding groundwater table, using a factor of safety of two, and using the assumption that the groundwater table is at the level of the top of the structure. The invert and bench liner material shall be the same thickness as that required for the base of the wall.
- C. Special care shall be used to provide a smooth transition between the intersecting pipelines and the manhole inverts such that flow is not impaired. Remove concrete material from the existing manhole base channel in depth to the required thickness of the new liner material.
- D. No active sewer flow shall be allowed in the newly lined structure, nor shall any vacuum tests be performed, until the liner material has had adequate time to cure, as recommended by the liner material manufacturer.
- E. Install the coating systems per manufacturer's recommendation and completely protect the structure from corrosion. The liner or coating systems must extend and seal onto manhole ring, onto and around pipe openings and any other protrusions, and completely cover the bench and flow invert. Provide a five (5)-year unlimited warranty on all workmanship and products. The work includes the surface preparation and application of the coating or liner

system, and shall protect the structure for at least five (5) years from all leaks and from failure due to corrosion from exposure to corrosive gases such as hydrogen sulfide.

3.06 CONNECTION TO EXISTING MANHOLE

- A. Where required or as indicated on the construction drawings, make connection of new pipelines to existing manhole structures. If pipe stub-outs of the correct size and position are not available, make connections by removing a portion of the manhole wall by mechanical rotary core boring. The connection between pipe and concrete manhole shall be completed with resilient seals meeting the requirements of ASTM C923 and according to the latest edition of the County's Approved Products List.
- B. A new channel shall be formed in the manhole base by removing and reforming or by providing new concrete to convey the new flow into the existing channel in accordance with the standard requirements for new sewer manhole structures. Flow direction shall not change by more than 90 degrees within the manhole base.
- C. Repair internal coating of existing manholes cored during connection of new sewers by applying approved coating material as listed in the County's Approved Products List in accordance with the manufacturer's recommendations. If the existing manhole is lined with a non-conforming liner, sandblast the interior of the existing manhole and apply an approved coating in accordance with the manufacturer's recommendations.
- D. When connecting a force main to an existing manhole, the force main termination manhole and the next two manholes downstream shall be rehabilitated and lined with a liner listed in the County's Approved Products List . If the existing manholes are lined with a non-conforming liner, the existing liner shall be removed and replaced, unless otherwise noted on the plans or with written approval by the County.

END OF SECTION

SECTION 02100 SITE PREPARATION

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This Section covers general site preparation such as, clearing, grubbing, stripping of the project site and/or along the pipeline route, grading, dust abatement, etc.
- B. The Contractor shall clear and grub all of the area within the limits of construction or as required, which includes, but is not limited to utility easements. The width of the area to be cleared shall be reviewed by the County prior to the beginning of any clearing.
- C. The Contractor's attention is directed to any Soil Erosion and Sediment Control Ordinances enforced in Manatee County. The Contractor shall comply with all applicable sections of these ordinances.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CLEARING

The surface of the ground, for the area to be cleared and grubbed shall be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish and all other objectionable obstructions resting on or protruding through the surface of the ground. However, trees shall be preserved as hereinafter specified unless otherwise designated by the County. Clearing operations shall be conducted so as to prevent damage to existing structures and installations and to those under construction, so as to provide for the safety of employees and others. Soil erosion control devices such as hay bales and silt fences shall be installed to satisfy all Federal, State and County requirements.

3.02 GRUBBING

Grubbing shall consist of the complete removal of all stumps, roots larger than 1-1/2 inches in diameter, matted roots, brush, timber, logs and any other organic or metallic debris not suitable for foundation purposes, resting on, under or protruding through the surface of the ground to a depth of 18 inches below the subgrade. All depressions excavated below the original ground surface for or by the removal of such objects, shall be refilled with suitable materials and compacted to a density conforming to the surrounding ground surface.

3.03 STRIPPING

In areas so designated, topsoil shall be stockpiled. Topsoil so stockpiled shall be protected until it is placed as specified. The County shall have the option to receive all excess topsoil materials. The Contractor shall pay all equipment and labor cost to deliver excess top soil material to a remote site chosen by the County within a five mile radius of the construction site. Should the County not choose to receive any or all excess topsoil materials, the Contractor shall dispose of said material at no additional cost to the County.

3.04 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

The Contractor shall dispose of all material and debris from the clearing and grubbing

operation by hauling such material and debris off site. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered a subsidiary obligation of the Contractor; the cost of which shall be included in the prices bid for the various classes of work.

3.04 DUST ABADEMENT

It is the responsibility of the Contractor to control all dust problems that may occur during the construction, with required watering. Dust control will be required seven days a week.

3.05 PRESERVATION OF TREES

Those trees which are not designated for removal by the County shall be carefully protected from damage. The Contractor shall erect such barricades, guards and enclosures as may be considered necessary by him for the protection of the trees during all construction operation.

3.06 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

- A. The Contractor shall exercise extreme care to avoid unnecessary disturbance of developed private property adjacent to proposed project site. Trees, shrubbery, gardens, lawns and other landscaping, which are not designated by the County to be removed, shall be replaced and replanted to restore the construction easement to the condition existing prior to construction.
- B. All soil preservation procedures and replanting operations shall be under the supervision of a nursery representative experienced in such operations.
- C. Improvements to the land such as fences, walls, outbuildings and other structures which of necessity must be removed, shall be replaced with equal quality materials and workmanship.
- D. The Contractor shall clean up the construction site across developed private property directly after construction is completed upon approval of the County.

3.07 PRESERVATION OF PUBLIC PROPERTY

The appropriate paragraphs of these Specifications shall apply to the preservation and restoration of public lands, parks, rights-of-way, easements and all other damaged areas. This includes, but is not limited to the trimming of trees damaged by contractor's equipment.

END OF SECTION

SECTION 02220 EXCAVATION, BACKFILL, FILL AND GRADING FOR STRUCTURES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Structural excavation shall consist of the removal of material for the construction of foundations for structures and other excavation designated on the drawings or in these specifications.
- B. Structural excavation and backfill shall consist of furnishing material, if necessary and placing and compacting backfill material around structures to the lines and grades designated on the drawings, as specified or directed by the County.
- C. Structural excavation and backfill shall include the furnishing of all materials, equipment and other facilities which may be necessary to perform the excavations, place and compact the backfill, install sheeting and bracing, and carry out any necessary dewatering. It shall also include the wasting or disposal of surplus excavated material in a manner and in locations approved by the County.
- D. The Contractor is responsible for the protection of every tree which is scheduled to remain in the project area. This includes trees which may or may not be shown on the plans. Every tree shall be adequately protected in place at no additional cost to the County. This includes, but is not limited to, protecting the root systems and adjusting grades as necessary for tree/root protection.

1.02 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. In place soil compaction tests shall be performed by a qualified testing laboratory.
 - 2. Compaction tests shall be taken every 500 feet, except in the road crossings or road shoulders. Tests are to be taken according to current FDOT Standards.
- B. Reference Standards:
 - 1. American Society for Testing and Materials (ASTM):
 - a. ASTM D1557, Moisture-Density Relations of Soils Using 10-lb. (4.5-kg) Rammer and 18-in. (457-mm) Drop.

1.03 JOB CONDITIONS

- A. The Contractor shall provide, operate and maintain all necessary pumps, discharge lines, well points, etc., in sufficient number and capacity to keep all excavation, bases, pits, etc., free from seepage, standing or running water at all times throughout the period of construction.
- B. The Contractor shall assume all responsibility for the security of the excavation required, employing bracing, lining or other accepted means necessary to accomplish same.
- C. Excavated areas shall be cleared of all debris, water, slush, muck, clay and soft or loose earth and shall be conditioned to the entire satisfaction of the County.

- D. All excavated material unsuitable for use or which will not be used shall be disposed of in a manner consistent with State and County regulation.
- E. All unsuitable organic materials, roots, logs, etc., found during excavation shall be removed by the Contractor and the trench shall be refilled with suitable material.

PART 2 PRODUCTS

2.01 MATERIAL FOR CONTROLLED FILL

- A. Composition: Only approved material free from organic matter and lumps of clay, shall be used for backfill. Excavated earth free from debris or organic material may be used for backfilling foundations or fill.
- B. Crushed stone and shell shall meet or exceed current FDOT Standards.

2.02 MATERIAL FOR SHORING AND SHEETING

Wood for shoring and sheeting shall be green, rough cut hardwood planking.

2.03 UNSUITABLE MATERIAL

Unsuitable material shall be defined as highly organic soil per ASTM D2487 Group PT. This includes, but is not limited to, such items as topsoil, roots, vegetable matter, trash, debris, and clays that cannot be dried sufficiently to obtain specified compaction.

PART 3 EXECUTION

3.01 INSPECTION

- A. The Contractor shall verify that work preceding the affected work of this Section has been satisfactorily completed.
- B. Conditions adversely affecting the work of this Section shall be corrected to the satisfaction of the County.

3.02 REMOVAL OF UNSUITABLE MATERIALS

- A. The Contractor shall remove unsuitable material from within the limits of the Work.
- B. Materials meeting requirements for controlled fill shall be stockpiled as necessary and in such a manner satisfactory to the County.
- C. All material excavated shall be placed so as to minimize interference with public travel and to permit proper access for inspection of the work.

3.03 EXCAVATION

- A. When concrete or shell subbase footing is to rest on an excavated surface, care shall be taken not to disturb the natural soil. Final removal and replacement of the foundation material and subbase compaction to grade shall not be made until just before the concrete or masonry is placed.

- B. When any structural excavation is completed, the Contractor shall notify the County who will make an inspection of the excavation. No concrete or masonry shall be placed until the excavation has been approved by the County.
- C. The elevations of the footing bottom and the base slab as shown on the Drawings, shall be considered as approximate and the County may order in writing, such changes in dimensions or elevations of the footings and slab base as necessary to secure satisfactory foundations.
- D. All excavation shall be made within an area bounded by lines five feet outside and parallel to the exterior walls of the structure to allow for correct forming, shoring and inspection of foundation work. Pouring of concrete against earth side walls shall not be permitted.
- E. If the ground is excavated below the grade called for by the Drawings or becomes unstable due to the Contractor's carelessness or operations, the ground shall be excavated to undisturbed native soil before continuing concreting operations.
- F. If in the opinion of the County, the material at or below the normal grade of the bottom of the trench is unsuitable for pipe or structure foundation, it shall be removed to the depth directed by the County and if so directed, replaced by crushed stone or washed shell.

3.04 INSTALLATION OF SHORING AND SHEETING

- A. The Contractor shall furnish, install and maintain sheeting and bracing required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below which is necessary for proper construction and to protect adjacent structures from undermining or other damage. If the County determines that insufficient or improper supports have been provided, additional supports shall be installed at the expense of the Contractor. Compliance with such orders shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting. Should voids form, they shall be immediately filled and rammed.
- B. The Contractor shall embed and leave in place all sheeting, bracing and other related items as shown on the Contract Drawings. The County may direct that sheeting and bracing timber be cut off at a specified elevation. No additional payment or compensation shall be made for this work.
- C. Sheeting and bracing not left in place shall be removed carefully in such manner as not to endanger other structures, utilities, property, or proposed construction.
- D. The County may order sheeting and bracing to be left in place; however, this shall not relieve the Contractor from liability for damages to persons or property due to negligence or the failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
- E. The Contractor shall receive no payment other than that included in the pipe bid item price for any timber used for sheeting, bracing, or other related items.

3.05 STRUCTURAL BACKFILL

- A. Structural backfill shall not be placed until the footings or other portions of the structure or facility have been inspected by the County and approved for backfilling.

- B. A minimum of 1-1/2" layer of lean concrete shall be placed as a working mat for the concrete base slabs and footings if required by the County.
- C. Fill shall be placed in uniform layers not more than 12" thick and compacted to a minimum of 98 percent of the maximum density determined by ASTM D1557, Method A or C, or as directed by the County. The Contractor shall securely tamp the backfill with pneumatic rammer around all wall foundations. The method of compaction shall be satisfactory to the County.
- D. Compaction of structural backfill by ponding and jetting may be permitted when, as determined by the County: the backfill material is of such character that it will be self-draining when compacted; foundation materials will not soften or be otherwise damaged by the applied water; no damage from hydrostatic pressure will result to the structure. Ponding and jetting within two feet below finished subgrade shall not be permitted in roadway areas. At the discretion of the County, ponding and jetting may be permitted with compaction layers not to exceed four feet.
- E. Surplus material not used on-site shall be removed and disposed of off-site by the Contractor. In no case shall surplus material be deposited on adjacent lands. Fill used for grading shall be placed in layers not to exceed 12 inches in thickness and shall be compacted to a density equal or greater to that of the surrounding natural ground.

3.06 BACKFILLING AROUND STRUCTURES

- A. Common fill and structural fill are specified for use as backfill against the exterior walls of the structures. Fill shall be placed in layers having a maximum thickness of eight (8) inches in loose state and shall be compacted sufficiently to prevent settlement. If compaction is by rolling or ramming, material shall be wetted down as required. Where material can be suitably compacted by jetting or puddling, the Contractor may use one of these methods. No boulders shall be allowed to roll down the slopes and hit the walls.
- B. Backfilling shall be carried up evenly on all walls of an individual structure simultaneously. A variation of two (2) feet in elevation will be the maximum allowable. No backfill shall be allowed against walls until the walls and their supporting slabs, if applicable, have attained sufficient strength. Backfilling shall be subjected to approval by the County.
- C. In locations where pipes pass through building walls, the Contractor shall take the following precautions to consolidate the refill up to an elevation of at least one foot above the bottom of the pipes:
 - 1. Place structural fill in such areas for a distance of not less than three feet either side of the center line of the pipe in level layers not exceeding 6-inches in depth.
 - 2. Wet each layer to the extent directed and thoroughly compact each layer with a power tamper to the satisfaction of the County.
 - 3. Structural fill shall be of the quality specified under Part 2 of this Section.
- D. The surface of filled areas shall be graded to smooth true lines, strictly conforming to grades indicated on the grading plan. No soft spots or uncompacted areas shall be allowed in the work.
- E. Temporary bracing shall be provided as required during construction of all structures to protect partially completed structures against all construction loads, hydraulic pressure and

earth pressure. The bracing shall be capable of resisting all loads applied to the walls as a result of backfilling.

3.07 FIELD QUALITY CONTROL

- A. The density of soil in place shall be a minimum of 95 percent in accordance with ASTM D1557, Method A or C.

END OF SECTION

SECTION 02221 TRENCHING, BEDDING AND BACKFILL FOR PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals necessary to perform all dewatering, excavation, backfill, fill, grading, trench protection or other related work required to complete the piping work shown on the Drawings and specified herein. The work shall include, but not be limited to: vaults; duct conduit; pipe; roadways and paving; backfilling; required fill or borrow operations; grading; disposal of surplus and unsuitable materials; and all related work such as sheeting, bracing and dewatering.
- B. Prior to commencing work, the Contractor shall examine the site and review test borings if available, or undertake his own subsurface investigations and take into consideration all conditions that may affect his work.
- C. The Contractor is responsible for the protection of every tree which is scheduled to remain in the project area. This includes trees which may or may not be shown on the plans. Every tree shall be adequately protected in place at no additional cost to the County. This includes, but is not limited to protecting the root systems and adjusting grades as necessary for tree/root protection.

1.02 PROTECTION

- A. Sheeting and Bracing in Excavations:
 - 1. In connection with construction of underground structures, the Contractor shall properly construct and maintain cofferdams. These shall consist of: sheeting and bracing as required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction and to protect adjacent structures, existing yard pipe and/or foundation material from disturbance, undermining, or other damage. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.
 - 2. Trench sheeting for pipes: no sheeting is to be withdrawn if driven below, mid-diameter of any pipe and no wood sheeting shall be cut off at a level lower than one foot above the top of any pipe unless otherwise directed by the County. During the progress of the work, the County may direct the Contractor in writing to leave additional wood sheeting in place. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given for an alternate method of removal.
 - 3. All sheeting and bracing not left in place shall be carefully removed in such a manner as not to endanger the construction or other structures, utilities, existing piping, or property. Unless otherwise approved or indicated on the Drawings or in the Specification, all sheeting and bracing shall be removed after completion of the piping or structure, care being taken not to disturb or otherwise injure the pipeline or finished masonry. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools specifically made for that purpose, by watering, or as may otherwise be directed.

4. The Contractor shall construct, to the extent he deems it desirable for his method of operation, the cofferdams and sheeting outside the neat lines of the pipeline trench or foundation unless otherwise indicated on the Drawings or directed by the County. Sheeting shall be plumb and securely braced and tied in position. Sheeting, bracing and cofferdams shall be adequate to withstand all pressures to which the pipeline or structure will be subjected. Pumping, bracing and other work within the cofferdam shall be done in a manner to avoid disturbing any construction of the pipeline or the enclosed masonry. Any movement or bulging which may occur shall be corrected by the Contractor at his own expense so as to provide the necessary clearances and dimensions.
5. Drawings of the cofferdams and design computations shall be submitted to the County and approved prior to any construction. However, approval of these drawings shall not relieve the Contractor of the responsibility for the cofferdams. The drawings and computations shall be prepared and stamped by a Registered Professional Engineer in the State of Florida and shall be in sufficient detail to disclose the method of operation for each of the various stages of construction, if required, for the completion of the pipeline and substructures.

B. Dewatering, Drainage and Flotation

1. The Contractor shall construct and place all pipelines, concrete work, structural fill, bedding rock and limerock base course, in-the-dry. In addition, the Contractor shall make the final 24" of excavation for this work in-the-dry and not until the water level is a minimum of 18 inches below proposed bottom of excavation.
2. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavation and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations. At all times during the construction operations, the groundwater levels shall be maintained at an elevation 18 inches below the lowest level where structures are being installed.
3. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
4. Wellpoints may be required for dewatering the soil prior to final excavation for deeper in-ground structures or piping and for maintaining the lowered groundwater level until construction has been completed to avoid the structure, pipeline, or fill from becoming floated or otherwise damaged. Wellpoints shall be surrounded by suitable filter sand and no fines shall be removed by pumping. Pumping from wellpoints shall be continuous and standby pumps shall be provided.
5. The Contractor shall furnish all materials and equipment to perform all work required to install and maintain the proposed drainage systems for handling groundwater and surface water encountered during construction of structures, pipelines and compacted fills.
6. Where required, the Contractor shall provide a minimum of two operating groundwater observation wells at each structure to determine the water level during

construction of the pipeline or structure. Locations of the observation wells shall be at structures and along pipelines as approved by the County prior to their installation. The observation wells shall be extended to 6 inches above finished grade, capped with screw-on caps protected by 24" x 24" wide concrete base and left in place at the completion of this Project.

7. Prior to excavation, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions to the County for approval. Such approval shall not relieve the Contractor of the responsibility for the satisfactory performance of the system. The Contractor shall be responsible for correcting any disturbance of natural bearing soils for damage to pipeline or structures caused by an inadequate dewatering system or by interruption of the continuous operation of the system as specified.
8. As part of his request for approval of a dewatering system, the Contractor shall demonstrate the adequacy of the proposed system and wellpoint filter sand by means of a test installation. Discharge water shall be clear, with no visible soil particles in a one quart sample. Discharge water shall not flow directly into wetlands or Waters of the State as defined by FDEP and SWFWMD.
9. During backfilling and construction, water levels shall be measured in observation wells located as directed by the County.
10. Continuous pumping will be required as long as water levels are required to be below natural levels.

PART 2 PRODUCTS

2.01 MATERIALS

A. General

1. Materials for use as fill and backfill shall be described below and shall be from an FDOT certified pit. For each material, the Contractor shall notify the County of the source of the material and shall furnish the County, for approval, a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of such material.
2. Additional materials shall be furnished as required from off-site sources and hauled to the site.

B. Bedding - shall conform to FDOT Standard Specifications for Road and Bridge Construction, Section 901 Coarse Aggregate, and shall be either coarse aggregate of Size No. 57 or coarse sand of Size No. 9. Washed shell size No.57 may be used as an alternate bedding material.

C. Wood for shoring and sheeting shall be green, rough cut hardwood planking.

D. Structural Fill

1. Structural fill in trenches shall be used below spread footing foundations, slab-on-grade floors and other structures as backfill within three feet of the below grade portions of structures.

2. Shall be either soil classification A-1, A-2 or A-3, per AASHTO M-145, and shall be free of organic matter, lumps of clay or marl, muck, compressible materials, and rock exceeding 2.5 inches in diameter. Broken concrete, masonry, rubble or other similar materials shall not be used as backfill. Minimum acceptable density shall be 98 percent of the maximum density as determined by AASHTO T-180.
- E. Selected Common Fill - shall have the same material classification and requirements as Structural Fill, as described above.
- F. Common Fill
1. Shall be either soil classification A-1, A-2, A-3, A-4, A-5 or A-6, per AASHTO M-145, and shall be free of organic matter, lumps of clay or marl, muck, compressible materials and rock exceeding 2.5 inches in diameter. Broken concrete, masonry, rubble or other similar materials shall not be used as backfill.
 2. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material which, in the opinion of the County, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials by the Contractor.
- G. Unsuitable Material - soil classification A-7 and A-8, per AASHTO M-145, shall not be used as backfill material.

PART 3 EXECUTION

3.01 EXCAVATION

- A. Excavate trenches and pits for structures to the elevations indicated on the construction drawings. Take special care to avoid over-excavating or disturbing the bottom of the trench or pit, so that the soil at the bottom of the hole remains in a naturally compacted condition. Excavate to widths sufficient to provide adequate working room to install the required structures. Do not excavate the final layer of soil to the designed grade until just before placing the bedding, foundation, pipe, structure, or masonry work required. Remove boulders, rocks, logs or any unforeseen obstacles encountered.
- B. In case the foundation soil found at the bottom of the trench or pit is soft, plastic or mucky, or does not conform to the soils classification specified as suitable foundation material, over-excavation to a greater depth will be required. Soils not meeting the classification required for foundation material shall be removed to a depth at least four inches below the bottom of the pipe, bedding or structure bottom elevation. Rock, boulders or other hard or lumpy material shall be removed to a depth 12 inches below the bottom of the pipe, bedding or structure bottom elevation. Remove muck, clay or other soft material to a depth as needed to establish a firm foundation.
- C. Where possible, the sides of trenches should be vertical up to at least the spring line of the installed pipe.
- D. Trench excavation shall be performed in accordance with Florida Statute Title XXXIII, Chapter 553, Part III, Trench Safety Act.

3.02 BACKFILLING

- A. Backfill materials shall be placed on solid, firm, naturally compacted or compacted to 98 percent of the maximum dry density of the material as determined by AASHTO T-180, dry or dewatered in place soil foundations.
- B. Where over-excavation is required due to nonconforming soil classification or rocky, unstable, or otherwise undesirable soil conditions, place Structural Fill or Selected Common Fill in the over-excavated zone up to the base of the bedding material layer. Compact the over-excavated zone to 98 percent of the maximum dry density of the material as determined by AASHTO T-180.
- C. When backfilling in an over-excavated zone where moist or watery conditions exist, backfill shall be coarse No. 9 sand or a mixture of No. 57 coarse aggregate with either No. 9 coarse sand, A-1, or A-3 material.
- D. After compaction, backfill material in the over-excavation zone shall form a solid and firm foundation on which to build up successive layers of backfill and structures.
- E. Bedding materials shall be placed on solid, firm soil foundations and shall be compacted to 98 percent of the maximum dry density of the material as determined by AASHTO T-180.
- F. Concrete and masonry structures shall be backfilled using Structural Fill. Backfilling and compaction shall be underneath the structure and carried up evenly on all walls of an individual structure simultaneously. The maximum allowable difference in backfill elevations shall be two feet. No backfilling shall be allowed against concrete or masonry walls until the walls and their supporting slabs have been in place at least seven days or until the specified 28-day strength has been attained. Compaction of Structural Fill underneath the base and along the walls shall be 98 percent of the maximum dry density of the material as determined by AASHTO T-180. The Structural Fill shall be either dried or shall have water added so that the moisture content of the material is within a range that will allow the required density to be achieved.
- G. Trenching backfill for pipe installation shall be Selected Common Fill for the pipe bedding zone. The pipe bedding envelope shall begin at the level four inches, six inches, or nine inches, depending on pipe diameter, below the bottom of the pipe, and shall extend vertically up to a level 12 inches above the top of the pipe. Where the in-place soil material within the four inch, six inch, or nine inch pipe bedding zone beneath the bottom of the pipe meets the soil classification for Selected Common Fill, undercutting of the trench below the bottom of the pipe will not be required. In this case, loosen the soil in the bottom of the trench immediately below the middle third of the pipe diameter, and place the pipe upon it. Where the in-place soil material within the pipe bedding zone does not meet the soil classification for Selected Common Fill, undercutting shall be required, and the bedding zone shall be backfilled with Selected Common Fill. In this case, place the pipe bedding material and leave it in a moderately firm uncompacted condition under the middle third of the pipe diameter, and compact the outer portions of the trench bottom to 98 percent of the maximum dry density. Soils that were over-excavated due to rocky, soft or otherwise unsuitable soil foundation conditions shall also be replaced with Selected Common Fill. Compaction of Selected Common Fill shall be 98 percent of the maximum dry density as determined by AASHTO T-180. Such backfill material shall have an optimized moisture content that will allow the required density to be achieved.

- H. Pipe sections for gravity flow systems shall be laid with spigots downstream and bells upstream. Excavate for pipe bells before laying pipe. Lay pipe true to the lines and grades indicated on the construction plans. Place backfill material on both sides of the pipe and compact to 98 percent of the maximum dry density of the material as determined by AASHTO T-180. Take special care to effectively fill and compact the material in the haunch areas under the sides of the pipe.
- I. For pipes that are not installed under roadways or driveways, trenching backfill for pipe installation shall be Common Fill above the pipe envelope zone, and shall be compacted to 95 percent of the maximum dry density of the material as determined by AASHTO T-180, and shall have moisture content optimized to allow the required density. For pipes that are installed under roadways or driveways, trenching backfill for pipe installation shall be Selected Common Fill above the pipe envelope zone, and shall be compacted to 98 percent of the maximum dry density of the material as determined by AASHTO T-180, and shall have moisture content optimized to allow the required density. Selected Common Backfill shall be placed in layers not to exceed 6 inches. Common Backfill shall be placed in layers not to exceed 12 inches.
- J. Backfill compaction tests shall be performed every 500 feet in pipe line trenches and for every utility structure. Test reports shall be presented to the County Inspector.

3.03 INSTALLATION OF SHORING AND SHEETING

- A. The Contractor shall furnish, install and maintain sheeting and bracing required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below which is necessary for proper construction and to protect adjacent structures from undermining or other damage. If the County determines that insufficient or improper supports have been provided, additional supports shall be installed at the expense of the Contractor. Compliance with such orders shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting. Should voids form, they shall be immediately filled and rammed.
- B. The Contractor shall embed and leave in place all sheeting, bracing and other related items as shown on the Contract Drawings. The County may direct that sheeting and bracing timber be cut off at a specified elevation. No additional payment or compensation shall be made for this work.
- C. Sheeting and bracing not left in place shall be removed carefully in such manner as not to endanger other structures, utilities, property, or proposed construction.
- D. The County may order sheeting and bracing to be left in place; however, this shall not relieve the Contractor from liability for damages to persons or property due to negligence or the failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.
- E. The Contractor shall receive no payment other than that included in the pipe bid item price for any timber used for sheeting bracing, or other related items.

3.04 GRADING AND CLEAN UP

- A. Surplus and unsuitable soil materials not used on-site shall be removed and disposed of off-site in a manner that is consistent with state and local regulations. In no case shall surplus or unsuitable material be deposited on-site or on adjacent lands.
- B. The surface of backfilled areas shall be graded smooth and true to the lines and grades indicated on the construction plans. No soft spots or uncompacted areas shall be allowed in the work.
- C. Upon completion of the work, leave the work areas and all adjacent areas in a neat and presentable condition, clear of all temporary structures, rubbish and surplus materials. Pile any salvageable materials that have been removed in neat piles for pickup by County crews, unless otherwise directed.

END OF SECTION

**SECTION 02223 EXCAVATION BELOW GRADE AND CRUSHED STONE OR SHELL
REFILL**

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. If in the opinion of the County, the material at or below the normal grade of the bottom of the trench is unsuitable for pipe or structure foundation, it shall be removed to the depth directed by the County and replaced by crushed stone or washed shell.

PART 2 PRODUCTS (NOT USED)

PART 3 MATERIALS

3.01 EXCAVATION AND DRAINAGE

- A. Whatever the nature of unstable material encountered or the groundwater conditions, trench stabilization shall be complete and effective.
- B. Should the Contractor excavate below the grade shown on the Contract drawings because of negligence or for his own convenience; due to failure in properly dewatering the trench; disturbs the subgrade before dewatering is sufficiently complete; he shall be directed by the County to excavate below grade. The work of excavating below grade and furnishing and placing the approved refill material shall be performed at the Contractor's expense.

3.02 REFILL

- A. Soils not meeting the classification required for foundation material shall be removed to a depth at least four inches below the bottom of the pipe, bedding or structure bottom elevation. Rock, boulders or other hard or lumpy material shall be removed to a depth 12 inches below the bottom of the pipe, bedding or structure bottom elevation. Remove muck, clay or other soft material to a depth as needed to establish a firm foundation.

END OF SECTION

SECTION 02260 FINISH GRADING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall finish grade sub-soil.
- B. The Contractor shall cut out areas to receive stabilizing base course materials for paving and sidewalks.
- C. The Contractor shall place, finish grade and compact top soil.

1.02 PROTECTION

- A. The Contractor shall prevent damage to existing fencing, trees, landscaping, natural features, bench marks, pavement and utility lines. Damage shall be corrected at no cost to the County.

PART 2 PRODUCTS

- A. Topsoil: Shall be friable loam free from subsoil, roots, grass, excessive amount of weeds or other organics, stones, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 4 percent and a maximum of 25 percent organic matter. The Contractor may use topsoil stockpiles on site if they conform to these requirements.

PART 3 EXECUTION

3.01 SUB-SOIL PREPARATION

- A. The Contractor shall rough grade sub-soil systematically to allow for a maximum amount of natural settlement and compaction. Uneven areas and low spots shall be eliminated. Debris, roots, branches or other organics, stones, and sub-soil shall be removed by the Contractor and disposed of in a manner consistent with the latest Manatee County Standards as well as any affected regulatory agency. Should contaminated soil be found, the Contractor shall notify the County.
- B. The Contractor shall cut out areas to sub-grade elevation to stabilize base material for paving and sidewalks and shall be compacted to 98 percent of the maximum dry density of the material as determined by AASHTO T-180, and shall have moisture content optimized to allow the required density.
- C. The Contractor shall bring sub-soil to required profiles and contour grades gradually; and blend slopes into level areas.
- D. The Contractor shall slope the structure grade a minimum of two (2) inches in ten (10) feet unless indicated otherwise on the Drawings.
- E. The Contractor shall cultivate sub-grade to a depth of 3 inches where the topsoil is to be placed. He shall repeat cultivation in areas where equipment use has compacted sub-soil.
- F. The Contractor shall not make grade changes which causes water to flow onto adjacent lands.

3.02 PLACING TOPSOIL

- A. The Contractor shall place topsoil in areas where seeding, sodding and planting is to be performed. He shall place from the following minimum depths, up to finished grade elevations:
 - 1. 6 inches for seeded areas
 - 2. 4-1/2 inches for sodded areas
 - 3. 24 inches for shrub beds
 - 4. 18 inches for flower beds
- B. The Contractor shall use topsoil in a dry state as determined by the County. He shall place the material during dry weather.
- C. The Contractor shall use fine grade topsoil eliminating rough and low areas to ensure positive drainage. He shall maintain levels, profiles and contours of the sub-grades.
- D. The Contractor shall remove stone, roots, grass, weeds, debris, and other organics or foreign material while spreading the material.
- E. The Contractor shall manually spread topsoil around trees, plants and structures to prevent damage which may be caused by grading equipment.
- F. The Contractor shall lightly compact and place the topsoil.

3.03 SURPLUS MATERIAL

- A. The Contractor shall remove surplus sub-soil and topsoil from site at his expense.
- B. The Contractor shall leave stockpile areas and entire job site clean and raked, ready for landscaping operations.

END OF SECTION

SECTION 02276 TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.01 DESCRIPTION

- A. The work specified in this Section consists of the design, provision, maintenance and removal of temporary erosion and sedimentation controls as necessary.
- B. Temporary erosion controls include, but are not limited to: grassing, mulching, netting, watering, and the reseeding of on-site surfaces and spoil and borrow area surfaces, interceptor ditches at ends of berms and other such work at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the County.
- C. Temporary sedimentation controls include, but are not limited to: silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which shall ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the County.
- D. The Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.02 REFERENCE DOCUMENTS

- A. Florida Building Code.
- B. FDEP/COE Dredge and Fill Regulations and/or Permit as applicable.
- C. SWFWMD Permit Regulations and/or Permit as applicable.
- D. Florida Stormwater, Erosion and Sedimentation Control Inspector's Manual.

PART 2 PRODUCTS

2.01 EROSION CONTROL

- A. Netting - fabricated of material acceptable to the County.
- B. Seed and sod.

2.02 SEDIMENTATION CONTROL

- A. Bales - clean, seed free cereal hay type.
- B. Netting - fabricated of material acceptable to the County.
- C. Filter stone - crushed stone conforming to Florida Dept. of Transportation specifications.
- D. Concrete block - hollow, non-load-bearing type.
- E. Concrete - exterior grade not less than one inch thick.

PART 3 EXECUTION

3.01 EROSION CONTROL

A. Minimum procedures for grassing shall be:

1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.
2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
3. Apply mulch loosely and to a thickness of between 3/4-inch and 1-1/2 inches.
4. Apply netting over mulched areas on sloped surfaces.
5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas which exhibit unsatisfactory growth. Backfill and seed eroded areas.

3.02 SEDIMENTATION CONTROL

A. The Contractor shall install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved descriptions and working drawings. Deteriorated hay bales and dislodged filter stone shall be replaced by the Contractor at his expense.

3.03 PERFORMANCE

A. The Contractor, at his own expense, shall immediately take whatever steps are necessary to correct any deficiencies of the temporary erosion and sediment control measures employed if they fail to produce results or do not comply with the requirements of the State of Florida or any other federal, governmental or regulatory agency.

END OF SECTION

SECTION 02615 DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install ductile iron pipe (DIP) and fittings, complete, as shown on the Drawings and specified in these Standards.
- B. Fittings are noted on the drawings for the Contractor's convenience and do not relieve the Contractor from laying and jointing different or additional items where required.
- C. The Contractor shall furnish all labor, materials, equipment and incidentals required to install flanged joint, push-on joint, mechanical joint, or restrained joint ductile iron pipe, complete as shown on the Drawings and Specifications.
- D. Newly installed pipe shall be kept clean and free of all foreign matter. All DI pipe and fittings installed underground shall be polyethylene wrapped unless noted otherwise on the plans.

1.02 SUBMITTALS

- A. The Contractor shall submit to the County, within ten days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate shop drawings for all ductile iron pipe and fittings.
- B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Ductile iron pipe shall conform to AWWA C150 and AWWA C151. Buried pipe shall be push-on mechanical joint, Pressure Class 350 for sizes 4" through 16" and Pressure Class 250 for sizes 18" and larger. All aboveground pipe shall be flanged joint, Special Thickness Class 53. All pipe materials used in potable water systems shall comply with NSF Standard 61.
- B. Unrestrained joint pipe shall be either the Fastite or Tyton push-on joint.
- C. Rubber gaskets shall conform to AWWA C111. Gaskets shall be Ethylene Propylene Diene Monomer (EPDM) rubber for potable and reclaimed water mains. Acrylonitrile butadiene (NBR) gaskets shall be used for potable and reclaimed water mains that are located in soil that is contaminated with low molecular-weight petroleum products or non-chlorinated organic solvents or non-aromatic organic solvents. Fluorocarbon (FKM) gaskets shall be used for potable and reclaimed water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used where both classes of contaminants are found. Gaskets shall be labeled with factory embossed or etched letters stating the gasket material.
- D. Thrust restraint devices shall be provided at all bends and fittings, in casings under roads and railroads, and at other locations specifically indicated on the Construction Drawings.

Thrust restraint devices shall be either concrete thrust blocks, ductile iron restraining glands, restrained joint rubber gaskets, or restraining locking ring/segments. Refer to Section 02640 of these Specifications for details.

- E. Ductile iron pipe shall be supplied in lengths not to exceed 21 ft.
- F. Restrained joint rubber gasket material shall be furnished per 2.01C of this Section. The gasket shall have special grade of corrosion-resistant, hardened, series 300 stainless steel locking segments vulcanized into the rubber gasket.
- G. Pipe joints shall be restrained both upstream and downstream from valves or fittings at distances as required by these Standards.
- H. All mechanical joint fittings shall be pressure rated for 350 psi for sizes 4-16 inches and 250 psi for sizes 18 inches and larger. All flanged fittings shall be pressure rated for 250 psi for all sizes. All fittings shall meet the requirements of AWWA C110 or AWWA C153.
- I. Potable and Reclaimed Water Main Coatings:
 - 1. All buried ductile iron pipe shall have a standard thickness cement lining on the inside in accordance with AWWA C104 and a standard 1-mil asphaltic exterior coating per AWWA C151. All aboveground ductile iron pipe shall have a standard thickness cement lining on the inside in accordance with AWWA C104 and have an exterior shop applied epoxy primer.
 - 2. All ductile iron fittings used in potable and reclaimed water systems shall have double the standard thickness cement lining on the inside per AWWA C104. All buried ductile iron fittings shall have a standard 1-mil asphaltic exterior coating per AWWA C151. All aboveground ductile iron fittings shall have an exterior shop applied epoxy primer.
- J. Wastewater Force Main Coatings:
 - 1. All ductile iron pipe and fittings shall have a green, factory applied 40-mil dry-film thickness of an amine cured novolac epoxy or a modified polyamine ceramic epoxy interior lining. The interior lining application is to be based on the manufacturer's recommendation for long-term exposure to raw sewage.
 - 2. To ensure a holiday-free lining, documentation must be provided, at time of delivery, showing each section of lined pipe has passed holiday testing at the time of production per ASTM G62, method B (high voltage). The lining shall have a minimum three (3) year warranty covering failure of the lining and bond failure between liner and pipe.
 - 3. A County representative shall have the right to deny any pipe/fitting that shows coating cracks due to improper handling/storage of the pipe/fittings or failure to provide a holiday-free certification letter.
 - 4. Exterior coatings for buried ductile iron pipe and fittings used in wastewater systems shall have a standard 1-mil asphaltic coating per AWWA C151. Aboveground ductile iron pipe and fittings shall have a shop applied epoxy primer.

- K. Acceptable pipe sizes for potable and reclaimed water mains are 4" and larger, and 36" and larger for wastewater force mains. All sizes are acceptable for lift station valve and metering assemblies as well as aerial crossings.
- L. Refer to the latest edition of the County's Approved Products List for acceptable products.

PART 3 EXECUTION

3.01 HANDLING

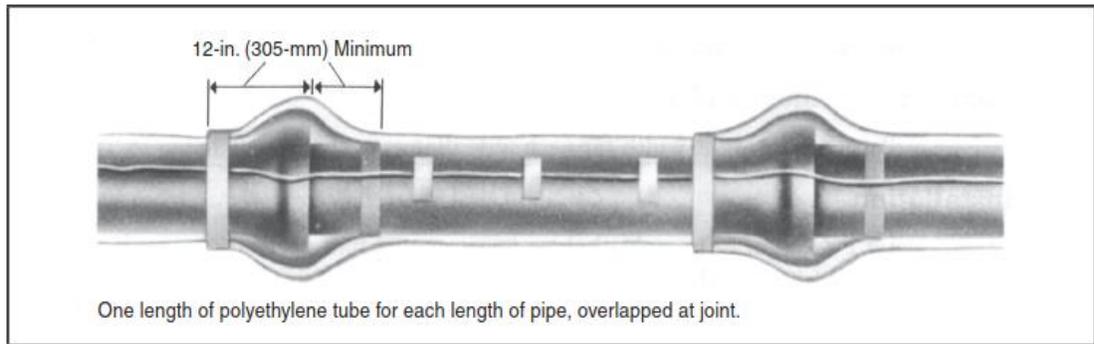
- A. The Contractor shall take extreme care when handling pipe and fittings to ensure the interior lining does not get damaged during construction. Lined pipe and fittings must be handled only from the outside of the pipe and fittings. No metallic forks, chains, straps, hooks, etc. shall be placed inside the pipe and fittings for lifting, positioning, or laying. The pipe shall not be dropped or unloaded by rolling.
- B. Care should be taken not to let the pipe strike sharp objects while swinging or being off loaded. Ductile iron pipe should never be placed on grade by use of hydraulic pressure from an excavator bucket or by banging with heavy hammers.

3.02 DETECTION

- A. Pipe shall have a 6-inch wide electronic detectable warning/path marking tape, color-coded per service type, placed directly above the pipe center. The tape shall be placed at least 12 inches below finished grade to a maximum depth of 24 inches below finished grade.
- B. The electronic detectable warning/path marking tape shall have detectable markers embedded in the tape and spaced adequately to provide a near continuous path to allow for easy detection at any point along the pipe. The embedded markers shall be spaced every 8-feet along the warning tape. The electronic marking tape shall be supplied per the latest edition of the County's Approved Products List.
- B. Tracer wire shall be required for all pipeline construction, except gravity sewer, per Specification Section 02800.

3.03 IDENTIFICATION

- A. Each length of pipe and each fitting shall be marked with the name of the manufacturer, size and class, lining type, and shall be clearly identified as ductile iron pipe. All gaskets shall be marked with the name of the manufacturer, size and proper insertion direction.
- B. All ductile iron pipe and fittings, appurtenances, and valves shall be entirely polyethylene-tube wrapped blue for potable water mains, purple for reclaimed water mains, or green for sewer mains, per AWWA C105 and sized per manufacturer's recommendations.
- C. Contractor shall ensure that no soil or embedment material is trapped between the pipe, fitting, appurtenance, or valves and the polyethylene wrap. The polyethylene film shall be snugly fitted to the contour of the pipe barrel with sufficient slack to prevent stretching the polyethylene where it bridges irregular surfaces such as bell-spigot interfaces, bolted joints, or fittings. The tube-form polyethylene should be used with both ends thoroughly sealed with adhesive tape or plastic tie straps at the joints overlap. The wraps shall overlap at the joints as shown below.



- D. The polyethylene shall have circumferential wraps of tape placed at 2 ft intervals at the pipe barrel.
- E. When it is not practical to wrap valves, tees, crosses, or other odd-shaped pieces in a tube, wrap with a polyethylene flat sheet or split length of polyethylene tube by passing the sheet under the piece and wrap around the body. Make seams by bringing the edge of the polyethylene sheet together, folding them over twice, and taping them.
- F. Provide openings in the encasement for branches, service taps, blowoffs, valves, and similar appurtenances by cutting an "X" in the polyethylene and temporarily folding back the film. After the device is installed, tape the slack securely to the appurtenance with tape.
- G. Service lines of dissimilar metals shall be wrapped with polyethylene for a minimum clear distance of 3 feet away from the ductile-iron pipe.
- H. Polyethylene encasement shall be furnished per the latest revision of the County's Approved Products List.
- I. All restrained push-on joint pipe that is restrained with restraining gaskets/locking segments shall have weather-resistant, min. 6 mil thick, 4" wide, solid red PVC marking tape around the polyethylene wrap at the pipe bell to indicate that the joint is restrained.
- J. All aboveground piping, fittings, and appurtenances shall be painted Scott Paints safety blue for potable water, Pantone 522C purple for reclaimed water, and Hunter Green (Rustoleum 7538) for pressure sewer.

END OF SECTION

SECTION 02617 INSTALLATION, TESTING, AND CLEANING OF PRESSURE PIPE

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install pipe, fittings, valves, fire hydrants, services, and all other appurtenances and incidentals complete and in-place as required by the construction drawings.
- B. The Contractor shall furnish all labor, materials, equipment and incidentals required to clean all new lines 4" and larger, and existing pipelines as specified in this specification and as indicated on the Drawings.
- C. This work shall include the furnishing and installation of all pig launching and retrieval devices and the appropriate pigs for the cleaning procedure, and all necessary excavations, shutdowns, fittings and valves required.

1.02 RELATED WORK

- A. The Contractor is responsible for all necessary supply water.
- B. The Contractor is responsible for all necessary bypass pumping.
- C. The Contractor is responsible for the proper disposal of any materials removed from the pipe lines as a result of the cleaning procedure.

1.03 SUBMITTALS

- A. The Contractor shall submit prior to construction, a cleaning plan, Shop Drawings, and layout diagram for approval to the County.
- B. The Contractor shall submit to the County a list of materials to be furnished, and the names of suppliers.

1.04 QUALIFICATIONS

- A. The Contractor performing this work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner.
- B. The Contractor shall also be capable of providing crews as needed to complete this work without undue delay.
- C. The County reserves the right to approve or disapprove the Contractor, based on the submitted qualifications.

PART 2 PRODUCTS

2.01 GENERAL

- A. All pipe crossing state or federal roads, local arterial, thoroughfares, or railroads shall be installed in a casing pipe (steel, PVC, or HDPE).

- B. Potable and reclaimed water mains shall be ductile iron or protected by a casing pipe in the following instances:
1. Mains that are installed under and run parallel with a paved roadway shall be ductile iron only;
 2. Mains that cross under more than 48 LF of paved roadway (as measured from outer most edge of pavement to outer most edge of pavement of the entire right-of-way cross-section) shall be in a casing; less than 48 LF shall be ductile iron pipe;
 3. Mains that are installed under paved areas, (i.e. parking lots, etc.) shall be ductile iron only;
- C. Force mains shall be protected by a casing pipe in the following instances:
1. Mains that cross under more than 48 LF of paved roadway (as measured from outer most edge of pavement to outer most edge of pavement of the entire right-of-way cross-section) shall be in a casing. Mains that cross less than 48 LF shall be determined on a case-by-case basis (i.e. cul-de-sacs, dead-end roads, etc.);
- D. Trees shall not be planted or located within 10 feet of any potable water main, reclaimed water main, sanitary force main or gravity sanitary sewer main, sanitary cleanouts, or potable/reclaimed/force main appurtenances such as meters, hydrants, backflow prevention assemblies that is owned and maintained by County. An approved root barrier shall be used where trees are planted closer than 10 feet.
- E. All distribution waterlines that enter private property become private lines and shall have a backflow preventer device (BFD) installed at the right-of-way in accordance with Chapter 2-31, Article X of the Manatee County Code of Ordinances. BFD can be part of a meter assembly or a BFD / detector check assembly.
- F. The Contractor shall be responsible for furnishing pigs in sufficient numbers and sizes, of appropriate densities, coatings and configurations to properly clean the piping systems.
- G. All pigs used for the cleaning of sewer or reclaimed water lines shall not be used in the cleaning of potable water lines.
- H. No line stops shall be used in potable water or reclaimed water mains.
- I. Water mains installed on short cul-de-sacs or permanent dead-ends, where future growth is not feasible (or expected), shall be reduced in diameter to 4-inch and/or 2-inch based on the hydraulic needs of the distribution system. On longer cul-de-sacs, the water main shall be reduced to 4-inch and/or 2-inch after the fire hydrant; also based on the hydraulic needs of the distribution systems. In all cases, dead-end mains shall require a manual blow-off assembly.
- J. Generally, not more than 4, or the equivalent of 4, residences shall be connected to a 2-inch diameter water line, unless the main is looped or otherwise supplied from two connections with mains of adequate capacities. A looped 2-inch main shall serve no more than 40 residences, or the equivalent water demand of 40 residences. A 2-inch diameter main shall not exceed 1,000 feet in length.
- K. The hydraulic calculations and distribution design shall produce a system that limits the need for constant regular flushing of water to ensure water-quality levels are met. Dead-

end public mains, with more than a 4-day water turn-over rate, shall require the installation of a metered blow-off assembly with an auto-flusher. Refer to the latest edition of the County's Approved Product List for acceptable manufacturers.

2.02 INSTALLATION MATERIALS

- A. Services under any kind of pavement shall be Polyethylene tubing meeting AWWA C901, Type "K" copper, or Schedule 40 stainless steel pipe encased in minimum 2" diameter SDR 21 PVC or Polyethylene SDR 9 piping conforming to ASTM 2241. Casing shall be color coded blue for potable water or purple for reclaimed water.
- B. Ductile iron pipe meeting AWWA C150/151 shall be allowed for potable/reclaimed water mains size 4" and larger. High density polyethylene pipe meeting AWWA C906 shall be allowed for potable/reclaimed water mains size 2" through 12". The use of 16" and larger HDPE pipe for potable and reclaimed water mains shall require written approval by County. PVC pipe meeting AWWA C900-16 shall be allowed for potable/reclaimed water mains sizes 4" through 12". The use of 14" pipe shall require written approval by County.
- C. Ductile iron pipe meeting AWWA C150/151 shall be allowed for force mains for pipe sizes 36" and larger. High density polyethylene pipe meeting AWWA C906 shall be allowed for force mains for sizes 4" through 36". PVC pipe meeting AWWA C900-16 shall be allowed for force mains sizes 4" through 36". The use of 14" pipe must be authorized by the County prior to ordering and installation.
- D. Proper gasket material shall be supplied as specified in these Specifications depending on soil condition.

2.03 CLEANING MATERIALS

- A. The pig launching and retrieval equipment shall be of the latest design and construction and shall include the means to maintain constant monitoring of the in-line flows and pressures of the system being cleaned and the constant location of the cleaning pigs in the system. Launching and retrieval systems shall be fabricated, designed and manufactured according to ANSI standards and capable of withstanding working pressures of 150 psi. Launching and receiving devices shall be sized one diameter larger than the system to which it will be attached with a minimum length of 2.5 times the diameter.
- B. The Contractor shall have available for immediate use an electronic pig detector for use in the system being cleaned to provide a means of tracking the passage of the pig in the system to locate areas of potential or suspected blockage and other disparities in the system.
- C. The pig shall be constructed of elastomer polyurethane with an open cell construction and a density equal to or suitable for use in the piping system being cleaned. Pig configuration shall consist of a parabolic nose with a concave base and coated with a resilient surface material that will maintain a peripheral seal and will effectively clean the piping system without over abrading the interior pipe wall. Pig characteristics shall include the ability to navigate through 90 degree bends, 180 degree turns, bi-directional fittings, full port valves, reduce its cross sectional area and return to its original design configuration and be propelled by hydraulic pressure.

PART 3 EXECUTION

3.01 SOIL TESTING

- A. If instructed by the County, soil testing in accordance with AWWA C105 soil samples shall be collected during the design phase to determine if the soil is corrosive. One (1) soil test shall be performed for pipe lengths under 500 lineal feet, with an additional soil test every 500 lineal feet of additional pipe to be installed. The soil testing shall be performed by a Florida licensed geotechnical engineering and signed and sealed report shall be supplied to the County for review prior to installation of the pipe for evaluation. The soil testing results shall be used to determine if additional requirements for the installation of pipe gaskets are required.

3.02 HANDLING AND STORAGE

- A. Prior to installation, all pipe and fittings shall be inspected. Cracked, broken, or otherwise defective materials not in compliance with these standards shall not be used and shall be removed from the project site.
- B. The pipeline installer shall take care in the handling, storage and installation of the pipe and fittings to prevent injury to the materials or coatings. Use proper implements, tools and facilities for the safe and proper protection of the work. Lower the pipe and fittings from the truck to the ground and from the ground into the trench in a manner to avoid any physical damages. Under no circumstances shall the pipe or fittings be dropped onto the ground or into the trenches.
- C. The pipeline installer shall not distribute material on the job site faster than it can be used to good advantage. Unless otherwise approved by the County, installer shall not distribute more than one week's supply of material in advance of laying. Any materials not to be installed within two weeks of delivery shall be protected from the sunlight, atmosphere and weather by suitable enclosures or protective wrapping until ready for installation. Stored pipe shall be placed on suitable racks with bottom tiers raised above the ground to avoid damage. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's written instructions.

3.03 INSTALLATION

- A. Pipe, fittings, valves and other appurtenances shall be installed in accordance with the manufacturer's written installation instructions and with the provisions of "Recommended Standards for Water Works" report as incorporated by reference in Chapter 62-555, F.A.C., and with the provisions of "Recommended Standards for Wastewater Facilities" report as incorporated by reference in Chapter 62-604, F.A.C.
- B. In general, all pressure pipe, (potable water, reclaimed water and force main sewer), shall be designed with no less than three feet of cover, but not more than six feet of cover from final grade, unless otherwise shown on the plans and approved by Utilities.
- C. In all cases, all pipe shall be laid to such lines, gradients and levels as shown on the construction drawings. Gravity sewer pipe shall be laid on grade with bell upgrade and spigot downgrade.

- D. It is the Contractor's responsibility to preserve uniform gradients and correct alignment. If it is determined the pipe is incorrect in size, level or grade, then all deficiencies shall be corrected.
- E. Where shown on the construction drawings, special bends shall be provided for horizontal or vertical changes of direction. Where such bends are not shown on the construction drawings, changes of direction shall be affected by angling the joints.
- F. No joint shall be angled to such an extent as to impair its effectiveness and tightness.
- G. When making a joint, pipes should always be in line and if required, deflection made after making the joint. The deflection shall not be greater than 75% the maximum value recommended by the pipe manufacturer.
- H. Installation tolerances:
 - 1. Direct Bury:
 - a. Vertical Alignment = ± 0.5 feet
 - b. Horizontal Alignment = ± 1.0 feet
 - 2. Horizontal Directional Drill (Trenchless Technologies):
 - a. Vertical Alignment:
 - 1) max. slope shall not exceed 2% (2.0 feet within a length of 100 feet).
 - 2) No reverse curvature within 200 feet
 - 3) No vertical deviation greater than ten (10) percent of the proposed depth of cover at that specific station.
 - b. Horizontal Alignment:
 - 1) max. rate of deviation shall not exceed 1.5% (1.5 feet within a length of 100 feet
 - 2) No reverse curvature
 - 3) Total deviation not to exceed 2.0 feet
- I. The trenches and bedding for the pipe installations shall be prepared according to Section 02221, Trenching, Backfill, and Excavation, of these specifications. Pipe sections shall be laid in full contact with the prepared pipe bedding, with bell holes dug out, to provide a continuous and uniform bearing and support for the pipe barrel between joints. Blocking under the pipe shall not be permitted (except through casing sleeves).
- J. While laying pipe in gravity sewer installations, the pipe alignment shall not deviate by more than 1/2 inch for line and 1/4 inch for grade, as measured at the pipe inverts at the manhole, from the design line and grade established on the construction drawings, provided that such variance does not result in a level or a reverse sloping pipe invert. Line and grade of gravity sewer pipelines shall be measured at the pipe invert and shall be controlled during installation by laser beam method. Other methods of controlling line and grade may be approved by the County if the laser beam method is shown to be unworkable. A "Caution - Laser Light" placard shall be displayed in a conspicuous place while laser beam pipe laying equipment is in use. Pipe grade between manholes shall not deviate by more than 1 inch from the design grade line, as measured with the television (TV) camera's depth gauge during the mandatory pre-acceptance TV inspection, provided that such deviation does not result in a level or a reverse sloping pipe invert.
- K. Joining of pipe sections shall be done in strict accordance with the pipe manufacturer's written instructions. The joining surfaces of the bell and spigot and the rubber seal ring shall be thoroughly cleaned and lubricated immediately prior to joining the pipe per the written

instructions. After the joint has been made, the pipe alignment shall be checked. Place sufficient compacted backfill material around and over the pipe to secure the pipe from movement before installing the next joint to assure proper pipe alignment and joint makeup.

- L. When cutting or machining pipe in the field is necessary, the pipe installer shall use only the tools and methods recommended by the manufacturer in the written instructions. Care shall be taken to not damage the pipe coating or linings. Damage to linings shall be cause for rejections of the complete section of pipe, or for the rejection of a fitting or valve. Damage to exterior coatings shall be corrected to the original standard material specification.
- M. At connections to manholes or other concrete structures, the pipe joint shall be located a minimum of 18 inches outside of the edge of the structure.
- N. At stub-outs from new structures to future pipelines, the pipe stub-out length shall be the same as the standard pipe length being laid. Stub-out pipes shall be closed off with standard restrained plug or cap fittings.
- O. Thrust restraint devices shall be either cast-in-place concrete thrust blocks or other approved restrained joint devices. Cast-in-place concrete for thrust blocks shall have a 28-day strength of 3,000 psi. The concrete shall be placed between undisturbed soil and the fittings or appurtenance to be supported. Concrete shall not be placed on or around the pipe, bells, flanges, or other joints.
- P. All ductile iron pipe(s) and fitting(s) shall be protected with a polyethylene encasement, thickness as defined by the Approved Products List.
- Q. At all fire hydrant laterals, the lateral pipe from tee to fire hydrant shoe shall have all joints restrained. The lateral shall also be restrained from side movement by concrete thrust blocks placed at the fire hydrant shoe and at the lateral tee.
- R. Place and secure a black bag over all fire hydrants not yet placed into service to designate them as such and to serve as a warning that the water is not safe to drink.

3.04 SURVEY MARKINGS

- A. As a marker for the Surveyor, a PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor on the top of pipe for potable water mains, reclaimed water mains and sanitary force mains at intervals no greater than 200 feet apart and at locations where there is a substantial grade change. The pipe markers shall indicate the pipe diameter and shall be labeled PWM in "safety" blue, RWM in purple, and FM in green, for potable water mains, reclaimed water mains and sanitary force mains, respectively. The Contractor is responsible for making the aforementioned markers available to the Surveyor. The Contractor shall field locate the mains and fittings when markers are not made available to the Surveyor.
- B. As a marker for the Surveyor, a PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor on the top of all pipe fittings (other than sanitary sewer service wyes, potable water saddles and reclaimed water saddles). The markers for fittings shall indicate the type of fitting and shall be labeled PWF in "safety" blue, RWF in purple, and FMF in green, for potable water fittings, reclaimed water fittings, and sanitary force main fittings, respectively. The Contractor is responsible for making the aforementioned markers available to the Surveyor. The Contractor shall field locate the mains and fittings when markers are not made available to the Surveyor.
- C. A PVC pipe marker or 2" x 4" marker shall be inserted by the Contractor at the beginning and end of each horizontal directional drill (HDD). The HDD Contractor shall provide a certified report and bore log indicating the horizontal and vertical location every 25 linear

feet or less along the pipe.

- D. A 2" PVC pipe marker with a painted end cap shall be inserted by the Contractor at the ROW line indicating each individual new service location or stub out. The marker shall be a 6 foot length of PVC pipe inserted 2 feet into the ground and shall be painted "sa fety" blue for potable water, purple for reclaimed water, and green for sewer.

3.05 PROCEDURE FOR TESTING POTABLE WATER, RECLAIMED WATER, AND FORCE MAINS

- A. A 48-hour notice to County and Engineer is needed prior to testing. A letter stating the reasons testing should be scheduled ahead of other jobs must accompany all emergency testing requests.
- B. County and Contractor must be present for all testing, except for testing tapping valves and sleeves.
- C. HYDROSTATIC TESTING
 1. Refer to Manatee County Public Works Part I Utilities Standards Manual Section 1.9.

3.06 INSPECTION/TESTING PROCEDURE COVERING BORED PIPELINES OR CASING AND CONDUITS INSTALLED ACROSS PREVIOUSLY TESTED AND/OR COUNTY ACCEPTED WATER AND SEWER PIPE WITHIN DEVELOPMENT PROJECTS UNDER ACTIVE CONSTRUCTION

- A. Prior to testing water and sewer lines, every effort will be made to install sleeves for underground utilities that will cross these water and sewer lines or services.
- B. Where it has not been possible to pre-install sleeves prior to testing and bores or conduits are required, it is the responsibility of the utility company and/or their Contractor performing the work to provide Manatee County Utility Operations Department or the Engineer of Record with accurate horizontal and vertical as-built information of the sleeves, bores and conduits installed by said utility company. This applies to all bores and conduits crossing water and sewer lines.
- C. Procedures to be followed for installation of conduits, pipelines and bores that will cross, or be closer than 5'-0" horizontally and 18 inches vertically to, previously tested water and sewer lines that are still under the ownership of the developer/contractor.
 1. Notify the County and obtain the best as-built information available. Allow sufficient time for the County to field locate the existing pipelines.
 2. Submit drawings of proposed location to the County and Manatee County Utility Operations Dept. Utility Locations Section for review.
 3. Obtain a County Right-of-Way Use Permit if the work area is within a dedicated area of right-of-way.
 4. Perform installation in the presence of a County representative. Call (941) 792-8811, ext. 5061 or ext. 5069 with at least two (2) working days notice.
 5. Submit two (2) copies of as-built information to the County to incorporate into the record drawings to be submitted to the County.
 6. Failure to follow steps 2) thru 5) will result in additional charges for retesting the previously tested water and sewer lines.

- D. Procedures to be followed for installation of conduits, pipelines and bores crossing or closer than 5'-0" horizontally and 18 inches vertically to previously tested water and sewer lines that have been previously accepted by Manatee County:
 1. Obtain record drawing information from the County.
 2. If roadway has been dedicated to Manatee County, obtain Right-of-Way Use Permit and copy the Project Management Department Locations Section with proposed location drawing.
 3. Follow procedures in "Sunshine State One-Call", paying special attention to the requirements of Section VII.
- E. Should water or sewer lines be damaged during the bore pipeline or casing installation, the cost of any repairs and retesting will be paid for by the company that installed the bore. The actual clearance between a bored casing crossing a water or sewer pipe should not be less than 18 inches.

3.07 PIPELINE CLEANING

- A. The cleaning of the pipeline shall be done by the controlled and pressurized passage of a polyurethane pig of varying dimensions, coatings and densities as determined by the County through the piping system.
- B. A series of pigs shall be entered into the system at a point as near to the beginning as is logistically and mechanically feasible.
- C. A launching assembly shall be used as the entrance point for the pig. This assembly shall allow for the following:
 1. The entering of pigs into the system by providing the means to induce flow from an external source, independent of the flows and pressures immediately available from the system, on the back of the pig to develop sufficient pressure to force the pig through the system.
 2. A means to control and regulate the flow.
 3. A means to monitor the flows and pressures.
 4. A means to connect and disconnect from the system without any disruption to the operation of the system.
- D. The pig shall be removed or discharged from the system at a point as near to the end as is logistically and mechanically feasible.
- E. The contractor shall be responsible for the retrieval of the pig at the discharge point. This may include setting a trap that will not disrupt normal flow and operations but will capture the pig and any debris. A retrieval assembly may also be used but said assembly shall be able to connect and disconnect from the system without any disruption to the operation of the system.
- F. Alternative launching and retrieval methods shall be done with the prior approval of the County.
- G. Any pig that cannot progress through the piping system shall be located by the Contractor and removed by excavation of the pipe in order to remove the blockage. All pipe repairs shall be the responsibility of the Contractor and shall be performed with as little disruption to the system as possible.

- H. Any increase in pressure that cannot be accounted for, i.e. fittings or valves or additional cleaning runs, shall be investigated, per the Engineers' approval, by locating the pig at the beginning of the increased pressure and excavating to determine the cause of the pressure increase. All pipe repairs shall be the responsibility of the Contractor and shall be performed with as little disruption to the system as possible.
- I. Final flushing of the cleansed lines shall be performed after the last successful run of the pig as determined by the County. The Contractor shall be responsible for all applicable flushing and disinfection requirements for potable water lines.
- J. The Contractor shall maintain and provide a report at the end of the cleaning procedure containing the following:
 - 1. The pressures in the pipe during the pigging procedure.
 - 2. Any inline problems encountered during the procedure including all excavations with detailed locations, reason for the excavation and any corrective measures taken to the pipeline.
 - 3. A record of the pigs used, their sizes, styles and other pertinent information regarding what materials were used during the cleaning.
 - 4. An analysis of the condition of the pipeline before and after the cleaning procedure.
- K. Inspectors must be notified 48 hours in advance of any pigging and flushing operations. With the County Inspector present, all new pressure mains 4 inches and larger shall be pigged and then flushed. All new pressure mains less than 4 inches shall be flushed to clean all parts of the system and to remove any accumulation of construction debris, rocks, sand, gravel, silt and other foreign material. If necessary, also make use of mechanical rodding or bucketing equipment. Short pipe lengths (i.e. stubs) may be flushed without pigs with prior approval from County.
- L. For flushing, a minimum velocity of at least 3.0 ft/sec, preferably 3.5 ft/sec, shall be obtained in the pipe. This velocity shall be maintained long enough to allow three (3) complete pipe volume changes of water for proper flushing action. Successful flushing shall be determined visually by the County Inspector and may be deemed acceptable when the water is clear and free of debris.

3.08 DETECTION

- A. Pipe shall have a 6-inch wide electronic detectable warning/path marking tape, color-coded per service type, placed directly above the pipe center. The tape shall be placed at least 12 inches below finished grade to a maximum depth of 24 inches below finished grade.
- B. The electronic detectable warning/path marking tape shall have detectable markers embedded in the tape and spaced adequately to provide a near continuous path to allow for easy detection at any point along the pipe. The embedded markers shall be spaced every 8-feet along the warning tape. The electronic marking tape shall be supplied per the latest edition of the County's Approved Products List.
- C. All direct buried pressure potable and reclaimed water, and force main pipelines laid in trenches shall have a continuous, No. 10 gauge solid copper clad wire with minimum 30-mils polyethylene insulation rated UF or USE by Underwriter's Laboratories attached to the pipe. The polyethylene insulation shall be color coded blue (potable water), purple (reclaimed water) or green (sanitary sewer). The wire shall be placed on top of the pipe

and secured in place at every joint and at 5 foot intervals with color coded 6 mil thick PVC marking tape.

- D. In directional bore applications, one No. 10 gauge extra high strength copper clad steel tracer wire shall be pulled and secured to the top of the pipe with color coded 6 mil thick PVC marking tape or 10-mil thickness polyethylene pressure sensitive tape at every joint and at 24-inch intervals. The tracer wire shall have minimum 45-mil polyethylene insulation rated UF or USE by Underwriter's Laboratories. The polyethylene insulation shall be color coded blue (potable water), purple (reclaimed water) or green (sanitary sewer).
- E. Underground splice connections shall be minimized and shall be rated for direct burial service. Spliced tracer wire connections shall be underground water-proof wire connectors meeting UL 486D test standards. The wire shall terminate at fire hydrants, backflow prevention assemblies, and at each meter box with a underground water-proof terminal connector. The wire shall also terminate at valve boxes for gate valves, plug valves, tapping valves, air release valves and blow-off valves. The tracer wire shall also terminate at gate valve boxes that are not located within 200 feet of a fire hydrant, backflow prevention assembly, meter box, plug valve, air release valve or blow-off valve. Meter boxes shall have at least 12 inches of wire looped into the boxes. The looped termination shall allow for the connection of an electronic locator transmitter.

END OF SECTION

SECTION 02620 POLYETHYLENE (HDPE) PIPE AND FITTING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install polyethylene pressure pipe, fittings and appurtenances as shown on the Drawings and specified in the Contract Documents and these Standards.
- B. Newly installed pipe shall be kept clean and free of all foreign matter & gouges.
- C. All pipe shall be correctly color coded / identified.

1.02 QUALIFICATIONS

All polyethylene pipe shall be furnished by a single manufacturer who is fully experienced, reputable and qualified in the manufacture of the items to be furnished.

1.03 SUBMITTALS

- A. The Contractor shall submit to the County, within ten days after receipt of Notice to Proceed, a list of materials to be furnished, the names of the suppliers and the appropriate shop drawings for all polyethylene pipe and fittings.
- B. The Contractor shall submit the pipe manufacturer's certification of compliance with the applicable sections of the Specifications.
- C. The Contractor shall submit shop drawings showing installation method and the proposed method and specialized equipment to be used.

PART 2 PRODUCTS

2.01 POLYETHYLENE PRESSURE PIPE

- A. Polyethylene pipe for mains of 2-inch diameter and larger shall be high-density bimodal PE4710 polyethylene resin with a minimum cell classification of 445574 per ASTM D3350, Class 200, DR 11, meeting the requirements of AWWA C906. All pipe materials used in potable water systems shall comply with NSF Standard 61. Outside diameters of water, reclaimed water and pressure sewer HDPE mains shall be ductile-iron pipe sizing system (DIPS).
- B. Polyethylene tubing 2-inches in diameter and smaller for potable water and reclaimed water services shall be high-density PE4710 polyethylene resin with a minimum cell classification of 445574 per ASTM D3350, Pressure Class 250, Copper Tube Size (CTS), SDR 9, meeting the requirements of AWWA C901 and ASTM D2737. Butt fusion or CTS brass connections shall be used. All pipe materials used in potable water systems shall comply with NSF Standard 61.

- C. Alternatively, polyethylene tubing 2 inches in diameter and smaller for potable water and reclaimed water services shall be crosslinked high-density polyethylene (PEXa) 3306 pipe, Pressure Class 250, Copper Tube Size (CTS), SDR 9, meeting the requirements of AWWA C904. Butt fusion or CTS brass connections shall be used. All pipe materials used in potable water systems shall comply with NSF Standard 61.
- D. Polyethylene pressure pipe and tubing shall be furnished per the latest edition of the County's Approved Products List.

2.02 JOINTS

- A. Where PE pipe is joined to PE pipe, it shall be by thermal butt fusion. Thermal fusion shall be accomplished in accordance with the written instructions of the pipe manufacturer and fusion equipment supplier. The installer of the thermal butt fused PE pipe shall have received training in heat fusion pipe joining methods and shall have had experience in performing this type of work.
- B. Molded fittings for 4" and larger pipe shall be Pressure Class 200, PE4710, Ductile Iron Pipe Size (DIPS), DR 11, conforming to AWWA C906 with min. cell classification of 445474 per ASTM D3350. Mechanical joints and fittings for 2" and smaller tubing shall meet the requirements of: AWWA C901, ASTM D3350 and ASTM D3140.
- C. All connections to fittings or valves shall use a thermally fused mechanical joint or flanged joint adapter with a 316 stainless steel backup ring. The pipe shall also have a 316 stainless steel insert stiffener.

2.03 DETECTION

- A. Pipe shall have a 6-inch wide electronic detectable warning/path marking tape, color-coded per service type, placed directly above the pipe center. The tape shall be placed at least 12 inches below finished grade to a maximum depth of 24 inches below finished grade.
- B. The electronic detectable warning/path marking tape shall have detectable markers embedded in the tape and spaced adequately to provide a near continuous path to allow for easy detection at any point along the pipe. The embedded markers shall be spaced every 8-feet along the warning tape. The electronic marking tape shall be supplied per the latest edition of the County's Approved Products List.
- C. Direct buried or horizontal directional drilled HDPE pipe shall also have tracer wire installed along the pipe alignment. The tracer wire to be used shall be per Section 02800 of these Specifications.

2.04 IDENTIFICATION

- A. Pipe shall bear identification markings in accordance with AWWA C906.
- B. HDPE mains shall be color coded blue for potable water, purple for reclaimed water, or green for pressure sewer using embedded colored striping on 3 sides (120 degrees apart).
- C. PE services shall be fully color coded blue for potable water or purple for reclaimed water using a solid pipe color.

PART 3 EXECUTION

3.01 INSTALLING POLYETHYLENE PRESSURE PIPE AND FITTINGS

All polyethylene pressure pipe shall be installed by direct bury, directional bore, or a method approved by the County prior to construction. If directional bore is used, or if directed by the County, the entire area of construction shall be surrounded by silt barriers during construction.

Exposure of product pipe to sunlight shall be limited to 14 consecutive days unless approved by the County. If after 14 days, the product pipe is still stored on site then it shall be fully covered to avoid UV degradation of the pipe material.

3.02 INSPECTION AND TESTING

All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak testing. Refer to Manatee County Public Works Part I Utilities Standards Manual Section 1.9.

END OF SECTION

SECTION 02622 POLYVINYL CHLORIDE (PVC) PRESSURIZED PIPE AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required to install AWWA C900-16 PVC piping, fittings and other appurtenances complete and ready for use as indicated on the construction drawings.
- B. Provide and install complete all fittings and appurtenances not noted specifically on the construction plans as required to complete the utility system in accordance with these Standards.

1.02 DESCRIPTION OF SYSTEM

The Contractor shall install the piping in the locations as shown on the Drawings.

1.03 QUALIFICATIONS

All plastic pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, qualified and specializes in the manufacture of the items to be furnished. The pipe and fittings shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications.

1.04 SUBMITTALS

- A. The Contractor shall submit shop drawings to the County including, but not limited to, dimensions and technical specifications for all piping and fittings.
- B. The Contractor shall submit to the County, samples of all materials specified herein.
- C. The Contractor shall submit and shall comply with manufacturer's recommendation for handling, storing and installing pipe and fittings.
- D. The Contractor shall submit pipe manufacturer's certification of compliance with these Specifications.

1.05 TOOLS

The Contractor shall supply special tools, solvents, lubricants, and caulking compounds required for proper installation.

PART 2 PRODUCTS

2.01 MATERIALS

- A. For potable and reclaimed water, Polyvinyl chloride (PVC) pressure pipe, 4-12 inches in diameter, shall be ductile iron pipe size (DIPS), Class 235, DR 18, meeting the requirements of AWWA C900-16. Each length of pipe shall be hydrostatically tested to two times its pressure class of the pipe by the manufacturer in accordance with AWWA C900-16. PVC pressure pipe shall not be used for potable or reclaimed water mains larger than 12-inch diameter.

- B. For pressure sewer, Polyvinyl chloride (PVC) pressure pipe, 4-36 inches in diameter, shall be ductile iron pipe size (DIPS), Class 235, DR 18, meeting the requirements of AWWA C900-16. 14" Diameter pipe shall only be used with the written approval by Manatee County. Each length of pipe shall be hydrostatically tested at twice its pressure class in accordance with AWWA C900-16. Pipe shall be furnished in standard lengths of approximately 20 feet.
- C. For grinder pump stations only, Polyvinyl chloride (PVC) pressure pipe, 2-inches in diameter, shall be Pressure Rated 200, SDR21, conforming to ASTM D2241, and shall have Iron Pipe Size (IPS) outside diameters. SDR 21 PVC pipe 2-inches in diameter shall not be used for working pressures greater than 125 psi. PVC pipe shall not be used in applications, which require pipes that are less than 2 inches in diameter for wastewater force mains.
- D. Standard PVC pressure pipe joints shall be bell and spigot push-on type with elastomeric ring seals. Ring seal gaskets used at push-on joints shall conform to ASTM F477 and shall be EPDM rubber for potable and reclaimed water pipes. Gaskets shall be labeled with factory embossed or etched letters stating the gasket material. Ductile iron pipe, with gasket materials as required in these standards, shall be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents.
- E. Lubricant furnished for lubricating the push-on joints in potable water pipes shall be nontoxic, water soluble, shall not support the growth of bacteria, shall have no deteriorating effects on the gasket or pipe material, and shall not impart color, taste, or odor to the water, and shall be an approved substance per NSF 61.
- F. Thrust restraint devices shall be installed at all bends, fittings, in casings under roads and railroads, and at pipe joint locations both upstream and downstream from bends or fittings as required by these Specifications. Thrust restraint devices for standard PVC pipe and fittings shall be either concrete thrust blocks, restraining glands, or self-restraining gaskets.
- G. All fittings for pressurized PVC pipe shall be made of ductile iron, with mechanical joints for buried pipe or flanged joints for aboveground pipe, and shall conform to AWWA C110/AWWA C153 and to the applicable sections of these Specifications for ductile iron fittings.
- H. All fittings for drop manholes P-Trapp pipe assemblies shall be made of PVC, Pressure Class 150, DR 18, and shall conform to AWWA C900-16/AWWA C907.
- I. All pipe materials used in potable water systems shall comply with NSF Standard 61.
- J. Refer to the latest edition of the County's Approved Products List for approved products.

PART 3 EXECUTION

3.01 INSTALLATION

The Contractor shall install the plastic pipe in strict accordance with the manufacturer's technical data and printed instructions.

3.02 DETECTION

- A. Pipe shall have a 6-inch wide electronic detectable warning/path marking tape, color-coded per service type, placed directly above the pipe center. The tape shall be placed at least 12 inches below finished grade to a maximum depth of 24 inches below finished grade.
- B. The electronic detectable warning/path marking tape shall have detectable markers embedded in the tape and spaced adequately to provide a near continuous path to allow for easy detection at any point along the pipe. The embedded markers shall be spaced every 8-feet along the warning tape. The electronic marking tape shall be supplied per the latest edition of the County's Approved Products List.
- B. Tracer wire shall be required for all pipeline construction per Specification Section 02800.

3.03 IDENTIFICATION

- A. PVC pipe shall bear identification markings in accordance with AWWA C900-16 or ASTM D2241.
- B. PVC pipe shall be color coded blue for water, purple for reclaimed water, or green for sanitary sewer using a solid pipe color pigment.
- C. All self-restrained PVC pipe shall have weather-resistant, min. 6 mil thick, 4" wide, solid red PVC marking tape around the pipe bell to indicate that the joint is restrained.

3.04 INSPECTION AND TESTING

All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak testing. Refer to Manatee County Public Works Part I Utilities Standards Manual Section 1.9. Prior to testing, the pipe lines shall be supported in a manner approved by the County to prevent movement during tests.

END OF SECTION

SECTION 02640 VALVES AND APPURTENANCES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to completely install ready for operation valves and appurtenances as shown on the Drawings and as specified herein.
- B. All types of valves and appurtenances shall be products of well-established reputable firms who are fully experienced and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these standards as applicable. Valves used in waterworks applications shall comply with NSF Standard 61 for mechanical devices.
- C. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of potable water, reclaimed water, and wastewater depending on the applications.
- D. All valves and appurtenances shall be of the size shown on the drawings and, to the extent possible, all equipment of the same type on the project shall be from a single manufacturer.
- E. All valves and appurtenances shall have the name of the manufacturer, year, and the working pressure for which they are designed cast in raised letters upon some visible part of the body.
- F. Special tools, if required for the normal operation or maintenance, shall be supplied with the equipment.
- G. All hand actuated buried valves shall have three-piece adjustable valve boxes and 2-inch square AWWA operating nuts. Provide min. 304 stainless steel extension stems and alignment rings where needed to bring the operating nut to within 4 feet below the box lid. Valve boxes and alignment rings shall be furnished per the latest edition of the County's Approved Products List.
- H. Valves shall open when turning the operating nut or wheel counterclockwise and shall close when turning clockwise.
- I. All buried valves shall have bonnet bolts, gland bolts, nuts, washers, and other trim hardware made of min. 304 stainless steel, unless otherwise specified in the following specification. All aboveground valves shall have bonnet bolts, gland bolts, nuts, washers, and other trim hardware made of min. 316 stainless steel, unless otherwise specified in the following specification.
- J. All aboveground external thrust restraints, flange adapters, and plain end coupling t-bolts, bolts, tie rods, nuts, and washers shall be 316 stainless steel.
- K. All underground external thrust restraints, mechanical joint adapters, and plain end coupling t-bolts, bolts, tie rods, nuts, and washers shall be high strength, low alloy steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242 Standards and shall be coated with a factory applied blue fluoropolymer coating with min. 1 mil DFT per the latest edition of the

County's Approved Products List. The coating shall pass a 2000 hour salt spray test with less than 15% red rust per ASTM B117. Alternatively, 316 SS hardware shall be acceptable.

- L. All ductile iron valves shall have a factory applied, min. 8 mils average dry film thickness, fusion bonded epoxy coating on the interior and exterior conforming to AWWA C550, unless otherwise noted in the plans or the following specification.
 - 1. A holiday-free certification letter shall be provided to the County at time of delivery stating that the internal coating of the valve has passed the Holiday testing in accordance with ASTM G62, Method A (Low-Voltage).
 - 2. The Contractor shall take extreme consideration when handling valves to ensure coating does not get damaged during construction. County representative shall have the right to deny the installation of the valve if the Contractor damages the internal coating.
- M. All other painted items exposed to sunlight, including field painted box lids, etc., shall be painted the appropriate color with an epoxy type paint per Section 09900 of these Specifications.
- N. No valves with a break-way stem shall be allowed.
- O. All manually-operated geared valves shall require a torque limiting device per Section 02640, 2.05
- P. The brass alloy used for all surfaces coming in contact with potable water shall meet the requirements of UNS/CDA number C89833 as listed in ANSI/AWWA C800 Standard and the products produced with this alloy shall meet the ANSI/NSF Standard 61 and/or ANSI NSF Standard 372 as applicable, complying with the Safe Drinking Water Act. These products shall have the letters "NL" cast into the main body for proper identification.
- Q. The equipment shall include, but not be limited to, the following:
 - 1. Gate Valves (Sec. 2.01)
 - 2. Combination Pressure Reducing and Pressure Sustaining with Check Valves Option (Sec. 2.02)
 - 3. Ball Valves and Curb Stops (Sec. 2.03)
 - 4. Plug Valves (Sec. 2.04)
 - 5. Valve Actuators and Torque Limiting Devices (Sec. 2.05)
 - 6. Air Release Valves (Sec. 2.06)
 - 7. Valves Boxes (Sec. 2.07)
 - 8. Corporation Stops and Service Saddles (Sec. 2.08)
 - 9. Plain End Couplings (Sec. 2.09)
 - 10. Flange Adapters (Sec. 2.10)
 - 11. Hose Bibs (Sec. 2.11)
 - 12. Swing Check Valves (Sec. 2.12)
 - 13. Swing-Flex Check Valves (Sec. 2.13)
 - 14. Hydrants (Sec. 2.14)
 - 15. Restrained Joints (Sec. 2.15)
 - 16. Tapping Sleeves and Tapping Valves (Sec. 2.16)
 - 17. Tracer Wire Boxes (Sec. 2.17)
 - 18. Insertion Valves (Sec. 2.18)

1.02 SUBMITTALS

- A. Submit to the County within 30 days after execution of the contract a list of materials to be furnished, the names of the suppliers, and the date of delivery of materials to the site.
- B. Complete shop drawings of all valves and appurtenances shall be submitted to the County for approval in accordance with the Specifications.

1.03 TOOLS

Special tools, if required for normal operation and maintenance shall be supplied with the equipment.

PART 2 PRODUCTS

2.01 GATE VALVES

- A. Where indicated on the drawings or necessary due to locations, size, or inaccessibility, chain wheel operators shall be furnished with the valves. Such operators shall be designed with adequate strength for the valves with which they are supplied and provide for easy operation of the valve. Chains for valve operators shall be galvanized.
- B. Gate valves installed underground shall be provided with a box cast in a concrete pad and a box cover. Min. 304 stainless steel valve extension stems shall be provided to place the valve operating nut no more than 4 feet deep. One valve wrench, 6 feet in length, shall be provided for every 15 valves installed.
- C. Gate valves 3 inches to 54 inches in diameter shall be resilient seated, manufactured to meet or exceed the requirements AWWA C515 and shall be UL listed and FM approved where applicable. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.
- D. Buried gate valves shall have a non-rising min. 304 stainless steel stem to eliminate lead content. Buried gate valve bolts, nuts and washers shall be min. 304 stainless steel to eliminate exterior corrosion and maintain fastener strength. Manufacturer shall use anti-seize lubricant during assembly of bolt and nut sets to prevent corrosion and galling of metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the thrust collar. Aboveground valves for potable and reclaimed water shall be OS&Y with flanged joints. Aboveground valves for wastewater shall be non-rising stem (NRS) type. All aboveground valves shall have 316 stainless steel stems, bolts, nuts, and washers.
- E. The wedge shall be ductile iron that is fully encapsulated with an EPDM rubber. The Elastomer type shall be permanently embossed or formed on the valve body or wedge. The resilient sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.
- F. The valve body and bonnet shall be ductile iron meeting or exceeding all the requirements of AWWA C515.
- G. Valves shall be rated for an operating pressure of 250 psi and shall be tested in accordance with AWWA C515.

- H. The valves are to have 2-inch cast or ductile iron AWWA operating nuts and shall open counterclockwise. The wedge nut shall be bronze.
- I. The valves shall be covered by a Manufacturer's 10 year warranty on manufacturer's defects and reasonable labor costs for replacement. Warranty shall become effective from the date of purchase by the end user and delivered within 30 days from the receipt of the purchase order. For publicly owned and maintained utilities, the end user is Manatee County Government.
- J. Gate valves shall be assembled and tested in a certified ISO 9001 manufacturing facility within the United States and provide their certification of meeting internationally recognized quality control procedures.
- K. Valves with 16" diameter and larger shall be equipped with manufacturer's standard heavy duty, externally adjustable gearbox that is totally enclosed to prevent water infiltration. Gearbox shall be permanently grease filled. For buried service, vertical installation valves shall be supplied with spur-type gear and horizontal installation valves shall be supplied with bevel-type gear.
- L. All horizontally-installed gate valves shall require a flush line installation per Manatee County's Utilities Standards Manual.
- M. All gate valves installed for wastewater application shall be installed vertically. Gate valves for force mains shall only be allowed for sizes 24-inch and above. Gate valves for lift stations aboveground metering and valve assemblies shall be allowed for sizes 3-inch and larger.
- N. All manually operated geared gate valves shall be furnished with a torque limiting device per Section 02640, 2.05.
- O. Gate valves shall be furnished per the latest edition of the County's Approved Products List.

2.02 COMBINATION PRESSURE RELIEF & PRESSURE SUSTAINING CONTROL VALVE WITH CHECK VALVE OPTION

- A. Pressure relief/sustaining control valve and check valve shall be pilot operated diaphragm actuated valve with cast iron body, bronze disc guide, bronze seat, bronze cover bearing, and 125-pound flanged ends. The stem, nut, and spring shall be min. 304 stainless steel. The pilot shall be hydraulically operated, diaphragm type globe valve. The main valve shall have a single removable seat and a resilient disc, of rectangular cross section, surrounded on three and a half sides. No external packing glands are permitted and there shall be no pistons operating the main valve or any controls. The valve shall be equipped with isolation valves to service the pilot system while permitting flow if necessary. Main valve and all pilot controls shall be manufactured in the United States of America. Main valve shall be single chamber type, with minimum 304 stainless steel stem.
- B. Valve shall automatically reduce pressure for the downstream distribution network and sustain a minimum pressure in the high pressure main regardless of distribution demand, and as an option, shall also close when a pressure reversal occurs for check valve operations. The pilot system shall consist of two direct acting, adjustable, spring loaded diaphragm valves.
- C. Valve shall be cast iron or ductile iron with main valve trim of brass and bronze. The pilot control valves shall be cast brass with min. 304 stainless steel trim.

- D. Pressure relief/sustaining control valve assembly shall be furnished per the latest edition of the County's Approved Products List.

2.03 BALL VALVES AND CURB STOPS

- A. Curb stop ball valves for potable and reclaimed water services, in sizes 3/4-inch through 2-inch, shall have a brass alloy 85-5-5-5 body, stem and ball per ASTM B62. Valves shall be full port, full flow, 1/4-turn check valves, rated for 300 psi, with compression, pack joint, flare, threaded or flanged ends as required. Curb stop ball valves shall be supplied per the latest edition of the County's Approved Products List.
- B. Ball valves for wastewater, 2-inch through 3-inch, shall have 316 stainless steel body, cap, stem, stem gland, and ball per ASTM A276. Valves shall be full port, full flow, 1/4-turn check, steam rated for 150 psi, pressure rating 1,000 psi CWT, with threaded or flanged ends as required. Ball valves for wastewater shall be supplied per the latest edition of the County's Approved Products List.
- C. All valves shall be mounted in such a position that valve position indicators are plainly visible. Above grade ball valves shall have a vinyl coated lever handle. Lever handle and nut shall be min. 304 stainless steel.
- D. Potable water plastic service pipe material and compression/pack joint connectors shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.

2.04 PLUG VALVES

- A. Plug valves shall be eccentric, non-lubricating type with integral plug and shafts. Plug valves shall be furnished with end connections and with actuating mechanisms as called for on the construction plans or as otherwise required. Valves shall seal bubble-tight or water drop-tight in both directions at hydrostatic pressure of 175 psi for 2-inch to 12-inch diameter and 150 psi for larger than 12-inch diameter when field pressure tested in accordance to AWWA C517-16.
- B. Plug valves shall also be subjected, at the factory, to the Hydrostatic Testing specified in AWWA C517-16. The shell test shall be performed at a hydrostatic pressure of 1-1/2 times the design pressure of the valve. The seat pressure test shall be a certified hydrostatic test at the full design pressure of the valve. During the test, there shall be no leakage through the metal, or through the end joints or shaft seal, nor shall any part of the valve be deformed.
- C. Flanged valve ends shall be faced and drilled according to ANSI B16.1, Class 125. Mechanical joint valve ends shall conform to AWWA C111. Threaded ends shall conform to the NPT requirements of ANSI B1.20.1.
- D. The plug valve body, bonnet and gland shall be cast iron per ASTM A126, Class B or ductile iron grade 65-45-12 per ASTM A526 in accordance with AWWA C517-16. The integral plug and shaft shall be ductile iron grade 65-45-12 per ASTM A526. The entire plug and stem shall be fully encapsulated with nitrile (Buna N) rubber. Per AWWA C517-16, the rubber compound shall have been vulcanized to the metal plug and shall have a minimum strength of not less than 250 psi when tested according to ASTM D429, Method A or shall have a peel strength of not less than 75 psi when tested according to ASTM D429, Method B. Valve

seats for sizes 3-inch and larger shall be at least 95 percent pure nickel, welded-in overlay into the cast or ductile iron body. The top and bottom shaft bearings shall be sintered, oil impregnated 316 stainless steel. Valves shall have top and bottom grit seals made of Buna-N rubber or PTFE.

- E. Plug valves shall have a full round/circular cross-sectional area of the nominal pipe size area. The internal opening shall have an unobstructed waterway equal to the full circular cross-sectional area of the inside diameter of the pipe it is attached.
- F. Below grade plug valves, 3-inch and larger shall have a manufacturer standard heavy duty worm gear type actuators with 2-inch square operating nuts. The gearbox shall be externally adjustable and totally enclosed to prevent water infiltration. Actuators for buried service valves shall be not less than 90% grease packed and totally sealed by means of gaskets or O-rings. Actuators shall be self-locking and designed to transmit twice the required actuator torque without damage to the faces of the gear teeth. Gearboxes shall be certified to meet ISO 9001 standards. The gearbox worm gear shall be hardened steel or ductile iron ASTM A536 Class 65-45-12. Gearbox shaft shall be manufactured of hardened steel. Gearbox bearings shall be high efficiency, oil impregnated, manufactured of bronze or hardened steel.
- G. All manually operated geared plug valves shall be furnished with a torque-limiting device per Section 2.05.
- H. Plug valves shall be installed side-ways with plug shaft horizontal so that the plug rotates upward when it opens, with the flow entering the seat end of the valve.
- I. All plug valves shall be internally and externally coated with at least 16-mils average dry film thickness of a factory applied, two-part high solids epoxy conforming to AWWA C550. A holiday-free certification letter shall be provided to the County at time of delivery stating that the internal coating of the valve has passed the Holiday testing in accordance with ASTM G62, Method A (Low Voltage). The Contractor shall take extreme consideration when handling valves to ensure coating does not get damaged during construction. County representative shall have the right to deny the installation of the valve if the Contractor damages the internal coating.
- J. Plug valves shall be furnished per the latest edition of the County's Approved Products List.

2.05 VALVE ACTUATORS AND TORQUE LIMITING DEVICES

Gate, Tapping, and Plug Valve Torque-Limiting Devices:

- A. Gate, tapping, and plug buried valves that are furnished with a gearbox shall also require a valve torque-limiting device to prevent valve and actuator damage caused by excessive operating torque.
- B. The overtorque protection mechanism enclosed in a hermetically sealed cast iron housing and permanently lubricated with molydisulfide-bearing, water-resistance, high pressure synthetic grease.
- C. The housing shall have integrally cast, 2-inch AWWA operating nut and matching socket to operate and to fit over the actuator or extension shaft nut, respectively. The socket shall be provided with a set screw to fit to the device.

- D. The device shall transmit sufficient torque to free up and operate the valve and shall be factory set to 1.5 times the input torque of the valve provided that the trip limit is at least 100 ft-lb less than the valve breaking torque. Refer to the latest edition of the County's Approved Products List for the trip limits set for each specified valve.
- E. The torque limiting device shall be internally and externally coated with a fusion-bonded epoxy and enamel top-coat conforming to AWWA C-213.
- F. All hardware shall be minimum 304 stainless steel.
- G. The torque limiting device shall be furnished per the latest edition of the County's Approved Products List.

Manual Actuators:

- H. Manual actuators shall be of the traveling nut, self-locking type or of the worm gear type and shall be designed to hold the valve in any intermediate position between fully open and fully closed without creeping or fluttering.
- I. Actuators shall be capable of seating and unseating the disc against the full design pressure and velocity, as specified for each class, into a dry system downstream, and shall transmit a minimum torque to the valve. Actuators shall be rigidly attached to the valve body.
- J. Actuators shall be equipped with mechanical stop-limiting locking devices to prevent over travel of the disc in the open and closed positions. They shall turn counter-clockwise to open valves.
- K. Valves located above grade shall have handwheel and position indicator, and valves located below grade shall be equipped with a 2-inch square AWWA operating nut located at ground level and cast iron extension type valve box.
- L. Manual actuators shall have permanently lubricated, totally enclosed gearing with handwheel and gear ratio sized on the basis of actual line pressure and velocities.

Motor Actuators (Modulating):

- M. The motor actuated valve controller shall include the motor, actuator unit gearing, limit switch gearing, limit switches, position transmitter which shall transmit a 4-20 mA DC signal, control power transformer, electronic controller which will position the valve based on a remote 4-20 milliamp signal, torque switches, bored and key-wayed drive sleeve for non-rising stem valves, declutch lever and auxiliary handwheel as a self-contained unit.
- N. The motor shall be specifically designed for valve actuator service using 480 volt, 60 Hertz, three phase power as shown, on the electrical drawings. The motor shall be sized to provide an output torque and shall be the totally enclosed, non-ventilated type. The power gearing shall consist of helical gears fabricated from heat treated alloy steel forming the first stage of reduction. The second reduction stage shall be a single stage worm gear. The worm shall be of alloy steel with carburized threads hardened and ground for high efficiency. The worm gear shall be of high tensile strength bronze with hobbed teeth. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout. Preference will be given to units having a minimum number of gears and moving parts. Spur gear reduction shall be provided as required.

- O. Limit switches and gearing shall be an integral part of the valve control. The limit switch gearing shall be made of bronze and shall be grease lubricated, intermittent type and totally enclosed to prevent dirt and foreign matter from entering the gear train. Limit switches shall be of the adjustable type capable of being adjusted to trip at any point between fully opened valve and fully closed valve.
- P. The speed of the actuator shall be the responsibility of the system supplier with regard to hydraulic requirements and response compatibility with other components within the control loop. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing. The rotor type gear limit switch shall have two normally open and two normally closed contacts per rotor. Gear limit switches must be geared to the driving mechanism and in step at all times whether in motor or manual operation. Provision shall be made for two additional rotors as described above, each to have two normally open and two normally closed contacts. Each valve controller shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve, should excessive load be met by obstructions in either direction of travel. The torque switch shall be provided with double-pole contacts.
- Q. A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operations, but must be responsive to manual operation at all times except when being electrically operated. The motor shall not rotate during hand operation nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve operator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. This movement from motor operation to handwheel operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running. The gear limit switches and torque switches shall be housed in a single easily accessible compartment integral with the power compartment of the valve control. All wiring shall be accessible through this compartment. Stepping motor drives will not be acceptable.
- R. The motor with its control module must be capable of continuously modulating over its entire range without interruption by heat protection devices. The system, including the operator and control module must be able to function, without override protection of any kind, down to zero dead zone.
- S. All units shall have strip heaters in both the motor and limit switch compartments.
- T. The actuator shall be equipped with open-stop-close push buttons, an auto-manual selector switch, and indicating lights, all mounted on the actuator or on a separate locally mounted power control station.
- U. The electronics for the electric operator shall be protected against temporary submergence.
- V. Actuators shall be Flowserve Limitorque L120 with Mudotronic Control System. Actuator shall contain a position transmitter with a 4-20MA output signal.

Motor Actuators (Open-Close):

- W. The electronic motor-driven valve actuator shall include the motor, actuator gearing, limit switch gearing, limit switches, torque switches, fully machined drive sleeve, declutch lever, and auxiliary handwheel as a self-contained unit.
- X. The motor shall be specifically designed for valve actuator service and shall be of high torque totally enclosed, nonventilated construction, with motor leads brought into the limit switch compartment without having external piping or conduit box.
- Y. The motor shall be of sufficient size to open or close the valve against maximum differential pressure when voltage to motor terminals is 10% above or below nominal voltage.
- Z. The motor shall be prelubricated and all bearings shall be of the anti-friction type.
- AA. The power gearing shall consist of helical gears fabricated from heat treated steel and worm gearing. The worm shall be carburized and hardened alloy steel with the threads ground after heat treating. The worm gear shall be of alloy bronze accurately cut with a hobbing machine. All power gearing shall be grease lubricated. Ball or roller bearings shall be used throughout.
- AB. Limit switches and gearing shall be an integral part of the valve actuator. The switches shall be of the adjustable rotor type capable of being adjusted to trip at any point between fully opened valve and fully closed valve. Each valve controller shall be provided with a minimum of two rotor type gear limit switches, one for opening and one for closing (influent valves require additional contacts to allow stopping at an intermediate position). The rotor type gear limit switch shall have two normally open and two normally closed contacts per rotor. Additional switches shall be provided if shown on the control and/or instrumentation diagrams. Limit switches shall be geared to the driving mechanism and in step at all times whether in motor or manual operation. Each valve actuator shall be equipped with a double torque switch. The torque switch shall be adjustable and will be responsive to load encountered in either direction of travel. It shall operate during the complete cycle without auxiliary relays or devices to protect the valve should excessive load be met by obstructions in either direction of travel. Travel and thrusts shall be independent of wear in valve disc or seat rings.
- AC. A permanently mounted handwheel shall be provided for manual operation. The handwheel shall not rotate during electric operation except when being electrically operated. The motor shall not rotate during hand operation, nor shall a fused motor prevent manual operation. When in manual operating position, the unit will remain in this position until motor is energized at which time the valve actuator will automatically return to electric operation and shall remain in motor position until handwheel operation is desired. Movement from motor operation to handwheel operation shall be accomplished by a positive declutching lever which will disengage the motor and motor gearing mechanically, but not electrically. Hand operation must be reasonably fast. It shall be impossible to place the unit in manual operation when the motor is running.
- AD. Valve actuators shall be equipped with an integral reversing controller and three phase overload relays, Open-Stop-Close push buttons, local-remote-manual selector switch, control circuit transformer, three-phase thermal overload relays and two pilot lights in a NEMA 4X enclosure. In addition to the above, a close coupled air circuit breaker or disconnect switch shall be mounted and wired to the valve input power terminals for the purpose of disconnecting all underground phase conductors.

- AE. The valve actuator shall be capable of being controlled locally or remotely via a selector switch integral with the actuator. In addition, an auxiliary dry contact shall be provided for remote position feedback.
- AF. Valve A.C. motors shall be designed for operation on a 480 volt, 3-phase service. Valve control circuit shall operate from a fuse protected 120 volt power supply.
- AG. Motor operators shall be Flowserve Limitorque L120 with Mudotronic Control System.

2.06 AIR RELEASE VALVES

- A. Air release valves shall be automatic float operated, with 2" inlet size and working pressure ratings as required, and NPT connections.
- B. Air release valves for standard application shall have body and cover made of ductile iron per ASTM A536, Class B. The orifice, float and linkage shall be 316 stainless steel. The seat shall be (Buna N) nitrile elastomer. The external fasteners including bolts, washers, and nuts shall be made of 316 stainless steel.
- C. Air release valves installed over waterways shall have body and cover made of 316 stainless steel, with 2" inlet size and working pressure ratings as required, and NPT connections. Diaphragm, debris shield, float, debris screen, diaphragm holder, and upper air valve part shall be made of homopolymer (PP) or Delrin (POM). The external fasteners including bolts, washers, and nuts shall be made of 316 stainless steel.
- D. Air release valves shall be furnished with a County-approved 316 stainless steel ball valve.
- E. Air release valves shall be furnished per the latest edition of the County's Approved Products List.

2.07 VALVE BOXES

- A. Buried valves shall have adjustable cast iron or HDPE valve boxes. Lids shall be cast iron drop type, and shall have "WATER", "SEWER", or "RECLAIM", as applicable, cast into the top. Lids will be painted "safety" blue for potable water, purple for reclaimed water, and green for sanitary sewer.
- B. Cast iron boxes shall be two-piece or three-piece, screw type, with extensions, as required to make the desired box length. Bottom barrel shall be 5-1/4 inches inside diameter, with a flanged bottom with sufficient bearing area to prevent settling.
- C. HDPE boxes shall be two-piece, adjustable, 1/4-inch thick minimum heavy wall, high density polyethylene, with cast iron top and min. 304 stainless steel adjustable stem. Bottom barrel shall have flanged bottom to prevent settling. All bolts, screws and pins shall be min. 304 stainless steel.
- D. Reclaimed Valve Boxes shall be square 9-inch x 9-inch load bearing marked "Reclaimed Water" and painted purple.
- E. All valves shall either have operating nuts within 4 feet below the top of the lid or shall have min. 304 stainless steel extension stems with centering guides to provide an extended

operating nut within 4 feet below the lid. Extension stems shall be fixed to the valve operating nut with min. 304 stainless steel fastener.

- F. All potable water, sewer, and reclaimed water grade-adjustment risers shall be cast iron material just like the cast iron valve box. No plastic or steel risers shall be allowed.
- G. A box alignment ring device shall be installed in the valve box per the latest edition of the County's Approved Product List.
- H. Stand pipe shall match color code of the system being installed, (blue for potable water, purple for reclaimed water, and green for sanitary sewer).

2.08 CORPORATION STOPS AND SERVICE SADDLES

- A. Corporation stop ball valves for connections to potable and reclaimed water mains, made of PVC or ductile iron, shall conform to AWWA C800 and be NSF 61 certified. Brass components in contact with potable water shall conform to ASTM B584, UNS C89833 and shall be identified with "NL". Alternatively, Brass components not in contact with potable water can conform to ASTM B62 and ASTM B584, UNS C83600 85-5-5-5 in lieu of requirements above. 1-inch through 2-inch corporation stops shall be ball type, 300 psi working pressure rated. Inlets shall be AWWA MIP or tapered threaded type and outlets shall be compression, pack joint, flare, or FIP threaded joint type. All joints made to CTS size HDPE tubing shall use min. 304 stainless steel insert stiffeners. Corporation stops shall be furnished per the latest edition of the County's Approved Product List
- B. For potable water, plastic service pipe material and compression and pack joint connectors shall not be used in soil that is contaminated with low molecular-weight petroleum products, aromatic hydrocarbons, chlorinated hydrocarbons or organic solvents. Appropriate service tubing shall apply.
- C. Water and reclaimed water service connections to PVC and DIP mains shall be made using saddles, straps, and hardware of red brass, alloy 85-5-5-5, per ASTM B62 and/or ASTM B584, UNS C83600. Alternatively, the saddles, straps, and hardware shall be minimum 304 stainless steel. The assembly shall be NSF 61 certified. No ductile iron, cast iron or steel saddles will be allowed. Service saddles shall be furnished per the latest edition of the County's Approved Products List.
- D. Connections to sanitary mains for services up to 2 inches shall be made using the service saddles per the latest edition of the County's Approved Products List. Saddles, straps, and hardware shall be 316 SS.
- E. Service and air release valve (ARV) connections to HDPE potable, reclaimed water and force mains shall be properly sized per the manufacturer product information and be installed according to the manufacturer's written instructions. Service saddles shall be furnished per the latest edition of the County's Approved Products List.
- F. For potable and reclaimed water mains, service saddles shall use Ethylene Propylene Diene Monomer (EPDM) rubber gaskets. The letters "EPDM" and company logo shall be factory stamped with white ink on gasket. Alternatively, the letters "EPDM" shall be factory engraved/edged on the exterior saddle body. Refer to Specification Section 02615 for gasket materials in contaminated soils.

2.09 PLAIN END COUPLINGS

- A. For potable and reclaimed water mains, plain end couplings shall use Ethylene Propylene Diene Monomer (EPDM) rubber gaskets. Shall have EPDM rubber gaskets with the letters "EPDM" factory embossed or etched into gasket. Refer to Specification Section 02615 for gasket materials in contaminated soils.
- B. All aboveground plain end coupling t-bolts, bolts, tie rods, nuts, and washers shall be 316 stainless steel. All buried plain end coupling t-bolts, bolts, tie rods, nuts, and washers shall be high strength, low alloy steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A242 standards and shall be coated with a factory applied blue fluoropolymer coating with min. 1 mil DFT per the latest edition of the County's Approved Products List. The coating shall pass a 2000 hour salt spray test with less than 15% red rust per ASTM B117. Alternatively, all hardware shall be 316 stainless steel.
- C. The coupling shall have a high performance internal epoxy coating from the factory. Contractor shall provide a holiday-free certification letter shall be provided to the County at time of delivery stating that the internal coating of the coupling has passed the Holiday testing in accordance with ASTM G62, Method A (Low Voltage).

2.10 FLANGE ADAPTERS

- A. Flange adapters to be used on ductile iron and PVC piping shall have a ductile iron ASTM A536 body with a factory applied fusion bonded or a thermally cured fluoropolymer epoxy interior (min. 15 mils DFT) and exterior (min. 6 mils) coating. The coating shall meet NSF-61 standards for potable water mains. The adapter shall adapt and restrain plain end pipe to flanged pipe or fittings, where the flange conforms to AWWA C111/A21.11-17 and meets ANSI B16.5 Class 150/125 drilling pattern per AWWA C110/A21.10.
- B. All aboveground gland bolts, flange connection bolts, t-bolts, tie-rods, nuts, and washers shall be 316 stainless steel. All underground flange adapters t-bolts, bolts, tie rods, nuts, and washers shall be high strength, low alloy steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A-242 standards and shall be coated with a factory applied blue fluoropolymer coating with min. 1 mil DFT per the latest edition of the County's Approved Products List. The coating shall pass a 2000 hour salt spray test with less than 15% red rust per ASTM B117. Alternatively, all hardware shall be 316 stainless steel.
- C. For potable and reclaimed water mains, flange adapters shall use Ethylene Propylene Diene Monomer (EPDM) rubber gaskets with the letters "EPDM" factory embossed or edged into gasket. Refer to Specification Section 02615 for gasket materials in contaminated soils.
- D. Flange adapters to be used with plain end ductile iron pipe conforming to AWWA C151 shall have the following minimum pressure ratings:

Size	Pressure Rating
2" - 16"	350 PSI
18" and Larger	250 PSI

- E. Flange adapters to be used with plain end PVC pipe (DR 18) conforming to AWWA C900-16 shall have the following minimum pressure rating:

Size	Pressure Rating
2"-36"	235 PSI

- F. Flange adapters to be used with HDPE pipe (DR 11) conforming to AWWA C906 shall be thermally fused per manufacturer's recommendations, shall have 316 stainless steel backup ring and pipe stiffeners, and shall have the following minimum pressure rating:

Size	Pressure Rating
4" and Larger	200 PSI

- G. Flange adapters shall be furnished per the latest edition of the County's Approved Products List.

2.11 RESTRAINED JOINTS

- A. Pipe joints shall be restrained by poured-in-place concrete thrust blocks, by external thrust restraint devices, internal restrained joint gaskets or locking segments. Flanged joints shall be used aboveground.
- B. For potable and reclaimed water mains, thrust restraint devices shall use Ethylene Propylene Diene Monomer (EPDM) rubber gaskets with the letters "EPDM" factory embossed or etched into gasket. Refer to Specification Section 02615 for gasket materials in contaminated soils.

Concrete Thrust Restraints:

- A. Cast-in-place or precast concrete for thrust blocks shall have a 28-day strength of 3,000 psi. The concrete shall be placed between undisturbed soil and the fittings or appurtenance to be supported. Concrete shall not be placed on or around the pipe, bells, flanges, or other joints. If contact with concrete is unavoidable, these areas shall be protected with a double wrap of 6-mil polyethylene film to allow for disassembly and repair of the fitting or appurtenance.

External Thrust Restraint Devices:

- A. External thrust restraint devices shall be made of ductile iron in accordance with ASTM A536, Grade 65-45-12. The gland body and wedges shall have a standard factory applied fusion bonded epoxy, thermally cured fluoropolymer epoxy, or acrylic enamel coating per the latest edition of the County's Approved Products List.
- B. External thrust restraint devices shall use wedge-action restraint type or split-casing restraint type.
- C. All aboveground gland bolts, t-bolts, tie-rods, nuts, and washers shall be 316 stainless steel. All buried external thrust restraint t-bolts, bolts, tie rods, nuts, and washers shall be high strength, low alloy steel conforming to AWWA C111/ANSI A21.11-17 or ASTM A-242 standards and shall be coated with a factory applied blue fluoropolymer coating with min. 1 mil DFT per the latest edition of the County's Approved Products List. The coating shall

pass a 2000 hour salt spray test with less than 15% red rust per ASTM B117. Alternatively, all hardware shall be 316 stainless steel.

- D. Additionally, all restraint assemblies of split-casing style which require a bolt and nut to join both halves shall have a side clamping bolt made of min. 316 stainless steel per ASTM A193 Grade B8M class 2 and side clamping nut made of min. 316 stainless steel per ASTM A194 Grade 8M class 1.
- E. External thrust restraint devices to be used with plain end ductile iron pipe conforming to AWWA C151 shall have the following minimum pressure ratings:

Size	Pressure Rating
2"-16"	350 PSI
18" and Larger	250 PSI

- F. External thrust restraint devices to be used with plain end PVC pipe (DR 18) conforming to AWWA C900-16 shall have the following minimum pressure rating:

Size	Pressure Rating
2"-36"	235 PSI

- G. External thrust restraint devices to be used with HDPE pipe (DR 11) conforming to AWWA C906 shall have the following minimum pressure rating:

Size	Pressure Rating
4" and Larger	200 PSI

- H. Refer to the latest edition of the County's Approved Products List for acceptable manufacturer and model.

Internal Self-Restrained Joints for Ductile Iron Pipe:

- A. Internal self-restrained joint gaskets for Fastite or Tyton joint ductile iron pipe shall be allowed in lieu of external thrust restraint devices. The gasket material shall be designated depending on the soil conditions described in Section 02615. The gasket shall restrain the pipe due to the wedging action of the high strength min. 304 stainless steel teeth spaced around the interior of the gasket.
- B. Internal self-restrained split locking rings made of high-strength, low-alloy (HSLA) steel conforming to AWWA C111 shall be allowed on ductile iron pipe manufactured for this type of joint restraint. The pipe shall have a shop-applied welded-on retainer ring.
- C. Internal self-restrained ductile iron split flexible rings shall be allowed when used with a beveled ductile iron, welded-on retainer ring in accordance with manufacturer's recommendations. The split flexible ring shall be assembled behind the retainer ring to provide the means of restraint. For pipe 14" and larger, a shop applied nickel-iron weld bead and a rubber-back ring containing ductile iron segments shall provide the means of restraint.
- D. Internal self-restrained ductile iron locking segments, inserted through slots in the pipe bell face, which provide a positive axial lock between the bell interior surface and a retainer weldment on the pipe spigot end, shall be allowed on ductile iron pipe manufactured for this type of joint restraint. Restraining components shall be ductile iron in accordance with

applicable requirements of AWWA C110 and AWWA C153 with the exception of the manufacturer's proprietary design dimensions.

- E. All self-restrained push-on joint pipe shall have a weather-resistant, minimum 6-mil thick, 4-inch wide solid-red PVC marking tape around pipe bell.
- F. Refer to the latest edition of the County's Approved Products List for acceptable manufacturers and models.

Internal Self-Restrained Joint Gasket for Pressurized PVC:

- A. Internal restrained joint gaskets PVC C900-16 pipe shall provide uniform circumferential restraint through the use of a metallic restraint casing and lock ring. The gasket material shall be designated depending on the soil conditions described in Section 02615.
- B. Refer to the latest edition of the County's Approved Products List for acceptable manufacturers and models.

2.12 HOSE BIBS

Hose bibs shall be 3/4" or 1" brass, polished chromium plated brass, with vacuum breaker as noted on the drawings.

2.13 LEVER & WEIGHT CHECK VALVES

- A. Check valves shall be swing type, weighted lever, conforming to AWWA C508. Valves shall be iron-body, bronze-mounted, single disc, with ANSI B16.1 Class 125 flanged ends.
- B. When there is no flow through the line, the disc shall hang lightly against its seat in practically a vertical position. When open, the disc shall swing clear of the waterway.
- C. Check valves shall have bronze seat and body rings. Hinge pins shall be extended bronze or 316 stainless steel. All external bolts, nuts, and washers shall be 316 stainless steel.
- D. Valves shall be so constructed that disc and body seat may easily be removed and replaced without removing the valve from the line. Valves shall be fitted with an extended hinge arm with outside lever and weight.
- E. All check valves shall be internally and externally coated with at least 12-mils average dry film thickness of a factory applied, two-part high solids epoxy conforming to AWWA C550. A holiday-free certification letter shall be provided to the County at time of delivery stating that the internal coating of the valve has passed the Holiday testing in accordance with ASTM G62, Method A (Low Voltage). The Contractor shall take extreme consideration when handling valves to ensure coating does not get damaged during construction. County representative shall have the right to deny the installation of the valve if the Contractor damages the internal coating.
- F. Refer to the latest edition of the County's Approved Products List for acceptable manufacturer and model.

2.14 SWING FLEX CHECK VALVES

- A. Swing Flex Check valves shall be of the full flow body type, with a domed access cover. It shall be equipped with a flexible disc, which is the only moving part, and it shall conform to AWWA C508.
- B. Valves body and cover shall be ASTM A536 Grade 65-45-12 ductile iron with ANSI B16.1 Class 125 flanged ends. The disc shall be precision molded EPDM.
- C. When there is no flow through the line, the disc shall hang lightly against its inclined seat. When open, the disc shall swing clear of the waterway.
- D. Check valves shall be lead free, ductile iron conforming to NSF 61. All external bolts, nuts, and washers shall be 316 stainless steel nuts and bolts on bolted covers.
- E. Valves shall be constructed so that the disc and body seat may easily be removed and replaced without removing the valve from the line. Valves shall be fitted with an extended hinge arm with outside lever and weight.
- F. Valves shall be equipped with minimum 17-4 stainless steel seat position indicator and minimum 304 stainless steel backflow actuator.
- G. All swing flex check valves shall be internally and externally coated with at least 8-mils average dry film thickness of a factory applied, two-part high solids epoxy conforming to AWWA C550. A holiday-free certification letter shall be provided to the County at time of delivery stating that the internal coating of the valve has passed the Holiday testing in accordance with ASTM G62, Method A (Low Voltage). The Contractor shall take extreme consideration when handling valves to ensure coating does not get damaged during construction. County representative shall have the right to deny the installation of the valve if the Contractor damages the internal coating.
- H. Refer to the latest edition of the County's Approved Products List for acceptable manufacturer and model.

2.15 HYDRANTS

- A. Hydrants shall be dry barrel and shall conform to AWWA C502 and UL/FM certified. The hydrants shall meet the specific requirements and exceptions which follow:
- B. Hydrants shall be according to manufacturer's standard pattern or nostalgic style and of standard size, and shall have one 5-inch Storz connection with two 2½-inch hose nozzles.
- C. Hydrant inlet connections shall have mechanical joints for 6-inch pipe.
- D. Hydrant valve opening shall have an area at least equal to that area of a 5 1/4-inch minimum diameter circle and be obstructed only by the valve rod. Each hydrant shall be able to deliver 500 gpm minimum through its two 2-1/2-inch hose nozzles when opened together with a loss of not more than 2 psi in the hydrant per AWWA C502.
- E. The upper and lower stem rod shall be min. 304 stainless steel and shall have a breakable stem-rod coupling of min. 304 stainless steel, or cast iron or ductile iron with a fusion bonded epoxy coating, with min. 304 stainless steel pins and clips.

- F. Hydrants shall be hydrostatically tested as specified in AWWA C502 and shall be rated at 250 psi minimum.
- G. The operating nut shall be 1½ -inch pentagon shaped with a protective weather cover, and open counter clockwise.
- H. All nozzle threads shall be American National Standard.
- I. Each nozzle cap shall be provided with a rubber washer.
- J. All hydrants shall be traffic breakaway type and allow for 360 degree rotation to position the Storz connection/nozzle in the desired direction after installation.
- K. Hydrants must be capable of being extended without removing any operating parts.
- L. The breakaway coupling can be fusion bonded epoxy coated or min. 304 stainless steel. Only one hydrant extension is allowed per hydrant.
- M. Weepholes shall be excluded from fire hydrants.
- N. Hydrant main valve closure shall be of the compression type opening against the pressure and closing with the pressure. The main valve shall be faced or covered with EPDM elastomer, which shall seat on a bronze ring. The letters "EPDM" shall be factory embossed or etched into the rubber.
- O. Hydrant bonnets, weather cover, nozzle section, caps and shoe shall be cast iron or ductile iron. Hydrant shoe shall be fusion bonded epoxy coated inside and outside. Standpipe shall have standard thickness cement lining on the inside in accordance with AWWA C104 and standard 1-mil asphaltic exterior coating or shall have fusion bonded epoxy inside and outside. Hydrant bonnets, weather cover, nozzle section, and caps shall have interior and exterior epoxy primer. Aboveground parts shall have a UV-resistant external top coat of minimum 4-mils DFT per the latest edition of the County's Approved Products List; color Safety Yellow for fire hydrants that are connected to the public potable water system or Pantone 522C purple for fire hydrants that are connected to the reclaimed water system.
- P. Above grade exterior nuts, bolts and washers shall be 316 stainless steel. Bronze nuts may be used below grade.
- Q. All internal operating parts shall be removable without requiring excavation.
- R. Refer to the latest edition of the County's Approved Products List for acceptable manufacturer and model.

2.16 TAPPING SLEEVES AND VALVES

- A. Tapping valves shall be provided with a box cast in a concrete pad and a box cover. Minimum 304 stainless steel valve extension stems shall be provided to place the valve operating nut no more than 4 feet deep. One valve wrench, 6 feet in length, shall be provided for every 15 valves installed.
- B. Tapping valves 3 inches to 54 inches in diameter shall be resilient seated, manufactured to meet or exceed the requirements AWWA C515 and shall be UL listed and FM approved where applicable. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve to accommodate the full size shell cutter.
- C. The valves shall have a non-rising minimum 304 stainless steel stem to eliminate lead content. All valve bolts, nuts and washers shall be minimum 304 stainless steel to eliminate exterior corrosion and maintain fastener strength. Manufacturer shall use anti-seize lubricant during assembly of bolt and nut sets to prevent corrosion and galling of metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the thrust collar.
- D. The wedge shall be ductile iron fully encapsulated with an EPDM rubber. The Elastomer type shall be permanently embossed or formed on the valve body or wedge. The resilient sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.
- E. The valve body and bonnet shall be ductile iron meeting or exceeding all the requirements of AWWA C515. The valves shall be flanged with alignment ring by mechanical joint.
- F. Valves shall be rated for an operating pressure of 250 psi and shall be tested in accordance with AWWA C515.
- G. The valves are to have 2-inch cast or ductile iron AWWA operating nuts and shall open left or counterclockwise. The wedge nut shall be bronze.
- H. The valves shall be covered by a Manufacturer's 10 year warranty on manufacturer's defects and reasonable labor costs for replacement. Warranty shall become effective from the date of purchase by the end user and delivered within 30 days from the receipt of the purchase order. For publicly owned and maintained utilities, the end user is Manatee County Government.
- I. Valves shall be assembled and tested in a certified ISO 9001 manufacturing facility within the United States and provide their certification of meeting internationally recognized quality control procedures.
- J. Valves with 16" diameter and larger shall be equipped with manufacturer's standard heavy duty, externally adjustable gearbox that is totally enclosed to prevent water infiltration. Gearbox shall be permanently grease filled. For buried service vertical installations valves shall be supplied with spur-type gear and horizontal installation valves shall be supplied with bevel-type gear.
- K. All horizontally-installed tapping valves shall require a flush line installation per Manatee County's Utilities Standards Manual.
- L. All tapping valves installed for wastewater application shall be installed vertically.

- M. All tapping valves shall be furnished with a torque limiting device per 2.06A of this Section.
- N. Full faced flange gaskets shall cover the entire area of the flange surface and be 1/8-inch minimal thickness of rubber.
- O. For potable and reclaimed water mains, tapping valve and sleeves shall use Ethylene Propylene Diene Monomer (EPDM) rubber gaskets with the letters "EPDM" factory embossed or edged into gasket. Refer to Specification Section 02615 for gasket materials in contaminated soils.
- P. Tapping sleeves and straps shall be constructed from 316 stainless steel. All hardware for joining the two sleeve halves and the tapping valve including bolts, nuts, and washers shall be 316 stainless steel. Threads must be coated to prevent galling.
- Q. Tapping sleeves shall seal to the pipe by the use of a gasket compounded for water or sewer, and shall be able to withstand a pressure test of 180 psi for water lines or 150 psi for sewer force mains for one hour with no leakage in accordance with AWWA C110. A 316 stainless steel 3/4-inch NPT test plug shall be provided for pressure testing. Threads must be coated to prevent galling.
- R. If the tapping sleeves have rubber wrap around gasket, it shall be provided with the elastomer letters and company logo factory stamped with white ink. Alternatively, the elastomer letters shall be factory engraved/etched on the exterior shell of the tapping sleeve.
- S. The diameter of the tapping sleeve outlet shall be a minimum of 2" less than the inside diameter of the branch line.
- T. Tapping sleeves and valves shall be furnished per the latest edition of the County's Approved Products List.

2.17 TRACER WIRE TEST STATION BOXES

- A. Tracer wire test station boxes shall be provided at plug valves, blowoff valves, gate valves, fire hydrants and backflow preventers as indicated in these Standards. Tracer wire test station boxes for yard service shall be 2 ½ inch diameter, 15 inch length, ABS plastic with a cast iron rim and lid. Where test boxes will be in streets or subject to vehicular traffic, use H-20 rated lids, 5-1/4 inch diameter or equal, centered in a separate concrete pad similar to a valve box pad.
- B. Where possible, locate the tracer wire testing station outside of travel lanes, in medians, or in grassy areas adjacent to the travel lanes. All tracer wire(s) shall be attached to the lid, allowing testing to be performed without removing the lid.
- C. Refer to Section 02800 for proper installation of the tracer wire system.
- D. Refer to the latest edition of the County's Approved Products List for acceptable manufacturer and model.

2.18 INSERTION VALVE

- A. Insertion valves shall be resilient wedge gate valves, manufactured to meet or exceed the requirements AWWA C515 and shall be UL listed and FM approved where applicable. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.
- B. Buried gate valves shall have a non-rising min. 304 stainless steel stem to eliminate lead content. Buried gate valve bolts, nuts and washers shall be min. 304 stainless steel to eliminate exterior corrosion and maintain fastener strength. Manufacturer shall use anti-seize lubricant during assembly of bolt and nut sets to prevent corrosion and galling of metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the thrust collar.
- C. The wedge shall be ductile iron that is fully encapsulated with an EPDM rubber. The Elastomer type shall be permanently embossed or formed on the valve body or wedge. The resilient sealing mechanism shall provide zero leakage at the water working pressure when installed with the line flow in either direction.
- D. The valve body and bonnet shall be ductile iron meeting or exceeding all the requirements of AWWA C515.
- E. Valves shall be rated for an operating pressure of 250 psi and shall be tested in accordance with AWWA C515.
- F. The valves are to have 2-inch cast or ductile iron AWWA operating nuts and shall open left or counterclockwise. The wedge nut shall be bronze.
- G. The valves shall be covered by a Manufacturer's 10 year warranty on manufacturer's defects and reasonable labor costs for replacement. Warranty shall become effective from the date of purchase by the end user and delivered within 30 days from the receipt of the purchase order. For publicly owned and maintained utilities, the end user is Manatee County Government.
- H. Gate valves shall be assembled and tested in a certified ISO 9001 manufacturing facility within the United States and provide their certification of meeting internationally recognized quality control procedures.
- I. Contractor shall be qualified to perform the installation and shall provide written certification by valve manufacturer guaranteeing the Contractor is qualified to perform the Work.
- J. Sizes 12" and smaller must be capable of working on ductile iron pipe, PVC IPS, PVC C900-16, or Asbestos Clay without having to change either the top or bottom portion of split valve body.
- K. Valve shall have a minimum 10-mil fusion bonded epoxy on the interior and exterior.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All valves and appurtenances shall be installed in the location shown, true to alignment and rigidly supported. Any damage occurring to the above items before they are installed shall

be repaired to the satisfaction of the County.

- B. After installation, all valves and appurtenances shall be tested at least two hours at the working pressure of pipeline, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the County.
- C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.
- D. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections.
- E. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- F. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8". Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6" from the end.
- G. Valve boxes with concrete bases shall be installed as shown on the Drawings. Mechanical joints shall be made in the standard manner. Valve stems shall be vertical in all cases. Place cast iron box over each stem with base bearing on compacted fill and the top flush with final grade. Boxes shall have sufficient bracing to maintain alignment during backfilling. Knobs on cover shall be parallel to pipe. Remove any sand or undesirable fill from valve box.

3.02 HYDRANTS

- A. Hydrants shall be set at the locations designated by the County and/or as shown on the Drawings and shall be bedded on a firm foundation. A drainage pit on crushed stone as shown on the Drawings shall be filled with gravel or crushed stone and satisfactorily compacted. During backfilling, additional gravel or crushed stone shall be brought up around and 6" over the drain port. Each hydrant shall be set in true vertical alignment and shall be properly braced. Concrete thrust blocks shall be placed between the back of the hydrant inlet and undisturbed soil at the end of the trench. Minimum bearing area shall be as shown on the plans. Felt paper shall be placed around the hydrant elbow prior to placing concrete. CARE MUST BE TAKEN TO ENSURE THAT CONCRETE DOES NOT PLUG THE DRAIN PORTS. Concrete used for backing shall be as specified herein.

3.03 TAPPING SLEEVE AND VALVE

- A. When installations are made under pressure, the flow of water through the existing main shall be maintained at all times. The diameter of the tap shall be a minimum of 2" less than

the inside diameter of the branch line.

- B. The entire operation shall be conducted by workmen thoroughly experienced in the installation of tapping sleeves and valves, and under the supervision of qualified personnel furnished by the manufacturer. The tapping machine shall be furnished by the Contractor if tap is larger than 12" in diameter.
- C. The Contractor shall determine the locations of the existing main to be tapped to confirm the fact that the proposed position for the tapping sleeve will be satisfactory and no interference will be encountered such as the occurrence of existing utilities or of a joint or fitting at the location proposed for the connection. No tap will be made closer than 30" from a pipe joint.
- D. Tapping valves shall be set in vertical position and be supplied with a 2" square operating nut for valves 2" and larger. The valve shall be provided with an oversized seat to permit the use of full sized cutters.
- E. Tapping sleeves and valves shall be squarely centered on the main to be tapped. Adequate support shall be provided under the sleeve and valve during the tapping operation. Thrust blocks shall be provided behind all tapping sleeves. Proper tamping of supporting earth around and under the valve and sleeve is mandatory. After completing the tap, the valve shall be flushed to ensure that the valve seat is clean.

3.04 SHOP PAINTING

Ferrous surfaces of valves and appurtenances shall receive a coating of min. 8 mils average dry film thickness rust-inhibitive epoxy, unless otherwise specified in this Section. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

3.05 FIELD PAINTING

All ferrous valves and appurtenances specified herein and exposed to view shall have a top coat painted safety blue for water mains, Pantone 522C for reclaimed water mains, or green for force mains per Specifications Section 09900.

3.06 INSPECTION AND TESTING

All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure and leak testing. Refer to Manatee County Public Works Part I Utilities Standards Manual Section 1.9. Prior to testing, the pipe lines shall be supported in a manner approved by the County to prevent movement during tests.

All leaks shall be repaired and lines retested as approved by the County.

END OF SECTION

SECTION 02720 SANITARY SEWER BYPASS PUMPING

PART 1 GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment and incidentals required to maintain existing and anticipated flows within the affected portion of the collection system throughout the construction period.

1.02 PUBLIC IMPACTS

The Contractor shall not create a public nuisance due to excessive noise or dust, nor impact the public with flooding of adjacent lands, discharge of raw sewage, or release of other potential hazards, nor shall he encroach on or limit access to adjacent lands. No extra charge may be made for increased costs to the Contractor due to any of the above.

1.03 SUBMITTALS

- A. The Contractor shall, within 30 days of the date of the Notice to Proceed, submit to the Project Manager a detailed Pumping Plan for each site in which by-pass pumping will be needed. The Pumping Plan shall address all measures and systems to prevent a sanitary sewer overflow (SSO) as defined by the EPA. The Plan shall include as a minimum:
1. Working drawings and sketches showing work location, pump location, piping layout & routing. Show all proposed encroachment and access impacts on adjacent properties or facilities.
 2. Pump, control, alarm and pipe specifications or catalog cuts. Detailed sketch of controls and alarm system.
 3. Power requirements and details on methods to provide by-pass power or fueling.
 4. Calculation and determination of response times to prevent an SSO after a high water alarm. If anticipated peak flows are 750 G.P.M. or greater, an operator is required on site at all times pump is in service. If the anticipated peak flows are less than 750 G.P.M. an operator may not be required to be on site at all times; show operator on-site schedule.
 5. Procedures to be taken in case of power, pump, or piping failures; including contact names and numbers for emergency notifications.
 6. Frequency and specific responsibility for monitoring pump operation, fuel levels, pump maintenance and entire length of piping.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Pumps:
1. By-pass pumping system shall consist of at least a primary pump and a backup pump. Each pump shall have a minimum pumping capacity of 100% of the anticipated peak flows. When bypassing a pump station, 100% of the lift station capacity (G.P.M. & T.D.H) shall be provided.
 2. Pumps shall be low noise or sound attenuated. The noise level at any operating condition, in any direction, shall not exceed 70dBA at a distance of twenty-three (23) feet (7 meters) from the pump and/or power source.

B. Controls:

The by-pass pump system shall be equipped with automatic controls and an alarm system. The automatic controls will automatically start the backup pump in the event of a high water condition or failure of the primary pump. The alarm system will immediately notify the Contractor of a pump failure or high water condition.

C. Pipe:

Pipe shall be of adequate size and capacity to match the pumps. Pipe type and materials will depend on the particulars of the site conditions, and shall be detailed in the Pumping Plan. Contractor will provide all connections.

PART 3 EXECUTION

3.01 SITE CONDITIONS

Site conditions will vary by site. Contractor is responsible to determine and address requirements such as traffic control, excavation, connections & fittings, impacts on access to adjacent properties, routing and support of by-pass piping, etc., in the Pumping Plan.

3.02 ON-SITE MONITORING

- A. All by-pass operations where the anticipated flow rates are 750 G.P.M or greater shall require an employee on-site at all times (full-time on-site monitoring attended by personnel experienced with the pumps and controls, with demonstrated ability to monitor, turn on & off, and switch between pumps) while the by-pass pump system is in service.
- B. By-pass operations where the anticipated flow rates are less than 750 G.P.M may not require an employee on-site at all times while the by-pass pump system is in operation. The Contractor shall have personnel experienced with the pumps and controls on site within the calculated response time to prevent an SSO after a high water alarm.
- C. During by-pass operations, the Contractor shall have posted on site with the permit, a copy of the approved Plan and the name and 24 hour contact number of the primary response person, the job site superintendent, and the construction company owner.

3.03 OPERATIONS

- A. The Contractor is responsible for securing and providing power, fuel, site security, traffic control and all other supplies, materials and permits required for the by-pass pumping.
- B. Contractor shall demonstrate automatic pump switching and alarm system to the satisfaction of: the County inspector, Project Manager, or Lift Stations Superintendent prior to beginning by-pass pumping. Satisfactory demonstration shall be documented by the inspector's, PM's or Lift Station Superintendent's dated signature on the posted copy of the approved Pumping Plan.

3.04 DAMAGE RESTORATION & REMEDIATION

- A. The Contractor shall be responsible for any pre-pump notifications, all restoration of pre-pump conditions and any damage caused by by-pass operations.
- B. Should there be an SSO caused by or as a direct result of the by-pass pumping, the Contractor is responsible for all immediate & long term response, notifications, clean up, mitigation, etc. Copies of all written response plans, notifications, documentation, mitigation plans, etc., shall be submitted to the County Project Manager.

END OF SECTION

SECTION 02800 TRACER WIRE SYSTEM

PART 1 GENERAL

1.01 SCOPE

The Contractor shall furnish all labor, materials, equipment and incidentals required to install a complete tracer wire system as specified in this section.

PART 2 PRODUCTS

2.01 TRACER WIRE

- A. Open trench pipeline construction shall require the installation of minimum #10 AWG Copper Clad, High Strength Steel tracer wire with minimum 448 psi break load, with a minimum 30 mil HDPE insulation thickness.
- B. Directional Drilling/Boring pipeline construction shall require the installation of minimum #10 AWG Copper Clad, Extra High Strength Steel tracer wire with minimum 1,940 psi break load, with a minimum 45 mil HDPE insulation thickness.
- C. Tracer wire products shall be per the latest edition of the County's Approved Products List

2.02 CONNECTORS

- A. All mainline tracer wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.
- B. Direct bury wire connectors shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner so as to prevent any uninsulated wire exposure.
- C. Non-locking friction fit, twist on, or taped connectors are prohibited.
- D. Connector products shall be per the latest edition of the County's Approved Products List

2.03 TRACER WIRE BOXES

- A. All tracer wire termination points must utilize an approved trace wire access box per the latest edition of the County's Approved Products List.
- B. All grade level/access boxes shall be appropriately identified with "sewer", "reclaimed" or "water" cast into the cap and be color coded.
- C. A minimum of 2 ft. of excess/slack wire is required in all trace wire access boxes after meeting final elevation.

PART 3 EXECUTION

3.01 GENERAL

- A. Tracer wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed, except as specified in Section 02617.
- B. Any damage occurring during installation of the trace wire must be immediately repaired by removing the damaged wire, and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.
- C. Tracer wire shall be installed at the top of the pipe and secured (taped/tied) at 5 foot intervals.
- D. Tracer wire on all stubs must terminate at an approved tracer wire access box located directly above the utility, at the edge of the road right-of-way, but out of the roadway.
- F. All water services tracer wires shall be a single wire, connected to the mainline trace wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire. If service lateral is a conductive pipe, tracer wire shall be installed 6" above the pipe to avoid contact.
- G. In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, the new tracer wire and existing tracer wire shall be connected using approved splice connectors, and shall be properly grounded at the splice location.
- H. Lay mainline tracer wire continuously, by-passing around the outside of appurtenances or valves.

END OF SECTION

DIVISION 3 CONCRETE

SECTION 03110 CONCRETE FORMING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide materials, labor, and equipment required for the design and construction of all concrete formwork, bracing, shoring and supports in accordance with the provisions of the Contract Documents.

1.02 REFERENCES

- A. Florida Building Code
- B. ACI 318 - Building Code Requirements for Structural Concrete
- C. ACI 301 - Specifications for Structural Concrete for Buildings
- D. ACI 347 - Recommended Practice for Concrete Formwork
- E. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials

1.03 QUALITY ASSURANCE

- A. Concrete formwork shall be in accordance with ACI 301, ACI 318 and ACI 347.

PART 2 PRODUCTS

1.04 FORMS AND FALSEWORK

- A. All forms shall be smooth surface forms unless otherwise specified.
- B. Materials for wood concrete forms and falsework shall be at the discretion of the Contractor.
- C. Other form materials such as metal, fiberglass, or other acceptable material that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form, line and grade indicated may be submitted to the Engineer for approval, but only materials that will produce a smooth form finish equal or better than the wood materials specified will be considered.

1.05 FORMWORK ACCESSORIES

- A. Wall form ties shall be removable snap-off type, 316 stainless steel, fixed length, cone type, with waterproofing rubber washer, 1" or 2" back break dimension, free of defects that could leave holes larger than 1" in concrete surface.
- B. Form Coating
 - 1. Conform to ACI 347.
 - 2. Form coating must not bond with, stain, or adversely affect concrete surfaces.

3. Form coating must not impair subsequent treatment of concrete surfaces, including bonding agents, curing compounds, paint, protective coatings and waterproofing.
4. Form coating must be non-toxic or become non-toxic within 30 days.

PART 3 EXECUTION

1.06 FORM DESIGN

- A. Forms and falsework shall be designed for total dead load, plus all construction live load as outlined in ACI 347. Design and engineering of formwork and safety considerations during construction shall be the responsibility of the Contractor.
- B. Forms shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. The maximum deflection of facing materials reflected in concrete surfaces exposed to view shall be 1/240 of the span between structural members.
- C. All forms shall be designed for predetermined placing rates per hour, considering expected air temperatures and setting rates.

1.07 CONSTRUCTION

- A. The type, size, quality, and strength of all materials from which forms are made shall be subject to the approval of the Engineer. No falsework or forms shall be used which are not clean and suitable. Deformed, broken or defective falsework and forms shall be removed from the work.
- B. Forms shall be smooth and free from surface irregularities. Suitable and effective means shall be provided on all forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets, or similar surface defects in the finished concrete. Joints between the forms shall be sealed to eliminate any irregularities. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to a practical minimum.
- C. Forms shall be true to line and grade, and shall be sufficiently rigid to prevent displacement and sagging between supports. Curved forms shall be used for curved and circular structures. Straight panels joined at angles will not be acceptable for forming curved structures. Forms shall be properly braced or tied together to maintain their position and shape under a load of freshly-placed concrete. Facing material shall be supported with studs or other backing which shall prevent both visible deflection marks in the concrete and deflections beyond the tolerances specified.
- D. Forms shall be mortar tight so as to prevent the loss of water, cement and fines during placing and vibrating of the concrete. Specifically, the bottom of wall forms that rest on concrete footings or slabs shall be provided with a gasket to prevent loss of fines and paste during placement and vibration of concrete. Such gasket may be a 1 to 1½ inch diameter polyethylene rod held in position to the underside of the wall form.
- E. All vertical surfaces of concrete members shall be formed, and side forms shall be provided for all footings, slab edges and grade beams. Vertical earth forms are not permitted.

- F. All forms shall be constructed in such a manner that they can be removed without hammering or prying against the concrete. Wood forms shall be constructed for wall openings to facilitate loosening and to counteract swelling of the forms.
- G. Adequate clean-out holes shall be provided at the bottom of each lift of forms. Temporary openings shall be provided at the base column forms and wall forms and at other points to facilitate cleaning and observation immediately before the concrete is deposited. The size, number and location of such clean-outs shall be as acceptable to the Engineer.
- H. Construction joints shall not be permitted at locations other than those shown or specified, except as may be acceptable to the Engineer. When a second lift is placed on hardened concrete, special precautions shall be taken in the way of the number, location and tightening of ties at the top of the old lift and bottom of the new to prevent any unsatisfactory affect whatsoever on the concrete. For flush surfaces at construction joints exposed to view, the contact surface of the form sheathing over the hardened concrete in the previous placement shall be lapped by not more than 1 inch. Forms shall be held against hardened concrete to prevent offset or loss of mortar at construction joints and to maintain a true surface.
- I. The formwork shall be cambered to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads. Set forms and intermediate screed strips for slabs accurately to produce the designated elevations and contours of the finished surface. Ensure that edge forms and screed strips are sufficiently strong to support vibrating screeds or roller pipe screeds if the nature of the finish specified requires the use of such equipment. When formwork is cambered, set screeds to a like camber to maintain the proper concrete thickness.
- J. Positive means of adjustment (wedges or jacks) for shores and struts shall be provided and all settlement shall be taken up during concrete placing operation. Shores and struts shall be securely braced against lateral deflections. Wedges shall be fastened firmly in place after final adjustment of forms prior to concrete placement. Formwork shall be anchored to shores or other supporting surfaces or members to prevent upward or lateral movement of any part of the formwork system during concrete placement. If adequate foundation for shores cannot be secured, trussed supports shall be provided.
- K. Runways shall be provided for moving equipment with struts or legs. Runways shall be supported directly on the formwork or structural member without resting on the reinforcing steel.

1.08

TOLERANCES

- A. Unless otherwise indicated in the Contract Documents, formwork shall be constructed so that the concrete surfaces will conform to the tolerance limits listed in ACI 117. These limits are reproduced in Table 3.1 herein solely for the Contractor's convenience. ACI 117 governs over any conflict between it and Table 3.1.
- B. Structural framing of reinforced concrete around elevators and stairways shall be accurately plumbed and located within ¼-inch tolerance from established dimensions.
- C. The contractor shall establish and maintain in an undisturbed condition and until final completion and acceptance of the project, sufficient control points and bench marks to be used for reference purposes to check tolerances. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be

used by Contractor's personnel and by the Engineer and shall be in sufficient number and properly installed. During concrete placement, the Contractor shall continually monitor plumb and string line form positions and immediately correct deficiencies.

- D. Regardless of the tolerances specified, no portion of the structure shall extend beyond the legal boundary of the structure.

TABLE 3.1: TOLERANCES FOR FORMED SURFACES

1.	Vertical Alignment	
a.	<i>For heights 100 ft or less</i>	
	Lines, surfaces and arises	1 in.
	Outside corner of exposed corner columns and control joint grooves in concrete exposed to view	½ in.
b.	<i>For heights greater than 100 ft</i>	
	Lines, surfaces, and arises, 1/1000 times the height but not more than	6 in.
	Outside corner of exposed corner columns and control joint grooves in concrete, 1/2000 times the height but not more than	3 in.
2.	Lateral Alignment	
a.	<i>Members</i>	1 in.
b.	<i>In slabs, centerline location of openings 12 in. or smaller and edge location of larger openings</i>	½ in.
c.	<i>Sawcuts, joints, and weakened plane embedments in slabs</i>	¾ in.
3.	Level Alignment	
a.	<i>Top of slabs</i>	
	Elevation of slabs-on-grade	¾ in.
	Elevation of top surfaces of formed slabs before removal of supporting shores	¾ in.
b.	<i>Elevation of formed surfaces before removal of shores</i>	¾ in.
c.	<i>Lintels, sills, parapets, horizontal grooves and other lines exposed to view</i>	½ in.
4.	Cross Sectional Dimensions	

a. <i>Members such as columns, beams, piers, walls, (thickness only), and slabs (thickness only)</i>	
12 in. dimension or less	+ $\frac{3}{8}$ in. - $\frac{1}{4}$ in.
More than 12 in. dimension but not over 3 ft dimension	+ $\frac{1}{2}$ in. - $\frac{3}{8}$ in.
Over 3 ft dimension	+ 1 in. - $\frac{3}{4}$ in.

5. Relative Alignment

a. <i>Stairs</i>	
Difference in height between adjacent risers	$\frac{1}{8}$ in.
Difference in width between adjacent treads	$\frac{1}{4}$ in.
b. <i>Grooves</i>	
Specified width 2 in. or less	$\frac{1}{8}$ in.
Specified width more than 2 in. but not more than 12 in.	$\frac{1}{4}$ in.
c. <i>Formed surfaces may slope with respect to the specified plane at a rate not to exceed the following amounts in 10 ft.</i>	
i. Vertical alignment of outside corner of exposed corner columns and control joint grooves in concrete exposed to view.	$\frac{1}{4}$ in.
ii. All other conditions	$\frac{3}{8}$ in.
d. <i>The offset between adjacent pieces of formwork facing material shall not exceed:</i>	
Class of surface:	
Class A	$\frac{1}{8}$ in.
Class B	$\frac{1}{4}$ in.
Class C	$\frac{1}{2}$ in.
Class D	1 in.

Unless otherwise specified or noted on the Drawings, the Class of surface to be used shall be as follows:

Class A shall be used on all surfaces that are to receive a smooth rubbed finish in accordance with Specification Section 03 30 00.

Class B shall be used on surfaces intended to receive plaster or cementitious coatings.

Class C shall be used on the inner face of walls of tanks and flow channels, from bottom of wall to 3 feet below water surface.

Class D shall be used on exterior surfaces below grade or otherwise intended to be permanently concealed.

- e. Floor finish tolerances as measured by placing a freestanding (unleveled) 10 ft. straightedge anywhere on the slab and allowing it to rest upon two high spots within 72 hours after slab concrete placement. The gap at any point between the straightedge and the floor (and between the highspots) shall not exceed:

Classification:	Tolerance
Conventional	
Bullfloated	½ in.
Straightedged	5/16 in.
Flat	3/16 in.
Very Flat	⅛ in.

Unless otherwise specified or noted on the Drawings, the floor finish tolerance classifications to be used shall be as follows:

Bullfloated classification shall be used on floors of tanks and flow channels.

Straightedged classification shall be used on floors of habitable spaces where no other classification is indicated.

Flat and Very Flat classifications shall be used where specifically indicated on the Drawings.

6. Openings Through Members

- | | | |
|----|--|--------------------|
| a. | <i>Cross-sectional size of opening</i> | - ¼ in.
+ 1 in. |
| b. | <i>Location of centerline of opening</i> | ½ in. |

Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items.

1.09 FORM ACCESSORIES

- A. Suitable moldings shall be placed to bevel or round all exposed corners and edges of beams, columns, walls, slabs, and equipment pads. Chamfers shall be ¾ inch unless otherwise noted.
- B. Form ties shall be so constructed that the ends, or end fasteners, can be removed without causing appreciable spalling at the faces of the concrete. After ends, or end fasteners of

form ties have been removed, the embedded portion of the ties shall terminate not less than 2 inches from the formed face of the concrete that is exposed to wastewater or enclosed surfaces above the wastewater, and not less than 1 inch from the formed face of all other concrete. Holes left by the removal of form tie cones shall be reamed with suitable toothed reamers so as to leave the surface of the holes clean and rough before being filled with mortar as specified in Section 03 30 00 - Cast-in-Place Concrete. No form-tying device or part thereof, other than metal, shall be left embedded in the concrete. Ties shall not be removed in such manner as to leave a hole extending through the interior of the concrete member. The use of snap-ties which cause spalling of the concrete upon form stripping or tie removal will not be permitted. No snap ties shall be broken off until the concrete is at least three days old. If steel panel forms are used, rubber grommets shall be provided where the ties pass through the form in order to prevent loss of cement paste.

1.10 APPLICATION - FORM RELEASE AGENT

- A. Forms for concrete surfaces that will not be subsequently waterproofed shall be coated with a form release agent. Form release agent shall be applied on formwork in accordance with manufacturer's recommendations.

1.11 INSERTS AND EMBEDDED ITEMS

- A. Sleeves, pipe stubs, inserts, anchors, expansion joint material, waterstops, and other embedded items shall be positioned accurately and supported against displacement prior to concreting. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

1.12 FORM CLEANING AND REUSE

- A. The inner faces of all forms shall be thoroughly cleaned prior to concreting. Forms may be reused only if in good condition and only if acceptable to the Engineer. Light sanding between uses will be required wherever necessary to obtain uniform surface texture. Unused tie rod holes in forms shall be covered with metal caps or shall be filled by other methods acceptable to the Engineer.

1.13 FORM REMOVAL AND SHORING

- A. Forms shall not be disturbed until the concrete has attained sufficient strength. Sufficient strength shall be demonstrated by structural analysis considering proposed loads, strength of forming and shoring system, and concrete strength data. Shoring shall not be removed until the supported member has acquired sufficient strength to support its weight and the load upon it. Members subject to additional loads during construction shall be adequately shored to sustain all resulting stresses. Forms shall be removed in such manner as not to impair safety and serviceability of the structure. All concrete to be exposed by form removal shall have sufficient strength not to be damaged thereby.
- B. Provided the strength requirements specified above have been met and subject to the Engineer's approval, forms may be removed at the following minimum times. The Contractor shall assume full responsibility for the strength of all such components from which forms are removed prior to the concrete attaining its full design compressive strength. Shoring may be required at the option of the Engineer beyond these periods.

Minimum time following concrete placement until form removal

Ambient Temperature (°F) During Concrete Placement					
	Over 95°F	70 to 95°F	60 to 70°F	50 to 60°F	Below 50°F
Walls	5 days	3 days	3 days	3 days	Do not remove until directed by Engineer (7 days minimum)
Columns	7 days	3 days	3 days	4 days	
Beam Soffits	10 days	7 days	7 days	7 days	
Elevated Slabs 6" or less	10 days	7 days	7 days	7 days	
Elevated Slabs over 6" thick	12 days	7 days	7 days	7 days	

- C. When, in the opinion of the Engineer, conditions of the work or weather justify, forms may be required to remain in place for longer periods of time.
- D. An accurate record shall be maintained by the Contractor of the dates of concrete placings and the exact location thereof and the dates of removal of forms. These records shall be available for inspection at all times at the site, and two copies shall be furnished the Engineer upon completion of the concrete work.

END OF SECTION

SECTION 03200 CONCRETE REINFORCEMENT

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Reinforcing steel bars and welded steel wire fabric for cast-in-place concrete, complete with tie wire.
- B. Support chairs, bolsters, bar supports and spacers, for reinforcing.

1.02 QUALITY ASSURANCE

Perform concrete reinforcing work in accordance with ACI 318 unless specified otherwise in this Section.

1.03 REFERENCES

- A. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ANSI/ASTM A1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- C. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- D. CRSI 63 - Recommended practice for placing reinforcing bars.
- E. CRSI 65 - Recommended practice for placing bar supports, specifications and nomenclature.
- F. ACI 315 - Details and Detailing of Concrete Reinforcement..

1.04 SHOP DRAWINGS

- A. Submit shop drawings in accordance with Contract Documents.
- B. Indicate bar sizes, spacings, locations and quantities of reinforcing steel and wire fabric, bending and cutting schedules and supporting and spacing devices.
- C. Manufacturer's Literature: Manufacturer's specifications and installation instructions for splice devices.

1.05 COORDINATION

- A. Coordinate with placement of formwork, formed openings, and other Work.

PART 2 PRODUCTS

2.01 REINFORCING

- A. Reinforcing steel: Grade 60, Minimum Yield Strength 60,000 psi, deformed billet steel bars, ASTM A615; plain finish.

- B. Welded steel wire fabric: ASTM A1064 deformed or smooth wire, in flat sheets; plain finish.

2.02 ACCESSORY MATERIALS

- A. Tie wire: Minimum 16 gauge annealed type, or patented system accepted by County.
- B. Chairs, bolsters, bar supports, spacers: Sized and shaped for strength and support of reinforcing during construction conditions.
- C. Special chairs, bolsters, bar supports, spacers (where adjacent to architectural concrete surfaces): Stainless steel type sized and shaped as required.
- D. Bar supports and accessories shall be of the sizes required to provide the concrete cover specified and shall be of non-corrosive material including, but not limited to, fiberglass, plastic, and/or precast concrete. Where concrete surfaces are exposed to the weather, or liquid in hydraulic structures in finished work, provide plastic accessories only. Use of galvanized or plastic-tipped metal is not permitted in these applications.
- E. Precast concrete bar supports shall use the same class of concrete as specified for the concrete in the structure. The height of the block shall be the height required to provide the cover specified for reinforcing.
- F. The use of wooden bar supports is prohibited.

2.03 FABRICATION

- A. Fabricate concrete reinforcing in accordance with ACI 315 and ACI 318.
- B. Locate reinforcing splices, not indicated on Drawings, at points of minimum stress. Location of splices shall be reviewed by County.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Reinforcing shall be supported and secured against displacement. Do not deviate from true alignment.
- B. Before placing concrete, ensure reinforcing is clean, free of loose scale, dirt, or other foreign coatings which would reduce bond to concrete.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing according to the construction plans and ACI 318.
- E. Welding of reinforcing bars is prohibited.

3.02 QUALITY ASSURANCE

- A. Acceptable Manufacturers: Regularly engaged in manufacture of steel bar and welded wire

fabric reinforcing.

- B. Installer Qualifications: Three years experience in installation of steel bar and welded wire fabric reinforcing.
- C. Allowable Tolerances:
 - 1. Fabrication:
 - a. Sheared length: ± 1 in.
 - b. Depth of truss bars: ± 0 , $\pm 1/2$ in.
 - c. Stirrups, ties and spirals: $\pm 1/4$ in.
 - d. All other bends: ± 1 in.
 - 2. Placement:
 - a. Concrete cover to form surfaces: $\pm 1/4$ in.
 - b. Minimum spacing between bars: $\bar{1}$ in.
 - c. Top bars in slabs and beams:
 - (1) Members 8 in. deep or less: $\pm 1/4$ in.
 - (2) Members more than 8 in.: $\pm 1/2$ in.
 - d. Crosswise of members: Spaced evenly within 2 in. of stated separation.
 - e. Lengthwise of members: Plus or minus 2 in.
 - 3. Maximum bar movement to avoid interference with other reinforcing steel, conduits, or embedded items: 1 bar diameter.

3.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcement to project site in bundles marked with metal tags indicating bar size and length.
- B. Handle and store materials to prevent contamination.

3.05 INSTALLATION

- A. Placement:
 - 1. Bar Supports: CRSI 65.
 - 2. Reinforcing Bars: CRSI 63.
- B. Steel Adjustment:
 - 1. Move within allowable tolerances to avoid interference with other reinforcing steel, conduits, or embedded items.
 - 2. Do not move bars beyond allowable tolerances without concurrence of County.
 - 3. Do not heat, bend, or cut bars without concurrence of County.
- C. Splices:
 - 1. Lap splices: Tie securely with wire to prevent displacement of splices during placement of concrete.
 - 2. Splice devices: Install in accordance with manufacturer's written instructions.
 - 3. Do not splice bars without concurrency of County, except at locations shown on Drawings.
- D. Wire Fabric:

1. Install in longest practicable length.
 2. Lap adjoining pieces one full mesh minimum, and lay splices with 16 gauge wire.
 3. Do not make end laps midway between supporting beams, or directly over beams of continuous structures.
 4. Offset end laps in adjacent widths to prevent continuous laps.
- E. Cleaning: Remove dirt, grease, oil, loose mill scale, excessive rust, and foreign matter that will reduce bond with concrete.
- F. Protection During Concreting: Keep reinforcing steel in proper position during concrete placement.

END OF SECTION

SECTION 03300 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED

Poured-in-place concrete slabs, thrust blocks, pile caps and pipe support cradles.

1.02 QUALITY ASSURANCE

- A. Perform cast-in-place concrete work in accordance with ACI 318, unless specified otherwise in this Section.
- B. Obtain materials from same source throughout the Work.
- C. Storage of all materials shall be such that concrete quality is not affected by storage.

1.03 TESTING LABORATORY SERVICES

- A. Inspection and testing will be performed by the testing laboratory currently under contract to Manatee County in accordance with the Contract Documents.
- B. Provide free access to work and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of work.
- D. Tests of cement and aggregates may be performed to ensure conformance with requirements stated herein.
- E. Five concrete test cylinders will be taken for every 50 cu. yds. or part thereof of each class of concrete placed each day. Smaller pours shall have cylinders taken as directed by the County.
- F. One slump test will be taken for each set of test cylinders taken.

1.04 REFERENCES

- A. ASTM C33 - Specifications for Concrete Aggregates
- B. ASTM C150 - Specifications for Portland Cement
- C. ACI 318 - Building Code Requirements for Structural Concrete
- D. ASTM C260 - Specifications for Air Entraining Admixtures for Concrete
- E. ASTM C94 - Specifications for Ready-Mixed Concrete
- F. ACI 304R - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete
- G. ACI 305R - Guide to Hot Weather Concreting

- H. ACI 306R - Guide to Cold Weather Concreting
- I. ACI 308 - Standard Practice for Curing Concrete
- J. ACI 309R - Guide to Consolidation of Concrete
- K. ACI SP-66 - ACI Detailing Manual
- L. ASTM C618 - Specifications for Pozzolonic Materials
- M. ACI 301 - Specifications for Structural Concrete for Buildings

1.05 SUBMITTALS

- A. Submit proposed mix design of each class of concrete to Engineer for review prior to commencement of work in accordance with Submittal Section. Submittal shall include proposed location for each class of concrete.
- B. Submit manufacturer's technical literature, including application procedures, for the following products:
 - 1. Air entraining agents.
 - 2. Admixtures.
 - 3. Joint sealants.
 - 4. Waterstops.
 - 5. Form-coating materials.
 - 6. Concrete finishing and coating products.
 - 7. Curing materials.
 - 8. Any products proposed for use by the contractor and not specified herein. The engineer reserves the right to reject any proposed products.
- C. Submit test data for the proposed concrete design mix(es). The test data shall be prepared by an independent certified testing laboratory employed and paid for by the contractor. The design mix submittal shall include the following:
 - 1. Three (3), Seven (7) and Twenty-eight (28) day compressive strength results for the specific proposed concrete design mix(es).
 - 2. The manufacturer's technical information for each type of admixture proposed for use on the project.
 - 3. Submit the following flyash information along with the concrete mix design:
 - a. The flyash producer's documentation of quality control procedures and compliance with this specification.
 - b. Complete chemical analyses of the flyash taken at a minimum of quarterly intervals for the preceding year.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: Moderate-Type II, High early strength-Type III, Portland type, ASTM C150.

- B. Fine and Coarse Aggregates: ASTM C33.
- C. Water: Clean and free from injurious amounts of oil, alkali, organic matter, or other deleterious material.
- D. Flyash: ASTM C618, Class F
 - 1. Flyash shall be produced from a single known and consistent source.

2.02 ADMIXTURES

- A. Air Entrainment: ASTM C260.
- B. Chemical: ASTM C494 Type A - water reducing admixture.
- C. High range water reducing admixture (Superplasticizer): ASTM C494, Type F or Type G.
- D. Use of calcium chloride is not permitted.

2.03 ACCEPTABLE MANUFACTURERS

Acceptable Products:

- 1. Pozzolith
- 2. WRDA 64
- 3. Darex II AEA
- 4. Approved equivalent

2.04 ACCESSORIES

Non-shrink grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2400 psi in 2 days and 7000 psi in 28 days.

2.05 CONCRETE MIXES

- A. Mix concrete in accordance with ASTM C94.
- B. Provide concrete of following strength:
 - 1. Required concrete strengths as determined by 28 day cylinders shall be as shown on the Drawings, but shall not be less than 3000 psi.
 - 2.
 - 3. All mixes shall be in accordance with the latest FDOT Specifications.
- C. Use set-retarding admixtures during hot weather only when accepted by County.
- D. Add air entraining agent to concrete mix for concrete work exposed to exterior.

2.06 CONCRETE CURING MATERIALS

- A. Membrane curing compounds shall conform to ASTM C309 as follows:

1. Solids: 18%.
 2. Unit moisture loss: <0.039 gm/cm² maximum at 72 hours.
 3. Rate of application: per the manufacturer or between 150 to 200 sq. ft./gal.
 4. Shall be pigmented and free of paraffin or petroleum. It shall not reduce the adhesion of paint, waterproofing or other material to be applied to the concrete.
- B. Polyethylene film for curing concrete shall conform to ASTM C171.
- C. Concrete curing materials shall be compatible with all specified coatings.

PART 3 EXECUTION

3.01 PLACING CONCRETE

- A. Placement of concrete shall conform to ACI 304R.
- B. Give the County 24 hours notice prior to concrete placements. No concrete shall be placed on any subgrade or in any formwork until the subgrade, formwork, reinforcing steel, anchor bolts and other imbedded items have been inspected and approved by the Engineer.
- C. The Contractor shall so plan his concrete work in such a manner that once started it can be carried on as a continuous operation until a section, panel or unit is completed. Construction joints other than the ones shown on the drawings must be approved by the Engineer prior to placing concrete.
- D. Concrete shall be placed in daylight except where required for continuous pours of such quantity to necessitate night placing. In such cases, the Contractor shall provide adequate lighting so as to carry on operations to the satisfaction of the Engineer.
- E. Footing concrete shall be cast in forms of the sizes and elevations indicated. If dry, all earth or rock surfaces that contact concrete shall be sprayed to avoid absorption of moisture from the concrete. No footing concrete shall be poured until soil and compaction are approved by the Engineer.
- F. Footing and slab subgrade materials encountered that are judged unsuitable by the Engineer shall be removed and replaced with suitable granular material.
- G. All footing and slab bearing soil surfaces shall be compacted in accordance with the recommendations in the geotechnical report, but not less than a density of at least 95 percent of standard maximum density as determined in accordance with AASHTO Specification T-180, latest revision, a test being made in each lift of compacted fill and/or one foot into the original soil.
- H. Before depositing new concrete on or against concrete that has set, existing surface shall be thoroughly roughened and cleaned of laitance, foreign matter and loose particles. Forms shall be re-tightened and existing surfaces covered with a bonding agent in accordance with the manufacturer's requirements.
- I. Concrete shall be conveyed to forms as rapidly as practicable without segregation or loss of ingredients. Concrete shall be conveyed to the point of placing continuously and at such a rate that no unfinished area will be left exposed or unworked before the concrete takes its initial set.

- J. When concrete is conveyed by chutes, there shall be a continuous flow of concrete. The chute shall be of metal or metal-lined wood, with sections set at approximately the same slope; namely, not less than the discharge end of the chute shall be provided with a drop chute to prevent segregation. If the height of the discharge end of the chute is more than 3 times the thickness of the layer being deposited, but not more than 5 feet above surface of concrete in forms, a spout shall be used, and the lower end maintained as near the surface of deposit as practicable. When pouring is intermittent, the chute shall discharge into a hopper. The chute shall be thoroughly cleaned before and after each run. Waste material and flushing water shall be discharged outside the forms. Raised runways for wheeling concrete to its place shall be provided when necessary.
- K. Drop chutes, elephant trunks, and/or tremies shall be used in walls and columns. Drop chutes, elephant trunks and tremies shall be moved at short intervals during the pour. Vibrators shall not be used in lieu of proper movement of this equipment. Tremies shall be used for underwater pours and to avoid segregation. Locate chutes or flex pipes so that concrete is delivered in a continuous flow to points not more than five feet horizontally or five feet vertically from its final location.
- L. Pumping equipment shall be compatible with the slump and aggregate size specified. Aluminum pump lines are unacceptable.
- M. In pouring concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs. Deposit concrete continuously or in layers so that no concrete will be placed on concrete that has hardened sufficiently to cause formation of seams or other planes of weakness.
- N. Concrete shall be placed in layers not over 18 inches deep and each layer shall be compacted by mechanical internal-vibrating equipment supplemented by hand-spading, rodding and tamping, as directed by the Engineer. Vibrators shall be in no case used to transport concrete inside forms.
- O. Vibrators shall conform to ACI 309R. Use of form vibrators will not be permitted. Internal vibrators shall maintain a speed of not less than 5,000 impulses per minute when submerged in the concrete. At least one spare vibrator shall be maintained as a relief. The duration of vibration shall be limited to time necessary to produce satisfactory consolidation without causing objectionable segregation. The vibrator shall not be inserted into lower courses that have begun to set. When absorptive form lining is used, the vibrator shall not be placed between the forms and the outer row of reinforcement, and in no case shall the vibrator be allowed to touch the absorptive form lining. Vibrators shall be applied at uniformly spaced points not farther than the visible effectiveness of the machine.
- P. Do not place concrete during rain, sleet, snow, or freezing weather.
- Q. Do not permit rainwater to increase mixing water or to damage the surface finish. If rainfall occurs after placing operations begin, provide adequate covering to protect the work.
- R. Hot Weather:
1. Conform to ACI 305R.
 2. The hot weather concreting plan shall be submitted to the engineer for review.
 3. The maximum permissible temperature of concrete during placement is 95°F.
- S. Cold Weather:

1. Conform to ACI 306R.
2. When the temperature is 40°F and rising, concrete may be placed as long as the water and/or aggregate is heated so that the concrete temperature is at least 55°F at the time of the pour. The placed concrete shall be maintained at 50°F minimum for 7 days minimum.
3. The cold weather concreting plan shall be submitted to the engineer for review.

3.02 SCREEDING

Screed surfaces level, maintaining flatness within a maximum deviation of 1/8" in 10 feet.

3.03 PATCHING

Allow County to inspect concrete surfaces immediately upon removal of forms. Patch imperfections as directed. All patching procedures shall be submitted to and approved by the County prior to use.

3.04 DEFECTIVE CONCRETE

- A. Modify or replace concrete not conforming to required lines, details and elevations.
- B. Repair or replace concrete not properly placed resulting in excessive honeycomb and other defects. Do not patch, fill, touch-up, repair, or replace exposed architectural concrete except upon express direction of County for each individual area.
- C. Repairing Surface Defects
 1. Repair surface defects immediately after the removal of forms.
 2. Remove honeycombed and other defective concrete down to sound concrete and repair with repair mortar as submitted to and approved by the County.
 3. Patch tie holes immediately after removal of forms. Fill solid with repair mortar as submitted to and approved by the County.
 4. The contractor shall submit patching materials and methods of application to the County for approval.

3.05 CONCRETE FINISHING

- A. Finishing of Formed Surfaces
 1. Rough-form finish shall be in accordance with ACI 301
 2. Smooth-form finish shall be in accordance with ACI 301.
 3. Smooth-rubbed finish shall be in accordance with ACI 301. A smooth-rubbed finish requires an initial smooth-form finish as required above.
 4. Tops of walls and similar unformed surfaces occurring adjacent to formed surfaces shall be struck smooth after concrete is placed. Float unformed surfaces to a texture consistent with that of the formed surfaces. Final treatment of formed surfaces shall continue uniformly across the unformed surfaces.
- B. Finishing Slabs and Similar Flat Surfaces

1. Use strike-off templates or approved compacting-type screeds riding on screed strips or edge forms to bring concrete surface to the proper contour.
2. Thoroughly consolidate concrete in slabs.
3. Floated Finish: Use float finish for the following:
 - a. Interior exposed horizontal surfaces of liquid containers, except those to receive grout topping.
 - b. Exterior below grade horizontal surfaces.
 - c. Surfaces to receive additional finishes, except as shown or specified.
4. Troweled finish: Use trowel finish for the following:
 - a. Interior exposed slabs, unless otherwise shown or specified
 - b. Slabs to receive resilient floor finishes.
 - c. To obtain a troweled finish, a floated finish as specified above must be applied. After power floating, use a power trowel to produce a smooth surface that is relatively free of defects, but may still contain some trowel marks. Do additional troweling by hand after the surface has hardened sufficiently. Do final troweling when a ringing sound is produced as the trowel is moved over the surface. Thoroughly consolidate the surface by hand-troweling operations.
 - d. Produce a finished surface free of trowel marks, uniform in texture and appearance, and conforming to ACI 117, section 4.8.6.1, 1/4" tolerance.
5. To obtain a broom, belt, or rake finish, immediately upon completing a floated finish, draw a broom or rake across the surface to give a coarse, transverse- scored texture.

3.06 CURING AND PROTECTION

Beginning immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures and mechanical injury. Maintain concrete with minimal moisture loss at relatively constant temperature for a period of 7 days or until concrete strengths reaches 75% of the 28-day design strength.

Protection against moisture loss may be obtained with spray on curing compounds or plastic sheets. Protection against heat or cold may be obtained with insulated curing blankets or forms.

3.07 CONCRETE DRIVEWAY RESTORATION

Concrete driveways shall be restored with 6 inches of 3,000 psi concrete with W2.5 X W2.5, 6X6 wire mesh. Place 1/2-inch expansion joint between back of curb and new concrete. Area beneath restoration shall be mechanically tamped prior to placing concrete.

3.08 CONCRETE SIDEWALK RESTORATION

Concrete sidewalks across driveways shall be restored with 6 inches of 3,000 psi concrete with W2.5 X W2.5, 6X6 wire mesh. Place 1/2-inch expansion joint between back of curb and new concrete. Area beneath restoration shall be mechanically tamped prior to placing concrete.

Concrete sidewalks outside of driveways shall be restored with 4 inches of 3,000 psi concrete per FDOT Design Standards, Sections 522 & 310.

END OF SECTION

SECTION 03350 CONCRETE FINISHES

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals required to finish cast-in-place concrete surfaces as specified herein.

1.02 SUBMITTALS

Submit to the County as provided in the Contract Documents, the proposed chemical hardener manufacturer's surface preparation and application procedures.

1.03 SCHEDULE OF FINISHES

- A. Concrete for the Project shall be finished in the various specified manners either to remain as natural concrete or to receive an additional applied finish or material under another Section.
- B. The base concrete for the following conditions shall be finished as noted and as further specified herein:
 - 1. Exterior, exposed concrete slabs and stairs - broomed finish.
 - 2. Interior, exposed concrete slabs - steel trowel finish.
 - 3. Concrete on which process liquids flow or in contact with sludge - steel trowel finish.
 - 4. Concrete where not exposed in the finished work and not scheduled to receive an additional applied finish or material - off-form finish.
 - 5. Provide concrete surfaces to be left exposed such as walls, columns, beams and joists with smooth rubbed finish.

1.04 RESPONSIBILITY FOR CHANGING FINISHES

- A. The surface finishes specified for concrete to receive additional applied finishes or materials are the finishes required for the proper application of the actual products specified under other Sections. Where different products are approved for use, it shall be the Contractor's responsibility to determine if changes in finishes are required and to provide the proper finishes to receive these products.
- B. Changes in finishes made to accommodate product different from those specified shall be performed at no additional cost to the County. Submit the proposed new finishes and their construction methods to the County for approval.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Portland cement and component materials required for finishing the concrete surfaces shall be as specified in the Contract Documents.
- B. Hardener shall be Lapidolith as manufactured by Sonneborn Building Products or approved equal. Hardener shall be used on all floors, stair treads and platforms.

PART 3 EXECUTION

3.01 FORMED SURFACES

- A. Forms shall not be stripped before the concrete has attained a strength of at least 50 percent of the ultimate design strength. This is equivalent to approximately five "100 day-degrees" of moist curing.
- B. Care shall be exercised to prevent damaging edges or obliterating the lines of chamfers, rustications, or corners when removing the forms or doing any work adjacent thereto.
- C. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to the satisfaction of the County.
- D. Off-form finish. Fins and other projections shall be removed as approved. Tie cone holes and other minor defects shall be filled with non-shrink grout specified under the Contract Documents.

3.02 FLOORS AND SLABS

- A. Floors and slabs shall be screeded to the established grades and shall be level with a tolerance of 1/8-inch when checked with a 10 foot straight edge, except where drains occur, in which case floors shall be pitched to drains as indicated. Failure to meet either of above shall be cause for removal, grinding, or other correction as approved by the County.
- B. Following screeding as specified above, power steel trowel as follows:
 - 1. Immediately after final screeding, a dry cement/sand shake in the proportion of 2-sacks of Portland cement to 350-pounds of coarse natural concrete sand shall be sprinkled evenly over the surface at the rate of approximately 500 pounds per 1,000 square feet of floor. Neat, dry cement shall not be sprinkled on the surface. This shake shall be thoroughly floated into the surface with an approved disc type power compacting machine weighing at least 200 pounds if a 20-inch disc is used or 300 pounds if a 24-inch disc is used (such as a "Kelly Float" as manufactured by the Weisner-Rapp Corporation of Buffalo, New York). A mechanical blade-type float or trowel is not acceptable for this work.
NOTE: This operation (application of the cement/sand shake) may be eliminated at the discretion of the County if the base slab concrete exhibits adequate fattiness and homogeneity.
 - 2. In lieu of power steel troweling, small areas as defined by the County shall be compacted by hand steel troweling with the dry cement/sand shake as ordered.
 - 3. The floor or slab shall be compacted to a smooth surface and the floating operation continued until sufficient mortar is brought to the surface to fill all voids. The surfaces shall be tested with a straight edge to detect high and low spots which shall be eliminated.
 - 4. Compaction shall be continued only until thorough densification is achieved and a small amount of mortar is brought to the surface. Excessive floating shall be avoided.
- C. After Paragraph 3.02A and B procedures are accomplished, floors and slabs for particular conditions shall be completed as scheduled in one of the following finishes:

1. Wood float finish: Hand wood float, maintaining the surface tolerance to provide a grained, nonslip finish as approved.
 2. Broomed finish: Hand wood float maintaining the surface tolerance and then broom with a stiff bristle broom in the direction of drainage to provide a nonslip finish as approved.
 3. Steel trowel finish: Hand steel trowel to a perfectly smooth, hard even finish free from high or low spots or other defects as approved.
- D. Floors, stair treads and platforms shall be given a floor hardener. Application shall be according to manufacturer's instructions.

3.03 APPROVAL OF FINISHES

- A. All concrete surfaces will be inspected during the finishing process by the County.
- B. Surfaces which, in the opinion of the County, are unsatisfactory shall be refinished or reworked until approved by the County.

END OF SECTION

DIVISION 5 METALS

SECTION 05500 MISCELLANEOUS METAL

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, equipment and incidentals required and install covers, grates, frames and other miscellaneous metals as shown on the Drawings and specified herein. The miscellaneous metal items include but are not limited to the following:
1. All metal frames, ladders, stairs, stair rails, floor opening frames including gratings and supports.
 2. Prefabricated access hatches and frames.
 3. Anchors and anchor bolts except those specified to be furnished with all equipment.
 4. Railings, posts and supports both interior and exterior.
 5. Cast iron frames, covers, grates, drain leaders and drains.
 6. Bridge crane track supports.
 7. Stair nosings, steel plates, overhead steel door frames, angle frames, plates and channels.
 8. Exterior H.V.A.C. hoods.
 9. Pump guide rail system.

1.02 COORDINATION

- A. The work in this Section shall be completely coordinated with the work of other Sections. Verify at the site both the dimensions and work of other trades adjoining items of work in this Section before fabrication and installation of items herein specified.
- B. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.

1.03 SHOP DRAWINGS AND SAMPLES

- A. Detail drawings, as provided for in the Contract Documents, showing sizes of members, method of assembly, anchorage, and connection to other members shall be submitted to the County for approval before fabrication.
- B. Samples shall be submitted at the request of the County for concurrent review with Shop Drawings.

1.04 FIELD MEASUREMENTS

- A. Field measurements shall be taken at the site to verify or supplement indicated dimensions and to insure proper fitting of all items.

1.05 REFERENCED SPECIFICATIONS

- A. Unless otherwise specified, materials shall conform to the following:

Structural Steel

ASTM A36

Welded & Seamless Steel Pipe	ASTM A53
Gray Iron Castings	ASTM A48, Class 30
Galvanizing, general	ASTM A123
Galvanizing, hardware	ASTM A153
Galvanizing, assemblies	ASTM A386
Aluminum (Extruded Shapes)	6061-T6 (Alum. alloy)
Aluminum (Extruded Pipe)	6061-T6 (Alum. alloy)
Aluminum Bar Structural	6061-T6 (Alum. alloy)
Bolts and Nuts	ASTM, A307
Stainless Steel Bolts, Fasteners	AISI, Type 316
Stainless Steel Plate and Sheet, Wire	AISI, Type 316
Welding Rods for Steel	AWS Spec. for Arc Welding

PART 2 PRODUCTS

2.01 ANCHORS, BOLTS AND FASTENING DEVICES

- A. Anchors, bolts, etc., shall be furnished as necessary for installation of the work of this Section.
- B. Compound masonry anchors shall be of the type shown or required and shall be equal to Star Slug in compounded masonry anchors manufactured by Star Expansion Industries, equal by Phillips Drill Co., Rawlplug, or equal. Anchors shall be minimum "two unit" type.
- C. The bolts used to attach the various members to the anchors shall be the sizes shown or required. Stainless steel shall be attached to concrete or masonry by means of stainless steel machine bolts and iron or steel shall be attached with steel machine bolts unless otherwise specifically noted.
- D. For structural purposes, unless otherwise noted, expansion bolts shall be Wej-it "Ankr-Tite", Phillips Drill Co. "Wedge Anchors", or Hilti "Kwik-Bolt". When length of bolt is not called for on the Drawings, the length of bolt provided shall be sufficient to place the wedge portion of the bolt a minimum of 1-inch behind the reinforcing steel within the concrete. Material shall be as noted on the Drawings. If not listed, all materials shall be stainless steel.

2.02 ALUMINUM ITEMS

- A. Aluminum gratings shall be of serrated I-Bar Aluminum Alloy 6061-T6, fabricated to the depths and thicknesses shown on the Drawings and shall be Reliance Steel Products Company, I-Lok Type 7/8 R4 Aluminum Grating; IKG Industries, "Galok" Aluminum I-Bar Grating Type S194-I, or equal. All openings 2 inches and greater in diameter shall be banded with a bar of the same depth and thickness as the main bearing bars of the grating, or furnished with continuous cross bridges. Each cut bar shall be welded to the band if banding is utilized. The ends of all grating sections shall be likewise banded. Clamps and bolts used for attaching grating to supporting members shall be stainless steel. All grating shall be clamped unless noted otherwise. Clamps shall be as recommended by the manufacturer.
- B. Stair treads shall be as specified above for grating and shall have abrasive nonslip nosing.
- C. Aluminum nosing at concrete stairs shall be an extrusion of 4-inch minimum width with abrasive filled and shall be Wooster Products, Inc., Alumogrit Treads, Type 116; equal by Barry Pattern and Foundry Co.; Andco; or equal. Embedded anchors shall be furnished

with a minimum of three anchors per tread.

- D. Aluminum ladders shall be fabricated to the dimensions and details and installed as shown on the Drawings. Treads to be of cast aluminum by Dixie Metals, Inc. of Fort Lauderdale, Florida or equal.
- E. Aluminum Handrails, Mechanically Fastened Type:
1. All aluminum mechanically fastened type pipe handrails and guardrails shall be clear anodized aluminum finish and installed as specified herein and indicated on the Drawings. Handrails shall be made of nominal 1-1/2 inches inside diameter pipe (Schedule 40) fabricated or seamless 6063-T6 alloy. The supplier of the handrail system shall supply all necessary fittings, rackets, transition, corner and connector pieces, toeboards, protective gaskets, etc., for a complete job at the locations, indicated on the Drawings. All mounting hardware including bolts, studs, nuts, etc., shall be stainless steel Type 316. Bends shall be smooth and accurate to the details shown. Railings shall be the "Rigid Rail System" as manufactured by Reynolds Aluminum of Reynolds Metal Company as Reynolds II pipe railing system or the "Connectorail System" as manufactured by Julius Blum & Co., Inc., Carlstadt, New Jersey. The handrail systems shall comply with all OSHA and D Section 1208.2 of the Standard Building Code.
 2. Spacing of posts where posts are required shall be as noted on shop drawings, but in all cases, shall be uniform and shall not exceed the requirements of OSHA and Section 1208.2 of the Standard Building Code. Shorter spacing may be used where required to maintain the maximum spacing. The fabricator of the aluminum handrail and guardrail system shall be responsible for the design and preparation of shop drawings and design calculations (signed and sealed by Florida Registered Engineer) to meet OSHA requirements and Section 1208.2 of Standard Building Code.
 3. All railings shall be erected in line and plumb. Field splicing and expansion compensation shall be accomplished using internal splice sleeves. Make provisions for removable railing sections as detailed and where shown on the Drawings.
 4. Where handrail or guardrail posts are set in concrete as per the manufacturer's requirements the posts shall be set into aluminum sheeves cast in the concrete and firmly cemented with 1651 epoxy resin by E-Bond Epoxies, Oakland Park, Florida, Moulded Reinforced Plastics, Inc., Fort Lauderdale, Florida or equal. Collars shall be placed on the posts and fastened in place, as shown and as detailed on approved shop drawings.
 5. Where handrail is supported from structural members, it shall be done by the use of approved sockets, flanges, brackets, or other approved means which will provide neat and substantial support for the pipe railing.
 6. All railing shall be properly protected by paper, or by an approved coating or by both against scratching, splashes or mortar, paint, or other defacements during transportation and erection and until adjacent work by other trades has been completed.
- F. Toeboards: Contractor shall furnish and install aluminum toeboards conforming to latest OSHA requirements on all railings and other locations where indicated on the Drawings.
1. Toeboards shall consist of an extruded 6063-T6 aluminum shape bolted by means of a pipe clamp to the railing posts without requiring any drilling or welding of the toeboard to the railing posts as manufactured by Reynolds Aluminum, Julies Blum & Company, Thompson Fabricating Company or equal. Toeboards shall have

- pitched top and tear drop bottom to prevent accumulation of dirt, or other material.
2. All fastening hardware shall be Type 316 stainless steel.
- G. Kickplates, if required, shall be fabricated and installed as shown on the Drawings.
- H. Aluminum safety gate shall be fabricated of extruded aluminum.
- I. Prefabricated checkerplate aluminum floor hatches shall be Type "JD", or "KD" as manufactured by Bilco Co., Babcock-Davis Associates, Inc.; Type "AM" Inland-Ryerson Construction Products Co., Milcor Division; or equal, sized as shown. Hatches with either dimension over 3 feet-6 inches shall be double leaf type. Hatches shall be designed for a live load of 300 pounds per square foot. Hatches shall be watertight.
- J. Ship ladders shall be of all aluminum construction as detailed. Treads shall have abrasive nosing as manufactured by Reliance Steel Products Co., IKG Industries, or equal.
- K. Checkplate aluminum cover plates shall be fabricated to the details shown and installed at the locations shown.
- L. Structural aluminum angle and channel door frames shall be provided as shown on the Drawings and shall be anodized. Frames shall be fabricated with not less than three anchors on each jamb.
- M. Miscellaneous aluminum shapes and plates shall be fabricated as shown. Angle frames for hatches, beams, grates, etc., shall be furnished complete with welded strap anchors attached. Furnish all miscellaneous aluminum shown, but not otherwise detailed. Structural shapes and extruded items shall conform to the detail dimensions on the Plans within the tolerances published by the American Aluminum Association.

2.03 STEEL ITEMS

- A. Sleeves shall be steel or cast iron pipe in walls and floors with end joints as shown on the Drawings. All pipe sleeves shall have center anchor around circumference as shown.
- B. Miscellaneous steel pipe for sleeves and lifting attachments and other uses as required shall be Schedule 40 pipe fabricated according to the details as shown on the Drawings.
- C. Miscellaneous steel shall be fabricated and installed in accordance with the Drawings and shall include: beams, angles, support brackets, closure angles in roof at edge of T-beams; base plates to support ends of T-beams; door frames; splice plates, anchor bolts; lintels and any other miscellaneous steel called for on the Drawings and not otherwise specified.

2.04 CAST IRON ITEMS

- A. Outside pipe clean-out frames and covers shall be heavy duty cast iron per the latest edition of the County's Approved Products List. All outside pipe clean-outs shall be 6-inch diameter.
- B. Frames and covers for valve vaults and manholes shall be of a good quality, strong, tough even grained cast iron except as otherwise specified below. Castings shall be as manufactured by the US Foundry, Neenah Foundry, Mechanics Iron Foundry, or equal. Covers to have letters "WATER", "SEWER" or "DRAIN", as applicable, embossed on top.

PART 3 EXECUTION

3.01 FABRICATION

- A. All miscellaneous metal work shall be formed true to detail, with clean, straight, sharply defined profiles and smooth surfaces of uniform color and texture and free from defects impairing strength or durability.
- B. Connections and accessories shall be of sufficient strength to safely withstand stresses and strains to which they will be subjected. Steel accessories and connection to steel or cast iron shall be steel, unless otherwise specified. Threaded connections shall be made so that the threads are concealed by fitting.
- C. Welded joints shall be rigid and continuously welded or spot welded as specified or shown. The face of welds shall be dressed flush and smooth. Exposed joints shall be close fitting and jointed where least conspicuous.
- D. Welding of parts shall be in accordance with the Standard Code of Arc and Gas Welding in Building Construction of the AWS and shall only be done where shown, specified, or permitted by the County. All welding shall be done only by welders certified as to their ability to perform welding in accordance with the requirements of the AWS Code. Component parts of built-up members to be welded shall be adequately supported and clamped or held by other adequate means to hold the parts in proper relation for welding.
- E. Welding of aluminum work shall be on the unexposed side as much as possible in order to prevent pitting or discoloration.
- F. All aluminum finish exposed surfaces, except as specified below, shall have manufacturer's standard mill finish. Aluminum handrails shall be given an anodic oxide treatment in accordance with the Aluminum Association Specification AA-C22-A41. A coating of methacrylate lacquer shall be applied to all aluminum shipment from the factory.
- G. Castings shall be of good quality, strong, tough, even-grained, smooth, free from scale, lumps, blisters, sand holes, and defects of any kind which render them unfit for the service for which they are intended. Castings shall be thoroughly cleaned and will be subjected to a hammer inspection in the field by the County. All finished surfaces shown on the Drawings and/or specified shall be machined to a true plane surface and shall be true and seat at all points without rocking. Allowances shall be made in the patterns so that the thickness specified or shown shall not be reduced in obtaining finished surfaces. Castings will not be acceptable if the actual weight is less than 95 percent of the theoretical weight computed from the dimensions shown. The Contractor shall provide facilities for weighing castings in the presence of the County showing true weights, certified by the supplier.
- H. All steel finish work shall be thoroughly cleaned, in accordance with the Contract Documents, of all loose mill scale, rust, and foreign matter before shipment and shall be given one shop coat of primer compatible with finish coats specified in Painting Section after fabrication but before shipping. Paint shall be applied to dry surfaces and shall be thoroughly and evenly spread and well worked into joints and other open spaces. Abrasions in the field shall be touched up with primer immediately after erection. Final painting is specified in the Contract Documents.
- I. Galvanizing, where required, shall be the hot-dip zinc process after fabrication. Following all manufacturing operations, all items to be galvanized shall be thoroughly cleaned,

pickled, fluxed, and completely immersed in a bath of molten zinc. The resulting coating shall be adherent and shall be the normal coating to be obtained by immersing the items in a bath of molten zinc and allowing them to remain in the bath until their temperature becomes the same as the bath. Coating shall be not less than 2 oz. per sq. ft. of surface.

3.02 INSTALLATION

- A. Install all furnished items imbedded in concrete or other masonry. Items to be attached to concrete or masonry after such work is completed shall be installed in accordance with the details shown. Fastening to wood plugs in masonry will not be permitted. All dimensions shall be verified at the site before fabrication is started.
- B. All steel surfaces to come in contact with exposed concrete or masonry shall receive a protective coating of an approved heavy bitumastic troweling mastic applied in accordance with the manufacturer's instructions prior to installation or provide a 1/32-inch neoprene gasket between the steel surface and the concrete or masonry.
- C. Where aluminum is embedded in concrete, apply a heavy coat of approved bitumastic troweling mastic in accordance with the manufacturer's instructions prior to installation.
- D. Where aluminum contacts masonry or concrete, provide a 1/32-inch neoprene gasket between the aluminum and the concrete or masonry.
- E. Where aluminum contacts a dissimilar metal, apply a heavy brush coat of zinc-chromate primer and provide a 1/32-inch neoprene gasket between the aluminum and the dissimilar metal.

Where aluminum contacts wood, apply two coats of aluminum metal and masonry paint to the wood.

END OF SECTION

DIVISION 7 THERMAL AND MOISTURE PROTECTION

SECTION 07100 WATERPROOFING, DAMPPROOFING AND CAULKING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all materials, labor, equipment, and incidentals required to perform all through wall flashing work, waterproofing, dampproofing, caulking, and related work necessary for the proper completion of the project as required by the Drawings and as specified herein.
- B. Dampproof the exterior surfaces of all exterior poured- in-place concrete walls or concrete masonry foundation walls from the top of the footings up to 6 inches below finished grade.

1.02 APPLICABLE SCHEDULE

- A. Deliver all materials in original manufacturer's packages with labels and seals intact. Handle and store in accordance with manufacturer's instructions.
- B. Inspect job conditions for defects which would prevent proper installation of caulking. Do not proceed until defects have been corrected.
- C. Caulk all exterior wall joints between metal wall panels and adjacent materials, between frames in openings and adjacent materials, between masonry and cast-in-place concrete, brick paver expansion and control joints and all other joints shown on the Drawings or required for the completion of the Work.
- D. Caulk all interior joints between frames and masonry, at tops of masonry walls, between masonry and structural concrete, expansion and control joints in ceramic tile and brick pavers, exterior window and door frames, louvers, and all other joints shown on the drawings or required for the completion of the Work.
- E. Joints noted as "caulk", "caulking", or "sealant" shall be caulked with the sealant specified herein.
- F. Furnish and place through wall flashing in exterior masonry walls as shown on the Drawings.
- G. Furnish and place vapor barrier under all building structure slabs contacting soil as specified herein.

1.03 SUBMITTALS

Submit two representative samples of any or all other proposed materials and installation method required for the work of this Section as requested by the County.

PART 2 PRODUCTS

2.01 DAMPPROOFING

- A. Dampproofing shall be Sealmatic Solvent by W.R. Meadows, Bitumastic Black Solution by the Koppers Company, Inc., Dehydrating 4 by W.R. Grace and Co., or equal.

2.02 CAULKING

- A. Caulking Compound: One component, synthetic rubber base sealant, soft curing, nonstaining, conforming to F.S. TT-S-00230 and Thiokol's Building Trade Performance Specifications for Type 1 Class B sealants. Colors shall match material receiving caulking, as directed by the County.
- B. Interior Silicone Sealant: F.S. TT-001543 for perimeter of plumbing fixtures against walls and floors and joints between laminated plastic counters and walls shall be transparent.
- C. Primer: As recommended by caulking compound manufacturer.
- D. Back-up Material: Closed cell foam polyethylene, or similar nonbituminous material as recommended by manufacturer of caulking compound and completely compatible with selected compound.

2.03 HYDRAULIC CEMENT

- A. Material for quick-set hydraulic cement shall be Waterplug as manufactured by Thoro System Products, or equal.

2.04 VAPOR BARRIER

- A. Vapor barrier shall be 10 mil thick polyethylene sheet with a vapor transmission rating of 0.20 perms. Laps between adjacent sheets shall be 10 inches minimum. Vapor barrier shall be carefully inspected by the County prior to concrete placement. Additional polyethylene sheet required for repair or replacement of damaged vapor barrier shall be furnished and installed by the Contractor as directed by the County at no additional cost to the County.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Installation of Dampproofing
 - 1. Surface to be treated shall be free from oil and dirt and shall be in the proper condition as indicated by the manufacturer prior to the application of the dampproofing material. The concrete shall have cured for 7 days or have reached 75% of its 28-day design strength at the time of dampproofing installation. The surface shall be dry and free from frost at the time of application.
 - 2. Surfaces to be dampproofed shall receive two (2) heavy coats 10 mils thick, the first coat being carefully applied so that "holidays" or untreated air-bubble depressions in the surface shall be completely filled and the second coat will guarantee a 100% coating of the surface. Backfill shall be done within 24-48 hours after the coatings have been applied.
 - 3. Particular care shall be given to the application of dampproofing at all construction joints which are encountered.
 - 4. The number of coats specified is in addition to primer coats as recommended by the manufacturer.
- B. Installation of Caulking

1. Surface Preparation: Clean metal surfaces free of grease, oil, wax, lacquer, and other foreign residue by wiping with a clean cloth moistened with a suitable solvent. Scrape or brush masonry surfaces clean. Apply appropriate primer to contact surfaces.
2. Joint Preparation: Joints to be caulked having a depth in excess of 3/8-inch shall be packed with back-up material. Round back-up material shall be sized to require 20 percent to 5 percent compression upon insertion. In joints not of sufficient depth to allow packing, install polyethylene bond-breaking tape at back of joint. Avoid lengthwise stretching of back-up material. Cut all corners, avoid wrapping around corners.
3. Application: Apply compound with pressure flow gun with nozzle of proper size and shape to suit width of joint, promptly after mixing and with sufficient pressure to fill joint. Apply as a continuous operation horizontally in one direction and vertically from bottom to top, except joints having excessive widths where compound might sag, the joints shall be built up with excessive beads. Finish joints smooth and slightly covered.
4. Cleaning: Immediately clean adjacent material which may be soiled by caulking operation.

C. Installation of Quick-Set Hydraulic Cement

1. The surface shall be cleaned and free of dirt, loose mortar particles, paints, films, protective coatings, efflorescence, laitance, form treatments, curing compounds, and other materials.
2. Cut out crack at least 3/4 inches wide and deep, cutting back into wall slightly. Flush away all cuttings and dirt. Force water-plug into prepared crack with a round tool and smooth out. Form cove at junction.
3. To be applied under manufacturer's recommendations.

END OF SECTION

DIVISION 9 PAINTING

SECTION 09865 SURFACE PREPARATION AND SHOP PRIME PAINTING

PART 1 GENERAL

1. This Section includes shop-applying a special coating product to items and surfaces scheduled, including surface preparation & cleanliness, environmental conditions during application, product preparation, and application method.
2. Documents affecting work of this Section include, but are not limited to, General Conditions, Supplementary Conditions, Sections in Division 1 of these Specifications, and including the following Divisions:
 - a. Division 5 - Metals
 - b. Division 7 - Thermal & Moisture Protection
 - c. Division 9 - Painting
3. REFERENCES
 - A. American Society for Testing and Materials (ASTM):
 1. ASTM B 117 Standard Test Method for Corrosion Resistance.
 2. ASTM D 2794 Standard Test Method for Measuring Direct Impact.
 3. ASTM D 3359 Standard Test Methods for Measuring Adhesion by Tape Test.
 4. ASTM D 3363 Standard Test Method for Film Hardness by Pencil Test.
 5. ASTM D 4060 Standard Test Method for Abrasion Resistance.
 6. ASTM D 4541 Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.
 7. ASTM E 119 (UL 263) Standard Test Method for Fire Tests of Building and Construction Materials.
 8. ASTM E 736 Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
 - B. Society of Protective Coatings (SSPC):
 1. SSPC Surface Preparation Specifications (SSPC-SP)
 2. SSPC Paint Application Specifications and Guides (SSPC-PA)
 - C. American Institute of Steel Construction
 1. Slip Coefficient and Tension Creep
 - D. NACE International
4. DEFINITIONS
 - A. Definitions as used in Finish Schedule shown on Drawings and Coating Schedule included herein.
 1. Coatings: Paint or heavy duty finishes for use on surfaces subject to interior and exterior exposure, submergence, high moisture, splash, or chemical environment, including primers, sealers, fillers, and intermediate and finish coats.
 2. Normal: Surfaces subject to normal temperature and humidity.
 3. First Coat: Factory primer or shop primer.
 4. DFT: Dry Film Thickness (Mils/coat).
 5. SqFt: Square feet per gallon (per coat).
 6. OWNER'S REPRESENTATIVE: Person, company, or

architectural/engineering firm authorized by the property owner to make decisions regarding coating selection.

5. Submittals

A. Product Data:

1. Manufacturer's literature including application recommendations and generic makeup for each coating scheduled.
2. List each material and cross-reference the specific coating, finish system, and application.

B. Submit one copy of manufacturer's Material Safety Data Sheets (MSDS) for each type of coating to OWNER'S REPRESENTATIVE'S field office for information. CONTRACTOR shall post a copy of MSDS on the site at all times when coating is in progress.

6. QUALITY ASSURANCE

A. Regulatory Requirements:

1. All coatings shall conform to OSHA requirements for allowable exposure to lead and other hazardous substances.

B. Product Manufacturer:

1. Manufacturer shall be a company that specializes in producing high quality industrial coating materials. This company shall have 10 years or more experience demonstrated by case histories in the designated field of application.

C. Applicator Qualifications:

1. Engage an experienced applicator with 5 years or more experience who has successfully completed coating system applications similar in material and extent to those indicated.

D. Single-Source Responsibility:

1. Provide coating material produced by the same manufacturer for each system.

E. Performance Testing:

1. The OWNER'S REPRESENTATIVE may request testing from the manufacturer for required performance that may include but is not limited to adhesion to the substrate and between coating layers, and resistance to abrasion, humidity, freeze/thaw, and Ultra-violet light exposure.

7. DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered to the site in original containers with labels intact and seals unbroken.
- B. Protect and heat or cool material storage location to maintain temperature ranges recommended by coating manufacturers, but not less than 50 degrees F.
- C. Oily rags and waste must be removed from buildings each night or kept in appropriate metal containers. Provide fire extinguishers of the type recommended by coating manufacturers in areas of storage and where finishing is occurring. Allow no smoking or open containers of solvent.
- D. Empty containers shall have labels canceled and clearly marked as to use.

8. PROJECT / SITE CONDITIONS

A. Environmental Requirements:

1. Use indirect-fired dry heat and ventilate areas to obtain conditions recommended by coating manufacturer.
2. Relative humidity conditions as specified by coating manufacturer shall be adhered to.
3. No unprotected, unheated exterior coating shall be undertaken when cold, damp, foggy, or rainy weather appears probable, nor when the temperature of the substrate is below 35 degrees F, unless listed in this specification or approved in writing by the coating manufacturer.
4. Maintain the manufacturer's environmental requirements until the coating is fully cured.
5. Apply no coating in areas where dust is being generated.
6. Testing and disposal of any waste and coating shall be the responsibility of the CONTRACTOR.

PART 2 PRODUCTS

1. MANUFACTURERS

- A. Tnemec Company, Inc., or OWNER'S REPRESENTATIVE approved equal.

2. SHOP APPLIED PRIMERS FOR METAL

- A. Factory-applied coating products of Tnemec Company, Inc. are listed as the standard of quality and performance, and it is not the intent of the Specifier that these materials are to be used to the exclusion of equivalent products of other manufacturers.
- B. Only coatings that meet or exceed the performance of these specified coatings may be submitted for use. No substitutions will be considered that change the generic chemistry of the coatings specified.
- C. No substitution will be considered unless the Architect/Owner has received a written request for approval at least 10 days prior to the bid date for receipt of bids.
- D. Each request shall include the name of the specified material for which a substitute is being requested; name of the proposed substitute material; and a complete description of the proposed substitute including performance & test data, cure times, recoat windows, and generic composition.
- E. No request for substitution will be considered that would decrease film thickness or offer a change in the generic type of coating specified.
- F. The decision of the OWNER'S REPRESENTATIVE regarding approval or disapproval of the proposed substitution shall be final.

3. MIXING AND THINNING

- A. Where thinning is necessary, only the products of the manufacturer furnishing the coating will be allowed. All such thinning shall be done in strict accordance with

the coating manufacturer's recommendations

B. Mix in accordance to the manufacturer's recommendations

4. SOURCE QUALITY

A. Source Quality: Obtain painting, coating, and thinning materials from a single manufacturer.

PART 3 EXECUTION

1. MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical information, catalogue instructions, and product instructions listed on material containers.

2. EXAMINATION

A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to the timely and proper completion of the work. Materials removed and replaced to correct defects due to errant application such as overspray or drips on unsuitable surfaces shall be at the CONTRACTOR'S expense.

3. SURFACE PREPARATION

A. General:

1. All surfaces to be coated shall be prepared as specified herein and in accordance with the coating manufacturer's recommendations. The object shall be to obtain a uniform, clean, and dry surface.
2. Quality of surface preparation described herein is considered a minimum. If the coating manufacturer requires a higher degree of preparation, comply with the coating manufacturer's recommendations.
3. Workmanship for surface preparation shall conform to the following Society of Protective Coatings (SSPC) / NACE specification:
 - a. Solvent Cleaning: SSPC-SP1
 - b. Hand Tool Cleaning: SSPC-SP2
 - c. Power Tool Cleaning: SSPC-SP3
 - d. White Metal Blast Cleaning: SSPC-SP5/NACE No. 1
 - e. Commercial Blast Cleaning: SSPC-SP6 / NACE No. 3
 - f. Brush-Off Blast Cleaning: SSPC-SP7 / NACE No. 4
 - g. Near-White Blast Cleaning: SSPC-SP10 / NACE No. 2
 - h. Power Tool to Bare Metal Cleaning: SSPC-SP11
 - i. High Pressure Water Jetting: SSPC-SP12 / NACE No. 5

4. FERROUS METAL

A. Ferrous Metal unprimed or shop-primed with an incompatible primer shall be abrasive blast cleaned prior to the application of a primer. Enclosed structural metals or those scheduled for overcoating with fire-resistive materials shall be prepared in accordance with SSPC-SP3. Exposed exterior elements shall be prepared in accordance with SSPC-SP6. Slip critical connections shall be

prepared in accordance with SSPC-SP3 or SP5.

5. APPLICATION

- A. Surfaces shall be dry at the time of application.
- B. The minimum surface temperature shall be 35 degrees F and rising unless noted otherwise.
- C. Apply in strict accordance to the manufacturer's recommendations by airless spray application.
- D. Each coat shall be allowed to dry in accordance to the manufacturer's requirements. Drying time shall be construed to mean "under normal conditions." Where conditions other than normal exist, because of weather or because of confined space, longer times will be necessary.
- E. Coatings shall be applied to provide an opaque smooth surface of uniform coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, or other surface imperfections will not be acceptable.
- F. Edges of coatings adjoining other materials or other colors shall be sharp and clean without overlapping.
- G. Crevices and other hard to apply areas shall be brushed in prior to the complete application.

6. FINAL TOUCH-UP AND CLEANING

- A. Prior to substantial completion, examine the coated surfaces and retouch or refinish surfaces to leave in condition acceptable to the OWNER'S REPRESENTATIVE

7. SHOP APPLIED COATING SCHEDULE

- A. All shop-applied coatings shall be in accordance with Section 09900, the High Performance Coatings section of this specification. This requirement supersedes all other options listed below.
- B. Perimeter Structural Steel, steel where extended field exposure is expected, steel intended for immersion service, slip-critical connections, wet conditions, moderate to severe exposures, all other circumstances, which may also include interior, dry, mild environments.
 - 1. Common Use: For use on unprimed structural and miscellaneous steel.
 - 2. Shop primer may be enclosed, covered with approved/tested spray-applied fireproofing, or finish painted.
 - 3. Surface Preparation:
 - a. SSPC-SP3 - Enclosed areas or members to be fireproofed
 - b. SSPC-SP6 - Exterior exposures, Moderate Exposures, or Slip Critical Connections
 - c. SSPC-SP10 - Immersion & Severe Exposures
 - 4. Moisture-Cured Urethane Primer
 - a. Shop Primer: Tnemec Series 394 PerimePrime

@ 2.5 - 3.5 mils DFT.

- b. Specifier Note Series 394 PerimePrime is UL Classified in accordance with UL 263 (ASTM E 119) for use under W.R. Grace Monokote MK-6/HY and Isolatek's (Cafco) Blaze-Shield II (Type II) fire-resistive materials. PerimePrime is tested in accordance with ASTM E 736 and found compatible with a variety of widely used fire-resistive materials. Contact your Tnemec Representative for ASTM E 736 compatibility results.

Performance Requirements:

1. ASTM B 117: Primer Shall Pass 10,000 Hours Salt Fog Corrosion Resistance.
2. ASTM E 736: Primer Shall Pass Bond Test Requirements.
3. ASTM D 3359: Primer and complete coating system shall have a Rating not less than 5.
4. ASTM 2794: No Visible Cracking or Delamination of Film after 160 Inch-Pounds Or Less Direct And Indirect Impact.
5. ASTM D 4585: No Blistering, Cracking, Rusting or Delamination of Film after 5,000 Hours Exposure.
6. UL 263 (ASTM E 119): Primer Shall Be UL Classified for use Under Selected Fire-Resistive Materials.
7. AISC Static Fatigue: Primer Shall Meet Requirements Of A Class B Surface With A Mean Slip Coefficient No Less Than 0.56 And A Tension Creep Not In Excess Of .005 Inch Over SSPC-SP3 Or SP5 Prepared Substrate.

- C. Steel intended for interior, dry, mild exposures only.

1. Common Use: For use on unprimed structural and miscellaneous steel.
2. Surface Preparation
 - a. SSPC-SP2 or SSPC-SP3
 - b. SSPC-SP6 - When extended field exposure is expected
3. Modified Alkyd Primer
 - a. Shop Primer: Tnemec Seies V10 Tnemec Primer @ 2.0 - 3.5 mils DFT.
 - b. Performance Requirements:
 - 1) ASTM D 4060: No more than 90.0 mg loss after 500 cycles with 500 gram load, average of three tests.
 - 2) ASTM D 4541 (On SSPC-SP1 solvent cleaned steel): No less than 825 psi (5.69 MPa) adhesion after ten freeze/thaw cycles, average of three trials.
 - 3) ASTM D 5894 (On SSPC-SP1 solvent cleaned steel): No blistering, cracking, rusting or delamination of the film and no rust creepage at the scribe after 1,008 hours (three cycles).
 - 4) Exterior Exposure (Mild industrial area, On SSPC-SP1 solvent cleaned steel): No blistering, cracking, rusting or delamination of the film after 12 months exposure.

END OF SECTION

SECTION 09900 PAINTING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, tools, materials, equipment, scaffolding or other structures and incidentals necessary to complete this Contract in its entirety.
- B. The work includes painting and finishing of all new interior and exterior exposed items above and below grade and surfaces, such as structural steel, miscellaneous metals, ceilings, walls, floors, doors, frames, transoms, roof fans, construction signs, guardrails, posts, pipes, fittings, valves, tanks, equipment and all other work obviously required to be painted unless otherwise specified herein or on the Drawings. The omission of minor items in the Schedule of Work shall not relieve the Contractor of his obligation to include such items where they come within the general intent of the Specification as stated herein.
- C. The following items shall not be painted:
1. Any code-requiring labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.
 2. Any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts, unless otherwise indicated.
 3. Aluminum handrails (except where in contact with concrete) walkways, windows, louvers and grating unless otherwise specified herein.
 4. Signs and nameplates.
 5. Finish hardware.
 6. Chain link fence.
 7. Piping buried in the ground or embedded in concrete.
 8. Concealed surfaces of pipe or crawl space.
 9. Nonferrous metals, unless specifically noted otherwise.
 10. Electrical switchgear and motor control centers.
 11. Stainless steel angles, tubes, pipe, etc.
 12. Products with polished chrome, aluminum, nickel or stainless steel finish.
 13. Plastic switch plates and receptacle plates.
 14. Flexible couplings, lubricated bearing surfaces, insulation and metal and plastic pipe interior.
 15. Sprinkler heads.
 16. Lifting chain on cranes and hoists
 17. Electrical cable, festooned conductor system, cables, collector pole brackets, etc.
- D. All work shall be done in strict accordance with this Specification, the Design Drawings and the painting package, including manufacturer's printed instructions.
- E. The Contractor will obtain, at its own expense, all permits, licenses and inspections and shall comply with all laws, codes, ordinances, rules and regulations promulgated by authorities having jurisdiction which may bear on the Work. This compliance will include Federal Public Law 91-596 more commonly known as the "Occupational Safety and Health Act of 1970".

1.02 DEFINITIONS

- A. Field Painting is the painting of new or rebuilt items at the job site. Field painting shall be the responsibility of the Contractor.
- B. Shop Painting is the painting of new or rebuilt items in the shop prior to delivery to the jobsite.
- C. Abbreviations: The abbreviations and definitions listed below, when used in this specification, shall have the following meanings:
 - 1. Owner - The term owner is used to refer to either the owner or an appointed owner's representative such as an engineer, architect, etc.
 - 2. SSPC - The Society for Protective Coatings
 - 3. Exterior - Outside, exposed to weather
 - 4. Interior Dry - Inside, concealed or protected from weather
 - 5. Interior Wet - Inside, subject to immersion services
 - 6. ASTM - American Society of Test Materials
 - 7. NACE - National Association of Corrosion Engineers
 - 8. NSF - National Sanitation Foundation
 - 9. AWWA - American Water Works Association
 - 10. ICRI - International Concrete Restoration Institute
 - 11. NAPF - National Association of Pipe Fitters
 - 12. Dry Film Thickness shall be in MILS

1.03 RESOLUTION OF CONFLICTS

- A. It shall be the responsibility of the Contractor to arrange a meeting prior to the start of any coatings applications between the Contractor, the Coating Manufacturer, whose products are to be used, and the Owner. All aspects of surface preparation, application and coating systems as covered by this Specification will be reviewed at this meeting.
- B. Clarification shall be requested promptly from the Owner when instructions are lacking, conflicts occur in the Specifications, or the procedure seems improper or inappropriate for any reason.
- C. Copies of all manufacturer's instructions and recommendations shall be furnished to the Owner by the Painting Contractor.
- D. It shall be the responsibility of the Coating Manufacturer to have their representative meet in person with the Contractor and Owner before and during the job as a consultant on proper preparation and application of the coating materials unless a meeting is determined to be unnecessary by the Owner.

1.04 SUBMITTALS

- A. Contractor shall submit catalog data and cut sheets for the painting system being used.
- B. Samples as detailed in 3.01 B shall be submitted regardless of system being used, showing each color to be used.
- C. Hazardous Material Disposal documentation shall be submitted if applicable.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Effective oil and water separators shall be used in all compressed air lines serving spray painting and sandblasting operations to remove oil or moisture from the air before it is used. Separators shall be placed as far as practicable from the compressor.
- B. All equipment for application of the paint and the completion of the work shall be furnished by the Contractor in first-class condition and shall comply with recommendations of the paint manufacturer.
- C. Contractor will make available to the County a "Nordson-Mikrotest" or "Positest" dry film thickness gauge for ferrous metal and an OG232 "Tooke" gauge or equal for non-ferrous and cementitious surface, to be used to inspect coatings by the County and Contractor. The gauges may be used by the Contractor and returned each day to the County. County will return gauges to Contractor at completion of job.

2.02 MATERIALS

- A. All materials specified herein are specified to establish standards of quality and are approved for use on this Project. These materials shall be used unless otherwise stated in the Contract documents.
- B. Equivalent materials of other manufacturers may be substituted on approval of the County. Requests for substitution must include a side-by-side comparison of equality, including: manufacturer's literature for each product giving the name, generic type, volume solids, descriptive information, evidence of satisfactory past performance, and an independent laboratory certification that their product meets the performance criteria of the specified materials.
- C. To allow time for review, all requests for substitution shall be submitted by the coating manufacturer a minimum of 21 days prior to the scheduled work.
- D. Substitutions which decrease the total film thickness, change the generic type of coating, or fail to meet the performance criteria of the specified materials shall not be approved. Substitutions which otherwise reduce performance shall not be approved.
- E. All coatings to be shop applied must meet the requirements for volatile organic compounds (VOC) of not more than 3.5 lbs/gallon after thinning.
- F. Colors, where not specified, shall be as selected by the Owner or their Representative.
- G. All coatings in contact with potable water need to be NSF Certified, Tested, and Listed in

accordance with ANSI/NSF Standard 61.

- H. All above ground potable water mains and appurtenances shall be painted Safety Blue (Tnemec 11SF), above ground reclaimed water mains and appurtenances shall be painted purple (Pantone 522C), and above ground pressure sewer mains and appurtenances shall be painted green (Rustoleum 7538 Hunter Green).

2.03 REFERENCES

- A. This section contains references to the governing standards and documents listed below. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the more stringent of the requirements shall prevail
- B. Unless otherwise specified, references to documents shall mean the documents in effect at the time of receipt of Bids. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.
- C. Referenced publications found within this specification shall be the latest revision unless otherwise specified; and applicable parts of the referenced publications shall become a part of this specification as if fully included.
- D. ASTM International (ASTM):
 1. ASTM B117 - Salt Spray (Fog)
 2. ASTM C140 - Water Absorption (Applied to Cast Mortar Cubes)
 3. ASTM C307 - Tensile Strength, Elongation, Modulus of Elasticity
 4. ASTM C531 - Thermal Expansion
 5. ASTM C579 - Compressive Strength
 6. ASTM C580 - Flexural Strength and Modulus of Elasticity
 7. ASTM C67 - Water Absorption (Applied to Fire Clay Brick)
 8. ASTM C793 - Accelerated Weathering
 9. ASTM C97 - Water Absorption (Applied to Ohio Sandstone)
 10. ASTM D1014 - Exterior Exposure
 11. ASTM D2047 - Coefficient of Friction
 12. ASTM D2240 - Hardness
 13. ASTM D2247 - Humidity
 14. ASTM D2370 - Tensile Strength, Elongation, Modulus of Elasticity
 15. ASTM D2794 - Impact
 16. ASTM D3273 - Fungal/Mold/Mildew Resistance
 17. ASTM D4060 - Abrasion
 18. ASTM D4141, Method C (EMMAQUA) - Exterior Exposure
 19. ASTM D4541 - Adhesion
 20. ASTM D4585 - Humidity
 21. ASTM D4587 - QUV Exposure
 22. ASTM D522 - Flexibility and Elongation
 23. ASTM D5590 - Fungal/Mold/Mildew/Algal Resistance
 24. ASTM D5894 - Cyclic Salt Fog/UV Exposure

- 25. ASTM D624 - Tear Strength
- 26. ASTM D638 - Tensile Strength, Elongation, Modulus of Elasticity
- 27. ASTM D648 - Deflection Temperature
- 28. ASTM D6695 - Xenon Arc Weathering
- 29. ASTM D695 - Compressive Strength
- 30. ASTM D7234 - Adhesion
- 31. ASTM D790 - Flexural Strength and Modulus of Elasticity
- 32. ASTM D870 - Immersion
- 33. ASTM G85 - Prohesion

E. NACE International (NACE):

- 1. NACE TM-01-74

F. Federal Specification (FED):

- 1. FED TT-C-555B - Wind Driven Rain

G. Military and Government Specs & Standards:

- 1. MIL D3134 - Impact

H. British Standard:

- 1. BS EN 598: 2007+A1: 2009 - Rocking Abrasion

I. American Association of State Highway and Transportation Officials

- 1. AASHTO T-259 - Chloride Ion Penetration

PART 3 EXECUTION

3.01 INSPECTION OF SURFACES

- A. Before application of the prime coat and each succeeding coat, all surfaces to be coated shall be subject to inspection by the County. Any defects or deficiencies shall be corrected by the Contractor before application of any subsequent coating.
- B. Samples of surface preparation and of painting systems shall be furnished by the Contractor to be used as a standard throughout the job, unless omitted by the County.
- C. When any appreciable time has elapsed between coatings, previously coated areas shall be carefully inspected by the County, and where, in his opinion, surfaces are damaged or contaminated, they shall be cleaned and recoated at the Contractor's expense.
- D. The Contractor shall follow the Manufacturer's latest printed recommended minimum and maximum recoat times. If the maximum recoat time has been exceeded, the Contractor shall follow the Manufacturer's latest printed instructions.
- E. Coating thickness shall be determined by the use of a properly calibrated "Nordson-Mikrotest" or "Positest" Coating Thickness Gauge (or equal) for ferrous metal. Please note that a "Tooke" gauge may be used on cementitious surfaces, and that use of the "Tooke" gauge is classified as a destructive test.

- F. Before performing any destructive tests on a newly applied coating system, the Owner and Contractor shall determine which of them is responsible for the cost of repairing the damaged coatings.

3.02 STANDARDS FOR SURFACE PREPARATION

- A. SSPC-SP1: Solvent Cleaning: Remove all grease, oil, salt, acid, alkali, dirt, dust, wax, fat, foreign matter and contaminates, etc. by one of the following methods: steam cleaning, alkaline cleaning, or volatile solvent cleaning.
- B. SSPC-SP2: Hand Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by hand chipping, scraping, sanding and wire brushing.
- C. SSPC-SP3: Power Tool Cleaning: Removal of loose rust, loose mill scale and loose paint to a clean sound substrate by power tool chipping, descaling, sanding, wire brushing and grinding.
- D. SSPC-SP5/NACE No.1: White Metal Blast Cleaning: Complete removal of all mill scale, rust, rust scale, previous coating, etc., leaving the surface a uniform gray-white color.
- E. SSPC-SP6/NACE No.3: Commercial Blast Cleaning: Complete removal of all dirt, rust scale, mill scale, foreign matter and previous coating, etc., leaving only shadows and/or streaks caused by rust stain and mill scale oxides. At least 66% of each square inch of surface area is to be free of all visible residues, except slight discoloration.
- F. SSPC-SP7/NACE No.4: Brush-Off Blast Cleaning: Removal of rust scale, loose mill scale, loose rust and loose coatings, leaving tightly-bonded mill scale, rust and previous coatings. On concrete surfaces, brush-off blast cleaning shall remove all laitance, form oils and solid contaminates. Blasting should be performed sufficiently close to the surface so as to open up surface voids, bugholes, air pockets and other subsurface irregularities, but so as not to expose underlying aggregate.
- G. SSPC-SP10/NACE No.2: Near-White Blast Cleaning: Removal of all rust scale, mill scale, previous coating, etc., leaving only light stains from rust, mill scale and small specks of previous coating. At least 95% of each square inch of surface area is to be free of all visible residues and the remainder shall be limited to slight discoloration.
- H. SSPC-SP11: Power Tool Cleaning to Bare Metal: Complete removal of rust, rust scale, mill scale, foreign matter and previous coatings, etc., to a standard as specified on a Commercial Grade Blast Cleaning (SSPC-SP-6, NACE-3) by means of power tools that will provide the proper degree of cleaning and surface profile.
- I. SSPC-SP13/NACE No.6: Surface Preparation of Concrete: Provides requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.
 - a. International Concrete Restoration Institute (ICRI):
 1. ICRI 310.1R - Exposed Reinforcing bar (Rebar) Repair
 2. ICRI-CSP 1 - Concrete Surface Profile 1
 3. ICRI-CSP 2 - Concrete Surface Profile 2
 4. ICRI-CSP 3 - Concrete Surface Profile 3

5. ICRI-CSP 4 - Concrete Surface Profile 4
6. ICRI-CSP 5 - Concrete Surface Profile 5
7. ICRI-CSP 6 - Concrete Surface Profile 6

- J. SSPC-SP14/NACE No.8: Industrial Blast Cleaning: An industrial blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, and dirt. Traces of tightly adherent mill scale, rust, and coating residues are permitted to remain on 10% of each unit area of the surface if they are evenly distributed.
- K. SSPC-SP15: Commercial Grade Power Tool Cleaning: A commercial grade power tool cleaned steel surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, rust, coating, oxides, mill scale, corrosion products, and other foreign matter, except as noted. Random staining shall be limited to no more than 33 percent of each unit area of surface as defined.
- L. Visual standards "Pictorial Surface Preparation Standards for Painting Steel Surfaces", and the National Association of Corrosion Engineer, "Blasting Cleaning Visual Standards" TM-01-70 and TM-01-75 shall be considered as standards for proper surface preparation.
- M. NAPF 500-03-04: External Pipe Surface: When viewed without magnification, the exterior surfaces shall be free of all visible dirt, dust, loose annealing oxide, rust, mold, coatings, and other foreign matter.
- N. NAPF 500-03-05: Fitting Blast Clean #2: When viewed without magnification, no more than 5% staining may remain on the surface and the exterior surfaces shall be free of all visible dirt, dust, annealing oxide, rust, mold, coatings, and other foreign matter.

3.03 SURFACE PREPARATION

- A. The surface shall be cleaned as specified for the paint system being used.
- B. All cleaning shall be as outlined in the Society for Protective Coatings (SSPC) Surface Preparation Specification, National Association of Corrosion Engineers (NACE), and the International Concrete Repair Institute (ICRI) unless otherwise noted.
- C. If surfaces are subject to contamination, other than mill scale or normal atmospheric rusting, the surfaces shall be checked for chloride contamination, pressure washed, and acid or caustic pH residues neutralized, in addition to the specified surface preparation.
- D. Oil, grease, soil, dust, etc., deposited on the surface preparation that has been completed shall be removed prior to painting according to SSPC-SP1 Solvent Cleaning under this Specification.
- E. Weld flux, weld spatter, and rust scale shall be removed by a minimum of SSPC-SP3 Power Tool Cleaning as per these Specifications.
- F. All weld seams, sharp protrusions and edges shall be ground smooth prior to surface preparation or application of any coatings.
- G. All areas requiring field welding shall be masked off prior to shop coating, unless waived by the Owner.
- H. All areas which require field touch-up after erection, such as welds, burnbacks, and

mechanically damaged areas, shall be prepared per the Manufacturer's latest written recommendations.

- I. In the event that an existing coating's max recoat window has been exceeded, all surfaces to be overcoated must be thoroughly and uniformly de-glossed and scarified before the application of additional coatings.
- J. All surfaces must be clean and dry prior to the application of any coatings.
- K. All bare concrete surfaces exposed to wastewater or similar corrosive atmospheres shall be confirmed to have a minimum pH of 9 prior to the application of coatings.

3.04 PRETREATMENTS

When specified, the surface shall be pretreated in accordance with the specified pretreatment prior to application of the prime coat of paint.

3.05 STORAGE

Materials shall be delivered to the job site in the original packages with seals unbroken and with legible unmutated labels attached. Packages shall be available for inspection by the County. All coating materials shall be stored in accordance with the Manufacturer's latest written recommendations. The Contractor is responsible for following the Manufacturer's suggested storage temperatures and conditions. The Contractor shall be solely responsible for the protection of the materials stored by himself at the job site. Empty coating cans shall be neatly stacked in an area designated by the County and removed from the job site on a schedule determined by the Contractor. County may request a notarized statement from Contractor detailing all materials used on the Project.

3.06 PREPARATION OF MATERIALS

- A. Mechanical mixers, capable of thoroughly mixing the pigment and vehicle together, shall mix the paint prior to use where required by manufacturer's instructions; thorough hand mixing will be allowed for small amounts up to one gallon. Pressure pots shall be equipped with mechanical mixers to keep the pigment in suspension, when required by manufacturer's instructions. Otherwise, intermittent hand mixing shall be done to assure that no separation occurs. All mixing shall be done in accordance with SSPC Vol. 1, Chapter 4, "Practical Aspects, Use and Application of Paints" and/or with manufacturer's recommendations.
- B. Thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction. Partial kits may only be used when components are accurately measured and mixed per the Manufacturer's latest written recommendations.

3.07 APPLICATION

- A. Paint shall be applied only on thoroughly dry surfaces and during periods of favorable weather, unless otherwise allowed by the paint manufacturer. Except as provided below, painting shall not be permitted when the atmospheric temperature is outside limit of the manufacturer's latest written recommendations, or when freshly painted surfaces may be damaged by rain, fog, dust, or condensation, and/or when it can be anticipated that these conditions will prevail during the drying period.

- B. No coatings shall be applied unless surface temperature is a minimum of 5 °F above dew point; temperature must be maintained during curing.
- C. See coating schedule for actual coating systems to be used on this project.

3.08 DEW POINT CALCULATION CHART

DEW POINT CALCULATION CHART

Ambient Air Temperature - Fahrenheit

Relative Humidity	20	30	40	50	60	70	80	90	100	110	120
90%	18	28	37	47	57	67	77	87	97	107	117
85%	17	26	36	45	55	65	76	84	95	104	113
80%	16	25	34	44	54	63	73	82	93	102	110
75%	15	24	33	42	52	62	71	80	91	100	108
70%	13	22	31	40	50	60	68	78	88	96	105
65%	12	20	29	38	47	57	66	76	85	93	103
60%	11	20	27	36	45	55	64	73	83	92	101
55%	9	17	25	34	43	53	61	70	80	89	98
50%	6	15	23	31	40	50	59	67	77	86	94
45%	4	13	21	29	37	47	56	64	73	82	91
40%	1	11	18	26	35	43	52	61	69	78	87
35%	-2	8	16	23	31	40	48	57	65	74	83

SURFACE TEMPERATURE AT WHICH CONDENSATION OCCURS

Dew Point

Temperature at which moisture will condense on surface. No coatings should be applied unless surface temperature is a minimum of 5°F above this point. Temperature must be maintained during curing.

Example

If air temperature is 70°F and relative humidity is 65%, the dew point is 57°F. No coating should be applied unless surface temperature is 62°F minimum.

- A. No coating shall be applied unless the relative humidity is below 85%.
- B. Suitable enclosures to permit painting during inclement weather may be used if provisions are made to control atmospheric conditions artificially inside the enclosure, within limits suitable for painting throughout the painting operations.
- C. Field painting in the immediate vicinity of, or on, energized electrical and rotating equipment, and equipment and/or pipes in service shall not be performed without the approval of the Owner.
- D. Extreme care shall be exercised in the painting of all operable equipment, such as valves,

electric motors, etc., so that the proper functioning of the equipment will not be affected.

- E. The Contractor's scaffolding shall be erected, maintained and dismantled without damage to structures, machinery, equipment or pipe. Drop cloths shall be used where required to protect buildings and equipment. All surfaces required to be clear for visual observation shall be cleaned immediately after paint application.
- F. Painting shall not be performed on insulated pipe within three (3) feet of insulation operations or on insulation whose covering and surface coat have not had time to set and dry. Painting shall not be performed on uninsulated pipe within one (1) foot of any type of connection until the connection has been made, except as directed by the Owner.
- G. The prime coat shall be applied immediately following surface preparation and in no case later than the same working day. All paint shall be applied by brushing, paint mitt and roller, conventional spraying, or airless spraying, using equipment approved by the paint manufacturer.
- H. Each coat of paint shall be recoated as per manufacturer's instructions. Paint shall be considered recoatable when an additional coat can be applied without any detrimental film irregularities such as lifting or loss of adhesion.
- I. Surfaces that will be inaccessible after assembly shall receive either the full specified paint system or three shop coats of the specified primer before assembly.
- J. Unless otherwise specified, each full coat within a coating system shall be of a different or alternating color.
- K. Finish colors shall be in accordance with the COLOR SCHEDULE and shall be factory mixed (i.e., there shall be no tinting by the Contractor, unless authorized by the Owner).
- L. All edges and weld seams in immersion service shall receive a "stripe coat" (applied by brush) of the 2nd coat prior to application of the full 2nd coat.
- M. All open seams in the roof area of tanks shall be filled after application of the topcoat with a flexible caulking such as Sika Flex 1A.

3.09 WORKMANSHIP

- A. The Contractor must show proof that all employees associated with this Project shall have been employed by the Contractor for a period not less than six (6) months.
- B. Painting shall be performed by experienced painters in accordance with the recommendations of the paint manufacturer. All paint shall be uniformly applied without sags, runs, spots, or other blemishes. Work which shows carelessness, lack of skill, or is defective in the opinion of the County, shall be corrected at the expense of the Contractor.
- C. The Contractor shall provide the names of at least three other projects of similar size and scope that they have successfully completed under their current company name.

3.10 APPLICATION OF PAINT

- A. By Brush and/or Rollers

1. Top quality, properly styled brushes and rollers shall be used. Rollers with a baked phenol core shall be utilized.
2. The brushing or rolling shall be done so that a smooth coat as nearly uniform in thickness as possible is obtained. Brush or roller strokes shall be made to smooth the film without leaving deep or detrimental marks.
3. Surfaces not accessible to brushes or rollers may be painted by spray, by dauber or sheepskins, and paint mitt.
4. It may require two coats to achieve the specified dry film thickness if application is by brush and roller.

B. Air, Airless or Hot Spray

1. The equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the paint to be applied and shall be equipped with suitable pressure regulators and gauges.
2. Paint shall be applied in a uniform layer, with a 50% overlap pattern. All runs and sags should be brushed out immediately or the paint shall be removed and the surface resprayed.
3. High build coatings should be applied by a cross-hatch method of spray application to ensure proper film thickness of the coating.
4. Areas inaccessible to spray shall be brushed; if also inaccessible to brush, daubs or sheepskins shall be used, as authorized by the manufacturer.
5. Thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction.
6. Nozzles, tips, etc., shall be of sizes and designs as recommended by the manufacturer of the paint being sprayed.
7. The first coat on concrete surfaces in immersion service should be sprayed and back rolled.

3.11 PROTECTION AND CLEANUP

- A. It shall be the responsibility of the Contractor to protect at all times, in areas where painting is being done, floors, materials of other crafts, equipment, vehicles, fixtures, and finished surfaces adjacent to paint work. Cover all electric plates, surface hardware, nameplates, gauge glasses, etc., before start of painting work.
- B. At the option of the County during the course of this project, the Contractor will contain all spent abrasives, old paint chips, paint overspray and debris by means suitable to the County, including, but not limited to, full shrouding of the area.
- C. If shrouding is required, the Contractor must provide a complete design of the intended shroud or cover. Care must be taken not to modify or damage the structure during the use of the shroud. If damage should occur, the Contractor is held responsible for all repairs.
- D. At completion of the work, remove all paint where spilled, splashed, spattered, sprayed or smeared on all surfaces, including glass, light fixtures, hardware, equipment, painted and unpainted surfaces.
- E. After completion of all painting, the Contractor shall remove from job site all painting equipment, surplus materials and debris resulting from this work.
- F. The Contractor is responsible for the removal and proper disposal of all hazardous materials from the job site in accordance with Local, State and Federal requirements as outlined by

the Environmental Protection Agency.

- G. A notarized statement shall be presented to the County that all hazardous materials have been disposed of properly including, but not limited to: name of disposal company, disposal site, listing of hazardous materials, weights of all materials, cost per pound and EPA registration number.

3.12 TOUCH-UP MATERIALS

- A. All areas which require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be prepared per the Manufacturer's latest written recommendations.
- B. Strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the Owner and Manufacturer's attention. Otherwise, Contractor assumes full responsibility.
- C. The Contractor shall provide, at the end of the Project, at least one (1) gallon of each generic topcoat in each color as specified by the Owner for future touch-up. Two gallons may be required for (2) component materials.

3.13 ON-SITE INSPECTION

During the course of this Project, the County will reserve the option of incorporating the services of a NACE Level III inspection service. The inspection service will be responsible for assuring the proper execution of this Specification by the successful Contractor.

3.14 STEEL & FERROUS METALS

A. FERROUS METALS - NON-IMMERSION / EXTERIOR / UV-EXPOSED

The coating systems in the FERROUS METALS - NON-IMMERSION / EXTERIOR / UV-EXPOSED section are listed in order of decreasing color & gloss retention and corrosion resistance. The first system has maximum color & gloss retention and maximum corrosion resistance.

1. System No. 700-1: Zinc/Epoxy/Fluoropolymer

This system provides outstanding resistance to ultra-violet light degradation and the absolute best color and gloss retention available. This system will have excellent resistance to abrasion and chalking, and is recommended for coastal environments and on structures where extremely long-term maintenance cycles are desired (such as elevated tanks and surfaces with custom artwork). (Note: Series 700 is gloss. If the Owner desires a semi-gloss finish then Series 700 may be replaced with Series 701.) Note: For single-component application, Series 90G-1K97 may be substituted as the primer.

Surface Preparation: SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile.

Primer: Series 90-97 Tneme-Zinc	2.5 - 3.5 mils
2nd Coat: Series 66HS Hi-Build Epoxoline	3.0 - 6.0 mils
3rd Coat: Series 700 Hydroflon	<u>2.0 - 3.0 mils</u>
Total Dry Film Thickness: 7.5 - 12.5 mils	
Minimum Dry Film Thickness: 9.5 mils	

System No. 1095-1: Zinc/Epoxy/Urethane

This system offers excellent color & gloss retention with the added corrosion protection of a zinc rich primer. Series 90-97 Tneme-Zinc is an organic zinc-rich primer that can be used for field touch up of a zinc primer or for touch up of galvanized surfaces that are damaged. For single-component applications, Series 90G-1K97 may be substituted for Series 90-97. Series 1095 has a semi-gloss finish. For a different sheen, apply Series 1094 (gloss) or Series 1096 (eggshell) at the same thickness.

Surface Preparation: SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile.

Shop Coat: Series 90-97 Tneme-Zinc	2.5 - 3.5 mils
2nd Coat: Series 66HS Hi-Build Epoxoline	3.0 - 6.0 mils
3rd Coat: Series 1095 Endurashield	<u>2.5 - 5.0 mils</u>
Total Dry Film Thickness: 8.0 - 14.5 mils	
Minimum Dry Film Thickness: 10.0 mils	

2. System No. 1095-2: Epoxy/Epoxy/Urethane

This system is highly resistant to abrasion, wet conditions, corrosive fumes and chemical contact. It provides excellent color & gloss retention. This system should be used for exterior steel surfaces that are neither submerged, nor buried. Series 161HS may be substituted for Series 66HS for low temperature cure or quick recoats. Series 1095 has a semi-gloss finish. For a different sheen, apply Series 1094 (gloss) or Series 1096 (eggshell) at the same thickness.

Surface Preparation: SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile.

Shop Coat: Series 66-1211 Hi-Build Epoxoline Primer	3.0 - 6.0 mils
2nd Coat: Series 66 Hi-Build Epoxoline	3.0 - 6.0 mils
3rd Coat: Series 1095 Endura-Shield	<u>2.0 - 5.0 mils</u>
Total Dry Film Thickness: 8.0 - 17.0 mils	
Minimum Dry Film Thickness: 10.0 mils	

3. System No. 1095-3: Epoxy Mastic/Urethane (Overcoat)

This system can be used over factory finish paint or over non-sandblasted steel and offers the high performance of an epoxy/urethane system. Series 1095 has a semi-gloss finish. For a different sheen, apply Series 1094 (gloss) or Series 1096 (eggshell) at the same thickness.

Surface Preparation: High Pressure Water Clean (min. 3500 psi, 3 to 5 gallons per minute, using an oscillating tip and potable water). A cleaning detergent such as Trisodium Phosphate should be used to facilitate cleaning. A degreaser may be required for oil soaked areas or heavily contaminated areas.

Some spot areas may require Hand Tool (SSPC-SP2), Power Tool Cleaning (SSPC-SP3), or Brush Blast (SSPC-SP7/NACE No. 4) to remove loose surface rust.

Existing coatings must be clean, dry, and tightly adhering prior to application of coatings.

Spot Prime (Areas of Bare Steel): Series 135 Chembuild	4.0 - 6.0 mils
1st Coat: Series 135 Chembuild	4.0 - 6.0 mils
2nd Coat: Series 1095 Endura-Shield	<u>2.0 - 5.0 mils</u>
Total Dry Film Thickness: 6.0 - 11.0 mils*	
Minimum Dry Film Thickness: 7.0 mils	

**Does not include spot prime or previously existing coatings.*

B. EXTERIOR BELOW GRADE EXPOSURE

1. System No. 66HS-1: Epoxy/Epoxy/Epoxy or Urethane

This system provides exceptional corrosion protection in buried environments. It offers better corrosion protection and a healthier application process than coal-tar epoxies. The 3rd coat is dependent on the exposure - for buried areas use an extra coat of high-solids epoxy, for uv-exposed, non-immersion areas use an aliphatic acrylic urethane. Series 1095 has a semi-gloss finish. For a different sheen, apply Series 1094 (gloss) or Series 1096 (eggshell) at the same thickness.

Surface Preparation: SSPC-SP10/NACE No. 2 Near-White Blast Cleaning with a minimum angular anchor profile of 1.5 mils.

Shop Coat: Series N140 Pota-Pox Plus	2.0 - 10.0 mils
2nd Coat: Series N140 Pota-Pox Plus	4.0 - 10.0 mils
3rd Coat (Buried Area Only): Series N140 Pota-Pox Plus	4.0 - 10.0 mils
3 rd Coat (UV Exposed, Non Immersion Areas Only): Series 1095	<u>2.5 - 5.0 mils</u>
Total Dry Film Thickness: 10.0 - 30.0 mils	
Minimum Dry Film Thickness: 11.0 mils	

System No. 46H-413-1: Polyamide Epoxy-Coal Tar

This system provides a high-build coating for underground conditions.

Surface Preparation: SSPC-SP10/NACE No. 2 Near-White Blast Cleaning with a minimum angular anchor profile of 1.5 mils.

1st Coat: Series 46H-413 Hi-Build Tneme-Tar	8.0 - 10.0 mils
2nd Coat: Series 46H-413 Hi-Build Tneme-Tar	<u>8.0 - 10.0 mils</u>
Total Dry Film Thickness: 16.0 - 20.0 mils	
Minimum Dry Film Thickness: 18.0 mils	

C. INTERIOR (NON-IMMERSION)

1. System No.66HS-2: Polyamide Epoxy

This system will provide chemical and corrosion resistance against abrasion, moisture, corrosion fumes, and occasional chemical contact. Primer coat must be touched-up before second coat is applied. Substitute Series 161 for low temperature cure or quick recoats. Use this system for interior exposed, non-submerged metals.

Surface Preparation: SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile.

Shop Coat: Series 66 Hi-Build Epoxoline	3.0 - 5.0 mils
2nd Coat: Series 66 Hi-Build Epoxoline	4.0 - 6.0 mils
3rd Coat: Series 66 Hi-Build Epoxoline	<u>4.0 - 6.0 mils</u>
Total Dry Film Thickness: 7.0 - 11.0 mils	
Minimum Dry Film Thickness: 9.0 mils	

2. System No. 27WB-1: Inorganic Hybrid Water-Based Epoxy (Overcoat)

This low VOC system can be used over factory finish paint or over non-sandblasted steel and offers the high performance of an epoxy/urethane system. Series 1095 has a semi-gloss finish. For a different sheen, apply Series 1094 (gloss) or Series 1096 (eggshell) at the same thickness.

Surface Preparation: Abrasive blast cleaning in accordance with SSPC-SP7/NACE No.4 generally produces the best coating performance. If conditions will not permit this, Series 27WB may be applied to SSPC-SP2 or SP3 Hand or Power Tool Cleaned surfaces (SSPC Rust Grade Condition C).

Shop Coat: Manufacturer's Standard (or existing coating)	varies
Spot Prime (Areas of Bare Steel): Series 27WB Typoxy	3.0 - 8.0 mils
2nd Coat: Series 27WB Typoxy	3.0 - 8.0 mils
3rd Coat: Series 1095 Endura-Shield	<u>2.5 - 5.0 mils</u>
Total Dry Film Thickness: 5.5 - 13.0 mils*	
Minimum Dry Film Thickness: 7.0 mils	

**Does not include spot prime or previously existing coatings.*

D. IMMERSION

1. System No. 104-1: Cycloaliphatic Amine Epoxy (Non-Potable Water)

This system will provide chemical and corrosion resistance for protection against moisture, corrosive fumes, chemical contact and immersion in **mild to moderate** wastewater, such as clarifiers, chlorine contact basins, aeration basins, settling basins and other open top (aerobic) structures. Shop coat must be touched-up before second coat is applied.

Surface Preparation: SSPC-SP10/NACE No.2 Near-White Blast Cleaning with a minimum 1.5 mil angular anchor profile.

Shop Coat: Series 1 Omnithane	2.5 - 3.5 mils
2nd Coat: Series 104 Hi-Build Epoxoline	6.0 - 8.0 mils
3rd Coat: Series 104 Hi-Build Epoxoline	<u>6.0 - 8.0 mils</u>
Total Dry Film Thickness: 14.5 - 19.5 mils	

Minimum Dry Film Thickness: 15.5 mils

Allow Series 104 to cure for 7 days at 75°F prior to immersion service.

2. System No. 142-1: Flake / Aluminum Oxide Filled Polyamine Epoxy
(Non-Potable Water)

This system will provide chemical and corrosion resistance for protection against moisture, corrosive fumes, chemical contact and immersion in **mild to moderate wastewater where increased abrasion resistance is required.**

Surface Preparation: SSPC-SP-10/NACE No.2 Near-White Metal Blast Cleaning
(1.5 Mil Profile)

1st Coat: Series 1 Omnithane 2.5 - 3.5 mils
2nd Coat: Series 142 Epoxoline 14 - 18.0 mils

Total Dry Film Thickness: 16.5 - 23.5 mils
Minimum Dry Film Thickness: 20.0 mils

3. System No. 446-1: Hydrophobic Aromatic Polyurethane (Non-Potable Water)

This system will provide exceptional chemical and corrosion resistance for protection against moisture, corrosive fumes, chemical contact and **immersion in mild to moderate wastewater environments. This system is designed for situations where an extremely quick return to service is required.**

Surface Preparation: SSPC-SP10/NACE No.2 Near-White Blast Cleaning.

1st Coat: Series 1 Omnithane 2.5 - 3.5 mils
2nd Coat: 446 Perma-Shield MCU 6.0 - 8.0 mils*
3rd Coat: 446 Perma-Shield MCU 6.0 - 8.0 mils*

Total Dry Film Thickness: 14.5 - 19.5 mils
Minimum Dry Film Thickness: 16.0 mils

**Exceeding 10.0 mils per coat of Series 446 may cause blistering.*

Notes:

1. Series 446 is not color stable. Its color may change drastically, which will not affect the performance of the product.
2. Allow Series 446 to cure for 4 hours at 75°F prior to service.

4. System No. 142-2: Flake / Aluminum Oxide Filled Polyamine Epoxy
(Methanol Liner)

This system will provide chemical and corrosion resistant liner suitable for methanol immersion service.

Surface Preparation: SSPC-SP-10/NACE No.2 Near-White Metal Blast Cleaning
(1.5 Mil Profile)

2nd Coat: Series 142 Epoxoline 15.0 - 18.0 mils

Total Dry Film Thickness: 15.0 - 18.0 mils
Minimum Dry Film Thickness: 15.0 mils

5. System No. 365-1: Novolac Epoxy (Sulfuric Acid Liner)

This system is a spray applied, 100% solids, high build, reinforced epoxy formulated for general use as an internal lining for tanks and other aggressive chemical immersion service. This lining is suitable for immersion service in 98% sulfuric acid, and **requires the use of heated plural component equipment to apply.**

Surface Preparation: SSPC-SP5/NACE No. 1 White Metal Blast Cleaning with a minimum angular anchor profile of 3.0 mils. Refer to the Series 365 Application Guide.

Surfacer/Filler (as needed to fill pits and voids): Series 351 Tank Armor

*Stripe Coat: Brush Series 365 Tank Armor into welds, seams, and edges

*Full Coat: Series 365 Tank Armor 35.0 - 50.0 mils
Total Dry Film Thickness: 35.0 - 50.0 mils

*Consult the manufacturer's latest written recommendations and application guide before applying.

Notes:

1. If the humidity is anticipated to exceed 80%, dehumidification equipment is required.
2. Allow Series 365 to cure for 48 hours at 75°F prior to service.

System No. 22-1: Modified Polyamine Epoxy (Potable Water)

This is a low VOC system which meets the requirements of approval for potable water use as established by NSF Std 61. **This system may be applied up to 40.0 mils in a single coat, providing exceptional barrier protection and a quicker return to service.** This system is intended for use over simple shapes and areas with minimal detail work.

Surface Preparation: SSPC-SP10/NACE No.2 Near-White Blast Cleaning with a minimum angular anchor profile of 3.0 mils.

Pre-patch (sharp, angular pits and voids): Series 215 as needed
Stripe Coat: Series 22 Welds, seams, and edges
Topcoat: Series 22 22.0 - 27.0 mils*
Total Dry Film Thickness: 22.0 - 27.0 mils

**In order to maintain NSF Std. 61 approval, maximum allowable DFT is 50.0 mils.*

Notes:

1. Series 22 is to be spray applied only.
2. Allow Series 22 to cure for a minimum of 5 days at 75°F prior to service.

6. System No. 20HS-1: Epoxy-Polyamide (Potable Water)

This system meets American Water Works Association AWWA D 102 Inside Paint System Number 1. Series 20 meets the requirements of approval for potable water

use as established by NSF Std 61. Substitute Series FC20 for low temperature cure or quick recoats.

Surface Preparation: SSPC-SP10/NACE No.2 Near-White Blast Cleaning with a minimum angular anchor profile of 2.0 mils.

Shop Coat: Series 94H ₂ O Hydro-Zinc	2.5 - 3.5 mils
Stripe Coat (Weld Seams and Edges): 20 Pota-Pox	3.0 - 5.0 mils
2nd Coat: 20 1255 Pota-Pox (Beige)	4.0 - 6.0 mils
3rd Coat: 20-15BL Pota-Pox (Tank White)	<u>4.0 - 6.0 mils</u>
Total Dry Film Thickness*: 10.5 - 15.5 mils**	
Minimum Dry Film Thickness: 11.5 mils	

**Excludes stripe coat*

***Note: In order to maintain NSF Std. 61 approval, maximum allowable DFT is 18 mils.*

Allow Series 20 to cure for 7 days at 75°F prior to service.

3.15 OVERHEAD METAL DECKING, JOISTS

A. EXTERIOR EXPOSURE

System No. 1029-1: HDP Acrylic Polymer

This system can be applied over a wide variety of coatings and factory finishes. It can also be applied direct to galvanized decking, joists, & conduits. Series 1029 is suitable for application in mild to moderate exposures.

Surface Preparation: Pressure clean to remove all dirt, oil, grease, chemicals and foreign contaminates. Remove loose paint and all rust by hand and power tool cleaning (SSPC-SP 2 & 3)

1st Coat: Series 115 Uni-Bond	2.5 - 4.0 mils
2nd Coat: Series 1029 Enduratone	<u>2.0 - 3.0 mils</u>
Total Dry Film Thickness: 4.5 - 7.0 mils	

B. INTERIOR EXPOSURE

System No. 115-1: Self-crosslinking Hydrophobic Acrylic

This system should be used on ceilings of non-chemical storage areas where a one-coat system is desired. Can be applied over steel, galvanized and aluminum decking, joist, shop primed beams, conduits and concrete. Note: Series 115 has "dry-fall" characteristics. See manufacturer's latest written Product Data Sheet for details.

Surface Preparation: Surfaces must be dry, clean and free of oil, grease and other contaminates.

One Coat: Series 115 Uni-Bond	<u>2.5 - 4.0 mils</u>
Total Dry Film Thickness: 2.5 - 4.0 mils	

3.16 GALVANIZED STEEL & NONFERROUS METALS

A. GALVANIZED STEEL, STAINLESS STEEL, ALUMINUM, OR COPPER

System No. 1095-4: Epoxy/High Build Urethane

Series 66 has excellent adhesion to galvanized steel & nonferrous metals. This system is highly resistant to abrasion, wet conditions, corrosive fumes and chemical contact. It provides excellent color & gloss retention. Series 1095 has a semi-gloss finish. For a different sheen, apply Series 1094 (gloss) or Series 1096 (eggshell) at the same thickness.

Surface Preparation: SSPC-SP1 Solvent Cleaning, followed by mechanically abrading (SSPC-SP7/NACE No.4, minimum angular anchor profile of 1.5 mils)

1st Coat: Series 66 Hi-Build Epoxoline	2.0 - 4.0 mils
2nd Coat: Series 1095 Endura-Shield	<u>2.5 - 5.0 mils</u>
Total Dry Film Thickness: 4.5 - 9.0 mils	
Minimum Dry Film Thickness: 5.0 mils	

B. ALUMINUM IN CONTACT WITH CONCRETE

System No. 46H-413-2: Polyamide Epoxy

Surface Preparation: SSPC-SP1 Solvent Cleaning, followed by thoroughly scarifying to de-gloss and provide a minimum uniform angular anchor profile of 1.0 mil.

1st Coat: Series 46H-413 Hi-Build Tneme-Tar	3.0 - 5.0 mils
2nd Coat: Series 46H-413 Hi-Build Tneme-Tar	<u>8.0 - 10.0 mils</u>
Total Dry Film Thickness: 11.0 - 15.0 mils	
Minimum Dry Film Thickness: 13.0 mils	

3.17 CONCRETE & MASONRY

A. EXTERIOR - ABOVE GRADE (NON-IMMERSION, VERTICAL SURFACES)

1. System No. 156-1: Modified Waterborne Acrylate (Elastomeric)

This system provides exceptional elongation for spanning hairline cracks in concrete structures. It also provides mold & mildew resistance, as well as wind-driven rain resistance. For application over previously applied coatings, use TNEMEC Series 151 Elasto-Grip at 0.7 - 1.5 mils DFT prior to the application of Series 156 Enviro-Crete. Note: If a textured finish is preferred, use 157 Enviro-Crete TX (medium texture) @ 6.0 - 9.0 mils dry film thickness per coat.

Surface Preparation: Allow concrete to cure for 28 days. Surface must be clean and dry.

1st Coat: Series 156 Enviro-Crete	4.0 - 8.0 mils
2nd Coat: Series 156 Enviro-Crete	<u>4.0 - 8.0 mils</u>
Total Dry Film Thickness: 8.0 - 16.0 mils	
Minimum Dry Film Thickness: 10.0 mils	

2. System No. 1026-1: Acrylic Emulsion (Non-Elastomeric)

This system provides a durable, easy-to-use, water-based coating that offers long-wearing protection. It is low odor, low VOC, and has “dry-fall” properties. See manufacturer’s latest written Product Data Sheet for details. This system will provide a high vapor transmission rate.

Surface Preparation: Allow concrete to cure for 28 days. Surface shall be clean and dry.

Block Filler (CMU only): 1254 Epoxoblock	100 - 150 ft ² /Gallon
1st Coat: Series 1026 Enduratone	2.0 - 3.0 mils
2nd Coat: Series 1026 Enduratone	<u>2.0 - 3.0 mils</u>
	Total Dry Film Thickness: 4.0 - 6.0 mils*
	Minimum Dry Film Thickness: 5.0 mils

*Does not include Block Filler

3. System No. 662-1: Silane /Siloxane Sealer (Min. 42% Solids)

This provides a clear, filmless, penetrating water repellent for virtually all above-grade, vertical and horizontal concrete, stucco, block, and brick masonry. This will allow the substrate to resist water and chloride ion intrusion, stain damage, freeze/thaw spalling, efflorescence, and rust damage. This system will not alter the color or texture of the surface, nor significantly affect the vapor transmission qualities of the substrate. This barrier is also resistant to ultraviolet and weather deterioration.

Surface Preparation: Allow new concrete to cure 28 days. All surfaces must be clean, dry, and free of oils, curing compounds, form release oils, and other contaminants that might interfere with the penetration of the sealer.

For Coating Brick & Concrete:

Tnemec Series 662.....Two Coats @ 75-200 ft²/gallon

For Coating Split-faced or Porous Masonry:

Tnemec Series 662.....Two Coats @ 35-100 ft²/gallon

4. System No. 626-1: Water Repellent and Graffiti Protectant

This provides superior protection against, and easy removal of, unwanted graffiti. **Series 626 is intended for use in conjunction with Series 680 Mark A Way (Cleaner) to provide a complete graffiti protection system.** This is a clear, silicone rubber-based formulation which protects vertical concrete block, brick, cast concrete, stone, and other masonry substrates with little or no change to the appearance of the untreated substrate. It has excellent stability against ultraviolet rays and salt spray.

Surface Preparation: Allow new concrete to cure 28 days. All surfaces must be clean, dry, and free of oils, curing compounds, form release oils, and other contaminants that might interfere with the penetration of the sealer.

For Coating Brick & Concrete:

Tnemec Series 626.....Two Coats @ 125-200 ft²/gallon

For Coating Split-faced or Porous Masonry:

Tnemec Series 626.....Two Coats @ 65-150 ft²/gallon

B. EXTERIOR - BELOW GRADE

1. System No. 46H-413-2: Polyamide Epoxy-Coal Tar

This system provides a high-build coating for underground conditions.

Surface Preparation: Allow new concrete to cure for 28 days. Surface shall be clean and dry.

One or Two Coats: 46H-413 Hi-Build Tneme-Tar

Total Dry Film Thickness: 16.0 - 20.0 mils*

C. INTERIOR (NON-IMMERSION)

The coating systems in the INTERIOR (NON-IMMERSION) section are listed in order of decreasing performance with regards to chemical & corrosion resistance. This generally has an inverse correlation with color & gloss retention. The first system has extremely good chemical resistance with the highest potential for yellowing, while the last system has extremely poor chemical resistance with the lowest potential for yellowing.

1. System No. 104-2: Cycloaliphatic Amine Epoxy

This system will produce a tile-like finish for easy cleaning and superior stain resistance. It will also provide protection against chemical attack, corrosive fumes, high humidity and wash down. Backroll first coat to fill porosity.

Surface Preparation: Allow new concrete and masonry to cure for 28 days. Surface must be clean and dry.

For New Concrete or Porous Masonry: Apply Tnemec Series 1254 Epoxoblock WB @ 100 - 150 ft²/Gallon.

1st Coat: Series 104 H.S. Epoxy (backrolled)

8.0 - 10.0 mils

2nd Coat: Series 104 H.S. Epoxy

8.0 - 10.0 mils

Total Dry Film Thickness: 16.0 - 20.0 mils

Minimum Dry Film Thickness: 18.0 mils

2. System No. 66HS-6: Polyamide Epoxy

This system provides excellent protection from abrasion, moisture, corrosive fumes and chemical contact.

Surface Preparation: Allow new concrete and masonry to cure for 28 days. Surface must be clean and dry.

For New Concrete or Porous Masonry: Apply Tnemec Series 1254 Epoxoblock WB @ 100 - 150 ft²/Gallon.

1st Coat: Series 66HS Hi-Build Epoxoline

3.0 - 5.0 mils

2nd Coat: Series 66HS Hi-Build Epoxoline

4.0 - 6.0 mils

Total Dry Film Thickness: 7.0 - 11.0 mils
Minimum Dry Film Thickness: 9.0 mils

3. System No. 113-1: Acrylic-Epoxy

This system will provide high performance and can be applied directly over existing coatings without lifting. Can be used when low odor is required during application. Note: Series 113 has a Satin finish. For a gloss finish, specify Series 114 Tneme-Tufcoat.

Surface Preparation: Allow new concrete and masonry to cure for 28 days. Surface must be clean and dry.

For New Concrete or Porous Masonry: Apply Tnemec Series 1254 Epoxoblock WB @ 100 - 150 ft²/Gallon.

1st Coat: 113 Tneme-Tufcoat
2nd Coat: 113 Tneme-Tufcoat

4.0 - 6.0 mils
4.0 - 6.0 mils

Total Dry Film Thickness: 8.0 - 12.0 mils
Minimum Dry Film Thickness: 9.0 mils

4. System No. 1026-2: Acrylic Emulsion

This system provides a durable, easy-to-use, water-based coating that offers long-wearing protection. It is low odor, low VOC, and has "dry-fall" properties. See manufacturer's latest written Product Data Sheet for details. This system will provide a high vapor transmission rate. Note: Series 1026 has a Matte finish. For a Semi-Gloss finish, specify Series 1029 Enduratone.

Surface Preparation: Surface shall be clean and dry. Allow concrete to cure for 28 days.

Block Filler (CMU only): 54 Masonry Filler
1st Coat: Series 1026 Enduratone
2nd Coat: Series 1026 Enduratone

80 - 100 ft²/Gallon
2.0 - 3.0 mils
2.0 - 3.0 mils

Total Dry Film Thickness: 4.0 - 6.0 mils*
Minimum Dry Film Thickness: 5.0 mils

**Does not include Block Filler*

D. IMMERSION

1. System No. 104-3: Cycloaliphatic Amine Epoxy (Non-Potable Water)

This system will provide chemical and corrosion resistance for protection against abrasion, moisture, corrosive fumes, chemical contact and immersion in ***mild to moderate*** Wastewater, such as clarifiers, chlorine contact basins, aeration basins, settling basins and other open top (aerobic) structures.

Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater.

Apply Tnemec Series 218 to all surfaces at a minimum of 1/16" to re-surface concrete, fill voids and bugholes, mitigate concrete outgassing, and to create a monolithic, paintable surface.

1st Coat: 104-1255 H.S. Epoxy Primer (backrolled)	6.0 - 8.0 mils
2nd Coat: 104 H.S. Epoxy	6.0 - 8.0 mils
3rd Coat: 104 H.S. Epoxy	<u>6.0 - 8.0 mils</u>
Total Dry Film Thickness: 18.0 - 24.0 mils	
Minimum Dry Film Thickness: 20.0 mils	

Allow Series 104 to cure for 7 days at 75°F prior to immersion service.

2. System No. 142-3: Flake/Aluminum Oxide Filled Polyamine Epoxy (Non-Potable Water)

This system will provide chemical and corrosion resistance for protection against moisture, corrosive fumes, chemical contact and immersion in *mild to moderate wastewater where increased abrasion resistance is required.*

Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater.

Apply Tnemec Series 218 to all surfaces at a minimum of 1/16" to re-surface concrete, fill voids and bugholes, mitigate concrete outgassing, and to create a monolithic, paintable surface.

1st Coat: Series 142 Epoxoline	8.0 - 10.0 mils
2nd Coat: Series 142 Epoxoline	<u>8.0 - 10.0 mils</u>
Total Dry Film Thickness: 16.0 - 20.0 mils	
Minimum Dry Film Thickness: 18.0 mils	

3. System No. 22-2: Modified Polyamine Epoxy (Potable Water)

This is a low VOC system which meets the requirements of approval for potable water use as established by NSF Std 61. **This system may be applied up to 40.0 mils in a single coat, providing exceptional barrier protection and a quicker return to service.** This system is intended for use over simple shapes and areas with minimal detail work.

Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater.

Apply Tnemec Series 218 to all surfaces at a minimum of 1/16" to re-surface concrete, fill voids and bugholes, and to create a monolithic, paintable surface.

Single Coat: Series 22	<u>22.0 - 27.0 mils*</u>
Total Dry Film Thickness: 22.0 - 27.0 mils	

**In order to maintain NSF Std. 61 approval, maximum allowable DFT is 50.0 mils.*

Notes:

1. Series 22 is to be spray applied only.
2. Allow Series 22 to cure for a minimum of 5 days at 75°F prior to service.

4. System No. 20HS-2: Epoxy-Polyamide (Potable Water)

This system meets American Water Works Association AWWAD 102 Inside System No. 1. Series 20HS meets the requirements of approval for potable water use as established by NSF Std 61.

Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater.

Apply Tnemec Series 218 to all surfaces at a minimum of 1/16" to re-surface concrete, fill voids and bugholes, and to create a monolithic, paintable surface.

1st Coat: 20-15BL Pota-Pox	4.0 - 6.0 mils
2nd Coat: 20-1255 Pota-Pox Finish	4.0 - 6.0 mils
3rd Coat: 20 -15BL	<u>4.0 - 6.0 mils</u>
Total Dry Film Thickness: 12.0 - 17.0 mils*	
Minimum Dry Film Thickness: 13.0 mils	

**In order to maintain NSF Std. 61 approval, maximum allowable DFT is 18 mils.*

Allow Series 20 to cure for 7 days at 75°F prior to service.

5. System No. 262-1: Modified Polyurethane (Non-Potable Water)

This system is a flexible liner which provides a seamless monolithic membrane for repairing minor leaking in water basins and reservoirs. This system may also be used to span hairline cracks on substrates where movement may occur.

Surface Preparation: Prepare concrete surfaces in accordance with SSPC-SP13/NACE No.6 Joint Surface Preparation Standards and ICRI Technical Guidelines. Mechanically abrade in accordance with SSPC-SP13/NACE No.6 to remove all existing coatings, laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI-CSP 5 or greater.

Apply Tnemec Series 218 Mortarclad Modified Cementitious Mortar to fill all voids and bugholes, and to resurface the entire concrete substrate to a minimum of 1/16".

1st Coat: Series 66 Hi-Build Epoxoline	4.0 - 6.0 mils
2nd Coat: Series 66 Hi-Build Epoxoline	4.0 - 6.0 mils
3rd Coat: Series 262 Elasto-Shield*	<u>65.0 - 75.0 mils</u>
Total Dry Film Thickness: 73.0 - 87.0 mils	
Minimum Dry Film Thickness: 77.0 mils	

** Consult the manufacturer's latest written recommendations and application guide before applying.*

Notes:

1. In order to mitigate outgassing, Series 262 should be applied during periods of declining temperatures.
2. Series 262 Elasto-Shield must be allowed to cure for 2 days before returning to immersion service.

6. System No. 264-1: Modified Polyurethane (Potable Water)

This system is a flexible liner which provides a seamless monolithic membrane **for fixing minor leaking in potable water basins and reservoirs**. This system meets the requirements of approval for potable water use as established by NSF Std 61.

Surface Preparation: Prepare concrete surfaces in accordance with SSPC-SP13/NACE No.6 Joint Surface Preparation Standards and ICRI Technical Guidelines. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all existing coatings, laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI-CSP 5 or greater.

Apply Tnemec Series 218 Mortarclad Modified Cementitious Mortar to fill all voids and bugholes, and to resurface the entire concrete substrate to a minimum of 1/16".

1st Coat: 20 Pota-Pox	4.0 - 6.0 mils
2nd Coat: 20 Pota-Pox	4.0 - 6.0 mils
3rd Coat: 264 Elasto-Shield*	<u>60.0 - 70.0 mils</u>
	Total Dry Film Thickness: 68.0 - 82.0 mils
	Minimum Dry Film Thickness: 72.0 mils

**Consult the manufacturer's latest written recommendations and application guide before applying.*

Notes:

1. In order to mitigate outgassing, Series 264 should be applied during periods of declining temperatures.
2. Allow Series 264 to cure for 14 days at 75°F prior to service in a potable water tank (*For non-potable service, allow to cure for 48 hours at 75°F*).

3.18 CONCRETE FLOORS (RESINOUS FLOORING SYSTEMS)

A. EPOXY FLOOR COATINGS

5. System No. 248-1: Aliphatic Moisture Cured Urethane (Thin Film with Increased Chemical Resistance, UV Stability, and Durability)

This system will provide a durable, long-wearing coating that bonds tightly to concrete and stands up under heavy foot traffic, frequent cleaning, spillage of water, oil, grease, or chemical, and UV Exposure. It is recommended that the 2nd and 3rd coat are the same color.

Moisture vapor transmission should not exceed three lbs per 1,000 ft² in a 24 hour period. (Reference ASTM F 1869 "Standard Test Method for Measuring Moisture

Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.") Relative humidity should not exceed 80%. (Reference ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes.")

Note: For moisture content up to 15 lbs per 1,000 ft² or relative humidity up to 90%, Series 208 should be substituted for Series 201 as the primer. See manufacturer's latest written recommendations for Series 208 coverage rates.

Surface Preparation: Allow new concrete to cure for 28 days.

Mechanically abrade in accordance with NACE No.6/SSPC-SP13 to provide a minimum ICRI-CSP3 or greater surface profile.

1st Coat: Series 201 Epoxoprime	6.0-12.0 mils
2nd Coat: Series 237 Tneme-Glaze	8.0-16.0 mils
3rd Coat: Series 248 Everthane*, tinted with S821 colorant	<u>2.0-3.0 mils*</u>
Total Dry Film Thickness: 16.0- 31.0 mils	
Minimum Dry Film Thickness: 18.0 mils	

**County's Options for the 3rd Coat:*

- *For exterior exposures and increased resistance to ultra-violet light, add Series 44-600 UV Blocker to Series 248.*
- *If a more textured finish is desired, mix Tnemec Series S211-0213 (Fine) Glass Beads into the 3rd Coat. The glass beads are typically added at approximately 4 - 6 oz. per gallon.*

6. System No. 222-1: Decorative Quartz Flooring (Non-Slip)

This system provides a decorative, chemical, abrasion, impact resistant, non-slip, seamless flooring system with a moisture mitigating base coat that **resists up to 20 lbs of moisture vapor pressure, 99% relative humidity, and can be applied on 10-day old concrete.** This floor utilizes clear resins, allowing for visibility of the quartz or other aggregate. For a solid-color floor, tint the 2nd and 3rd coats with Series 820 field tint.

Surface Preparation: Allow new concrete to cure for 10 days. Mechanically abrade in accordance with NACE No.6/SSPC-SP13 to provide a minimum surface profile equal to ICRI-CSP4-5.

1st Coat: 241 Ultra-Tread MVT (Broadcast with Quartz or aggregate of choice)	70 ft ² per small kit
2nd Coat: 222 Deco-Tread (Broadcast with Quartz or aggregate of choice)	1/16"
3rd Coat: 284 Tneme-Glaze (clear)	<u>8.0 - 12.0 mils*</u>
Minimum Dry Film Thickness: 1/8"	

**The degree of slip-resistance is affected by the thickness of the 3rd coat.*

7. System No. 287-1: Waterborne Epoxy-Amine Adduct (Thin-film)

This thin-film system provides a low odor, rapid cure, wear-resistant coating for floors, walls, and other substrates. It is capable of withstanding mild to moderate chemical and solvent exposures and repeated cleanings. **This system may also be**

used as an overcoat system over well-adhered, unidentified existing coatings.

Surface Preparation: Allow new concrete to cure for 28 days.
Mechanically abrade concrete surfaces in accordance with NACE No.6/SSPC-SP13 to provide an ICRI-CSP 1-3 surface profile.

1st Coat: Series 287 Enviro-Pox	2.0-4.0 mils
2nd Coat: Series 287 Enviro-Pox	<u>2.0-4.0 mils</u>
Total Dry Film Thickness: 4.0-8.0 mils	
Minimum Dry Film Thickness: 5.0 mils	

3.19 GYPSUM WALLBOARD & WOOD

B. GYPSUM WALLBOARD

The coating systems in the GYPSUM WALLBOARD Section are listed in order of decreasing performance with regards to chemical resistance. This generally has an inverse correlation with color & gloss retention. The first system has very good chemical resistance with the highest potential for yellowing, while the last system has extremely poor chemical resistance with the lowest potential for yellowing.

1. System No. N69-1: Polyamidoamine Epoxy (Interior Only)

This system provides a high-solids, low VOC epoxy coating which offers exceptional protection. It offers superior cleanup and stain-, abrasion-, chemical-, and moisture-resistance.

Surface Preparation: Surface must be clean and dry.

1st Coat: Series 151 Elasto-Grip FC	0.7 - 1.5 mils
2nd Coat: Series N69 Hi-Build Epoxoline II	<u>4.0 - 6.0 mils</u>
Total Dry Film Thickness: 4.7 - 7.5 mils	
Minimum Dry Film Thickness: 5.0 mils	

**If brushing or rolling, two coats may be required to achieve the specified film thickness.*

2. System No. 113-2: Acrylic-Epoxy (Interior Only)

This system is designed for mild environments where frequent cleaning is expected. It provides a higher build, low odor, and fade resistant colors. It offers easy cleanup and stain-, abrasion-, chemical-, and moisture-resistance. Note: Series 113 has a satin finish. If a gloss finish is desired, specify Series 114 Tneme-Tufcoat instead.

Surface Preparation: Surface must be clean and dry.

1st Coat: 51PVA Sealer	1.0 - 2.0 mils
2nd Coat: 113 H.B. Tneme-Tufcoat*	<u>4.0 - 6.0 mils</u>
Total Dry Film Thickness: 5.0 - 8.0 mils	
Minimum Dry Film Thickness: 6.0 mils	

**If brushing or rolling, two coats may be required to achieve the specified film*

thickness.

3. System No. 1026--3: Acrylic Emulsion (Interior/Exterior Exposure)

This system is designed for mild use areas like office walls, laboratory ceilings, stairwells, etc. Note: Series 1026 has a Matte finish. For a Semi-Gloss finish, specify Series 1029 Enduratone.

Surface Preparation: Surface must be clean and dry.

1st Coat: Series 51PVA Sealer 1.0 - 2.0 mils

1st Coat: Series 1026 Enduratone 2.0 - 3.0 mils

2nd Coat: Series 1026 Enduratone 2.0 - 3.0 mils

Total Dry Film Thickness: 4.0 - 6.0 mils

Minimum Dry Film Thickness: 5.0 mils

B. WOOD - EXTERIOR OR INTERIOR EXPOSURE

1. System No. 1029-2: HDP Acrylic Polymer

Series 1029 has a low semi-gloss finish. If a gloss finish is desired, specify Series 1028 Enduratone.

Surface Preparation: Surface shall be clean and dry.

1st Coat: 10-99W Undercoater* 2.0 - 3.0 mils

2nd Coat: 1029 Enduratone 2.0 - 3.0 mils

3rd Coat: 1029 Enduratone 2.0 - 3.0 mils

Total Dry Film Thickness: 6.0 - 9.0 mils

Minimum Dry Film Thickness: 7.0 mils

**Allow Series 10 to cure for 3 days before topcoating with Series 1029.*

3.20 HIGH TEMPERATURE COATINGS

C. System No. 1552-1: Acrylic Silicone Copolymer (500°F Maximum)

This system provides heat and corrosion resistance for steel in service environments up to 500°F (315°C). This system has excellent resistance to weathering and UV-light degradation.

Surface Preparation: SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum angular profile of 1.5 mils and a maximum angular anchor profile of 2.0 mils.

1st Coat: Series 1501 Endura-Heat Primer 2.0 - 3.0 mils

2nd Coat: Series 1552 Endura-Heat 2.0 - 3.0 mils

Total Dry Film Thickness: 4.0 - 6.0 mils

Minimum Dry Film Thickness: 4.5 mils

D. System No. 1556-1: Modified Silicone Copolymer (1000°F Maximum)

This system provides galvanic protection for steel in service environments up to 1000°F (538°C). The topcoat outperforms conventional high-temperature topcoats with exceptional

color stability, resistance to thermal cycling, and cure requirements.

Surface Preparation: SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum angular profile of 1.0 mil and a maximum angular anchor profile of 2.0 mils.

1st Coat: Series 1505 Endura-Heat ZR	2.0 - 3.0 mils
2nd Coat: Series 1556 Endura-Heat	<u>2.0 - 3.0 mils</u>
	Total Dry Film Thickness: 4.0 - 6.0 mils
	Minimum Dry Film Thickness: 4.5 mils

Note: Contractor must follow the manufacturer's most recent written recommendations regarding curing procedures.

E. System No. 1528-1: Inert Multipolymeric Matrix (1200°F Maximum)

This system provides high-performance coating protection to steel and stainless steel substrates in elevated temperatures up to 1200°F (648°C). Excellent adhesion properties allow this system to withstand severe thermal cycling (-300°F to 1200°F), and its tolerance to marginally prepared substrates makes it a viable alternative when abrasive blasting is not permitted. Its dry-fall spray characteristic provides a fast, labor-saving coating application when used with the appropriate thinner.

Surface Preparation for Exterior Exposure: SSPC-SP6/NACE 3 Commercial Blast Cleaning or ISO Sa 2 Thorough Blast Cleaning with a minimum angular anchor profile of 1.5 mils and a maximum angular anchor profile of 3.0 mils. Note: Abrasive blast cleaning generally produces the best coating performance. If conditions will not permit this, Series 1528 may be applied to SSPCSP2 or SSPC-SP3 Hand or Power Tool Cleaned surfaces in maintenance situations where mill scale has previously been removed.

Surface Preparation for Under Insulation: SSPC-SP10/NACE 2 Near-White Blast Cleaning or ISO Sa 2 1/2 Very Thorough Blast Cleaning is required.

1st Coat: Series 1528 Endura-Heat DTM	6.0 - 8.0 mils
*2nd Coat: Series 1528 Endura-Heat DTM	<u>6.0 - 8.0 mils</u>
	Total Dry Film Thickness: 12.0 - 16.0 mils

**For mild environments, the 2nd Coat may be omitted.*

Note: Contractor must follow the manufacturer's most recent written recommendations regarding curing procedures.

3.21 SURFACES EXPOSED TO H₂S/H₂SO₄ (SEVERE EXPOSURE/IMMERSION)

The systems listed in this section are designed for severe wastewater exposure. Substrates are exposed to submergence and/or intermittent submergence in severe wastewater conditions. Substrates may also be exposed to H₂S Gas and the biogenic sulfide corrosion process associated with severe wastewater conditions.

A. CEMENTITIOUS SURFACES

1. System No. 434-1: Modified Aliphatic Amine Epoxy Mortar

This system is a 100% solids, hybrid epoxy mortar system designed for severe waste water immersion and fume environments. It is specifically formulated to withstand high levels of hydrogen sulfide gas (H₂S), sulfuric acid (H₂SO₄), as well as other gases common to sewer exposures. Aggregate reinforcement provides additional resistance to abrasions and impacts.

Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater.

Apply Tnemec Series 218 MortarClad to all surfaces at a minimum of 1/16" to re-surface concrete, fill voids and bugholes, mitigate concrete outgassing, and to create a monolithic, paintable surface.

1st Coat: 434 Perma-Shield	1/8" or 125.0 mils minimum
2nd Coat: 435 Perma-Glaze	<u>18.0 - 20.0 mils</u>
	Minimum Dry Film Thickness: 144.0 mils

Allow coatings to cure for a minimum of 2 days at 75°F prior to service.

2. System No. 436-1: Fiber-Reinforced Modified Polyamine Epoxy

This system provides a thick film, 100% solids, **spray-applied**, high build, abrasion-resistant coating specifically designed for wastewater immersion and fume environments. Provides excellent resistance to H₂S gas permeation, protects against MIC, and provides chemical resistance to severe wastewater environments. Fiber-reinforcement provides superior physical strength and higher film build.

Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater.

Apply Tnemec Series 218 MortarClad to all surfaces at a minimum of 1/16" to re-surface concrete, fill voids and bugholes, mitigate concrete outgassing, and to create a monolithic, paintable surface.

One Coat: 436 Perma-Shield FR	<u>80.0 - 125.0 mils</u>
	Total Dry Film Thickness: 80.0 - 125.0 mils

Allow coatings to cure for a minimum of 2 days at 75°F prior to service.

B. FERROUS METAL SURFACES

1. System No. 435-1: Modified Polyamine Epoxy

This system provides a versatile, thick film, 100% solids lining specifically designed for wastewater immersion and fume environments. It provides low permeation to H₂S gas, protects against MIC, and provides chemical resistance to severe wastewater environments.

Surface Preparation: SSPC-SP5/NACE No.1 White Metal Blast Cleaning with a

minimum 3.0 mil angular anchor profile.

1st Coat: 435 Perma-Glaze
2nd Coat: 435 Perma-Glaze

15.0 - 20.0 mils
15.0 - 20.0 mils

Total Dry Film Thickness: 30.0 - 40.0 mils
Minimum Dry Film Thickness: 33.0 mils

Allow coatings to cure for a minimum of 2 days at 75°F prior to service.

2. System No. 431-1: Modified Polyamine Ceramic Epoxy

This system is to be used in severe wastewater exposures where increased abrasion resistance is desired. It is specifically designed for immersion and fume environments and exposure to corrosive soils. It provides low permeation to H₂S gas, protects against MIC, and provides chemical resistance to steel and ductile iron pipe for severe wastewater or buried exposure. It is a coal-tar free, resin-rich formulation with low pigment volume concentration (PVC) for maximum performance.

Surface Preparation:

Steel - SSPC-SP5/NACE No.1 White Metal Blast Cleaning with a minimum 3.0 mil angular anchor profile.

Ductile Iron Pipe Interiors - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-04: Internal Pipe Surface condition with a minimum 3.0 mil angular anchor profile.

Ductile Iron Pipe Exteriors (Applicable if exposed to H₂S gas) - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-04: External Pipe Surface condition with a minimum 3.0 mil angular anchor profile.

Ductile Iron Fittings Interiors - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-05: Fitting Blast Clean #1 condition with a minimum 3.0 mil angular anchor profile.

Ductile Iron Fittings Exteriors (Applicable if exposed to H₂S gas) - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-05: Fitting Blast Clean #1 condition with a minimum 3.0 mil angular anchor profile.

One Coat*: 431 Perma-Shield PL

40.0 - 50.0 mils

Total Dry Film Thickness: 40.0 - 50.0 mils
Minimum Dry Film Thickness: 40.0 mils

**Series 431 may be applied in two coats to reach the above specified total dry film thickness. Consult the manufacturer's latest written recommendations and application guide before applying this product.*

Allow Series 431 to cure for 48 hours at 75°F prior to service.

3. System Permax-CTF: Amine Cured Novalac Epoxy

This system is to be used in severe wastewater exposures. It provides low chemical resistance to steel and ductile iron pipe for severe wastewater or buried exposure. It is a coal-tar free, minimum 20% by volume ceramic pigmentation, with no less than 97% solids by volume.

Surface Preparation:

Steel - SSPC-SP5/NACE No.1 White Metal Blast Cleaning with a minimum 3.0 mil angular anchor profile.

Ductile Iron Pipe/Fittings Interiors - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-04: Internal Pipe Surface condition with a minimum 3.0 mil angular anchor profile.

Ductile Iron Pipe/Fittings Exteriors (Applicable if exposed to H₂S gas) - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-04: External Pipe Surface condition with a minimum 3.0 mil angular anchor profile

One Coat: Permax-CTF

40.0 - 50.0 mils
Total Dry Film Thickness: 40.0 - 50.0 mils
Minimum Dry Film Thickness: 40.0 mils

3.22 EXTERIOR OF PRESTRESSED CONCRETE TANKS

A. System No. 156-2: New Tanks

This system provides exceptional elongation, allowing it fill and bridge minor hairline cracks. It also provides mold & mildew resistance, as well as wind-driven rain resistance.

Surface Preparation: Allow new concrete to cure for at least (3) days. Surface to be clean and dry.

1st Coat: Series 156 Envirocrete
2nd Coat: Series 156 Envirocrete

4.0 - 6.0 mils
4.0 - 6.0 mils
Total Dry Film Thickness: 8.0 - 12.0 mils
Minimum Dry Film Thickness: 10.0 mils

B. System No. 156-3: Existing Tanks (Previously Painted)

This system provides exceptional elongation for spanning hairline cracks in concrete structures. It also provides mold & mildew resistance, as well as wind-driven rain resistance. Note: If a textured finish is preferred, replace Series 156 with Series 157 Enviro-Crete TX (medium texture) @ 6.0 - 9.0 mils dry film thickness per coat.

Surface Preparation: Remove all dirt, oil, grease, chalk, and loose paint per high pressure water blast (min. 3500 psi).

1st Coat: 151 Elasto-Grip
Stripe Coat: Use a brush to fill all hairline cracks with Series 156 Envirocrete*
Topcoat: 156 Envirocrete

0.7 - 1.5 mils
6.0 - 8.0 mils**
Total Dry Film Thickness: 6.7 - 9.5 mils***
Minimum Dry Film Thickness: 7.0 mils

**Deeper hairline cracks may require multiple brushed coats.*

***Roller or brush application may require multiple coats to obtain recommended film thickness.*

****Total Dry Film thickness does not include stripe coat.*

3.23 SECONDARY CONTAINMENT AREAS

A. System No. 239SC-1: Modified Novolac Epoxy

This system offers superior chemical resistance to a wide range of aggressive chemicals, including Sulfuric Acid, Hydrofluosilicic Acid, Sodium Hydroxide, Sodium Hypochlorite, Polymer Emulsion, and hydrocarbons. The fiber-reinforced mat within this system provides it with an exceptional ability to bridge the hairline cracks in concrete substrates.

Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater.

Moisture vapor transmission should not exceed three lbs per 1,000 ft² in a 24 hour period. (Reference ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.") Relative humidity should not exceed 80%. (Reference ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes.") Note: For moisture content up to 10 lbs per 1,000 ft² or relative humidity up to 90%, Series 241 may be substituted for the primer. Refer to the Series 241 product data sheet for more information.

Apply Tnemec Series 218 MortarClad to all vertical surfaces at a minimum of 1/16" to re-surface concrete, fill voids and bugholes, and to create a monolithic, paintable surface.

Apply Tnemec Series 215 Surfacing Epoxy or Series 218 as needed to fill voids in horizontal surfaces.

Primer: Tnemec Series 239SC RCK	6.0 - 8.0 mils
Basecoat: Tnemec Series 239SC MCK	60.0 - 80.0 mils
Fiberglass Mat: Tnemec Series 211-0215SC	Embedded
Saturant Coat: Tnemec Series 239SC RCK	10.0 - 12.0 mils
Top Coat: Tnemec Series 282*	<u>8.0 - 10.0 mils</u>
Total Dry Film Thickness: 84.0 - 110.0 mils	

**Series 282 is not color stable. For extended color and gloss retention, apply an extra finish coat of Tnemec Series 290 CRU @ 2.0-3.0 mils DFT.*

Note: See Tnemec's Fiberglass Mat Reinforced Mortar Application Guide for System details.

B. System No. 61-1: Cycloaliphatic Amine Epoxy

This system offers excellent resistance to hydrocarbons and chemicals, such as gasoline, diesel fuel, sodium hydroxide, ferric chloride, and sodium hypochloride. Use Tnemec Series 215 Surfacing Epoxy between coats as a filler and surfacer if required.

Surface Preparation: Allow new concrete to cure for 28 days. Mechanically abrade per SSPC-SP13/NACE No.6 to remove all laitance, fines, curing compounds, form release oils, and other contaminants, and to establish a surface profile equal to ICRI CSP 5 or greater.

Moisture vapor transmission should not exceed three lbs per 1,000 ft² in a 24 hour period. (Reference ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.") Relative humidity should not exceed 80%. (Reference ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete using in situ Probes.") Note: For moisture content up to 10 lbs per 1,000 ft² or relative humidity up to 90%, Series 241 may be applied prior to the "Primer" coat. Refer to the Series 241 product data sheet for more information.

Apply Tnemec Series 218 MortarClad to all *vertical* surfaces at a minimum of 1/16" to re-surface concrete, fill voids and bugholes, mitigate concrete outgassing, and to create a monolithic, paintable surface.

Apply Tnemec Series 215 Surfacing Epoxy or Series 218 MortarClad as needed to fill voids in *horizontal* surfaces.

Primer: 61-5002 Tneme-Liner (Beige)
Topcoat: 61-5001 Tneme-Liner (Gray)

8.0 - 12.0 mils

8.0 - 12.0 mils

Total Dry Film Thickness: 16.0 - 24.0 mils

Minimum Dry Film Thickness: 18 mils

3.24 PIPE EXTERIOR COATING SYSTEMS

The coating systems in the PIPE EXTERIOR COATING SYSTEMS section are not intended for use over bitumastic coatings. Do not apply bitumastic prior to the application of any of these systems.

A. System No. 700-2: Zinc/Epoxy/Fluoropolymer (Ductile Iron Pipes and Fittings at Aerial Crossings or Similarly Difficult to Maintain Areas)

This system provides outstanding resistance to ultra-violet light degradation and extremely good color and gloss retention. This system will have excellent resistance to abrasion and chalking, and is recommended for coastal environments and on structures where extremely long-term maintenance cycles are desired. This system may also be applied to new steel pipes or existing steel pipes which require removal of existing coatings. (Note: Series 700 is gloss. If the Owner desires a semi-gloss finish then Series 700 may be replaced with Series 701.) Note: For single-component application, Series 90G-1K97 may be substituted as the primer.

Surface Preparation:

Steel - SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile.

Ductile Iron Pipe - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-04: External Pipe Surface condition.

Ductile Iron Fittings - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-05: Fitting Blast Clean #3 condition.

Primer: Series 90-97 Tneme-Zinc

2.5 - 3.5 mils

2nd Coat: Series 66 Hi-Build Epoxoline	2.0 - 3.0 mils
3rd Coat: Series 700 Hydroflon	<u>2.0 - 3.0 mils</u>
	Total Dry Film Thickness: 6.5 - 9.5 mils
	Minimum Dry Film Thickness: 8.0 mils

B. System No. N140-2: Epoxy/Epoxy/Epoxy or Urethane (Standard Ductile Iron Pipe and Fittings System - Exposed)

This system provides exceptional corrosion protection in atmospheric environments. This system is to be applied to new ductile iron pipes. Series 1095 has a semi-gloss finish. For a different sheen, apply Series 1094 (gloss) or Series 1096 (eggshell) at the same thickness.

Surface Preparation:

Steel - SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile.

Ductile Iron Pipe - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-04: External Pipe Surface condition.

Ductile Iron Fittings - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-05: Fitting Blast Clean #3 condition.

Shop Primer: Series N140 Pota-Pox Plus	2.0 - 10.0 mils
2nd Coat: Series N140 Pota-Pox Plus	4.0 - 10.0 mils
3rd Coat (UV Exposed, Non-immersion Areas Only): Series 1095	<u>2.5 - 5.0 mils</u>
	Total Dry Film Thickness: 10.0 - 30.0 mils
	Minimum Dry Film Thickness: 11.0 mils

C. System No. 46H-413-3: Polyamide Epoxy-Coal Tar (Buried Ductile Iron Pipes and Fittings Only)

This system provides a high-build coating for underground conditions.

Surface Preparation:

Steel - SSPC-SP6/NACE No.3 Commercial Blast Cleaning with a minimum 1.5 mil angular anchor profile.

Ductile Iron Pipe - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-04: External Pipe Surface condition.

Ductile Iron Fittings - Uniformly abrasive blast using angular abrasive to a NAPF 500-03-05: Fitting Blast Clean #3 condition.

1st Coat: Series 46H-413 Hi-Build Tneme-Tar	8.0 - 10.0 mils
2nd Coat: Series 46H-413 Hi-Build Tneme-Tar	<u>8.0 - 10.0 mils</u>
	Total Dry Film Thickness: 16.0 - 20.0 mils
	Minimum Dry Film Thickness: 18.0 mils

D. System No. 1095-5: Acrylic Polyurethane (PVC or HDPE Pipe)

This system provides a user friendly, low VOC, aliphatic acrylic polyurethane coating which offers excellent color and gloss retention. Series 1095 has a semi-gloss finish. For a

different sheen, apply Series 1094 (gloss) or Series 1096 (eggshell) at the same thickness.

Surface Preparation: SSPC-SP1 followed by hand or power sanding to thoroughly and uniformly scarify and de-gloss the surface.

1st Coat: Series 66 Hi-Build Epoxoline	2.0 - 3.0 mils
2nd Coat: Series 1095 EnduraShield	<u>2.5 - 5.0 mils</u>
	Total Dry Film Thickness: 4.5 - 8.0 mils
	Minimum Dry Film Thickness: 5.0 mils

System No. 1026-4: Acrylic Emulsion (Interior Exposed, Insulated Pipe)

Surface Preparation: Surface shall be clean and dry.

1st Coat: Series 1026 Enduratone	2.0 - 3.0 mils
2nd Coat: Series 1026 Enduratone	<u>2.0 - 3.0 mils</u>
	Total Dry Film Thickness: 4.0 - 6.0 mils
	Minimum Dry Film Thickness: 5.0 mils

E. System No. 700-3: Epoxy Mastic/Fluoropolymer Overcoat (Existing, Previously Coated Aerial Pipes or Similarly Difficult to Maintain Areas)

This system provides outstanding resistance to ultra-violet light degradation and extremely good color and gloss retention. This system will have excellent resistance to abrasion and chalking, and is recommended for coastal environments and on structures where extremely long-term maintenance cycles are desired. This system is to be used for overcoating existing steel pipes whose surfaces have some rust present. (Note: Series 700 is gloss. If the Owner desires a semi-gloss finish then Series 700 may be replaced with Series 701.)

Surface Preparation: High Pressure Water Clean (min. 3500 psi, 3 to 5 gallons per minute, using an oscillating tip and potable water). A cleaning detergent such as Trisodium Phosphate should be used to facilitate cleaning. A degreaser may be required for oil soaked areas or heavily contaminated areas.

Some spot areas may require Hand Tool (SSPC-SP2), Power Tool Cleaning (SSPC-SP3), or Brush Blast (SSPC-SP7/NACE No. 4) to remove loose surface rust.

Existing coatings must be clean, dry and tightly adhering prior to application of coatings.

Spot Prime (Areas of Bare Steel): Series 135 Chembuild	4.0 - 6.0 mils
1st Coat: Series 135 Chembuild	4.0 - 6.0 mils
2nd Coat: Series 700 Hydroflon	<u>2.0 - 3.0 mils</u>
	Total Dry Film Thickness: 6.0 - 9.0 mils*
	Minimum Dry Film Thickness: 7.0 mils

*Does not include Spot Prime or previously existing coatings

F. System No. 1095-6: Epoxy Mastic/Urethane Overcoat (Existing Pipes Previously Coated with High Performance Coatings)

This system can be used over factory finish paint or over non-sandblasted steel and offer the high performance of a urethane coating. Series 1095 has a semi-gloss finish. For a different sheen, apply Series 1094 (gloss) or Series 1096 (eggshell) at the same thickness.

Surface Preparation: High Pressure Water Clean (min. 3500 psi, 3 to 5 gallons per minute, using an oscillating tip and potable water). A cleaning detergent such as Trisodium Phosphate should be used to facilitate cleaning. A degreaser may be required for oil soaked areas or heavily contaminated areas.

Some spot areas may require Hand Tool (SSPC-SP2), Power Tool Cleaning (SSPC-SP3), or Brush Blast (SSPC-SP7/NACE No. 4) to remove loose surface rust.

Existing coatings must be clean, dry, and tightly adhering prior to application of coatings.

Spot Prime (Areas of Bare Steel): Series 135 Chembuild	4.0 - 6.0 mils
1st Coat: Series 135 Chembuild	4.0 - 6.0 mils
2nd Coat: Series 1095 Endura-Shield	<u>2.5 - 5.0 mils</u>
Total Dry Film Thickness: 6.5 - 11.0 mils*	
Minimum Dry Film Thickness: 7.0 mils	

**Does not include spot prime or previously existing coatings.*

3.25 INSULATIVE COATINGS - THERMAL RESISTANCE

A. SUBSTRATES UP TO 325°F

1. System No. 971-1: Personnel Protection

This system utilizes fluid-applied aerogel particles to **provide “safe touch,” allowing a minimum 5 seconds of skin contact with the substrate (up to 325°F).** This system is ideal for hot pipes, valves, tanks, etc. This coating system eliminates the corrosion under insulation (CUI) issues associated with traditional insulations. **This system negates the need for a mineral wool + aluminum jacket system.**

Surface Preparation: SSPC-SP6/NACE No. 3 Commercial Blast Cleaning with a minimum angular anchor profile of 1.5 mils.*

1 st Coat: Series 1224 Epoxoline WB	5.0 - 8.0 mils
2 nd Coat: Series 971 Aerolon Acrylic	50.0 mils
3 rd Coat: Series 971 Aerolon Acrylic	50.0 mils
4 th Coat: Series 72T EnduraShield	<u>2.0 - 5.0 mils</u>
Total Dry Film Thickness: 107.0 - 113.0 mils	
Minimum Dry Film Thickness: 109.0 mils	

**Abrasive blast cleaning generally produces the best coating performance. If conditions will not permit this, Series 1224 may be applied to SSPC-SP2 or SSPC-SP3 Hand or Power Tool Cleaned surfaces.*

B. SUBSTRATES BELOW AMBIENT TEMPERATURE

1. System No. 971-2: Condensation Control (Sweating Substrates)

This system utilizes Series 971's fluid-applied aerogel particles and hydrophobic properties to **mitigate condensation on otherwise wet, “sweating” surfaces.** This is ideal for pipes,

valves, and other substrates which have temperatures that create condensation (but do not freeze). **This system negates the need for a mineral wool + aluminum jacket system.**

Surface Preparation: SSPC-SP6/NACE No. 3 Commercial Blast Cleaning with a minimum angular anchor profile of 1.5 mils.*

1 st Coat: Series 1224 Epoxoline WB	5.0 - 8.0 mils
2 nd Coat: Series 971 Aerolon Acrylic	50.0 mils
3 rd Coat: Series 971 Aerolon Acrylic	50.0 mils
4 th Coat: Series 72T EnduraShield	<u>2.0 - 5.0 mils</u>
Total Dry Film Thickness: 107.0 - 113.0 mils	
Minimum Dry Film Thickness: 109.0 mils	

**Abrasive blast cleaning generally produces the best coating performance. If conditions will not permit this, Series 1224 may be applied to SSPC-SP2 or SSPC-SP3 Hand or Power Tool Cleaned surfaces.*

2. System No. 971-3: Condensation Control (Freezing Substrates)

This system utilizes Series 971's fluid-applied aerogel particles and hydrophobic properties to **mitigate condensation on surfaces that would otherwise ice & freeze over**. This is ideal for pipes, valves, and other substrates which have temperatures & condensation that are creating ice on the substrate. This coating system will significantly reduce/eliminate ice formations. **This system negates the need for a mineral wool + aluminum jacket system.**

Surface Preparation: SSPC-SP6/NACE No. 3 Commercial Blast Cleaning with a minimum angular anchor profile of 1.5 mils.*

1 st Coat: Series 1224 Epoxoline WB	5.0 - 8.0 mils
2 nd Coat: Series 971 Aerolon Acrylic	50.0 mils
3 rd Coat: Series 971 Aerolon Acrylic	50.0 mils
4 th Coat: Series 971 Aerolon Acrylic	50.0 mils
5 th Coat: Series 72T EnduraShield	<u>2.0 - 5.0 mils</u>
Total Dry Film Thickness: 157.0 - 163.0 mils	
Minimum Dry Film Thickness: 159.0 mils	

**Abrasive blast cleaning generally produces the best coating performance. If conditions will not permit this, Series 1224 may be applied to SSPC-SP2 or SSPC-SP3 Hand or Power Tool Cleaned surfaces.*

3.26 PERFORMANCE CRITERIA

The following shall serve as a basis of comparison for material substitution requests. Any substitutions which decrease the total film thickness, change the generic type of coating, or fail to meet the performance criteria of the specified materials shall not be approved.

- A. Series 1 Omnithane - Zinc/Micaceous Iron Oxide Urethane:
- Adhesion: ASTM D4541 (Method B, Type II) - No less than 1,433 psi (9.88 MPa) adhesion, average of three tests.
 - Salt Spray (Fog): ASTM B117 - No blistering, cracking or delamination of film. No more than .03% rusting on plane and no more than 3/16" rust creepage at scribe after 10,000 hours exposure.

- B. Series 20 Pota-Pox - Polyamide Epoxy:
- Special Qualification: Certified by NSF International in accordance with NSF/ANSI Std. 61.
 - Abrasion: ASTM D4060 (CS-17 Wheel, 1,000 gram load) - No more than 68.5 mg loss after 1,000 cycles with 1,000 gram load, average of three tests
 - Adhesion: ASTM D4541 - No less than 1909.3 psi (13.16 MPa) adhesion after ten freeze/thaw cycles, average of three tests
 - Immersion: ASTM D870 - No blistering, cracking, rusting or delamination of the film after 1,500 hours continuous immersion in deionized water at 140°F.
 - Salt Spray: ASTM B117 - No blistering, cracking, rusting or delamination of the film and no creepage at the scribe after 5000 hours
 - Cyclic Salt Fog/UV Exposure: ASTM 5894 - No blistering, cracking, rusting or delamination of the film after 10,000 hours.
- C. Series 22 Epoxoline - Modified Polyamine Epoxy:
- Special Qualification: Certified by NSF International in accordance with NSF/ANSI Std. 61.
 - Product must be able to be applied in one single-coat application from 16.0 to 40.0 mils dry film thickness.
 - VOC Content: 0.10 lbs/gallon (12 grams/litre)
 - Immersion: ASTM 870 - No blistering, cracking, rusting or delamination of film after 2,000 hours continuous immersion in deionized water at 140°F (60°C), average of three tests.
- D. Series 27WB Typoxy - Inorganic Hybrid Water-Based Epoxy:
- Adhesion: ASTM D4541 (Type V Tester) - No less than 1,440 psi (9.93 MPa) pull, average of three tests.
 - Salt Spray: ASTM B117 - No blistering, cracking, rusting or delamination of film. No more than 3/16 inch rust creepage at scribe after 6,200 hours exposure.
- E. Series 46H-413 Hi-Build Tneme-Tar - Polyamide Epoxy-Coal Tar:
- Adhesion: ASTM D4541 - Exceeds the cohesive strength of the concrete substrate (400 psi), average of three tests.
 - Abrasion: ASTM D4060 (CS-17 wheel, 1,000 gram load) - No more than 142 mg loss after 1,000 cycles.
 - Salt Spray (Fog): ASTM B117 - No blistering, cracking, checking, rusting or delamination of film. No rust creepage at scribe after 9,000 hours continuous exposure.
- F. Series 61 Tneme-Liner - Cycloaliphatic Amine Epoxy:
- Chemical Immersion: NACE TM-01-74, Procedure B - No blistering, cracking, rusting or delamination of film after six months continuous immersion.
 - Immersion: ASTM D870 - No blistering, cracking or delamination of film after 12 months continuous immersion in deionized water at 200°F (93°C).
- G. Series 66 Hi-Build Epoxoline - Polyamide Epoxy:
- Salt Spray: ASTM B117 - No blistering, cracking, checking or delamination of film. No more than 1/8" rust creepage at scribe after 8,000 hours exposure.
- H. Series 66 Hi-Build Epoxoline - Polyamide Epoxy:
- Abrasion: ASTM D4060 (CS-17 Wheel, 1,000 gram load) - No More than 68.5 mg loss

- after 1,000 cycles with 1,000 gram load, average of three tests.
 - Adhesion: ASTM D4541 - No less than 1,909.3 psi (13.16 MPa) adhesion after ten freeze/thaw cycles, average of three trials.
 - Salt Spray: ASTM B117 - No blistering, cracking, rusting or delamination of the film and no creepage at the scribe after 4000 hours
- I. Series 90-97 Tneme-Zinc - Aromatic Zinc-Rich Urethane:
- Zinc Pigment: 83% by weight in dried film
 - Adhesion: ASTM D4541 (Type II) - No less than 1,442 psi (9.94 MPa) adhesion, average of three tests.
 - Salt Spray: ASTM B117 - No blistering, cracking or delamination of film. No more than 1/8" creepage at scribe and no more than 1% rusting on plane after 50,000 hours exposure.
- J. Series 94H₂O Hydro-Zinc - Zinc-Rich Aromatic Urethane
- Special Qualification: Certified in accordance with ANSI/NSF Std. 61 for use on interior potable water tanks of 500 gallons or greater.
 - Zinc Pigment: 83% by weight in dried film.
 - Adhesion: ASTM D4541 (Type V Self-Aligning Adhesion Tester): No less than 1,713 psi adhesion, average of three tests.
 - Salt Spray: ASTM B117 - No blistering, cracking or delamination of film. No rusting on plane and no more than 1/16" rust creepage at scribe after 10,000 hours.
- K. Series 104 HS Epoxy - Cycloaliphatic Amine Epoxy:
- Adhesion: ASTM D4541 - No less than 900 psi (6.21 MPa) pull, average of three tests.
 - Chemical Immersion: NACE TM-01-74, Procedure B - No blistering, cracking or delamination of film after seven days.
 - Salt Spray (Fog): ASTM B117 - No blistering, cracking, rusting or delamination of film. No more than 1/32" (.8 mm) rust creepage at scribe after 1,500 hours exposure.
- L. Series 113 Tneme-Tufcoat - Waterborne Acrylic Epoxy:
- Adhesion: ASTM D4541 - No less than 380 psi (2.6 MPa) pull, average of three tests (applied directly to concrete block).
 - Humidity: ASTM D2247 - No blistering, cracking or delamination after 1,000 hours exposure.
- M. Series 115 Uni-Bond DF - Self-Crosslinking Hydrophobic Acrylic:
- Adhesion: ASTM D4541 (Method C - Type V Tester) - No less than 1,472 psi pull (10.15 MPa), average of three tests
 - Salt Spray: ASTM B117 - No more than 1/64" rust creepage at scribe, no more than 3% rusting on plane and no less than a blister rating of 8 after 500 hours exposure.
 - Humidity: ASTM D4585 - No blistering, cracking, rusting or delamination of film after 2,000 hours exposure.
- N. Series 135 Chembuild - Modified Polyamidoamine Epoxy:
- Adhesion: ASTM D4541 (Type II, Method B) - No less than 883 psi (5.86 MPa) pull, average of three tests.
 - Salt Spray: ASTM B117 (Two coats, applied to SSPC-SP10/NACE No.2 Near-White Metal Blast Cleaned steel which was exterior exposed for four months until uniformly rusted, then SSPC-SP2 Hand Tool Cleaned) - No blistering, cracking, rusting or delamination of the film and no creepage at the scribe after 4000 hours

- O. Series N140 Pota-Pox Plus - Polyamidoamine Epoxy:
- Adhesion: ASTM D4541 - No less than 1,943 psi (13.40 MPa) pull, average of three tests.
 - Exterior Exposure: ASTM D1014 - No blistering, cracking, checking, rusting or delamination of film. No rust creepage at scribe after 5 years exposure.
 - Humidity: ASTM D4585 - No blistering, cracking or delamination of film after 10,000 hours exposure.
 - Immersion: ASTM D870 - No blistering, cracking, rusting or delamination of film after 2,000 hours continuous immersion in deionized water at 140°F, average of three tests.
 - Salt Spray (Fog): ASTM B117 (2 Coats Series N140) - No blistering, cracking or delamination of film. No more than 1% rusting on plane. No more than 1/16" rust creepage at scribe after 6,700 hours exposure.
 - Salt Spray (Fog): ASTM B117 (Series 91H₂O and 2 Coats Series N140) - No blistering, cracking, checking or delamination of film. No more than 1% rusting on plane and no more than 3/16" rust creepage at scribe after 20,000 hours exposure.
- P. Series 142 Epoxoline - Modified Polyamine Epoxy:
- Adhesion: ASTM D4541 - No less than 2,042 psi (14.08 MPa) pull, average of three tests.
 - Salt Spray (Fog): ASTM B117 - No blistering, cracking, rusting or delamination of film and less than 1/32 inch creepage at the scribe after 5,000 hours exposure.
 - Abrasion: ASTM D4060 - No more than 59.3 mg loss after 1,000 cycles, average of two tests.
- Q. Series 156 Enviro-Crete - Modified Waterborne Acrylate:
- Adhesion: ASTM D7234 - Exceeds the cohesive strength of concrete substrate (400 psi), average of three tests.
 - Salt Spray: ASTM B117 - No blistering, cracking or delamination of film. No visible damage to coating or substrate after 5,000 hours.
 - QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking, chalking or delamination of the film. No less than 69% gloss retention, no more than 1.1 units gloss loss, and no more than 3.59 DE (FMC-2) color change (white) after 5,000 hours QUV exposure.
 - Fungal/Mold/Mildew Resistance: ASTM D3273 - No More than slight mold growth after five weeks exposure.
 - Tensile Strength, Elongation, Modulus of Elasticity: ASTM D2370 - Elongation no less than 200 percent, average of five tests. Tensile strength no less than 250 psi (1.7 MPa), average of three tests.
 - Wind Driven Rain Resistance: FED TT-C-555B, Section 4.4.7.3 - No damage to coating or substrate. No visible moisture on the back of lightweight block after 48 hours exposure.
- R. Series 201 Epoxoprime - Modified Polyamine Epoxy:
- Adhesion: ASTM D4541 - 400 psi (2.8 MPa) pull, average of three tests. 100% Concrete Failure.
 - Compressive Strength: ASTM D695 - 6,866 psi (47.34 MPa) compressive strength unfilled
 - Flexural Strength and Modulus of Elasticity: ASTM D790 - 12,873 psi (88.76 MPa) flexural strength average of five tests. 553,832 psi (3,818.54 MPa) flexural modulus, average of five tests.

- Tensile Strength: ASTM D638 - 4,871 psi (33.59 MPa) tensile strength, average of five tests.
- S. Series 215 Surfacing Epoxy - Modified Polyamine Epoxy
- Special Qualification: Certified in accordance with ANSI/NSF Std. 61 for use on interior potable water tanks of 200 gallons or greater at 80 mils DFT
 - VOC Content: 0.08 lbs/gallon
 - Adhesion: ASTM D7234 (Method B): Exceeds the cohesive strength of the concrete substrate (400 psi).
 - Adhesion: ASTM D4541 - Not less than 2,226 psi (15.35 MPa) pull, average of three tests.
 - Compressive Strength: ASTM C579 - No less than 9,183 psi (63.3 MPa) compressive strength, average of five tests.
 - Flexural Strength and Modulus of Elasticity: C580 - No less than 4,330 psi (29.9 MPa) flexural strength and 324,877 psi (2,240 MPa) flexural modulus of elasticity, average of six tests.
 - Flexural Strength and Modulus of Elasticity: ASTM D790 - No less than 10,630 psi (73.29 MPa) flexural strength and 87,440 psi (602.88 MPa) flexural modulus of elasticity, average of three tests.
 - Tensile Strength, Elongation, Modulus of Elasticity: ASTM C307 - No less than 2,280 psi (15.72 MPa) tensile strength, average of six tests.
 - Tensile Strength, Elongation, Modulus of Elasticity: ASTM D2370 - No less than 2,011 psi (13.86 MPa) tensile strength, 304,213 psi (2,102 MPa) tensile modulus of elasticity and 1.04% elongation, average of ten tests.
 - Water Absorption: ASTM C413 - No weight gained after 2 hours continuous boiling water immersion, average of three tests.
- T. Series 217 Mortarcrete - Cementitious Repair Mortar:
- VOC Content: 0.0 lbs/gallon
 - Compressive Strength: ASTM C579 - No less than 10,650 psi (73.43 MPa) compressive strength, average of three tests.
 - Density: ASTM C188 - 2.13 g/cm³ (133 pcf) density.
 - Drying Shrinkage: ASTM C596 - No more than 0% drying shrinkage, average of four specimens.
 - Set Times: ASTM C266 - Fresh Mortar Properties: Initial Setting Time - 65 minutes; Final Setting Time - 80 minutes.
 - Splitting Tensile Strength: ASTM C496 - No less than 850 psi (5.86 MPa) splitting tensile strength, average of three tests.
 - Thermal Expansion: ASTM C531 - No more than 7.46 X 10⁻⁶ linear coefficient of thermal expansion in/in/°F, average of three tests.
- U. Series 222 Deco-Tread - Colored Quartz-Filled Modified Polyamine Epoxy:
- Compressive Strength: ASTM C579 - 15,567 psi (107.33 MPa) compressive strength.
 - Flexural Strength and Modulus of Elasticity: ASTM D790 - No less than 2,867 psi (19.77 MPa) flexural strength and 127,876 psi (881.67 MPa) flexural modulus of elasticity, average of five tests.
 - Tensile Strength: ASTM C307 - 2,100 psi (14.5 MPa) tensile strength, average of three tests.
 - Thermal Expansion: ASTM C531 - No more than 1.85 x 10⁻⁵ linear coefficient of thermal expansion per °F, average of two rounds of six tests.

- V. Series 237 Power-Tread - Modified Polyamine Epoxy:
- Flexural Strength and Modulus of Elasticity: ASTM D790 - 5,274 psi (36.4 MPa) flexural strength and 222,933 psi (1,537 MPa) flexural modulus of elasticity, average of five tests.
 - Impact: Mil D3134 - No more than 1/16" permanent indentation. No cracking, checking or delamination of film after 240 in-lb (27 J) direct impact.
- W. Series 239SC Chembloc - Modified Novolac Polyamine Epoxy:
- Chemical Immersion: NACE TM-01-74, Procedure B - No blistering, cracking, rusting or delamination of film after 72 hours continuous contact with chemical.
 - Compressive Strength: ASTM C579 - Not less than 11,195 psi (77.19 MPa) compressive strength, average of six tests.
 - Flexural Strength and Modulus of Elasticity: ASTM D790 - Not less than 6,270 psi (43.23 MPa) flexural strength and 323,900 psi (2,233 MPa) flexural modulus of elasticity, average of five tests.
 - Impact: MIL D3134 (modified using 2.5 lb steel ball) - No more than 1/16" permanent indentation. No cracking, checking or delamination of film after 240 in-lb (27 J) direct impact, average of three tests.
 - Tensile Strength, Elongation, Modulus of Elasticity: ASTM D638 - No less than 7,913 psi (54.56 MPa) tensile strength, 222,975 psi (1,537 MPa) tensile modulus of elasticity and 6.14% elongation at break.
- X. Series 241 Ultra-Tread MVT - Polyurethane Modified Concrete:
- Can be applied to 10 day old concrete
 - Withstands moisture vapor transmission up to 20 lbs per ASTM F1869
 - Withstands relative humidity up to 99% per ASTM F2170
 - Adhesion: ASTM D7234 - Exceeds the cohesive strength of the concrete substrate (~400 psi), average of three tests.
 - Compressive Strength: ASTM C579 - No less than 4,922 psi (33.94 MPa) compressive strength, average of six tests.
 - Flexural Strength and Modulus of Elasticity: ASTM C580 - No less than 2,438 psi (16.81 MPa) flexural strength and 313,614 psi (2,162 MPa) modulus of elasticity (tangent), average of five tests.
 - Tensile Strength: ASTM C307 - No less than 1,015 psi (7.00 MPa) tensile strength, average of six tests.
- Y. Series 248 Everthane - Aliphatic Moisture Cured Urethane:
- Chemical Resistance: TTM-59 (Covered Spot Test) - No blistering, cracking, checking or delamination of film. No more than slight softening or very slight swelling and loss of gloss after 24 hours exposure to the following reagents: 30% Sulfuric Acid, 10% Hydrochloric Acid, 50% Phosphoric Acid, 10% Acetic Acid, 50% Sodium Hydroxide, 10% Ammonium Hydroxide, Methyl Ethyl Ketone, Ethyl Alcohol, Hexane, Xylene, Gasoline, Ethylene Glycol, Skydrol, Brake Fluid, Transmission Fluid, Aviation Gas, Jet Fuel (JP4)
 - Abrasion: ASTM D4060 (CS-17 Wheel, 1,000 gram load) - No more than 18 mg loss after 1,000 cycles, average of three tests.
- Z. Series 262 Elasto-Shield - Modified Polyurethane:
- Abrasion: ASTM D4060 (CS-17 Wheel, 1,000 grams load) - No more than 1.2 mg loss

- after 1,000 cycles.
 - Deflection Temperature: ASTM D648 - (Minimum use temp) Below -60°F (-15°C).
 - Flexibility and Elongation: ASTM D522 - Must pass 1/8" bend with no cracking or delamination.
 - Tear Strength: ASTM D624 - 150 lbs/inch.
 - Tensile Strength, Elongation, Modulus of Elasticity: ASTM D412 - Requirement (extension to break) 400%. 900 psi.
- AA. Series 264 Elasto-Shield - Modified Polyurethane:
- Special Qualification: Certified by NSF International in accordance with NSF/ANSI Std. 61. Maximum contact area is 20 cm² per litre of water, with minimum allowable size of tanks 5,000 gallons; cold water applications.
 - Abrasion: ASTM D4060 (CS-17 Wheel, 1,000 grams load) - No more than 1.2 mg loss after 1,000 cycles.
 - Deflection Temperature: ASTM D648 - (Minimum use temp) Below -60°F (-15°C).
 - Flexibility and Elongation: ASTM D522 - Must pass 1/8" bend with no cracking or delamination.
 - Tear Strength: ASTM D624 - 180 lbs/inch.
 - Tensile Strength, Elongation, Modulus of Elasticity: ASTM D412 - Requirement (extension to break) 300%. 1,000 psi.
- BB. Series 282 Tneme-Glaze - Polyamine Novolac Epoxy:
- Chemical Immersion: NACE TM-01-74, Procedure B - No blistering, cracking, rusting or delamination of film after 72 hours continuous contact with chemical.
 - Compressive Strength: ASTM C579 - Not less than 11,195 psi (77.19 MPa) compressive strength, average of six tests.
 - Immersion: 140°F Deionized Water Immersion - No blistering, cracking, rusting or delamination of film after 2,000 hours continuous immersion.
 - Impact: ASTM D2794 - No visible cracking or delamination of film after 59 in/lbs direct impact, average of three tests.
 - Salt Spray (Fog) - ASTM B117 - No blistering, cracking, rusting or delamination of film. No more than 1/16 inch rust creepage at scribe after 3,500 hours exposure.
- CC. Series 284 Deco-Clear - Modified Polyamine Epoxy:
- Coefficient of Friction: ASTM D2047 - 1.2 static coefficient of friction, average of 12 tests.
 - Flexural Strength and Modulus of Elasticity: ASTM D790 - 2,867.1 psi (19.768 MPa) flexural strength average of five tests. 127,876 psi (881.67 MPa) flexural modulus, average of five tests.
 - Impact: ASTM D2794 - 160 inch pounds (18.08 J) average, direct impact.
 - Tensile Strength: ASTM D638 - 2,182.9 psi (15.1 MPa) tensile strength, average of five tests.
- DD. Series 287 Enviro-Pox - Waterborne Epoxy-Amine Adduct:
- Adhesion: ASTM D4541 - Exceeds the cohesive strength of the concrete substrate (400 psi), average of three tests.
 - Impact: ASTM D2794 - No visible cracking or delamination of film after 60 in-lb (6.8 J) direct impact, average of three tests.
 - Abrasion: ASTM D4060 (CS-17 Wheel, 1,000 grams load) - No more than 113.3 mg loss after 1,000 cycles, average of three tests.

- EE. Series 365 Tank Armor - Novolac Epoxy:
- Adhesion: ASTM D4541, Type II - No less than 1,650 psi (11.38 MPa) adhesion, average of three tests.
 - Hardness: ASTM D2240 (Shore D Durometer) - Not less than 90 Shore Type D hardness, average of five tests.
- FF. Series 431 Perma-Shield PL - Modified Polyamine Ceramic Epoxy:
- Severe Wastewater Analysis Test: ASTM G210 - Initial impedance of 11.18 log-Z at 0.001 Hz (ohms cm²). No blistering, cracking, checking or delamination. No less than 88.7% EIS retention or not more than 1.26 ohms cm² reduction in log-Z electrochemical impedance at 0.001 Hz after 28 days exposure. No less than 2,363 psi (16.30 MPa) adhesion or no loss of adhesion after 28 days in S.W.A.T., average of three tests.
 - Abrasion Resistance: ASTM D4060-14 (CS-17 Wheel, 1,000 cycles, 1,000 gram load) - No more than 41 mg loss, average of three tests.
 - Abrasion Resistance: BS EN 598: 2007+A1: 2009 (Rocking Abrasion) - No more than 0.14 mm (5.5 mils) thickness of coating loss after 1,000,000 cycles.
- GG. System Permax-CTF: Amine Cured Novolac Epoxy
- Abrasion Resistance: ASTM D4060-14 (CS-17 Wheel, 1,000 cycles, 1,000 gram load) - No more than 300 mg loss
- HH. Series 434 Perma-Shield H₂S - Modified Aliphatic Amine Epoxy Mortar:
- Severe Wastewater Analysis Test: ASTM G210 - Initial impedance of 10.6 log-Z at 0.01 Hz (ohms cm²). No blistering, cracking or checking. No less than 86.7% retention or not more than 1.4 ohms cm² reduction in log-Z electrochemical impedance at 0.01 Hz after 28 days exposure.
 - Abrasion Resistance: ASTM D4060 (CS-17 Wheel, 1,000 gram load) - No more than 88 mg loss after 1,000 cycles, average of three tests.
 - Impact: ASTM D2794 - No visible cracking or delamination after 160 inch-pounds (18.1 J) direct impact.
 - Compressive Strength: ASTM D695 - Not less than 12,331 psi (85.0 MPa) compressive strength, average of five tests.
- II. Series 435 Perma-Glaze - Modified Polyamine Epoxy:
- Severe Wastewater Analysis Test: ASTM G210 - Initial impedance of 12.46 log-Z at 0.01 Hz (ohms cm²). No blistering, cracking, checking or delamination. No less than 84.3% retention and no more than 1.95 ohms cm² reduction in electrochemical impedance after 28 days exposure. No less than 93% loss of tensile adhesion after 28 days in S.W.A.T. average of three tests.
 - Abrasion Resistance: ASTM D4060 (CS-17 Wheel, 1,000 gram load) - No more than 72 mg loss after 1,000 cycles, average of three tests.
- JJ. Series 436 Perma-Shield FR - Fiber-Reinforced Modified Polyamine Epoxy:
- Severe Wastewater Analysis Test: ASTM G210 - Initial impedance of 10.2 log-Z at 0.01 Hz (ohms cm²). No blistering, cracking or checking. No less than 83.7% retention or not more than 1.6 ohms cm² reduction in log-Z electrochemical impedance at 0.01 Hz after 28 days exposure.
 - Abrasion: ASTM D4060 (CS-17 Wheel, 1,000 gram load) - No more than 74.6 mg loss after 1,000 cycles, average of three tests.
 - Impact: ASTM D2794 - No visible cracking or delamination of film after 88 inch-pounds direct impact.

- Compressive Strength: ASTM D695 - No less than 8,866 psi (6.13 MPa) compressive strength, average of five tests.
- KK. Series 446 Perma-Shield MCU - Hydrophobic Aromatic Polyurethane:
- Minimum Time to Return to Immersion Service: 4 Hours
 - Severe Wastewater Analysis Test: ASTM G210 - Initial impedance of 10.2 (log-Z). No blistering, cracking, checking or loss of adhesion. No more than 0.1 (log-Z) reduction in electrical impedance after 28 days exposure.
- LL. Series 626 Dur A Pell GS - RTV Silicone Rubber Water & Graffiti Protectant:
- Accelerated Weathering: ASTM C793 - No signs of deterioration except for dirt accumulation after 4,000 hours exposure.
 - Chloride Ion Penetration: AASHTO T-259 - No less than a 1500% reduction in the chloride ion content when compared to untreated concrete, average of two tests.
- MM. Series 662 Prime-A-Pell Plus - Modified Siloxane/Silane with Diffused Quartz Carbide:
- QUV Exposure: ASTM D4587 (UVA-340 bulbs, Cycle 4: 8 hours UV/4 hours condensation) - No reduction in water repellent performance after 5,000 hours exposure.
 - Water Absorption: ASTM C67 (Applied to Ohio Sandstone) - No less than a 96% reduction in water absorption as compared to untreated samples following 24 hours of immersion.
 - Water Absorption: ASTM C97 (Applied to Fire Clay Brick) - No less than a 93% reduction in water absorption as compared to untreated samples following 24 hours of immersion.
 - Water Absorption: ASTM C140 (Applied to Cast Mortar Cubes) - No less than a 96% reduction in water absorption as compared to untreated samples following 24 hours of immersion.
- NN. Series 700 Hydroflon - Advanced Thermoset Solution Fluoropolymer:
- Exterior Exposure: ASTM D1014 (AAMA 2604-98) (South Florida Marine Exposure) - exceeds the exterior weathering requirements of the American Architectural Manufacturers Association (AAMA) 2604-98 standard.
 - Exterior Exposure: ASTM D4141, Method C (EMMAQUA) - No blistering, cracking or chalking. No less than 100% gloss retention, no more than 1 unit gloss loss and no more than 0.23 DEHunter color change (white) after 1,500 MJ/m² (69,109MJ/m² total) EMMAQUA exposure.
 - QUV Exposure: ASTM D4587 - No blistering, cracking or chalking. No less than 61% gloss retention (31.4 units gloss change) and 1.89 DEFMC2 (MacAdam units) color change (white) after 25,000 hours exposure.
 - Xenon Arc Weathering: ASTM D6695 - No blistering, cracking or chalking. No less than 87% gloss retention (11.9 units gloss change) and no greater than 0.37 DE00 color change (white) after 8,000 hours Xenon Arc exposure.
- OO. Series 971 Aerolon - Fluid-Applied Acrylic Insulation Coating:
- Thermal Conductivity: ASTM C518 - Thermal Conductivity shall not be greater than 0.0356 W/m-°K or 0.2468 BTU-in/ft²-hr-°F (R value at one inch equals 4.1).
- PP. Series 1026 Enduratone - Acrylic Emulsion:
- VOC Content: 0.38 lbs/gallon (1.4 grams/litre)
 - QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking, chalking or delamination of film. No less than 49% gloss retention (2.3 units gloss change) and 0.39 DE00 color change after 10,000 hours exposure.

- QQ. Series 1029 Enduratone - HDP Acrylic Polymer:
- Algal Resistance: ASTM D5590 - No more than traces of fungal growth (less than 10%) after three weeks continuous exposure.
 - Fungal/Mold/Mildew Resistance: ASTM D5590 - No more than traces of fungal growth (less than 10%) after four weeks continuous exposure.
 - QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking or delamination of film. No less than 100% gloss retention, no more than 0.45 DE00 color change and no units gloss loss after 3,000 hours.
- RR. Series 1095 Endura-Shield - Aliphatic Acrylic Polyurethane:
- Volatile Organic Compounds (Thinned 5%): 0.77 lbs/gallon (92 grams/litre)
 - QUV Exposure: ASTM D4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation) - No blistering, cracking or delamination. No less than 52% gloss retention or 23 units gloss change and .59 DECIE2000 color change (white) after 2,000 hours exposure.

3.27 SYSTEMS REFERENCE GUIDE

A. STEEL & FERROUS METALS

FERROUS METALS - NON-IMMERSION / EXTERIOR / UV-EXPOSED

- 3.14.A.1 System No. 700-1: Zinc/Epoxy/Fluoropolymer
- 3.14.A.2 System No. 1095-1: Zinc/Epoxy/Urethane
- 3.14.A.3 System No. 1095-2: Epoxy/Epoxy/Urethane
- 3.14.A.4 System No. 1095-3: Epoxy Mastic/Urethane (Overcoat)

EXTERIOR - BELOW GRADE

- 3.14.B.1 System No. N140-1: Epoxy/Epoxy/Epoxy or Urethane
- 3.14.B.2 System No. 46H-413-1: Polyamide Epoxy-Coal Tar

INTERIOR (NON-IMMERSION)

- 3.14.C.1 System No. 66-1: Polyamide Epoxy
- 3.14.C.2 System No. 27WB-1: Inorganic Hybrid WB Epoxy (Overcoat)

IMMERSION

- 3.14.D.1 System No. 104-1: Cycloaliphatic Amine Epoxy (Non-Potable)
- 3.14.D.2 System No. 142-1: Flake / Aluminum Oxide Epoxy (Non-Potable)
- 3.14.D.3 System No. 446-1: Aromatic Polyurethane (Non-Potable)
- 3.14.D.4 System No. 142-2: Methanol
- 3.14.D.5 System No. 365-1: Sulfuric Acid
- 3.14.D.6 System No. 22-1: Modified Polyamine Epoxy (Potable)
- 3.14.D.7 System No. 20-1: Polyamide Epoxy (Potable)

B. OVERHEAD METAL DECKING, JOIST

- 3.15.A System No. 115-1: Self-crosslinking Hydrophobic Acrylic (Interior)
- 3.15.B System No. 1029-1 HDP Acrylic Polymer (Exterior)

C. GALVANIZED STEEL & NONFERROUS METALS

GALVANIZED STEEL, STAINLESS STEEL, ALUMINUM, OR COPPER

3.16.A System No. 1095-4: Epoxy/High Build Urethane

ALUMINUM IN CONTACT WITH CONCRETE

3.16.B System No. 46H-413-2: Polyamide Epoxy-Coal Tar

D. CONCRETE & MASONRY

EXTERIOR-ABOVE GRADE (VERTICAL SURFACES)

3.17.A.1 System No. 156-1: Modified Waterborne Acrylate (Elastomeric)

3.17.A.2 System No. 1026-1: Acrylic Emulsion (Non-Elastomeric)

3.17.A.3 System No. 662-1: Clear Silane/Siloxane Sealer (Min. 42% Solids)

3.17.A.4 System No. 626-1: Clear Water Repellent and Graffiti Protectant

EXTERIOR-BELOW GRADE

3.17.B.1 System No. 46H-413-3: Polyamide Epoxy-Coal Tar

INTERIOR (NON-IMMERSION)

3.17.C.1 System No. 104-2: Cycloaliphatic Amine Epoxy

3.17.C.2 System No. 66-2: Polyamide Epoxy

3.17.C.3 System No. 113-1: Acrylic Epoxy

3.17.C.4 System No. 1026-2: Acrylic Emulsion

IMMERSION

3.17.D.1 System No. 104-3: Cycloaliphatic Amine Epoxy (Non-Potable)

3.17.D.2 System No. 142-3: Flake / Aluminum Oxide Epoxy (Non-Potable)

3.17.D.3 System No. 22-2: Modified Polyamine Epoxy (Potable Water)

3.17.D.4 System No. 20-2: Polyamide Epoxy (Potable)

3.17.D.5 System No. 262-1: Modified Polyurethane (Non-Potable Repairs)

3.17.D.6 System No. 264-1: Modified Polyurethane (Potable Repairs)

E. CONCRETE FLOORS (RESINOUS FLOORING SYSTEMS)

3.18.A.1 System No. 248-1: Moisture Cured Urethane (Thin film with increased chemical resistance, UV stability, and durability)

3.18.A.2 System No. 222-1: Decorative / Functional Flooring (Non-Slip)

3.18.A.3 System No. 287-1: Waterborne Epoxy-Amine Adduct (Thin-film)

F. GYPSUM WALLBOARD & WOOD

GYPSUM WALLBOARD

3.19.A.1 System No. N69-1: Polyamidoamine Epoxy

3.19.A.2 System No. 113-2: Acrylic Epoxy

3.19.A.3 System No. 1026-3: Acrylic Emulsion

WOOD - EXTERIOR or INTERIOR EXPOSURE

3.19.B.1 System No. 1029-2: HDP Acrylic Polymer

G. HIGH TEMPERATURE COATINGS

3.20.A System No. 1552-1: Acrylic Silicone Copolymer (500°F Max)
3.20.B System No. 1556-1: Modified Silicone Copolymer (1000°F Max)
3.20.C System No. 1528-1: Silicone Aluminum (1200°F Max)

H. SURFACES EXPOSED TO H₂S/H₂SO₄ (SEVERE EXPOSURE/IMMERSION)

CEMENTITIOUS SURFACES

3.21.A.1 System No. 434-1: Modified Aliphatic Amine Epoxy Mortar
3.21.A.2 System No. 436-1: Fiber-Reinforced Modified Polyamine Epoxy

FERROUS METAL SURFACES

3.21.B.1 System No. 435-1: Modified Polyamine Epoxy
3.21.B.2 System No. 431-1: Modified Polyamine Ceramic Epoxy
3.21.B.3 System Permax-CTF: Amine Cured Novalac Epoxy

I. EXTERIOR OF PRESTRESSED CONCRETE TANKS

3.22.A System 156-2: New Tanks
3.22.B System 156-3: Existing Tanks (Previously Painted)

J. SECONDARY CONTAINMENT AREAS

3.23.A System No. 239SC-1: Modified Novolac Epoxy
3.23.B System No. 61-1: Cycloaliphatic Amine Epoxy

K. PIPE EXTERIOR COATING SYSTEMS

3.24.A System No. 700-2: Zinc/Epoxy/Fluoropolymer (New Aerials)
3.24.B System No. N140-2: Epoxy/Epoxy/Topcoat (Exposed)
3.24.C System No. 46H-413-4: Polyamide Epoxy-Coal Tar (Buried Only)
3.24.D System No. 1095-5: Acrylic Polyurethane (PVC or HDPE Pipe)
3.24.E System No. 1026-4: Acrylic Emulsion (Interior Insulated Pipe)
3.24.F System No. 700-3: Epoxy Mastic/Fluoropolymer (Overcoat)
3.24.G System No. 1095-6: Epoxy Mastic/Urethane (Overcoat)

L. INSULATIVE COATINGS - THERMAL RESISTANCE

SUBSTRATES UP TO 325°F

3.25.A.1 System No. 971-1: Personnel Protection (up to 325°F)

SUBSTRATES BELOW AMBIENT TEMPERATURE

3.25.B.1 System No. 971-2: Condensation Control (Sweating)

3.25.B.2 System No. 971-3: Condensation Control (Freezing/Icing)

3.28 COATING SCHEDULE - TO BE DEVELOPED BY PROJECT AS NEEDED

END OF SECTION

SECTION 09970 SURFACE PROTECTION SPRAY SYSTEM

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The Contractor shall furnish all labor, materials, equipment and incidentals required to install and test the coating system complete and ready for operation for the structures listed in the specifications and as shown on the Drawings.
- B. The work includes coating of all surfaces as shown and specified on the Drawings. This includes, but is not limited to stairs, walls, floors, concrete divider, concrete slabs, manholes wet wells, and all other work obviously required to be coated unless otherwise specified herein or on the Drawings. The omission of minor items in the Schedule of Work shall not relieve the Contractor of his obligation to include such items where they come within the general intent of the Specification as stated herein.

1.02 RELATED WORK

- A. Bypass pumping is the responsibility of the General Contractor.
- B. Concrete surface cleaning in each lift station/manhole is the responsibility of the General contractor.
- C. Removal and offsite disposal of rubble is the responsibility of the General Contractor.

1.03 SUBMITTALS

- A. Submit to the County shop drawings and schedules of all surfacing systems and appurtenances required. Submit design data and specification data sheets listing all parameters used in the surfacing system design and thickness calculations based on applicable provisions of ASTM.
- B. Submit to the County the name of the surfacing supplier, a list of materials to be furnished, and the qualification per 1.05A of the application contractor.

1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
ASTM D-638
ASTM D-790
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 QUALIFICATIONS

- A. The Contractor performing the surfacing work shall be fully qualified, experienced a minimum of seven years and equipped to complete this work expeditiously and in a satisfactory manner. The Contractor shall submit the following information to the County for review and approval before any surfacing work is performed.
1. The number of years of experience in performing this type of specialized work must be seven years minimum.
 2. Name of the surfacing manufacturer and supplier for this work and previous work listed below. The Contractor shall be an approved installer as certified and licensed by the surfacing manufacturer and equipment supplier.
 3. A list of clients that the Contractor has performed this type of work for.
 - a. The list shall contain names and telephone numbers of persons who can be called to verify previous satisfactory performance.
 - b. Installation dates and a description of the actual work performed.
 - c. The surfacing manufacturer shall provide an installation list of product used for similar sewer rehabilitation projects. The list shall provide the same information as required in paragraphs 3.a and 3.b above.
- B. The County reserves the right to approve or disapprove the Contractor, based on the submitted qualifications.

1.06 GUARANTEE

All surfacing shall be guaranteed by the Contractor for a period of five years from the date of acceptance. During this period, all defects discovered in the surfacing, as determined by the County, shall be repaired or replaced in a satisfactory manner at no cost to the County, this shall include, but is not limited to, all work and costs associated with the shut down of any pump stations and all bypass operations needed for the proper repairs to be made.

1.07 QUALITY ASSURANCE

- A. All surfacing products shall be from a single manufacturer. The supplier shall be responsible for the provisions of all test requirements specified in ASTM Standards D-638 and D-790 as applicable.
- B. The Contractor shall employ specialty workers who have proven ability to perform the Work included herein. This will consist of a minimum of two years or two project experiences installing this product. This is a requirement for each and every employee.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Care shall be taken in shipping, handling and placing to avoid damaging. Any material damaged in shipment shall be replaced as directed by the County.
- B. Any material showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be

seen, shall be marked as rejected and removed at once from the work.

PART 2 PRODUCTS

2.01 GENERAL

- A. The material sprayed onto the surface shall be a urethane resin system formulated for the application within a sanitary sewer environment. The urethane will exhibit suitable corrosion resistance to corrosive gases and fluids found within domestic sanitary sewage. Unless dictated by varying effluent, the spray system shall be a urethane and exhibit the cured physical strengths specified herein.
- B. When cured, the surface coating shall form a continuous, tight-fitting, hard, impermeable surfacing data which is suitable for sewer system service and chemically resistant to any chemicals or vapors normally found in domestic sewage.
- C. The surface shall be an integral part of the structure being rehabilitated after being placed and cured. The surface shall cover the complete interior of the existing structure. The surface shall provide a continuous watertight seal or barrier.
 - 1. The surface shall effectively seal the interior surfaces of the structure and prevent any penetration or leakage of groundwater infiltration.
 - 2. Provide water resistance data on surface based on ASTM Standards.
 - 3. The surface shall be compatible with the thermal conditions of existing sewer lift stations and manholes. Surface temperature will range from 30 to 80 degrees F. Provide test data on thermal compatibility based on ASTM Standards.

2.02 MATERIALS

- A. Refer to the latest edition of the County's Approved Products List for Approved materials
- B. Polyurethane spray application shall comply with the following specifications:

The cured urethane system shall conform to the minimum physical standards, as listed below. The long-term data is for a 50-year design life of the process.

<u>Cured Urethane</u>	<u>Standard</u>	<u>Long-Term Data</u>
Tensile Stress	ASTM D-638	5,000 psi
Flexural Stress	ASTM D-790	10,000 psi
Flexural Modulus	ASTM D-790	550,000 psi

- C. Epoxy spray application shall be 100% VOC free / 100% solids.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

- A. The Contractor shall clean each structure and shall dispose of any resulting material.
- B. All contaminants including: oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.
- C. All concrete or mortar that is not sound or has been damaged by chemical exposure shall be removed to a sound concrete surface or replaced.
- D. Surface preparation method(s) should be based upon the conditions of the substrate, service environment and the requirements of the protective coating to be applied.
- E. Surfaces to receive protective coating shall be cleaned and abraded to produce a sound surface with adequate profile and porosity to provide a strong bond between the protective coating and the substrate. Generally, this can be achieved with a high pressure water cleaning using equipment capable of 5,000 psi at 4 gpm. Other methods such as abrasive blasting, shotblasting, grinding, scarifying or acid etching may also be used. Detergent water cleaning and hot water blasting may be necessary to remove oils, grease or other hydrocarbon residues from the concrete. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound clean neutralized surface that is not excessively damaged.
- F. A concrete structure suitably prepared for coating shall have all loose, soft, discolored or otherwise deteriorated material removed from the manhole and the surface profile of the manhole shall be in accordance with ICRI Guidelines No. 03732. Expose aggregate and obtain a uniform surface texture resembling an ICRI - CPS (Concrete Surface Profile) #4-6. The County may use one or more of the following observations/tests to determine whether the manhole substrate has been properly cleaned and prepared:
 - a. Visual appearance of the manhole - The prepared substrate shall have the appearance of sound concrete, free from discolored, white, chalky and cracked areas.
 - b. Aural observations - When struck with a metal hammer or similar metal tool, the prepared substrate shall exhibit the characteristic sound of solid, competent concrete (or brick). Care should be taken not to fracture sound concrete.
 - c. Mechanical abrasion tests - The substrate should be competent enough such that it cannot be scraped off with the claw of a hammer or similar metal tool.
 - d. pH testing - The County may use wetted litmus paper applied to the surface of the substrate to ensure that the pH of the substrate is 7 or higher.
 - e. Phenolphthalein testing - The County may apply a few drops of phenolphthalein to the surface of the concrete, which if the concrete is competent should yield a purple color.
- G. The County is not obligated to use all of the above tests, but may do so at the County's sole discretion. Often visual, mechanical and/or aural observations and tests alone will be adequate, but the pH and/or phenolphthalein tests may be used if there is still some uncertainty.
- H. If after cleaning, a new or existing manhole does not meet these requirements, the County shall have authority to require additional cleaning effort and/or increased blasting pressure as required to adequately prepare the manhole. If necessary, the County may also require acid etching of the concrete surface to create the desired texture. For existing manholes, the

County may also require mechanical removal of deteriorated concrete or other substrate materials.

- I. A mild chlorine solution may be used to neutralize the surface to diminish microbiological bacteria growth prior to final rinse and coating system if approved by the Manufacturer's Representative.
- J. The time between structure cleaning and preparation activities and application of the first coating layer shall be within the coating manufacturer's recommendation.
- K. All infiltration shall be stopped by using a material which is compatible with and is suitable for topcoating with the specified protective coating.
- L. The area between the manhole and the manhole ring and any other area that might exhibit movement or cracking due to expansion and contraction, shall be grouted with a flexible grout or gel before surface coating spray application.
- M. All surfaces should be inspected by the Inspector during and after preparation and before the repair material is applied.
- N. No separate payment shall be made for any preparatory work required prior to application of the surface coating.

3.02 INSTALLATION

- A. The Contractor shall notify the Project Manager at least 48 hours in advance, giving the date, start time and estimated completion time for the work being conducted.
- B. The Contractor shall provide bypass pumping of sewage flows (as required) where and when the rehabilitation work is being performed. No flows will be permitted in the structure until the spray coating has properly cured to the manufacturer's specifications.
- C. The installation of the surface coating shall be in complete accordance with the applicable provisions of ASTM and the manufacturer's specifications. A representative of the manufacturer shall be present during the actual installation.
 - 1. Prior to placing the surface coating, the manufacturer's representative must approve the surface preparation work and installation conditions including temperatures.
 - 2. All surfaces shall be sufficiently smooth and even, to ensure good flow handling characteristics when complete.
 - 3. All surfaces shall have the surface coating applied to the required thickness by spray application.
- D. Application procedures shall conform to the recommendations of the protective coating manufacturer, including material handling, mixing, environmental controls during application, safety, and spray equipment.
- E. The spray equipment shall be specifically designed to accurately ratio and apply the specified protective coating materials and shall be regularly maintained and in proper working order.

- F. The protective coating material must be spray applied by a Certified Applicator of the protective coating manufacturer.
- G. Polyurethane spray application shall be applied such that all surfaces shall be coated in accordance with the manufacturer's recommended thickness but not be less than 125 mils.
- H. Epoxy spray application shall be applied such that all surfaces shall be coated in accordance with the following:

- 1. Specified surfaces shall be coated by spray application of a moisture tolerant, solvent-free, 100% solids, epoxy protective coating as further described herein. Spray application shall be to a minimum wet film thickness in accordance with the following table or manufacturer's recommendation, whichever is greater:

Concrete, New/Smooth	80-100 mils for immersion, 60-80 mils for atmospheric, splash and spill exposure
Concrete, Rough	100-125+ mils
Masonry/Brick	125-150+ mils
Steel	16-80 mils for immersion, 16-40 mils for atmospheric, splash and spill exposure; also profile dependent
Fiberglass Systems	40-60 mils tack coat, 9 oz/yd ² fabric, 40-60 mils top coat. Varies with circumstances

- 2. Airless spray application equipment approved by the coating manufacturer shall be used to apply each coat of the protective coating. Air assisted spray application equipment may be acceptable, especially for thinner coats (<10 mils), only if the air source is filtered to completely remove all oil and water.
- 3. If necessary, subsequent topcoating or additional coats of the protective coating should occur as soon as the basecoat becomes tack free, ideally within 12 hours but no later than the recoat window for the specified products. Additional surface preparation procedures will be required if this recoat window is exceeded.

3.03 FIELD TESTING AND ACCEPTANCE

- A. Field acceptance of surface coatings shall be based on the County's evaluation of the proper surfacing of the structure and the appropriate installation and curing test data along with review of the structure inspections.
- B. The surface coatings shall provide a continuous monolithic surfacing with uniform thickness throughout the structure interior. If the thickness of the coating surface is not uniform or is less than specified, it shall be repaired or replaced at no additional cost to the County.
 - 1. The County will measure the surface cured thickness from a specimen retrieved by the Contractor. The Contractor shall retrieve the specimen by physically cutting

through the surfacing (by drilling or coring). There will be up to three thickness measurement locations in each structure. A suitable non-destructive type of thickness measurement may also be used.

2. All the surface coating thickness measurement locations shall be repaired by the Contractor in accordance with the manufacturer's recommendations. These repairs shall be included in the five year surface coating guarantee.
- C. All pipe connections shall be open, clear, and watertight.
 - D. There shall be no cracks, voids, pinholes, uncured spots, dry spots, lifts, delaminations or other type defects.
 - E. If any defective surface coating is discovered after it has been installed, it shall be repaired or replaced in a satisfactory manner within 72 hours and at no additional cost to the County. This requirement shall apply for the entire five year guarantee period.

END OF SECTION

DIVISION 11 EQUIPMENT

SECTION 11130 OVERHEAD BRIDGE CRANE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Overhead Bridge Crane.
- B. Related Sections:
 - 1. Division 03 Section "Cast-in-Place Concrete" for concrete work for bridge crane equipment.
 - 2. Division 05 Section "Steel Items" for crane runway beam.
 - 3. Division 16 Sections for electrical wiring and connections to bridge crane equipment.

1.3 DEFINITIONS

- A. Operating Range: Maximum amount of travel above and below the hoisting level.
- B. Working Range: Recommended amount of travel above and below the hoisting level for which loading and unloading operations can take place.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for loading dock equipment. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: For bridge crane: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 2. Wiring Diagrams: For power, signal, and control wiring.
- C. Qualification Data: For qualified Installer.
- D. Welding certificates.

- E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency; indicate compliance of bridge crane with requirements for determining rated capacity, which is based on comprehensive testing within last two years of current products.
- F. Operation and Maintenance Data: For bridge crane equipment to include in operation and maintenance manuals.
- G. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
 - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Source Limitations: Obtain bridge crane from single source from single manufacturer.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3, "Structural Welding Code - Sheet Steel."
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- E. Preinstallation Conference: Conduct conference at Project site.
 - 1. Inspect and discuss electrical roughing-in, equipment bases, and other preparatory work specified elsewhere.
 - 2. Review sequence of operation for each type of bridge crane equipment.
 - 3. Review coordination of interlocked equipment specified in this Section and elsewhere.
 - 4. Review required testing, inspecting, and certifying procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle bridge crane equipment and accessories in a manner to avoid significant or permanent damage to fabric or frame.
 - 1. Comply with manufacturer's written instructions for minimum and maximum temperature requirements for storage.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of construction contiguous with bridge crane equipment, by field measurements before fabrication.

1.8 WARRANTY

- A. Special Warranty for Bridge Crane : Manufacturer's standard form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Structural failures including cracked or broken structural support members, load-bearing welds, and front and rear hinges.
- b. Faulty operation of operators, control system, or hardware.
- c. Failures including cracks or permanent deformation.

2. Warranty Period for Structural Assembly: 10 years from date of Substantial Completion.

3. Warranty shall be for unlimited usage of leveler for the specified rated capacity over the term of the warranty.

1.9 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 36 months' full maintenance by skilled employees of loading dock equipment Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper loading dock equipment operation at rated speed and capacity. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.
- B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM 36/A 36M.
- B. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from steel plate complying with ASTM A 572/A 572M, Grade 55.
- C. Steel Tubing: ASTM A 500, cold formed.
- D. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.2 BRIDGE CRANE

- A. General: Recessed, bridge crane designed for permanent installation of type, function, operation, capacity, size, and construction indicated; and complete with controls, safety devices, and accessories required.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide 1 ½ Ton Top Running Single Girder Crane by J. Herbert Corporation or Material Handling Systems Inc. (MHS)
- B. Rated Capacity: Capable of supporting total gross load of 5,000 lbs without permanent deflection or distortion.
- C. Electric Operating System: Electric control from a remote-control station; motorized operation. Electric activation for raising of ramp and automatic extending of lip. Equip leveler with a packaged unit including a unitized electric motor and shaft assembly of proper size, type, and operation for capacity of leveler indicated. Include means for lowering ramp below platform level with lip retracted behind dock bumpers.

1. Pendant Control: Weatherproof multibutton pendant control with an UP, DOWN, LEFT, AND RIGHT button of the constant-pressure type and an emergency STOP button of the momentary-contact type, enclosed in NEMA IP-55 components. .

PART 3

EXECUTION

3.1

EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of loading dock equipment.
- B. Examine roughing-in for electrical systems for bridge crane equipment to verify actual locations of connections before equipment installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2

PREPARATION

- A. Coordinate size and location of bridge crane equipment indicated to be attached to or recessed into concrete or masonry, and furnish anchoring devices with templates, diagrams, and instructions for their installation.

3.3

INSTALLATION

- A. General: Install loading dock equipment, including motors, control stations, wiring, safety devices and accessories as required for a complete installation.
 - 1. Rough-in electrical connections according to requirements specified in Division 16 Sections.

3.4

ADJUSTING

- A. Adjust bridge crane equipment to function smoothly and safely, and lubricate as recommended by manufacturer.
- B. Test bridge crane for vertical travel within operating range indicated.
- C. After completing installation of exposed, factory-finished bridge crane equipment, inspect exposed finishes and repair damaged finishes.

3.5

DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain loading dock equipment.

END OF SECTION

SECTION 11931 SUBMERSIBLE WASTEWATER PUMPS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

The work covered by this section and the related sections consists of providing all labor, material, equipment and performing all construction required to purchase and install three (3) non-clog wastewater pumps complete with 316 stainless steel pump base plates and pedestals, and all accessories as specified herein and shown on the drawings. This section includes wet pit submersible pump(s) to be supplied with motor, volute, mounting brackets, power cable and accessories.

1.02 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification sections, apply to this section.
- B. Section 01340 - Shop Drawings, Project Data, and Samples
- C. Section 02615 - Ductile Iron Pipe and Fittings
- D. Section 16050 - Electrical General Provisions

1.03 PUMP PERFORMANCE DATA & CERTIFIED TEST RESULTS

- A. Factory testing in accordance with the standards of the Hydraulic Institute shall be required for each pump.
- B. Certified pump performance curves shall be submitted for approval by the Engineer on the wastewater pumps prior to shipment. The certified pump performance curves shall be submitted, including head, capacity, brake horsepower, and pump efficiency for each pump supplied.
- C. The pump shall be tested through the specified range of flow, and head/capacity/efficiency curves plotted at maximum output speed. During each test, the pump shall be run at each head condition for sufficient time to accurately determine discharge, head, power input, and efficiency.
- D. If any pump tested fails to meet any specification requirement it will be modified until it meets all specification requirements. If any pump tested fails to meet the efficiency requirements at any of the listed flow or head conditions as specified and all reasonable attempts to correct the inefficiency are unsuccessful, the pump(s) shall not be accepted and shall be replaced with unit(s) which meets the specified requirements. Performance data must be the results of project pump. Also report amperage and voltage of each power leg, efficiency, and horsepower.

1.04 QUALITY ASSURANCE

- A. Provide shop drawings in maintenance material in accordance with Section 01340. Shop drawings shall be provided to show compliance with these specifications, plans or other specifications that will influence the proper operation of the pump(s). Shop drawings for

approval must consist of:

1. Pump Performance Curves.
2. Pump Outline Drawing.
3. Station Drawing for Accessories.
4. Electrical Motor Data.
5. Control Drawing and Data.
6. Access Frame Drawing.
7. Typical Installation Guides.
8. Technical Manuals.
9. Parts List.
10. Printed Warranty.
11. Manufacturer's Equipment Storage Recommendations.
12. Manufacturer's Standard Recommended Start-Up Report Form.

Lack of the above requested submittal data is cause for rejection.

- B. Provide operation and maintenance material and record drawings in accordance with Section 01730.
- C. Provide manufacturer's certification of correct installation after manufacturer's inspection.

PART 2 PRODUCTS

2.01 SUBMERSIBLE WASTEWATER PUMPS

A. Requirements

The pump(s) shall be heavy duty, electric submersible rated, centrifugal, self-cleaning, semi-open or enclosed impeller design, non-clog units designed for handling raw, unscreened sewage and wastewater and shall be fully guaranteed for this use.

The pump, mechanical seals and motor units provided under this specification shall be from the same manufacturer in order to achieve standardization of operation, maintenance, spare parts, manufacturer's service and warranty.

Pump performance shall be non-overloading across the entire performance curve and shall not exceed 85 HP and shall require not more than 32.809 feet NPSHRE across normal operating conditions. Each pump shall meet the following design conditions:

Flow (GPM)	Head (ft)	Min. Efficiency	Max HP
0	240	-	-
600	200	50	65
1000	172	65	74
1200	158	68	76
1600	134	70	82

Pump and motor shall be Flygt Model NP3301 HT3-464, impeller diameter 370mm, utilizing the double shrouded, non-clogging, design for wastewater handling.

Each pump shall be equipped with a 85 HP submersible electric motor, connected for operation on 460 volts, 3 phase, 60 hertz. The power cable shall be sized according to NEC

and ICEA standards and also meet with P-MSHA Approval.

Acceptable pump manufacturer shall be Flygt.

B. Pump Design

The pump(s) shall be designed for a submersible installation as shown on the drawing with a quick disconnect flange engagement arrangement. Each pump is tested and approved in accordance with national and international standards (IEC 34-1, HI, CSA).

C. Pump Construction

Major pump components shall be of grey cast or ductile iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. All exposed nuts or bolts shall be AISI type 316 stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.

Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

D. Cable Entry Seal

The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal. The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the interior from foreign material gaining access through the pump top.

E. Motor

The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air or oil filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of no less than 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in

conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber containing the terminal board, shall be hermetically sealed from the motor by an elastomer compression seal. The motor and the pump shall be produced by the same manufacturer.

The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.

The power cable shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 50 feet or greater.

The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.

F. Bearings

The pump shaft shall rotate on two bearings. Motor bearings shall be permanently lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. Single row lower bearings are not acceptable.

G. Mechanical Seal

Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in an lubricant reservoir that hydrodynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating, corrosion resistant tungsten-carbide ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating, corrosion resistant steel ring. Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor depend on direction of rotation for sealing. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. For special applications, other seal face materials shall be available.

The following seal types shall not be considered acceptable nor equal to the dual independent seal specified: shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to affect sealing shall be used.

Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for

lubrication. The motor shall be able to operate dry without damage while pumping under load.

Seal lubricant shall be FDA Approved, nontoxic.

H. Pump Shaft

Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The shaft shall be stainless steel. The use of stainless steel sleeves will not be considered equal to stainless steel shafts.

I. Impeller

The impeller(s) shall be of gray cast iron, Class 35B, or ductile iron, Class 40, dynamically and hydraulically balanced, non-clog design capable of handling materials typically found in domestic sewage. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on the volute suction which shall keep them clear of debris, maintaining an unobstructed leading edge. The impeller(s) vanes shall have screw-shaped leading edges that are hardened to Rc 45 and shall be capable of handling solids, fibrous materials, and other matter found in waste water and sludge with up to 7% solids. Impellers shall be locked to the shaft and held by an impeller bolt.

J. Volute

1. The casing shall be of the end suction volute type having sufficient strength and thickness to withstand all stress and strain from service at full operating pressure and load. The casing shall be of the centerline discharge type equipped with an automatic pipe coupling arrangement for ease of installation and piping alignment. The design shall be such that the pumps will be automatically connected to the discharge piping when lowered into position with the guide rails. The casing shall be accurately machined and bored for register fits with the suction and casing covers.
2. A volute case wearing ring shall be provided to minimize impeller wear. The wear ring shall be alloy 230 brass, ASTM-B-43 and held by 316 stainless steel fasteners. The wear ring shall be easily replaceable in the field. Wear rings of any other material shall not be acceptable.

K. Protection

All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. The thermal switches shall open at 125°C (260°F), stop the motor and activate an alarm.

PART 3 EXECUTION

3.01 SUBMERSIBLE WASTEWATER PUMPS

- A. Install all equipment in strict conformance with the manufacturer's specifications and industry standards.
- B. Manufacturer's representative for pump shall inspect installation for correctness and compliance with manufacturer's specifications and submit written certification that

equipment is ready to be placed in service.

- C. No piping connecting any of the equipment will be jacked, pried or forced in to position in any way. All piping must mate perfectly with the equipment it is attaching prior to installation of flange bolts or other connecting devices.
- D. Spare Parts shall include one set of mechanical seals per pump
- E. Store spare pumps, parts, drivers, etc. in strict accordance with manufacturer's recommendations. Notify the owner in writing of any special storage maintenance required, and provide such maintenance until final acceptance of contract.

3.02 TESTING

- A. Testing performed upon each pump shall include the following inspections:
 - 1. Impeller, motor rating and electrical connections shall be checked for compliance with this specification.
 - 2. Prior to submergence, each pump shall be run dry to establish correct rotation.
 - 3. Motor and cable insulation shall be tested for moisture content or insulation defects.
- B. A written quality assurance record confirming the above testing/inspections shall be supplied with each pump at the time of shipment.
- C. Each pump (when specified) shall be tested in accordance with the latest test code of the Hydraulic Institute (H.I.) at the manufacturer to determine head vs. capacity and kilowatt draw required. Witness tests shall be available at the factory upon request.
- D. The pump(s) shall be rejected if the above requirements are not satisfied.

3.03 START-UP SERVICE

- A. The equipment manufacturer shall furnish the services of a qualified factory trained field service engineer for 8-hour working day(s) at the site to inspect the installation, perform start-up and instruct the owner's personnel on the operation and maintenance of the pumping units. After the pumps have been completely installed and wired, the contractor shall have the manufacturer do the following:
 - 1. Megger stator and power cables.
 - 2. Check seal lubrication.
 - 3. Confirm for proper rotation.
 - 4. Confirm power supply voltage.
 - 5. Confirm pump flow as measured by existing flow meter.
 - 6. Confirm pump discharge pressures as measured by calibrated gauges, converted to feet of liquid pumped.
 - 7. Based on field test data, confirm pump performance corresponds to the pump performance curve.
 - 8. Measure motor operating load and no load current.
 - 9. Check pressure control operation and sequence.

3.04 FACTORY SERVICE

Factory-Approved service facilities with qualified factory-trained mechanics shall be

available for prompt emergency and routine service.

3.05 GUARANTEE

In addition to the general guarantee required elsewhere in these specifications, the pump manufacturer shall furnish the Owner with a written warranty to cover the pump(s) and motor(s) against defects in workmanship and material for a period of five (5) years or 10,000 hours of operation under normal use and service. The pump manufacturer will pay a pro-rated cost of all replacement parts and repair labor from the date of shipment of the pump unit. Pumps repaired under warranty will be returned to the owner freight prepaid. The warranty shall be in printed form and previously published as the manufacturer's standard warranty for all similar units manufactured.

END OF SECTION

DIVISION 13 SPECIAL CONSTRUCTION

SECTION 13100 LIFT STATION SPECIFICATION

PART 1 GENERAL

Furnish all labor, materials, equipment and incidentals required to install complete automatic, underground lift stations with all required equipment installed in a polymer concrete wet well and adjacent above-ground valve assembly (and meter). The principal items of equipment shall include two submersible motor-driven sewage pumps, valves, internal piping, automatic pumping level controls, control panel and telemetry. All materials shall be new, without defects and of the best quality. All materials furnished and all work done shall be in strict accordance with the National Electrical Code and all local requirements and codes.

All lift stations that re-pump sewage from four (4) other upstream lift stations or has a discharge flow 500 gpm or greater shall have an on-site back-up diesel pump equipped with a transducer level controls, and backup float switches. Re-pump station may require an in-line submersible magnetic flow meter (as determined by County), and a force main pressure transducer. Onsite full tanks shall not exceed 540 gallons.

Alternatively, at the discretion of the County, an electric generator equipped with an automatic power transfer switch may be installed.

1.01 STRUCTURES AND EQUIPMENT

A. Pump Station Wetwell

All wetwells 6 feet diameter and larger, and all pump stations that are owned and maintained by Manatee County, shall be precast polymer concrete designed to accommodate the peak hour development flow from all contributing areas. The wetwell shall have a minimum of 4 feet from the lowest invert to the wetwell bottom. The pump station wetwell size shall be determined using the following formula to determine the minimum volume between the off-level elevation and the influent invert elevation:

$$\text{MIN. VOLUME (GALS.)} = \text{PUMP CAPACITY (G.P.M.)} \times 4$$

Wetwell diameters shall be 6 feet or larger. 4-foot and 5-foot diameter wetwells shall be used only for special grinder pump applications as approved by the County on a case-by-case basis. The minimum wall thickness for polymer concrete wetwells shall be per Specification Section 02625.

The pump station wetwell size and control equipment shall be designed to limit the pumping cycles of each pump to a maximum of 5 starts per hour for duplex stations and 3 starts per hour for triplex stations. Pump stations discharging through pipes 12 inches or larger shall have more than two variable speed pumps. The pump cycle off level shall be no lower than the top of the sewage pumps. The lead pump on level shall be no higher than 18 inches below the invert elevation of the influent pipe for duplex stations, and no higher than 24 inches below the invert for triplex stations.

All pump stations shall have a single gravity-flow influent pipe discharging into the wetwell. Multiple gravity pipelines and force mains upstream shall all terminate at a separate polymer concrete manhole before flowing into the pump station wetwell. This separate polymer

concrete manhole shall be located no further than 50 feet from the wet well. The influent gravity sewer shall be aligned, so that the inflowing stream drops into the front side of the wet well, opposite from the riser pipes.

B. Above-ground Valve Assembly

An above-ground valve assembly and concrete pad with three gate valves, two weighted lever swing check valves, and a pump-out connection shall be constructed adjacent to the wet well. Tri-plex stations have four gate valves and three check valves. The pump-out connection shall be equipped with a gate valve and an male aluminum quick-coupler w/ cap; 4-inch for 4 inch or smaller valve assemblies; 6 inch for all others, unless otherwise specified on the plans. All valves shall have factory applied, fusion bonded epoxy coating on interior and exterior. A holiday free factory certification per ASTM G62, Method A (Low-Voltage) shall be provided for the interior coating at the time of delivery. All bolt, nuts & washers in or on the wet well or valve assembly shall be 316 stainless steel.

The valve assembly shall be supported by 316 stainless steel adjustable, flange-type, pipe supports anchored to the structure/valve pad.

To ensure the tops of the wet well and valve assembly pad will remain flush ,

C. Entrance Hatches

The lift station wetwell shall be equipped with an aluminum access cover of adequate size to permit easy removal and installation of sewage pumps and equipment. The wetwell access cover shall be a minimum 36" x 48" single (preferred) or double door. The dimensions of the hatch will vary depending on the internal discharge pipe size and internal configuration. The actual required dimensions of the hatch shall be confirmed with the pump manufacturer prior to ordering. The access covers shall be constructed of aluminum with a minimum load rating of 300 lbs/sq. ft. and equipped with 316 stainless steel hinges, a recessed lifting handle which lies flush with the door surface, and a 316 stainless steel staple which may be used to secure the door with a padlock when closed. The doors shall have a raised diamond thread pattern to provide a skid resistant surface and shall open to 90 degrees and lock automatically in that position, with a handle to release the doors for closing. The hatch assemblies shall be furnished per the latest edition of the County's Approved Products List.

D. Sewage Pump Assemblies

Each pumping station shall have a minimum of two identical, totally submersible sewage pump assemblies which are rated and suitable for continuous duty, underwater operation. These units and their associated power and signal cables shall have watertight integrity to a depth of 65 feet. The pump, pump motor and associated components shall all be the products of the same manufacturer. Pump assemblies shall be painted after assembly with an approved air dry enamel which will adequately protect the exterior housings from the corrosive environment in the wastewater sewer system. Coating thickness shall be a minimum of 4 mils.

Pumps shall be selected to operate within 10 percent of the Best Efficiency Point (BEP). The overall life station system shall be designed to allow for the selected pumps to operate within 10 percent of their BEP.

Factory testing of the pump assemblies shall be required and as a minimum, shall include:

- (1) All tests recommended by the manufacturer.
- (2) Verify the integrity of assembly and connections (no leaks, tightness of hardware, proper alignment, assembly, etc.) and that the nameplate and specified pump and pump motor (HP, Voltage, Phase and HZ) correspond.
- (3) The motor windings and seal housing chambers shall be hi-potted to test for insulation defects and moisture content. Check the resistance of the stator windings with a bridge to verify that the readings of all three phases are basically equal and within tolerance.
- (4) Energize pump motor, verify direction of rotation and that it corresponds to the nameplate.
- (5) Provide a written report of all testing with the shipped pump.

All pump assemblies shall be warranted against defects in workmanship and materials for whichever is the greater of: a 5-year pro-rated warranty from the date of purchase or as provided in the Defect Security Agreement with the County.

Month 0-18 = 100% Month 19-31 = 75% Month 32-45 = 50% Month 46-60 = 25%

Pump motors shall have the following electrical characteristics: 230 -volt for 20 HP and lower or 460 -volt for greater than 20 HP, 3 phase, 60 hertz, minimum service factor of 1.15, continuous duty, maximum NEMA LRA/HP code of J, and NEMA Design B. Pump motors shall be non-overloading throughout the entire range of operation. The pump motors are to be induction motors which are built with moisture resistant Class F insulation. Each motor shall be capable of a minimum of 10 starts per hour without degradation of the windings. The pump motor shaft shall be made from a single, solid, forging of 303 (or better grade) stainless steel, tapered, keyed, and supported by a minimum of one heavy duty upper radial ball bearing and a minimum of one heavy duty lower thrust bearing. The bearings shall have a minimum B-10 life rating of 60,000 hours. The shaft and shaft extension shall be of minimum length and maximum diameter to reduce shaft deflection and prolong bearing life. The pump motor shall be designed for pumping at a maximum sump ambient of 40 degrees C (104 degrees F). The stator of the pump motor shall be copper wound (aluminum stator windings are not permitted) and equipped with at least two heat sensors (klixons installed in the stator end turns) which will shut the motor off in case of excessive heat built up. The heat sensors shall be connected in series with the motor starter coil so the starter is tripped if the heat sensor opens. The pump motor housing shall be oil or air filled type for cooling purposes. Oil filled motors shall use pure dielectric insulating oil. The pump motor shall be capable of operating at +/- 10% of rated voltage and +/- 5% of rated frequency without excessive heating. The pump motor shall not exceed a rise by resistance of 90 degrees C at full load over the entire performance curve. It shall be able to operate intermittently a full load while unsubmerged without damage. Power cables and signal cables shall be continuous (without splices from the pump motor to the power supply). Power cables shall be sized for operation at the rated service factor. The power cable shall be a single, multi-conductor, STW-A type that is epoxy potted and compression fitted for water tight sealing into the pump cable entry. As a minimum, the nameplate for the pump motor shall include: MODEL/SERIAL NUMBER, HORSEPOWER, VOLTAGE, FULL LOAD AMPS, FULL LOAD RPM, PHASES, FREQUENCY, NEMA LRA CODE, NEMA DESIGN, INSULATION CLASS, AMBIENT TEMPERATURE, LEAD CONNECTIONS FOR DIRECTION OF ROTATION, TYPE OF DUTY, TYPE OF BEARINGS, and PUMP IMPELLER SIZE. All electrical components used in or in conjunction with the sewage pump assembly shall be UL approved when UL approval is available for that type component.

The pumps shall be capable of pumping raw, unscreened sewage and able to pass a minimum 3-inch solid. Each pump shall have an enclosed cast iron or ductile iron impeller and shall be equipped with a bronze wear ring. The pump lifting cover, stator housing, and volute casing shall be gray cast iron, ASTM A48, Class 30. Castings shall have smooth surfaces that are devoid of blow holes or other casting defects. The pump lifting bail shall have a minimum of 4-inch diameter clear opening and shall be cast as part of the motor cover or fabricated from 316 stainless steel. All fasteners exposed to raw sewage shall be 316 stainless steel. The backside of the impeller shall have pump-out vanes to keep contaminants out of the seal area. The impeller shall be dynamically balanced, and shall be single - or multi-vaned, with an enclosed or recessed, non-clogging design. There shall be a maximum clearance of .125 inches between the seal housing and the top of the impeller. The pump shall have a minimum of two mechanical seals mounted in tandem with an oil chamber between the two seals. The oil chamber of each pump shall be equipped with an electric seal fail sensor which shall be connected to an indicating light at the control panel to annunciate a seal failure and a set of relay contacts for purposes of remote notification via the County RTU system. The unit shall be designed so that when the outer seal fails, the contaminants that enter shall not enter the bearing housing and cause damage to the bearings. The inner seal shall be replaceable without disassembly of the motor housing and without the need for special tools. As a minimum, the rotating seal faces shall be carbon and the stationary seal faces shall be ceramic.

All pumps shall be center-line discharge type constructed so that the discharge flange supports the full weight of the pump. Pump assemblies shall be complete with ductile iron BPIU discharge base elbows that are bolted directly to a base plate which is bolted directly to the wetwell floor, guide flange adapter and guide rails. The discharge elbow shall have an automatic coupling end facing the pump and an ANSI Class 125 flanged end ready for connection to the flange of the riser pipe. The design of the pump assembly installation shall be such that the pump will be automatically connected to the discharge piping when lowered into place along the guide rails, and shall seal leak-tight to the discharge base elbow by the weight of the pump assembly resting in the installed position. The pump base elbow shall be mounted on an high strength, low-alloy weather steel conforming to ASTM A242/A588 mounting plate that is level and is bolted to the wetwell floor using ¾-inch 316 stainless steel threaded rods with Hilti HVA anchors or approved equal anchors and shall have base ell mounting bolts of ¾-inch 316 stainless steel that are mounted in place and welded to the plate. The pump guide rails for each pump shall be constructed of two separate whole length sections of 2 inch Schedule 40, 316 stainless steel pipe set 4 inches on center.

The pump assemblies shall be easily removed for inspections or service, requiring no fasteners to be removed or disconnected, and no need for personnel to enter the confined space of the wetwell, by simply hauling up on the lift chains. The lifting chains shall be type 316 stainless steel, and shall be 1/4-inch for pumps less than 10 HP and 3/8-inch for pumps 10 HP and greater, or as required by the pump assembly weight. Chains shall be attached to the pump lifting bails using 316 stainless steel shackles and shall extend to the inside top of the wetwell. All rails and mounting hardware shall be 316 stainless steel.

E. Riser and Fittings

All force main piping and fittings within the wetwell from the pump base elbow to the check valve shall be DR-11 HDPE; only molded HDPE fittings shall be used upstream of the check valves. The HDPE discharge piping from the pump base ells (in the wet well) and to the valve assembly check valves shall be made using HDPE flange adapters with 316 stainless steel backup rings. No ductile iron bodied fittings shall be located between the pump base elbow and the check valves. All HDPE connections shall be thermal fused. All piping downstream of the tee/cross in the valve assembly to the first underground fitting shall be ductile iron pipe, after which PVC C900-16, class 235, DR 18 shall be used.

All flanged fittings shall use 316 stainless steel bolts, nuts and washers. All threads shall be treated with Bostik Never-Seez anti-seizing compound or approved equal. All bolts on the flange connection at the pump base ells shall have two nuts with a lock washer between them or a nylon lock nut.

All 316 stainless steel fasteners shall be treated with Never-Seez prior to assembly and torque according to the fitting manufacturer's recommendation.

The riser pipes shall be attached to riser pipe brackets by cushioned 316 stainless steel U-bolt clamps per the latest edition of the County's Approved Products List. The cushion design shall distribute the total load allowing the U-Bolt to become a full contact hanger. The U-bolts shall be tightened to secure the riser pipe as to grip the pipe without deforming the pipe when bolted to the brackets. The riser pipe brackets shall be constructed of 316 stainless steel 2 inch tubing (or 2 inch 316 stainless steel angle) with 6"x6"x1/4" 316 stainless steel plates welded to each end and attached to the wet well walls by two (min) 316 stainless steel anchors.

F. Hardware

A multi hook stainless steel hanger shall be installed inside the wetwell access opening for supporting the float switches and pump electric cables. The multi hook hanger shall be constructed from 1/4-inch x 2-inch type 316 stainless steel flat stock with individual hooks constructed of 1/4" type 316 stainless steel rod stock. Individual hangers shall be installed on each side of the upper guide rail bracket for each pump to support the pump lifting chain and power cable. The lifting chain hook shall be constructed from 3/8-inch type 316 stainless steel rod stock. The pump power cable hook shall be constructed from 1/4-inch x 1-inch type 316 stainless steel flat stock.

G. Painting and Coating

All paint and other coatings shall be applied in accordance with the product manufacturer's specifications for the surfaces being coated. All iron body valves shall have a factory applied fusion bonded epoxy coating inside and outside. A holiday free factory certification per ASTM G62, Method A (Low-Voltage) shall be provided for the interior coating at the time of delivery. All ductile iron fittings shall have a 40-mil DFT of an approved interior epoxy coating per the latest edition of the County's Approved Products List and a standard 1-mil asphaltic exterior coating per AWWA C151 if buried or a field applied coating of Rustoleum 7538 (Hunter Green) for aboveground fittings.

H. Stilling Well

The stilling well shall be a 6" PVC stilling well mounted such that the top is available to an

open hatch cover. The bottom of the stilling well shall have two 316 stainless steel bolt all the way through both sides, passing through the center of the pipe, approximately 4" from the base of the pipe. It shall have 1/2" diameter holes drilled around the circumference at a rate of one hole per inch of length for at least the full wetted height. All mounting hardware shall be 316 stainless steel.

I. Magnetic Flow Meter (where required)

A flow meter may be required, and if so, shall be rated for continuous submergence, 0.05% accuracy with a polyurethane liner, flush electrodes, FM Class 1, Division 2, Groups A, B, C & D and shall be constructed for a flanged mount. Meter shall be supplied with a like size spool piece. The exterior control module/transmitter shall be mounted either inside or adjacent to the lift station control panel on the same support structure per the Lift Station Supervisor.

2.01 ELECTRICAL

A. Service and Metering

The Contractor shall be responsible and shall pay for any permits, fees, and inspections required by the local power company for service installations. Three phase power shall be used unless otherwise approved by the County. Service for pump motors of 20 horsepower or smaller shall be 230 volts. For motors greater than 20 horsepower, the service voltage shall be 460. No phase converters will be accepted. All lift stations shall be equipped with a knife-type fused safety switch in a NEMA 4X stainless steel enclosure, lockable in the ON and OFF position, between the service meter and the control panel to permit servicing of the main breaker without removing the service meter. All meter bases shall be aluminum. Minimum service size shall be 100 amp. Conduit connections to the disconnect shall be sealed using Myers conduit hub connectors (disconnect side).

B. Conductors

All power conductors shall be single conductor, 600 volt, type THW or THHN stranded copper. Minimum conductor size shall be #12 AWG. ALUMINUM WIRE IS NOT PERMITTED. All control wiring shall be single conductor #14 AWG, 600 volt, type THHN stranded copper. All terminations and interconnections of control wiring shall be by means of compression-type lugs of the nylon self insulated type with an inner bronze insulation grip sleeve on identified terminal strips. All control wiring shall be color coded as indicated on the standard details.

C. Conduit

All power conductors from the utility source to the service meter shall be enclosed in PVC Schedule 80 conduit below ground and aboveground (NO I.M.C. ALLOWED). All lift stations shall be equipped with one conduit to the wet well for each pump power cables and a separate conduit to the wet well for the control (floatball) and signal cables. In lift stations with large horsepower pumps and pumps equipped with sensor cables, the conduit size and quantity shall be determined by the County. All conduit to the lift station wet well shall be minimum 2" Schedule 80 PVC and shall be run by the shortest route possible. All terminations shall be made inside the electrical control panel. All flexible conduit shall be non-metallic.

D. Control Panel

All pump stations shall have one automatic control panel, one telemetry control unit enclosure with specified TCU with assigned radio frequency and one junction control box for motor control, floats, seal fail and transducer (if required). The control panel will be ordered through Barney's Pump of Lakeland, FL. The fiberglass telemetry control cabinet will be ordered through Data Flow Systems (DFS), part# DFS-00275-008-04. Specify if 480V 3 phase is needed. Enclosure must be ordered with 'NO' tower mounting brackets. All cabinets shall be white in color unless specified otherwise.

The Order Numbers and specification are listed in the following table.

Barney's Pumps approved panels by Manatee County

Part#	STD. FLA	MCB/ECB	PCB	Starter	Size (Starter or OL)	Note:
ManCoCP240_1_3_VFD	24 (Input)	100	40	FRN003E1S-7U	N/A	11A Max Pump FLA (VFD)
ManCoCP240_1_5_VFD	42.7 (Input)	125	70	FRN010E1S-2U	N/A	19A Max Pump FLA (VFD)
ManCoCP240_3_2_SSC	8.3	100	15	SSR	3-12A	Solid State Starter
ManCoCP240_3_3_SSC	9.5	100	15	SSR	3-12A	Solid State Starter
ManCoCP240_3_5_SSC	15.3	100	25	SSR	10-40A	Solid State Starter
ManCoCP240_3_7.5_SSC	25.2	100	40	SSR	10-40A	Solid State Starter
ManCoCP240_3_10_SSC	29.5	100	50	SSR	10-40A	Solid State Starter
ManCoCP240_3_15_SSC	44.2	125	70	SSR	25-100A	Solid State Starter
ManCoCP240_3_20_FVNR	54.4	175	90	14HUG32AF	Size 3	Elect-mech starter
ManCoCP240_3_25_FVNR	68	200	100	14HUG32AF	Size 3	Elect-mech starter
ManCoCP480_3_2_SSC	4.1	100	15	SSR	3-12A	Solid State Starter
ManCoCP480_3_3_SSC	4.8	100	15	SSR	3-12A	Solid State Starter
ManCoCP480_3_5_SSC	7.8	100	15	SSR	3-12A	Solid State Starter
ManCoCP480_3_7.5_SSC	12.6	100	20	SSR	10-40A	Solid State Starter
ManCoCP480_3_10_SSC	14.7	100	25	SSR	10-40A	Solid State Starter
ManCoCP480_3_15_SSC	22.1	100	40	SSR	10-40A	Solid State Starter
ManCoCP480_3_20_SSC	27.2	100	50	SSR	10-40A	Solid State Starter
ManCoCP480_3_25_SSC	34	100	60	SSR	10-40A	Solid State Starter
ManCoCP480_3_30_SSC	40.1	110	70	SSR	25-100A	Solid State Starter
ManCoCP480_3_40_FVNR	52.2	125	80	14HUG32AF	Size 3	Elec-mech Starter
ManCoCP480_3_50_FVNR	70.5	175	110	14HUG32AF	Size 3	Elec-mech Starter
All part numbers include junction box/Inverters/VFD's only Part number for cabinets that are single phase does not include inverters - sold separately.						

The control panel, telemetry control cabinet, and motor cable junction box along with the safety switch box and electric utility power meter, shall be attached to horizontal support channels with stainless steel fastening systems designed for use with the support channel. The horizontal channels shall be 1-5/8 inch, 12 gage (or thicker) solid 316 stainless steel channels per the latest edition of the County's Approved Products List attached with 316 stainless steel 3/8-inch all thread rod with 316 stainless steel flat washers and nuts to two vertical 3 inch diameter 316 stainless steel, schedule 40 posts. The 3 inch vertical pipe shall have plastic end caps or stainless steel end caps at the top and shall be anchored in concrete adjacent to the pump station wet well. See County Standard, "Sewage Pump Station Meter & Electrical Details". No fittings shall enter from the top or back of the control panel. All fittings shall enter the side or bottom of the control panel and shall penetrate the control panel with Myers Hubs conduit end connections.

The overall control panel shall be a minimum of 30"x 36"x 12" deep and of adequate size to completely cover (without crowding) all wiring and components mounted inside it. It shall have provisions for the mounting of all basic and optional controls and instrumentation. Install engraved nameplates defining door mounted hardware. The electrical control panel shall have a complete wiring schematic which is laminated in plastic and attached to the inside of the outer control panel door.

All components shall be installed per the most current NEMA and NEC regulations and standards. The components shall be industrial NEMA rated (I.E.C. is not acceptable) and UL approved when UL approval is available for that particular type component. The components of the panel shall be held in place with stainless steel, slotted, plan head machine screws with star type washers. The panel shall be tapped to accept the mounting screws of the components and no self-tapping type screws shall be used. The control panel shall have the following items installed on the back plane or on aluminum "high hats" attached to the back plane, so the body of the component is flush with the dead front door to allow operation and reset of the components without opening the dead front door: main power breaker, emergency power circuit breaker, individual pump circuit breakers, control circuit breaker and G.F.I. duplex receptacle circuit breaker. The control panel shall have the following items installed directly to the back plane: individual motor starters, power distribution blocks, neutral bar assembly, grounding bar/lugs, terminal strips, 2 inch PVC panduit for control and telemetry wiring and fuses, and surge suppressor. The control panel shall have one G.F.I. duplex receptacle installed on the dead front door. The exterior of the control panel shall have one emergency generator receptacle, one flashing red light, and one audible alarm with reset button. The individual placement of all the components of the control panel shall be installed as indicated in the standard details.

E. Ratings

The controls shall be rated for the supply voltage (230 or 460 volts), 3 phase, 60 hertz. In the event that three phase power is not available at the location of the control panel, the cabinet shall be either ManCOCP240 1 3 VFD (3 hp) or ManCoCP240 1 5 VFD (5 hp) inverters. All control voltage to the wetwell shall not exceed 24 volts DC.

F. Wiring Method

All power conductors from the main circuit breaker to all other circuit breakers shall be connected via a Square D model LBA363206, Marathon #1333555, or equal power distribution block. All electrical panel components shall have individual neutral wires. All neutral wiring shall be connected via a Square D model SN12-125 neutral assembly. Wiring is to be continuous with no splices between connections. Provide a Square D model

PK9GTA grounding bar at the bottom of the backplate. This grounding bar will be the central connection point of all ground wires for the system with the exception of the pump power cords and surge arresters. The pump power cords and surge arresters shall be grounded via individual ground lugs that are to be attached to the control panel back plane. Provide two 12 terminal, Ideal Model 89-208 terminal strips to make electrical connections in the control panel. One terminal strip shall be used exclusively for 24 volt connections (TB-1) and the other shall be used exclusively for 120 volt connections (TB-2). The power distribution block, neutral assembly, grounding bar and terminal strips shall be located as indicated in the standard details. Use 316 stainless steel screws and fasteners for all wiring connections.

G. Circuit Breakers

The panels shall be equipped with main and emergency circuit breakers for a minimum size of service of 100 amps. The main and emergency circuit breakers shall be interlocked so that when one is in the open position, the other circuit breaker must be in the closed position. There shall also be an individual circuit breaker for each pump, a control circuit breaker, a 20 amp circuit breaker for site lighting, a 20 amp circuit breaker for the flow meter (re-pump stations only) and a minimum 20 amp circuit breaker for the 120 volt GFI protected convenience outlet that is mounted on the inner control panel door. All circuit breakers shall be mounted in the control panel per the standard details. The circuit breakers shall be of the heavy duty thermal magnetic trip variety. For circuit breakers up to 100 amps, use Square D series QOU or County approved equal. For circuit breakers greater than 100 amps, use Square D "Mag Guard" series with adjustable trip for the pumps, main and emergency breakers shall be Square D QBL, HGL, or JGL.

H. Motor Starters

Pump motors shall each have a NEMA-rated, solid state or magnetic starter sized as called for on the construction plans. No starter smaller than NEMA size 1 shall be used. Starters shall be solid state, full voltage, non-reversing type. These starters shall be Siemens series ESP-100 or County approved equal with special phase loss protection and a special factory coating of the solid state circuit boards which prevents hydrogen sulfide damage. The starters shall be equipped with under voltage release and overload protection on all three phases. The motor starter contacts (if used) shall be constructed so that they may be easily replaced without removing the starter unit from its mounted position. The overload reset device shall be operable without having to open the inner swing panel.

I. Lightning Arresters

There shall be a Ditek DTK Series lightning arrester/surge suppressor installed on the incoming power source. It shall be mounted on the bottom exterior or placed inside of the safety switch enclosure and connected to the LOAD SIDE of the safety switch and overload reset.

The main circuit breaker and the RTU circuit breaker shall also each have a Ditek CM+Series lightning arrester/surge suppressor connected to the load side of the breaker wiring. These lightning arresters/surge suppressors shall be mounted with the supplied adhesive strip on the back of the "high hat" supporting the breakers. The exact model lightning arresters/surge suppressors shall be based on the voltage and number of phases of the protected circuits.

J. Liquid Level Switches and Sensors

A minimum of four float switches are to be installed in the wetwell to monitor and control liquid level height. The switches shall be a single pole mechanical type switch per the latest edition of the County's Approved Products List. They shall be designed to actuate when the longitudinal axis of the float is horizontal, and deactivate when the liquid level falls one inch below the actuation elevation. The switching arrangement shall be normally open when deactivated. The output leads shall be connected in the control panel as shown in the standard details. The control voltage to the level switches shall be 24 volts DC and the switches shall be sized to operate at that voltage. In addition to the above, pump stations that re-pump sewage flows (directly or indirectly) from other pump stations shall have a DFS Bubbler Transducer (Model TBU 360) mounted inside a stilling well as the primary level sensor.

The wiring connecting the cable junction box to the wet well floats shall be a continuous length (no splices) of flexible rate 600 volt, minimum diameter of #18, type S.O. cable. The float switches shall have all connections made inside the junction box using crimp on spade terminals that are landed to the terminal strip. The wiring shall be installed so there is a minimum of four (4) feet, and a maximum of six (6) feet, of excess cable in the wet well for relocation of the float switches.

K. Alarms

Each pump station shall have one flashing red light to signal high level conditions. A flasher unit shall be installed and mounted in the control panel enclosure to operate the led flashing light attached to the unistrut.

L. Generator Receptacle

A generator receptacle to permit the installation of a portable emergency generator as the power source when the local utility power company power supply is lost shall be installed on the outside of the control panel as indicated on the standard details. It shall be directly connected to the emergency circuit breaker inside the control panel. The emergency and main circuit breakers shall have a mechanical interlink between them which shall allow only one source to supply power to the control panel at any given period of time. The generator receptacles shall be

<u>Power Supply</u>	<u>Required Receptacle</u>
0-100 Amp, 230 Volt	Russell Stoll JRSB1044FR
100-200 Amp, 230 Volt	Russell Stoll JRSB2044FR
0-200 Amp, 460 Volt	Russell Stoll JRSB2034HR

M. Seal Leak Moisture Detector

Provide for each pump a moisture sensing sensor which will detect when moisture has penetrated the seal chamber. The moisture seal detector shall be connected to the County RTU system to notify lift station maintenance personnel when a seal has allowed moisture to enter the oil chamber of the pump. An indicating lamp is to be mounted in the control panel as illustrated in the standard details to also signal the seal failure.

N. Telemetry Control Unit

The remote terminal/pump control unit shall be a complete TCU system as manufactured by Data Flow Systems, Inc. The unit is to be a fully programmable, dual function device. It

shall be used to monitor and control SCADA equipment and it shall have all the necessary hardware and software to control three pump motor starters. Its operation is based on level inputs from a minimum of four float ball switches in the wetwell. It shall have the ability to control pump alternation, activate and deactivate remote and local alarms, and communicate with the HT3 SCADA System. It shall be equipped with RTU surge protection and a transient filter shield. The unit shall have an uninterruptible power source and contain all the components and be electrically connected as indicated in the standard details. It shall be equipped with an antenna tower with supporting mast and coaxial cable that is required by the manufacturer for that particular system. The battery backup will be contained with the TCU in its own enclosure. The installation shall include the required FCC licensing. The antenna and mast shall be rated for 150 MPH winds. Tower heights above 20 feet must be per the latest edition of the County's Approved Products List.

Pump stations that re-pump sewage flows (directly or indirectly) from other pump stations will also require an Analog Monitor Module to receive input from the force main pressure transducer and flow meter.

Telemetry control and remote terminal/pump control units are not required for privately owned and maintained pump stations.

O. Grounding

Install a 5/8" x 10' copper-clad ground rod for each electrical service. Connect to the ground rod a #6 bare copper wire to connect with the electrical panel grounding bar. Provide another, separate ground rod, tower clamp, and #6 bare copper wire to connect directly to the antenna tower, control cabinet/TCU cabinet, polyphaser, and ground. The ground rods and #6 bare copper wires shall be connected by an exothermic weld (cad weld).

P. Site Lighting

A minimum 6000 lumens LED shall be mounted on the system tower for illumination of the pump station area. The manually operated light shall be per the latest edition of the County's Approved Products List, mounted on 3/4-inch aluminum rigid conduit connected to the RTU tower using 90 degree korms clamps.

3.01 GRINDER PUMP (LIFT) STATIONS

- A. Grinder pumps shall be used where the required discharge rate is low and the discharge pipe is required to be smaller than 4-inch diameter. Grinder pumping stations shall be constructed essentially to the same standards as the larger standard pumping stations, however made of fiberglass wet wells, dual pumps with guide rails, control panels, RTUs, antennas and masts, etc., but sized smaller to accommodate the lesser capacity. Wetwell diameters may be smaller than 6 feet, but shall be no smaller than 4 feet. Riser pipes shall be no smaller than 1.25 inches diameter, and force mains shall be no smaller than 2 inches diameter. Ball check valves shall not be used.
- B. Grinder pumps will not be required to pass a 3-inch solid, but shall rather be capable of grinding all materials normally found in domestic raw wastewater into a pumpable slurry. The grinder cutters shall be made of 440C stainless steel hardened to Rockwell 60C. Motors shall be 230 volt, 3 phase, 60 hertz, 3450 or 1750 RPM speed, and shall otherwise meet the same requirements as for the larger standard sewage pump motors. Minimum hatch cover sizes for grinder pump station wetwells shall be 30 x 36 inches.

- C. There shall be an approved shut-off valve (tapping gate valve) installed at the connection of a grinder pump station pipeline to a County force main, and where the grinder pump station is maintained by a private entity, there shall be another approved shut-off valve (plug valve) installed at the point where the grinder pump pipeline enters the public right-of-way or public utility easement. The force main shall be at least 18 inches below the top slab within the valve vault. A 90 degree bend, which is turned down, shall be installed 18 inches outside of the valve vault to lower the force main to obtain a minimum 3 feet of cover.

Valve vaults for grinder lift stations may be fiberglass.. The fiberglass resins used shall be a commercial grade unsaturated polyester or vinyl ester resin. The reinforcing materials shall be commercial Grade "E" type glass in the form of continuous roving and chop roving, and shall have a coupling agent that will provide a suitable bond between the glass reinforcement and the resin. The inner surface exposed to the chemical environment shall be a resin-rich layer of 0.010 to 0.020 inches thick. The inner surface layer exposed to the corrosive environment shall be followed with a minimum of two passes of chopped roving of minimum length 0.5 inch (13 mm) to maximum length of 2.0 inches (50.8 mm) and shall be applied uniformly to an equivalent weight of 3 oz/ft². Each pass of chopped roving shall be well-rolled prior to the application of additional reinforcement. The combined thickness of the inner surface and interior layer shall not be less than 0.10 inch (2.5 mm). The interior surface shall be free of crazing, delamination, blisters larger than 0.5-inch in diameter and wrinkles of 0.125-inch or greater in depth. Surface pits may be permitted if they are less than 0.75-inch in diameter and less than 0.0625-inch deep. Voids that may not be broken with finger pressure and that are entirely below the resin surface shall be permitted if they are less than 0.5-inch in diameter and less than 0.0625-inch thick. After inner layer has been applied, the valve vault wall shall be constructed with chop and continuous strand filament wound manufacturing process which insures continuous reinforcement and uniform strength and composition. Valve vaults may require resin fiber-reinforced bottoms.

Valve vault bottom shall be designed to resist all pressures induced by water, soil and wheel loads with a maximum deflection of 1/4-inch.

All pipe openings shall have resilient pipe to wetwell seals.

The 1:1 bottom fillet may shall be concrete. Concrete also may be used on the top of anti-flotation ring and as required to resist buoyancy. The wetwell and valve vault shall resist flotation with ground water level assumed to be at finished grade. The Engineer of Record shall submit flotation calculations to Manatee County when submitting Construction Drawing approval.

All fiberglass and plastic valve vaults located such that a vehicle may run over it shall have a minimum dynamic-load rating of 16,000 lbs. when tested in accordance with ASTM D3753. To establish this rating, the complete wetwell and valve vault shall not leak, crack, or suffer other damage when load tested to 40,000 lbs. and shall not deflect vertically downward more than 0.25 in. at the point of load application when loaded to 24,000 lbs. Thickness of fiberglass wetwells and vaults shall be determined by calculations submitted when submitting construction drawings for approval. The Engineer of Record shall perform the calculations or shall submit a certification that he or she reviewed calculations prepared by others.

Each wetwell and valve vault shall be designed and built to meet all required ASTM D3753 designations for dimensional requirements, hardness, chemical resistance, and workmanship. Test records shall be provided to the Owner/Engineer of Record and to the County Inspector.

The Contractor shall set sections vertical and in true alignment. The finished wetwell and valve vault shall not be out of plumb by more than 3/8-inch per 10 feet of height.

Each wetwell and valve vault shall be marked on the inside and outside with the following information: Manufacturer's name or trademark, factory location, serial or model number and total length.

4.01 WATER SERVICE

All pump stations shall be equipped with a 3/4-inch water service (hose bib). Each water service shall be equipped with a 5/8-inch water meter, a reduced-pressure principle backflow preventer per the latest edition of the County's Approved Products List and a 3/4-inch brass hose bib. The water meter and backflow preventer shall be located within two feet of the pump station easement (or property) line. All water meters shall be obtained from the Manatee County Water Meter Department. Reclaimed water shall be used where available.

5.01 PERMITS

The Contractor shall be responsible for obtaining and shall pay for any permits and/or inspections required.

6.01 SHOP DRAWINGS AND INSPECTIONS

When calling for inspection, the Contractor shall have these approved shop drawings available on-site for review by the inspectors. The Contractor shall also deliver to the Lift Station Section inspector, the pump manufacturer's technical manual with the model number, serial number, and certified pump curve, for each pump prior to acceptance by the County for maintenance.

7.01 EASEMENTS

An easement for ingress and egress to the lift station and an easement for the lift station must be granted and recorded before the lift station can be accepted by the County for operation and maintenance.

8.01 SITING

- A. The siting of all pump station facilities shall be subject to review and approval by Manatee County. All pump stations shall be located on a separate parcel of land or within a utility easement in common open space. The station shall be properly sited with due consideration of the neighborhood, surrounding site features, landscaping, aesthetics, safety and security. The station and associated landscaping shall not be sited on a right-of-way, private road, median, front yard of a residence, or within a visibility triangle. The pump station wetwell, valve assembly, control panel, and telemetry antenna shall not be sited within 20 feet of overhead power lines.
- B. Each pump station site shall have a vehicular access drive paved with a concrete surface course over a base course. The drive shall be designed to allow a service truck to park off of the right-of-way or roadway easement and to also allow the service truck to back up to the wetwell such that the wetwell is directly to the rear of the truck or adjacent to the side of the truck. The pump station control panel, telemetry antenna and hose bib shall not be located between the vehicular access driveway and the wetwell and/or valve vault.
- C. There shall be at least a 20-foot easement in all directions from the pump station site equipment. There shall be no obstructions within the easement such as buildings, walls, fences, etc., other than those that are part of the pump station and identified in these standards. A minimum setback of 5 ft shall be provided between pump station structures/equipment and the security fence. Pump station easement shall extend a minimum of 15 ft beyond all four sides of the security fence. If the pump station is adjacent to the street's right-of way, the pump station easement shall extend to the ROW line. The lift station site shall be made accessible with a minimum 30 ft wide corridor/easement.
- D. Surface stormwater flow shall be directed around the pump station site. The site shall be graded to provide sheet flow of site runoff away from the equipment and direct it to a suitable swale or drainage outfall. The construction drawings shall include a pump station site plan with a grading and drainage plan, along with a landscaping plan.

9.01 FLOODING

Wastewater pumping station structures and electrical and mechanical equipment shall be fully protected from physical damage from flood water intrusion by the 100-year flood. Wastewater pumping stations shall remain fully operational and accessible during the 25-year flood. Regulations of state and federal agencies regarding obstructions of the pumping station site by flood waters shall be observed during the design of the development.

10.01 ENTRANCE HATCH ELEVATIONS

The wetwell and valve vault top and entrance hatches shall be set at least 4 inches above the 100-year flood plain elevation, or 8 inches above the 25-year flood plain elevation, or 4 inches above the surrounding grade, or 12 inches above the adjacent roadway crown

elevation, whichever is highest. Where this is not practical, deviation from the above must be approved by the County on a case-by-case basis.

11.01 ACCESSIBILITY AND SECURITY

All County owned and maintained pumping stations shall be readily accessible by maintenance vehicles during all weather. A fully functional paved travelway shall be provided to the lift station driveway. The facility shall be located off the traffic way of streets and alleys. All hatches, electrical panel and irrigation panel doors shall be provided with lockable hasps or staples. Security fences with lockable gates shall be provided for all lift stations that are owned and maintained by Manatee County. Lift stations shall have a 6-foot high vinyl coated chain link security fence with privacy decorative slatting (color matched). Chain link security fencing shall be #9 gauge core, galvanized with vinyl coating, with 1 5/8 inch top rails, 2 3/8 inch Schedule 40 line posts, 2 1/2 inch Schedule 40 corner posts and 3 1/2 inch Schedule 40 gate posts for swing gates. Gate posts and track line posts shall be 4 inch Schedule 40 for cantilever slide gates. Maximum line posts spacing shall be equally spaced, not to exceed 8 feet. For private lift stations, the Engineer of Record shall evaluate the location of the proposed lift station and determine whether a security fence is necessary.

12.01 FORCE MAIN PRESSURE TRANSMITTER AND FLOW METER

Lift stations that re-pump sewage flows (directly or indirectly) from other lift stations shall be equipped with a submersible electromagnetic flow meter. The flow meter shall be mounted on an above-ground force main. The flow meter shall be a furnished per the latest edition of the County's Approved Products List. The meters, gauges and all connections and wiring shall be rated fully submersible. The flow meter shall transmit 4-20 mA signals to the telemetry system via the Analog Monitor Module mounted inside the control panel. The signal cables shall be run through 1-inch PVC conduit from the meter to the control panel. The meter display unit shall be weather-proof and mounted on an aluminum stand adjacent to the meter.

13.01 LANDSCAPING & IRRIGATION

A. Landscape trees and shrubs:

The pump station site shall have shrubs planted around the perimeter of the pump station security fence in a hedge-like placement. Shrubs shall have a minimum spacing of 3 feet between the centers of the shrub's base stem. For private pump stations that are located in non-residential areas, shrubs are optional for the sides that are not adjacent to thoroughfare roads, non-thoroughfare roads, and residential areas. For pump stations that are located adjacent to thoroughfare roads and non-thoroughfare roads, a minimum of two small understory trees or palm trees shall be planted between the pump station security fence and the right of way line. For pump stations within residential areas or located adjacent to residential areas, a minimum of two additional understory trees or palm trees; for a total of at least four understory trees or palm trees shall be planted around the pump station (these landscaping requirements are not applicable to pump stations that only serve one single family residence.) A minimum setback of 5 feet shall be provided between the shrub's base stem and the security fence to provide an access way for service personnel. A minimum setback of 10 feet shall be provided between the trunk of understory trees/palm trees and the security fence.

Understory trees shall not have a mature height exceeding 30 feet. Small understory trees, palm trees and shrubs shall not have evasive roots. The minimum height of understory trees shall be six (6') feet at time of placement. The minimum height of palm trees shall be fifteen

(15') feet at time of placement. The minimum height of shrubs shall be two (2') feet at time of placement. Shrubs shall have three gallon root balls. Shrub growth habits shall be upright, globose, or columnar. Shrub growth habits shall not be spreading or broad spreading. The understory trees and palm trees shall be planted to accent the shrub placement. Tops of root balls of plants shall be set at or slightly above existing grade. All plant material to be Florida Grade #1 or better, as defined in "Grades and Standards for Nursery Plants," State of Florida Dept. of Agriculture. Plants shall be sound, healthy, vigorous, and free from plant diseases, insects, pests, or their eggs and shall have healthy normal root systems. Plants shall be nursery grown stock, freshly dug. No heeled in, cold storage, or collected stock shall be accepted. Ground covers shall have sturdy fibrous root systems. Staking and bracing shall be done on all trees using Arbor tape and the Duckbill anchor system, in accordance with sound nursery practices.

The shrubs, understory trees and palm trees shall be of the drought tolerant, low maintenance varieties. Plant selection shall be based on soil water retention as well as soil pH.

Examples of acceptable vegetation are as follows:

PLANT NAME	SOIL CONDITIONS WHERE PLANT WILL GROW		pH RANGE	
	Damp to poorly drained soils w/ low percolation	Well drained sands w/ high percolation	Plant tolerates acidic & alkaline soils	Plant tolerates acidic soils only
UNDERSTORY TREES (Mature height not exceeding 30 feet)				
Little Gem Magnolia (Magnolia grandiflora)	X			X
Southern Wax Myrtle (Myrica cerifera)	X	X	X	
Peregrina (Jatropha intergerrima)		X	X	
Bottle Brush Tree (Callistemon citrinus)		X		X
Crape Myrtle Tree (Lagerstroemia Indica)		X		X
Feijoa (Feijoa sellowiana)		X	X	
PALMS				
Cabbage Palms (Sabal palmetto)	X	X	X	
Pindo Palms (Butia capitata)		X	X	
Dwarf Royal (aka Christmas) Palm (Veitchia merrillii)		X	X	
SHRUBS & BUSHES				
Cocoplum (Chrysobalanus icaco)		X	X	
Pipestem (Agarista Populafollia)	X	X	X	
Sweet Viburnum (Viburnum odoratisimum)		X	X	
Yew podocarpus (Podocarpus macrophyllus)		X	X	

The following plant species shall not be planted at the lift station site:

Melaleuca quinquenervia (commonly known as Punk tree, Malaleuca); Schinus terebinthifolius (commonly known as Brazilian Pepper); Casuarina species (commonly known as Australian Pine); Rhodomyrtus tomentosa (commonly known as Downy Rose Myrtle); Mimosa pigra (commonly known as the Catclaw Mimosa); Dalbergia sissoo (commonly known as the Indian Rosewood); and Cupaniopsis anacardioides (commonly known as the Carrotwood).

B. Ground cover:

There shall be no vegetation within the lift station fencing. Site shall include a polypropylene weed barrier fabric that is covered with a minimum of 2-inches of washed shell, or rock within lift station fencing. Landscaping stones shall be inert and nonleaching. Crushed lime rock shall not be acceptable. Site shall include a polypropylene weed barrier fabric that is covered with 3 to 4-inches of shredded wood-type mulch that is located under the shrubs and up to the outside of the security fence. Polypropylene weed barrier fabric that is covered with 3 to 4-inches of shredded wood-type mulch shall be located under the trees for a minimum distance of 3 feet from the tree. Bahia, St. Augustine or Floritam sod or shredded wood-type mulch with a polypropylene weed barrier fabric shall be extended from the shrubs to the lift station easement line.

C. Irrigation:

An irrigation system shall be connected to a non-potable water source. A weather-tight time clock with built-in transformer, minimum of four zones (Rainbird ESP-4M, Toro CC-M-9, or equal) and a rain sensor (Mini-Clik, or equal) shall be furnished and installed. The irrigation controller shall be in a lockable control panel and attached with stainless steel two piece pipe clamps or stainless steel U-bolts to two vertical 3 inch diameter stainless steel, schedule 40 pipes or equal pipe support. The pipe clamp or U-bolt ends shall be covered with plastic caps to prevent injury to personnel. The 3 inch vertical pipe shall have plastic end caps or stainless steel end caps at the top and shall be anchored in concrete. The irrigation system control panel recommended location is outside of the fence and behind the shrubs. The Contractor shall furnish the County a padlock with a set of two keys for the irrigation control panel. The number of zones shall be based on the proposed site, planting configuration, watering distribution, irrigation system demand, and type of vegetation to be irrigated.

The irrigation system shall be installed to irrigate the trees, shrubs and grassed areas; and designed to provide three-fourths (3/4") to one (1") inch of water per week and be in conformance with irrigation restrictions established by the Southwest Florida Water Management District (not restricted if using reclaimed water). The irrigation system shall adhere to the requirements of the Manatee County Land Development Code and to the "Standards and Specifications for Turf and Landscape Irrigation Systems", latest edition, as published by the Florida Irrigation Society, Inc. A permanent sprinkler system with distribution lines underground with mist and/or bubbler nozzles, as appropriate, above the ground are acceptable. A micro-irrigation system located within the planting beds of shrubs and trees is acceptable for that type of installation. In each accent, isolated or separate tree planting bed, a tree bubbler (Toro 514-20 or equal), shall be installed at each tree. In addition, a four (4') foot section of flexible PVC shall be provided for the tree bubbler at each tree. Drip line hoses shall have built-in emitters (Toro DL2000 or equal).

D. Radio signal interference:

Landscape buffer plantings are to be field adjusted in coordination with the siting of the lift station's radio antenna to eliminate signal interference. The antenna for the existing or proposed radio telemetry unit at the lift station requires direct line-of-sight signaling capability to the Utilities Department office that will receive the signal. There shall be an unobstructed horizontal angle of fifteen (15°) degrees from the antenna mast (7 1/2 degrees on both sides of the direct line-of-sight azimuth). No tree shall be planted within the designated unobstructed angle for a twenty (20') foot horizontal distance measured from the mast.

14.01 BACK-UP DIESEL PUMPS OR EMERGENCY GENERATOR SET

Back-up Diesel Pumps:	See Section 11215
Emergency Generators:	See Section 16231

END OF SECTION

SECTION 13300 - CONTROLS AND INSTRUMENTATION GENERAL PROVISIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, devices, equipment, appurtenances, and incidentals required for a complete electrical system as hereinafter specified and/or shown on the Contract Drawings. This work may necessarily include interfacing with and/or completely installing devices and/or equipment furnished under other sections of these Specifications.
- B. All interruptions to the existing control system shall be at the County's convenience. Each interruption shall have prior approval. Request(s) for control system interruption(s) shall be made at least forty-eight (48) hours in advance.
- C. The work shall include complete testing of all electrical components, including wiring.
- D. All workmanship shall be of the highest quality. Substandard work will be rejected and it shall be replaced entirely at the Contractor's expense with no cost to the County.
- E. It shall be the responsibility of each bidder or his authorized representative to physically visit the job site in order that he may be personally acquainted with the area(s), buildings and/or structures intended for use in the installation/construction under this Specification. The submittal of a proposal/bid by a bidder shall be considered evidence that he has complied with this requirement and accepts all responsibility for a complete knowledge of all factors governing his work. Therefore, failure to comply with this requirement of the Specifications will NOT be grounds for the successful bidder (Contractor) to request approval of change orders and/or additional monetary compensation.

1.02 DIVISION OF WORK

- A. The Electrical Contractor shall be responsible for, and his/her scope of work shall include:
 - 1. Providing and installing all conduit, fittings, conductors, and raceways as indicated on the drawings and as defined in Division 16 Specifications.
 - 2. Termination of control and power wiring to supplied control panels, existing control panels and field elements. The electrical subcontractor shall mark on the record drawings the field wire numbers used for each termination point.
 - 3. Physical installation of the Variable Frequency Drives (VFD's) supplied by Manatee County. This installation shall include all conduit, fittings, conductors and structural rack(s) as required.
 - 4. Physical installation of manufacturer supplied flow meter transmitter. This installation shall include all conduit, fittings, conductors, structural rack(s) and sun shields as required.
 - 5. Providing conduit, fittings and conductors as required to accommodate the new flow meters, float switches, level transmitter and any/all new field devices that are supplier or installed by others.
 - 6. Coordinating all interface requirements with mechanical and electrical system suppliers and furnish any devices that might be required in order to insure

compatibility between all equipment.

7. Calibration of all field instruments.
 8. Obtaining, in writing, a final acceptance from DATA FLOW SYSTEMS (DFS) to indicate that all conductors and their terminations, as well as, all field devices and their associated I/O are in proper working order. The Electrical Contractor shall make any corrections necessary, at no charge to the County, for items identified as unsatisfactory by DFS.
- B. The Mechanical Contractor shall be responsible for, and his/her scope of work shall include:
1. Included within the mechanical subcontractor's scope installation of any in-line instrumentation. This instrumentation shall include the flow meter and level transmitter.
- C. DATA FLOW SYSTEMS (DFS) shall be responsible for, and his/her scope of work shall include:
1. Providing TCU/VFD Control Panel capable of controlling the three (3) Variable Frequency Drives (VFD's) under this contract. Contract drawings depict the required I/O.
 2. Radio telemetry shall be via existing antenna and tower. Coaxial cable is existing. DFS shall make any modifications or extensions to the coaxial cable required for proper communications.

1.03 SUBMITTALS

- A. Furnish, as prescribed under the General Requirements, all required submittals covering the items included under this section and its associated sections of the work.
- B. Submit complete, neat, orderly, and indexed submittal packages. Handwritten diagrams are not acceptable and all documentation submittals shall be made using CADD generated utilities as specified herein.
- C. Partial submittals or submittals that do not contain sufficient information for complete review or are unclear will not be reviewed and will be returned by the ENGINEER as not approved.
- D. Provide all shop-drawing submittals on disk in AutoCad format.
- E. Design Related Submittals: Provide individual shop drawing submittals as further defined in each specification section defining the SCADA System. Provide the following additional submittals covering the complete system:
1. Loop diagrams, consisting of complete wiring and/or plumbing diagrams for each control loop showing all terminal numbers, the location of the dc power supply, surge arrestors, etc. The loop diagrams shall meet the minimum requirements of

ISA S5.4 plus divide each loop diagram into four areas for identification of element locations: SCADA System I/O point(s), panel face, back-of-panel, and field, respectively. On each diagram present a tabular summary of:

- a. The output capability of the transmitting instruments
 - b. The input impedance of each receiving instrument
2. System interconnect diagram that shows all connections required between component parts of the items covered in this section and between the various other systems specified in this Contract. Number all electrical terminal blocks and field wiring. Identify each line at each termination point with the same number. Do not use this number again for any other purpose in the complete control scheme.
 3. Test Procedures: Submit the procedures proposed to be followed during all system testing. Procedures shall include test descriptions, forms, and check lists to be used to control and document the required tests.

F. Instrument Installation Details Submittal

1. The Electrical Contractor shall develop and submit for review, complete installation details for each field mounted device and panel furnished prior to shipment and installation. Common details may be referenced by an index showing the complete instrument tag number, service, location, and device description. Installation details shall be provided as required to adequately define the installation of the components. Drawings may be included in the Control Panel Submittal when only a few are required.

G. System Calibration and Test Documentation Submittal

1. The Electrical Contractor shall submit an example of each type of Instrument Calibration Report and Loop Functional Test Report that will be used to verify that all preliminary calibration and testing has been performed and the system is considered, by the supplier, to be ready for testing.
2. After approval of the examples, the Electrical Contractor shall prepare Loop Functional Test Report(s) for each loop and an Instrument Calibration Sheet for each active element (except simple hand switches, lights, etc.). These sheets shall be completed and submitted to the Engineer after completion of the operational availability field tests.
3. An Instrument Calibration report shall be used to certify that each instrument requiring calibration has been calibrated to its published specified accuracy shall be submitted to the Engineer. This report shall include all applicable data as listed below plus an area to identify any defects noted, corrective action required, and corrections made. This report shall include:
 - a. Facility identification (Name, location, etc.)
 - b. Loop identification (Name or function)
 - c. Scale ranges and units

- d. Actual readings at 0, 10, 25, 50, 75, 90 and 100 percent of span
- e. Tester's certification with name and signature

4. Upon completion of all preliminary calibration and functional testing, the Electrical Contractor, shall submit a certified report for each control panel and its associated field instruments certifying that the equipment (1) had been properly installed under his or her supervision, (2) is in accurate calibration, (3) was placed in operation, (4) has been checked, inspected, calibrated, and adjusted as necessary, (5) has been operated under maximum power variation conditions and operated satisfactorily, and (6) is fully covered under the terms of the warranty.

1.04 STANDARDS

- A The design, testing, assembly, and methods of installation of the wiring materials, electrical equipment and accessories proposed under this Contract shall conform to the National Electrical Code and to applicable state and local requirements. UL listing and labeling shall be adhered to under this Contract.
- B Any equipment that does not have a UL, FM CSA, or other approved testing laboratory label shall be furnished with a notarized letter signed by the supplier stating that the equipment furnished has been manufactured in accordance with the National Electric Code and OSHA requirements.
- C Any additional work needed resulting from any deviation from codes or local requirements shall be at no additional cost to the OWNER.
- D Instrument Society of America (ISA) and National Electrical Manufacturers Association (NEMA) standards shall be used where applicable in the design of the Control System.
- E All equipment used on this project to test and calibrate the installed equipment shall be in calibration at the time of use. Calibration shall be traceable to National Institute of Standards (NIS - formally NBS) calibration standards.

1.05 TESTS

- A. The Contractor shall test all items individually and as a system for proper operation.
- B. The Contractor shall, at his expense, make all the requisite repairs, adjustments and/or alterations to correct any shortcomings found as a result of the tests performed under Item 1.02.A.10 above.
- C. A representative of the County shall be present during all testing. The County shall be notified at least two (2) days prior to any testing.

1.06 GUARANTEES AND WARRANTIES

- A. All items furnished under the Electrical Specifications shall be guaranteed and/or warranted,

in writing, against defects in materials, construction and workmanship as specified under Section 01740 of these Specifications.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. All SCADA System equipment shall produce or be activated by signals, which are established standards for the water and wastewater industries. Outputs of equipment that are not of the standard signals as outlined, shall have the output immediately raised and/or converted to compatible standard signals for remote transmission. No zero based signals will be allowed.
- B. All equipment and devices furnished hereunder shall be heavy-duty type, designed for continuous industrial service. The System shall contain products of a single MANUFACTURER, insofar as possible, and shall consist of equipment models that are the latest design currently in production.
- C. All equipment shall be designed to operate on a 60-Hertz alternating current power source at a normal 120 volts, plus or minus 10 percent, except where specifically noted. All regulators and power supplies required for compliance with the above shall be provided between power supply and interconnected instrument loop. Where equipment requires voltage regulation, constant voltage transformers shall be supplied.
- D. Materials and equipment used shall be U.L. approved wherever such approved equipment and materials are available.
- E. All SCADA System equipment shall be designed and constructed so that in the event of a power interruption, the equipment shall resume normal operation without manual resetting when power is restored.

PART 3 EXECUTION

3.01. PRODUCT HANDLING

- A. Store and protect equipment until installation following the storage and handling instructions recommended by the equipment manufacturers. Place special emphasis on proper anti-static protection of sensitive equipment.
- B. Protection During Construction: Throughout this Contract, provide protection for materials and equipment against loss or damage and from the effects of weather. Prior to installation, store items in indoor, dry locations. Provide heating in storage areas for items subject to corrosion under damp conditions. Provide covers for panels and other elements that may be exposed to dusty construction environments.
- C. Corrosion Protection: Protect all consoles, panels, enclosures, and other equipment containing electrical or instrumentation and control devices, including spare parts, from corrosion through the use of corrosion-inhibiting vapor capsules. Prior to shipment, include capsules in the shipping containers, and equipment as recommended by the capsule

manufacturer. During the construction period, periodically replace the capsules in accordance with the capsule manufacturer's recommendations. Replace all capsules just prior to Final Acceptance.

- D. ESD Protection: Provide for the proper handling, storage, and environmental conditions required for the components deemed static sensitive by the equipment manufacturer. The components of the SCADA System shall be protected in particular. Utilize anti-stat wrist straps and matting during installation of these items to prevent component degradation.
- E. Adequately pack manufactured material to prevent damage during shipping, handling, storage and erection. Pack all material shipped to the project site in a container properly marked for identification. Use blocks and padding to prevent movement.
- F. Ship materials that must be handled with the aid of mechanical tools in wood-framed crates.
- G. Ship all materials to the project site with at least one layer of plastic wrapping or other approved means to make it weatherproof. Anti-stat protection shall be provided for all sensitive equipment.
- H. Inspect the material prior to removing it from the carrier. Do not unwrap equipment until it is ready to be installed. If any damage is observed, immediately notify the carrier so that a claim can be made. If no such notice is given, the material shall be assumed to be in undamaged condition, and any subsequent damage that is discovered shall be repaired and replaced at no additional expense to the OWNER.
- I. The Contractor shall be responsible for any damage charges resulting from the handling of the materials.

3.02. INSTALLATION

- A. Install materials and equipment in a workmanlike manner utilizing craftsmen skilled in the particular trade. Provide work, which has a neat and finished appearance. Coordinate work with the OWNER and work of other trades to avoid conflicts, errors, delays, and unnecessary interference with operation of the existing plant during construction.
- B. Provide finish on instruments and accessories that protects against corrosion by the elements in the environment in which they are to be installed. Finish both the interior and exterior of enclosures. Provide extra paint of each color used in the material from the manufacturer for touch-up purposes.
- C. Ground each analog signal shield on one end at the receiver end only. Properly ground all surge and transient protection devices. Coordinate grounding system with Division 16, Electrical.
- D. For the purposes of uniformity and conformance to industry standard, provide analog signal transmission modes of electronic 4-20 ma DC. No other signal characteristics are acceptable.
- E. Fully isolate outputs for transmitted electronic signals between transmitters and receivers, equipment of different manufacturers and between control panels to conform to ISA Standard S 50. 1.

- F. Discrete signal are two-state logic signals. Use 120V ac sources on all discrete signals unless otherwise noted or shown.
- G. Surge Protection: Provide appropriately sized electrical transient protection devices for all electrical elements of the system to protect the SCADA System equipment and equipment which interfaces with the SCADA System from transient surges in power and signal wiring (from lightning and other ground potential differences). Locate and properly ground surge suppressors at: any connection between power sources and electrical equipment including panels, assemblies, and field devices; and at both ends of all analog signal circuits.

3.03. TESTING

- A. All elements of the SCADA System shall be tested to demonstrate that the total system satisfies all of the requirements of the Contract Documents
- B. As a minimum, the testing shall include shop tests, operational check-out tests, and Demonstration Tests.
- C. Each test shall be in the cause and effect format. The person conducting the test shall initiate an input (cause) and, upon the system producing the correct result (effect), the specific test requirements will have been satisfied.
- D. All tests shall be conducted in accordance with, and documented on, prior approved procedures, forms, and checklists. Each specific test to be performed shall be described and a space provided after it for signoff by the appropriate party after its satisfactory completion. Copies of these signoff test procedures, forms, and checklists will constitute the required test documentation.
- E. Provide all special testing materials and equipment. Wherever possible, perform tests using actual process variables, equipment, and data. Where it is not practical to test with real process variables, equipment, and data, provide suitable means of simulation. Define these simulation techniques in the test procedures.
- F. The Electrical Contractor shall coordinate all of their testing with DFS, the ENGINEER, all affected suppliers, and the OWNER.
- G. DFS shall reserve the right to test or retest any and all specified functions whether or not explicitly stated in the approved test procedures. DFS's decision shall be final regarding the acceptability and completeness of all testing.

END OF SECTION

DIVISION 15 MECHANICAL

SECTION 15094 PIPE HANGERS AND SUPPORTS

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish all labor, materials, equipment and incidentals and install pipe hangers, supports, concrete inserts and anchor bolts including all metallic hanging and supporting devices for supporting exposed piping.

1.02 QUALIFICATIONS

- A. Hangers and supports shall be of approved standard design where possible and shall be adequate to maintain the supported load in proper position under all operating conditions. The minimum working factor of safety for pipe supports shall be five (5) times the ultimate tensile strength of the material.

Note: Lift Stations have their own pipe support hanger and support design and detail, shown in the Utility Standards if not shown on the plans.

- B. All pipe and appurtenances connected to equipment shall be supported in such a manner as to prevent any strain being imposed on the equipment. When manufacturers have indicated requirements that piping loads shall not be transmitted to their equipment, the Contractor shall submit a certification stating that such requirements have been complied with.

1.03 SUBMITTALS

- A. Submit to the County for approval, as provided in the Contract Documents, shop drawings of all items to be furnished under this Section.
- B. Submit to the County, for approval, samples of all materials specified herein.
- C. All pipe hangers, supports, hanger rods, clamps, concrete inserts and wall brackets, etc., whether specified or not, shall be submitted (together with load calculations) to the County for approval, if requested.

PART 2 PRODUCTS

2.01 GENERAL

- A. All pipe and tubing shall be supported as required to prevent significant stresses in the pipe or tubing material, valves, and fittings and to support and secure the pipe in the intended position and alignment. All supports shall be designed to adequately secure the pipe against excessive dislocation due to thermal expansion and contraction, internal flow forces, and all probable external forces such as equipment, pipe, and personnel contact. All pipe supports shall be approved prior to installation.
- B. All materials used in manufacturing hangers and supports shall be capable of meeting the respective ASTM Standard Specifications with regard to tests and physical and chemical properties, and be in accordance with MSS SP-58.

- C. Hangers and supports shall be spaced in accordance with ANSI B31.1.0 except that the maximum unsupported span shall not exceed 10 feet unless otherwise specified herein.
- D. Unless otherwise specified herein, pipe hangers and supports shall be as manufactured by Grinnell Co., Inc., Carpenter and Patterson, Inc., or equal. Any reference to a specific figure number of a specific manufacturer is for the purpose of establishing a type and quality of product and shall not be considered as proprietary. Any item comparable in type, style, quality, design and performance will be considered for approval.

2.02 PIPE HANGERS AND SUPPORTS FOR METAL PIPE

- A. Suspended single pipes shall be supported by hangers suspended by steel rods from galvanized concrete inserts, beam clamps, or ceiling mounting bolts.

The following sizes are minimum requirements and are subject to the County's approval:

- 1. Hanger rods shall be rolled steel machine threaded with load ratings conforming to ASTM Specifications and the strength of the rod shall be based on root diameter. Hanger rods shall have the following minimum diameters:

<u>Pipe Size, Inches</u>	<u>Min. Rod Diameter, In.</u>
Less than 2-1/2	3/8
2-1/2 through 4	1/2
4	5/8
6	3/4
8-12	7/8
14-18	1
20-30	1-1/4
Above 30	See SPECIAL SUPPORTS Paragraph 2.04

- 2. Where applicable, structural attachments shall be beam clamps. Beam clamps, for rod sizes 1/2-inch through 3/4-inch shall be equal to Grinnell Fig. No. 229, and for rod sizes 7/8-inch through 1-1/4 inches shall be equal to Grinnell Fig. No. 228, or equal.
- 3. Concrete inserts for pipe hangers shall be continuous metal inserts designed to be used in ceilings, walls or floors, spot insets for individual pipe hangers, or ceiling mounting bolts for individual pipe hangers and shall be as manufactured by Unistrut Corp., Wayne, Michigan; Carpenter and Patterson, Inc., Laconia, New Hampshire; Richmond or equal and shall be as follows:
 - a. Continuous concrete inserts shall be used where applicable and/or as shown on the Drawings and shall be used for hanger rod sizes up to and including 3/4-inch diameter. Inserts to be used where supports are parallel to the main slab reinforcement shall be Series P3200 by Unistrut Corp., Fig. 1480 Type 2 by Carpenter and Patterson, Inc. or equal. Inserts to be used where supports are perpendicular to the main slab reinforcement shall be Series P3300 by Unistrut Corp., Fig. 1480 Type I by Carpenter and Patterson, Inc., or equal.
 - b. Spot concrete inserts shall be used where applicable and shall be used for hanger sizes up to and including 7/8-inch diameter. Inserts shall be Fig. 650 by Carpenter and Patterson, Inc. for hanger rod sizes 1/2-inch through and including 3/4-inch and Fig. 266 by Carpenter and Patterson, Inc., for 7/8-inch hanger rods.

- c. Ceiling mounting bolts shall be used where applicable and be for hanger rod sizes 1-inch through and including 1-1/4 inches shall be Fig. 104M as manufactured by Carpenter and Patterson, Inc. or equal.
 - d. All pipe hangers shall be capable of vertical adjustment under load and after erection. Turnbuckles, as required and where applied, shall be equal to Grinnell Fig. No. 230.
4. Wall or column supported pipes shall be supported by welded steel brackets equal to Grinnell Fig. 194, 195 and 199 as required, for pipe sizes up to and including 20-inch diameter. Additional wall bearing plates shall be provided where required.
- a. Where the pipe is located above the bracket, the pipe shall be supported by an anchor chair and U-bolt assembly supported by the bracket for pipes 4-inches and larger or by a U-bolt for pipes smaller than 4-inches. Anchor chairs shall be equal to Carpenter & Patterson Fig. 127. U-bolts shall be equal to Grinnell Fig. 120 and 137.
 - b. Where the pipe is located below the bracket, the pipes shall be supported by pipe hangers suspended by steel rods from the bracket. Hangers and steel rods shall be as specified above.
 - c. Wall or column supported pipes 2-inches and smaller may be supported by hangers equal to Carpenter and Patterson Figures 74, 179 or 237 as required.
5. Floor supported pipes 3-inches and larger in diameter shall be supported by either cast-in-place concrete supports or adjustable pipe saddle supports as directed by the County. In general, concrete supports shall be used when lateral displacement of the pipes is probable (unless lateral support is provided), and adjustable pipe saddle type supports shall be used where lateral displacement of the pipes is not probable.
- a. Each concrete support shall conform to the details shown on the Drawings. Concrete shall be poured after the pipe is in place with temporary supports. Top edges and vertical corners of each concrete support shall have 1-inch bevels. Each pipe shall be secured on each concrete support by a wrought iron or steel anchor strap anchored to the concrete with cast-in-place bolts or with expansion bolts. Where directed by the County, vertical reinforcement bars shall be grouted into drilled holes in the concrete floor to prevent overturning or lateral displacement of the concrete support. Unless otherwise approved by the County, maximum support height shall be five (5) feet.
 - b. Concrete piers used to support base elbows and tees shall be similar to that specified above. Piers may be square or rectangular.
 - c. Each adjustable pipe saddle support shall be screwed or welded to the corresponding size 150 lb. companion flanges or slip-on welding flanges respectively. Supporting pipe shall be of Schedule 40 steel pipe construction. Each flange shall be secured to the concrete floor by a minimum of two (2) expansion bolts per flange. Adjustable saddle supports shall be equal to Grinnell Fig. No. 264. Where used under base fittings, a suitable flange shall be substituted for the saddle.
 - d. Floor supported pipes less than 3-inches shall be supported by fabricated steel supports.
6. Vertical piping shall be supported as follows:
- a. Where pipes change from horizontal to vertical, the pipes shall be supported on the horizontal runs within two feet of the change in direction by pipe supports as previously specified herein.
 - b. For vertical runs exceeding 15 feet, pipes shall be supported by approved

- pipe collars, clamps, brackets, or wall rests at all points required to insure a rigid installation.
- c. Where vertical piping passes through a steel floor sleeve, the pipe shall be supported by a friction type pipe clamp which is supported by the pipe sleeve. Pipe clamps shall be equal to Grinnell Fig. 262.
 7. Anchor bolts shall be equal to Kwik-Bolt as manufactured by Hilti Fastening Systems, Tulsa, Oklahoma or Wej-it manufactured by Wej-it Expansion Products, Inc., Bloomfield, Colorado.
 8. All rods, hangers, inserts, brackets, and components shall be furnished with galvanized finish.

2.03 PIPE HANGERS AND SUPPORTS FOR PLASTIC PIPE

- A. Single plastic pipes shall be supported by pipe supports as previously specified herein.
- B. Multiple, suspended, horizontal plastic pipe runs, where possible, and rubber hose shall be supported by ladder type cable trays such as the Electray Ladder by Husky-Burndy, the Globetray by the Metal Products Division of United States Gypsum, or equal. Ladder shall be of mild steel construction. Rung spacing shall be approximately 18 inches for plastic pipe and 12 inches for rubber hose. Tray width shall be approximately 6-inch for single runs of rubber hose and 12 inches for double runs of rubber hose. Ladder type cable trays shall be furnished complete with all hanger rods, rod couplings, concrete inserts, hanger clips, etc. required for a complete support system. Individual plastic pipes shall be secured to the rungs of the cable tray by strap clamps or fasteners equal to Globe Model M-CAC, Husky-Burndy Model SCR or equal. Spacing between clamps shall not exceed 9 feet. The cable trays shall provide continuous support along the length of the pipe.
- C. Individual clamps, hangers, and supports in contact plastic pipe shall provide firm support, but not so firm as to prevent longitudinal movement due to thermal expansion and contraction.

2.04 SPECIAL SUPPORTS

- A. The pipes shall be supported by means of a supporting framework suitably anchored into the floor or curbing. The vertical piping shall be suitably secured to horizontal support members connected at each end to vertical support members and spaced as required to provide a rigid installation.
 1. The complete supporting system shall be as manufactured by the Unistrut Corporation, Globe-Strut as manufactured by the Metal Products Division of U.S. Gypsum, or equal.
 2. Vertical and horizontal supporting members shall be U-shaped channels similar to Unistrut Series P1000. Vertical piping shall be secured to the horizontal members by pipe clamps or pipe straps equal to Unistrut Series P1100M and Series P2558. All components shall be of mild steel.
 3. The assemblies shall be furnished complete with all nuts, bolts, and fittings required for a complete assembly.
 4. The design of each individual framing system shall be the responsibility of the Contractor. Shop drawings shall be submitted and shall show all details of the installation including dimensions and types of supports.
- B. Any required pipe supports for which the supports specified in the Section are not applicable, including pipe supports for above 30-inch pipe, shall be fabricated or

constructed from standard aluminum shapes in accordance with Specifications, concrete and anchor hardware similar to items previous specified herein and shall meet the minimum requirements listed below and be submitted to the approval of the County.

1. Pipe support systems shall meet all requirements of this Section and all related Sections of this Specification.
 2. Complete design details of the entire pipe support systems shall be provided by the Contractor, for approval by the County.
 3. The pipe support system shall not impose loads on the supporting structures, in excess of the loads for which the supporting structure is designed.
 4. Hanger rods for above 30-inch pipe shall be a minimum of 1-1/2 inch diameter and shall not exceed the manufacturer's standard maximum recommended safe load.
- C. Pipe supports in lift stations shall be as shown in the Utility Standards details.

PART 3 EXECUTION

3.01 INSTALLATION

- A. All pipes, horizontal and vertical, shall be rigidly supported from the building structure by approved supports. Supports shall be provided at changes in direction and elsewhere as shown in the Drawings or specified herein. No piping shall be supported from other piping or from metal stairs, ladders, and walkways, unless it is so indicated on the Drawings, or specifically directed or authorized by the County.
- B. All pipe supports shall be designed with liberal strength and stiffness to support the respective pipes under the maximum combination of peak loading conditions to include pipe weight, liquid weight, liquid movement, and pressure forces, thermal expansion and contraction, vibrations, and all probable externally applied forces. Prior to installation, all pipe supports shall be approved by the County.
- C. Pipe supports shall be provided to minimize lateral forces through valves, both sides of split type couplings, and sleeve type couplings and to minimize all pipe forces to pump housings. Pump housings shall not be utilized to support connecting pipes.
- D. Pipe supports shall be provided as follows:
1. Cast iron and ductile iron shall be supported at a maximum support spacing of 10 feet-0-inches with a minimum of one support per pipe section at the joints.
 2. Supports for multiple PVC pipes shall be continuous wherever possible. Individually supported PVC pipes shall be supported as recommended by the manufacturer except that support spacing shall not exceed five (5) feet.
 3. Support spacing for galvanized steel pipe and copper tubing shall not exceed five (5) feet.
 4. All vertical pipes shall be supported at each floor or at intervals of at least 15 feet by approved pipe collars, clamps, brackets, or wall rests and at all points necessary to insure rigid construction.
- E. Pipe supports shall not result in point loadings, but shall distribute pipe loads evenly along the pipe circumference.
- F. Effects of thermal expansion and contraction of the pipe shall be accounted for in pipe support selection and installation.

- G. Inserts for pipe hangers and supports shall be installed on forms before concrete is poured. Before setting these items, all drawings and figures shall be checked which have a direct bearing on the pipe locations. Responsibility for the proper location of pipe supports is included under this Section.
- H. Continuous metal inserts shall be embedded flush with the concrete surface.

3.02 PRIME COATING

- A. Prior to prime coating, all pipe hangers and supports shall be thoroughly clean, dry, and free from all mill-scale, rust, grease, dirt, paint, and other foreign substances to the satisfaction of the County.
- B. All submerged pipe supports shall be prime coated per Section 09900.
- C. Finish coating shall be compatible with the prime coating used and shall be applied as specified in the Contract Documents.

END OF SECTION

SECTION 15500 AIR CONDITIONING SYSTEM

PART 1 GENERAL

1.01 SCOPE

Furnish and install a complete air conditioning system for climate control. The system shall be a two and four (2 and 4) ton high efficient air conditioning unit manufactured by Carrier, York or approved equal, with a minimum SEER rating of 12. The system shall include all necessary components to insure a complete operable system. The major components shall include inside fan coils, outside condensing units, refrigerant piping, condensate lines, thermostats, electrical power and wiring.

1.02 CODES AND STANDARDS

All work performed under this specification shall conform to the requirements of the latest edition of the following codes and standards as modified by local ordinances:

NFPA Compliance: Comply with applicable provisions of ANSI/NFPA 70 National Electric Code. Also conform to Pamphlet 90A of NFPA.

AMCA Standards: Comply with Air Movement and Control Association (AMCA) standards as applicable for testing and rating fans, and testing louvers, dampers and shutters.

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) Handbook.

ARI Certification: Provide central station packaged air handling units which comply with Air-Conditioning and Refrigeration Institute (ARI) Standard 430 and display ARI's certification symbols.

UL Compliance: Provide electric components for air handling units which have been listed and labeled by Underwriters Laboratories.

Construction shall comply with ANSI B9.1 safety code.

Standard Building Code.

Standard Mechanical Code.

National Warm Air Heating and Air Conditioning Association - Manual 4.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver all components in factory-fabricated protective containers.
- B. Handle all components carefully to avoid damage to components, enclosures and finish. Do not install damaged components; replace and return damaged components to manufacturer.
- C. Store all components in clean dry place and protect from weather and construction traffic.

1.04 SUBMITTALS

- A. Thoroughly coordinated shop drawings shall be submitted for approval.
 - 1. Provide submittal data for major component, air distribution devices, installation materials and piping.
 - 2. Submit for approval complete power and control field wiring diagrams.
- B. Warranty for the equipment under this Section.

1.05 OPERATING AND MAINTENANCE MANUALS

- A. When the installation is completed, submit to the County, one copy of the following, bound in a hard cover booklet:
 - 2. General operating instructions, including copies of posted specific instructions and automatic control diagrams.
 - 3. Maintenance instructions, followed by tabulated manufacturer's descriptive literature, shop drawings, performance curves and rating data, spare parts lists and manufacturer's maintenance manuals.
 - 4. Names, addresses and telephone numbers of local service representatives of the manufacturer's of the installed equipment.

PART 2 PRODUCTS

2.01 OUTSIDE CONDENSING UNIT

- A. Provide factory assembled self-contained, air cooled condensing unit, complete with compressor section, integral condenser, all necessary controls and interconnecting refrigerant piping. Furnish manufacturer's five (5) year parts and labor warranty for motor compressor.
- B. All components shall be protected against corrosion and shall be mounted in a steel casing of a minimum of 14-gauge panels with steel angle framing and adequate access panels for inspection and maintenance.
- C. Provide all piping, valves, and fittings required to properly interconnect all system components.
- D. Tubing for coils shall be copper and fins shall be aluminum. Water-based and water-reducible synthetic flexible polymer coating shall be provided for evaporator and condenser coils. Approved manufacturer shall be Luvata Insitu or approved equal.

2.02 INSIDE FAN COILS

- A. Cabinet shall be Enameled steel with removable panels shall provide access to the interior of the unit.
- B. Fan wheel shall be forward curved type, non-overloading, and keyed to the shaft. Fan wheel shall be dynamically and statically balanced at factory.
- C. V-belt driven fan shall be designed for 50 percent overload capacity.
- D. Bearings shall be designed for a minimum of 200,000 hours average life.
- E. Refrigerant Coil shall be copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.

2.04 TEMPERATURE CONTROLS

Furnish and install a heavy duty corrosion resistant wall mounted thermostat. Use Carrier thermostat control or equal.

PART 3 TESTING AND BALANCING

- A. The Contractor shall test and balance the air conditioning system.
- B. The term air conditioning system shall be understood and intended to mean all air conditioning supply systems, and all associated equipment and accessories.

PART 4 EXECUTION

4.01 GENERAL

- A. Install the air conditioning system where indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices, to ensure that units comply with requirements and serve intended purposes.
- B. Coordinate with other work.
- C. Install fan coils and condensers per manufacture's recommendations.

4.02 INSTALLATION

- A. All major components shall be rigidly and strongly supported with suitable braces, tees, or angles to keep them true to shape and prevent buckling.

END OF SECTION

DIVISION 16 ELECTRICAL

SECTION 16050 ELECTRICAL - GENERAL PROVISIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish all labor, materials, devices, equipment, appurtenances, and incidentals required for a complete electrical system as hereinafter specified and/or shown on the Contract Drawings. This work may necessarily include interfacing with and/or completely installing devices and/or equipment furnished under other sections of these Specifications.
- B. It is the intent of these Specifications that the electrical system be suitable in every way for the service required. All materials and all work/labor which may be reasonably implied as being incidental to the requirements of this Section shall be furnished at no additional cost to the County.
- C. All power interruptions to existing equipment shall be at the County's convenience. Each interruption shall have prior approval. Request(s) for power interruption(s) shall be made at least forty-eight (48) hours in advance.
- D. The work shall include complete testing of all electrical components, including wiring.
- E. All workmanship shall be of the highest quality. Substandard work will be rejected and it shall be replaced entirely at the Contractor's expense with no cost to the County.
- F. It shall be the responsibility of each bidder or his authorized representative to physically visit the job site in order that he may be personally acquainted with the area(s), buildings and/or structures intended for use in the installation/construction under this Specification. The submittal of a proposal/bid by a bidder shall be considered evidence that he has complied with this requirement and accepts all responsibility for a complete knowledge of all factors governing his work. Therefore, failure to comply with this requirement of the Specifications will NOT be grounds for the successful bidder (Contractor) to request approval of change orders and/or additional monetary compensation.
- G. The CONTRACTOR shall be responsible for:
 - 1. Disconnecting all conduit, conductors, and ancillary items.
 - 2. Connecting the new equipment per the contract documents
 - 3. Testing the equipment and electrical system as described in these specifications.

1.02 TEMPORARY ELECTRICAL SERVICE

- A. The Contractor shall make the requisite arrangements for securing temporary electrical power for his use in accordance with Section 01510 of these Specifications.

1.03 CODES, INSPECTIONS AND FEES

- A. All materials and installations shall be in accordance with the National Electrical Code (latest edition) and the latest editions of all applicable national, state, county and local codes.
- B. To the extent that any item is routinely tested and rated by the Underwriter's Laboratories, Inc., that item shall bear the U.L. label. Additionally, all items shall be manufactured to the applicable NEMA standards.
- C. The Contractor shall make the necessary arrangements for obtaining all requisite permits and inspections and pay any applicable fees.

1.04 TESTS

- A. The Contractor shall test all items individually and as a system for proper operation.
- B. The Contractor shall, at his expense, make all the requisite repairs, adjustments and/or alterations to correct any shortcomings found as a result of the tests performed under Item 1.04.A above.
- C. A representative of the County shall be present during all testing. The County shall be notified at least two (2) days prior to any testing.

1.05 SLEEVES AND FORMS FOR OPENINGS

- A. Provide and place all sleeves for conduits penetrating floors, walls, partitions, etc. Locate all necessary slots for electrical work and form before concrete is poured.

1.06 CUTTING AND PATCHING

- A. All cutting and patching shall be done in a thoroughly workmanlike manner - i.e., care shall be taken when cutting not to damage or mar surrounding areas, and when patching to match the original finish as closely as possible while providing a watertight seal. Refer to Item 1.01.E above.

1.07 INTERPRETATION OF DRAWINGS

- A. The layouts and arrangements as shown on the Contract Drawings are indicative of the physical arrangements desired; however, they are not intended to restrict the Contractor's freedom to accommodate the exact conditions as found in the field. Any deviations from the arrangements shown must be approved by the County prior to the final placement of the item(s) in question.
- B. The Contract Drawings are not intended to show exact locations of conduit runs.
- C. Circuit and conduit layouts shown are not intended to indicate the exact installation details. The Contractor shall furnish and install all requisite items, including all fittings, junction boxes, etc., to insure that the electrical system operates in conformance with the Specifications and the specific requirements of an individual piece of equipment.
- D. Where circuits are shown as "home-runs", all necessary fittings and boxes shall be provided for a complete conduit installation.

- E. All three-phase circuits shall be run in separate conduits unless otherwise shown on the Contract Drawings.
- F. Surface mounted items such as panelboards, junction boxes, conduit, etc., shall be supported by spacers to provide a clearance between the equipment and the mounting surface.
- G. The County shall make the final decision in determining the exact location(s) and mounting height(s) of any item(s) or piece(s) of equipment in question.
- H. All connections to equipment shall be made in accordance with the approved shop and manufacturer's drawings, regardless of the number of conductors shown on the Contract Bid Drawings.
- I. The Contractor shall coordinate the work of the different trades in order to prevent interferences between conduit(s), piping and other non-electrical equipment. In case any interference develops, an authorized representative of the County shall decide which equipment, conduit(s) or piping must be relocated, regardless of which was installed first. Any such interferences shall be remedied solely at the Contractor's expense without any additional cost to the County.

1.08 EQUIPMENT SIZING AND HANDLING

- A. The Contractor shall thoroughly check all entryways, doors, hallways, stairways, buildings and structures through which equipment must be transported to reach its final location.
- B. If necessary for safe passage of the equipment, the manufacturer shall be required to ship his material in sections sized to pass through the restricted areas. This requirement holds even if such equipment sizing differs from the manufacturer's standard shipping section.
- C. To the extent possible, the equipment shall be kept upright at all times. If equipment has to be tilted for ease of passage through restricted areas, the manufacturer shall provide specific handling instructions as well as any requisite bracing in order to assure both the functional integrity of the equipment and the validity of the equipment warranty.

1.09 SUBMITTALS

- A. As specified under Section 01340 of these Specifications, the Contractor shall submit shop drawings and/or manufacturer's cut sheets for approval of all materials, equipment, devices, apparatus, and other items as required by the County.
 - 1. Prior to submittal by the Contractor, all shop drawings shall be checked for accuracy and Contract requirements. Shop drawings shall bear the date checked and shall be accompanied by a statement that the shop drawings have been examined for conformity to the Specifications and Contract Drawings. This statement shall also list all discrepancies with the Specifications and Contract Drawings. Shop drawings not so checked and noted shall be returned unchecked by the County.
 - 2. The County's check shall be only for conformance with the design concept of the Project and compliance with the Specifications and Contract Drawings. The responsibility for, or the necessity of, furnishing materials and workmanship required by the Specifications and Contract Drawings which may not be indicated on the shop drawings is included under the work of this Section.

3. No material shall be ordered, no equipment manufacturing shall be started, nor shall any shop work/fabrication commence until the County has approved the shop drawings. Any deviation from this requirement of the Specifications shall be entirely at the risk and expense of the Contractor without any additional cost to the County.

B. Record Drawings: As the work progresses, the Contractor shall legibly record all field changes on a set of Contract Drawings. When the project is completed, the Contractor shall furnish the County with a complete set of reproducible "as-built" drawings.

1.10 MANUFACTURER'S SERVICES

A. The Contractor shall arrange for an authorized manufacturer's representative who shall be an experienced field service engineer to be present for the inspection, installation, testing, calibration, adjusting and start-up of any item(s) or piece(s) of equipment as deemed necessary by the County.

B. In addition to the duties of Item 1.11.A above, the manufacturer's representative shall also instruct the County's personnel in the proper operation and maintenance of the item(s) in question.

1.11 MATERIALS

A. All materials used shall be new, unused and as hereinafter specified. Where not specifically called out, all materials shall be of the very best quality of their respective kinds. Unless specifically otherwise approved in writing by the County, only material manufactured in the United States shall be used!

B. Where applicable, all materials and equipment shall conform with the requirements of Item 1.03.B above.

C. Electrical equipment shall at all times during construction be adequately protected against both mechanical injury and damage by water. Electrical equipment shall be stored indoors in dry shelters. Any damaged equipment shall be replaced by the Contractor at his own expense.

D. All items shall be manufactured from the materials specified - substitute materials will NOT be acceptable.

E. Only the specified manufacturer's equipment shall be used unless an "or approved equal" is noted. The County shall be the sole determiner of what constitutes an "approved equal".

1.12 GUARANTEES AND WARRANTIES

A. All items furnished under the Electrical Specifications shall be guaranteed and/or warranted, in writing, against defects in materials, construction and workmanship as specified under Section 01740 of these Specifications.

END OF SECTION

SECTION 16108 MISCELLANEOUS EQUIPMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install all miscellaneous equipment as hereinafter specified and/or shown on the Drawings.

A. Installation shall be in the locations described herein and/or shown on the Drawings and/or where directed by the County's authorized personnel.

PART 2 PRODUCTS

2.01 MATERIALS

A. CIRCUIT BREAKERS

1. The circuit breakers shall be the molded case bolt-on type, shall have a single pole, shall be rated as required and shall have an interrupting rating of 10,000-amperes.
2. To match existing equipment, the circuit breakers shall be the Square "D" Catalog No. Q0BXXX with "VISI-TRIP" indicator for use on a Square "D" NQOD panelboard, NO SUBSTITUTIONS!

B. SAFETY SWITCHES

1. The safety switches shall be the visible blade, non-fusible, heavy duty type, shall have a quick-make, quick-break, single throw operating mechanism, and shall have both a dual cover interlock and a color coded indicator handle.
2. The safety switches shall have three (3) poles, shall be rated 30-amperes at 600 VAC, shall have all current carrying parts made of copper, and shall be furnished in a NEMA 4X stainless steel rainproof enclosure
3. The safety switches shall have 1-inch bolt-on hubs, a solid neutral assembly, and a copper ground kit.
4. In addition to being UL listed under files E2875 and 154828, the safety switches shall comply with the following standards:
 - a. UL 98, Enclosed and Dead Front Switches.
 - b. NEMA KS1, Enclosed Switches.
 - c. Federal Spec WS-865c for Type "HD".
5. To match existing equipment, the safety switches shall be the Class 3110 Heavy Duty Safety Switch, Square "D" Catalog No. HU36SS, NO SUBSTITUTIONS!

C. FLOW METER

1. Meter shall be a velocity sensing electromagnetic type flanged tube meter with sealed housing for 150 PSI working pressure. The meter shall be a 16 inch McCrometer Ultra Mag™ MODEL UM06 with a digital indicator having a range of 0 to 10,000 and shall be equipped with a 9 digit digital totalizer reading in units of GPM and shall be accurate within 0.5% of actual flow. The meter assembly shall operate within a range of 0.2 FPS to 32 FPS and be constructed as follows:
2. Meter tube (sensor) shall be fabricated stainless steel pipe and use 150 lb. AWWA Class "D" flat face steel flanges. The internal and external of the meter tube shall be blasted and lined with a NSF approved fusion bonded epoxy UltraLiner™, applied by

the fluidized bed method. Meter tubes shall have a constant nominal inside diameter offering no obstruction to the flow. Electrodes shall be 316 stainless steel.

3. Mag shield shall be welded to the tube providing a completely sealed environment for all coils, electrode connections and wiring harness capable of NEMA 6P/IP68 operation.
4. Signal converter shall be pulsed DC coil excitation type with auto zeroing. The converter shall indicate direction of flow and provide a flow rate indication and a totalization of flow volume for both forward and reverse directions. Both forward and reverse totalizers shall be electronically resettable. The flow meter converter shall be microprocessor based with a keypad for instrument set up and LCD displays for totalized flow, flow rate engineering units and velocity. The converter shall power the flow sensing element and provide galvanically isolated dual 4-20mA outputs. It shall be possible, in the test mode, to easily set the converter outputs to any desired value within the range. The 4-20mA scaling, time constants, pipe size, flow proportional output, engineering units and test mode values shall be easily set via the keypad and display. Four separate fully programmable alarm outputs shall be provided to indicate empty pipe, forward/reverse polarity (normally open/close), analog over-range, fault conditions, high/low flow rates, percent of range and pulse cutoff. The converter shall periodically perform self-diagnostics and display and resulting error messages. All set up and data and totalizer values may be protected by a password. The converter shall be integrally mounted or remotely mounted up to 500 feet from the sensor, and shall be supplied in a sealed IP67 rated enclosure. Calibration will be completed at the manufacturer's location in accordance with customer supplied application-based requirements.
5. Grounding rings shall be 316 stainless steel and shall be supplied with the meter tube. For best performance grounding rings must be used.
6. Power and signal isolation: The power supplied between the converter and the meter tube (sensor) and signal between the meter tube and the converter shall be isolated and placed in separate submersible cables.
7. Service & Support: Supplier must have flow calibration laboratories and personnel to perform testing and certify calibration. Personnel must also provide instruction or training as required assuring meters are supported and maintained throughout the guarantee period.
8. Volumetric testing of all meters must be performed and approved prior to shipment. The complete meter assembly and signal converter must be wet accuracy tested and calibrated. The test facility must be rigorously traceable to an accuracy of $\pm 0.15\%$ with the National Institute of Standards and Technology. If desired, the test shall be witnessed by the customer or their selected agent. A copy of the certified accuracy test record must be furnished at no charge to the customer.
9. One manufacturer shall make all meter sizes and styles required for this contract. The meters shall be manufactured and tested in the U.S.A.
10. The Power Supply shall be 100-240VAC/45-66 Hz (20W/25VA).
11. The unit shall be provided with Dual 4-20mA Outputs, galvanically isolated and fully programmable for zero and full scale (0-22mA).

D. WET WELL LEVEL TRANSMITTER

1. Level transmitter shall bubbler type with transmitter capable of 4-20mA via 2 wire 24V DC output.

2. Level transmitter shall be TBU 360 as manufactured by Data Flow Systems (DFS).
3. Level transmitter shall be provided in NEMA 4X stainless steel enclosure (size as required by DFS). Enclosure shall be provided with all required surge protection devices (for both 120V AC power and 4-20mA signal), all valves/piping and all ancillary equipment as required.

E. VARIABLE FREQUENCY DRIVES (VFD's)

1. Contractor shall provide 480V VFD's suitable for use on 85 Horsepower submersible pump motors.
2. VFD shall be provided in NEMA 1 enclosure. Enclosure shall be ventilated to an extent that assures proper heat dissipation.
3. Provide integral main disconnect with branch circuit protection, including a padlockable through-the-door operator handle mechanically interlocked with the enclosure door.
4. Provide 5% AC line reactor.
 6. Provide a DC link reactor.
 7. Provide a control power transformer with primary & secondary fusing.
 8. Provide a door mounted drive keypad with backlit LCD and LED displays for drive set-up, troubleshooting, local operation control, maintenance indication, and operational indication.
 9. Provide 0-10Vdc or 4-20mA customer supplied analog input for remote speed reference.
 10. Provide programmable 0-10Vdc or 4-20mA analog output for indication.
 11. Provide for a Common Run Input.
 12. Provide for an Enable/Safety Interlock Input.
 13. Provide Drive Run and Fault Status Outputs.
 14. Provide 3 Contactor Soft Start Bypass configuration including drive isolation contactors as well as drive output and bypass contactors.
 15. Provide mechanically and electrically interlocked drive output and bypass contactors.
 16. Provide overload relay for motor thermal protection in bypass mode.
 17. Provide door mounted operator controls and indication for "Power On", "Bypass Run" and "Motor Overload" (during bypass mode).
 18. Provide Bypass Run Status Output.
 19. Provide appropriately sized choke for each VFD.
 20. VFD's shall be manufactured by FUJI, model # FRN100G1S-4U rated at 112A for heavy duty service.

F. INGROUND PULL BOX

1. Inground pull boxes shall be AASHTO H-20 rated, 24" wide x 36" long x 30" deep (subject to contractor field investigations).
2. Provide H-20 traffic-rated lid. Provide recessed identification marking of "ELECTRIC" permanently indented in the cover. Lid shall be provided with non-skid surface.
 3. Provide stainless steel bolts and associated hardware. Bolts shall be a minimum of 5/8".
 4. Provide a minimum of 6 feet of slack conductor or cable in each pull box..
 5. Install each pull box with a bed of pea rock gravel (6" minimum depth, 3" minimum exterior of pull box) inside the bottom of the pull box.
 6. **SPLICING OF CONDUCTORS OR CABLES SHALL NO BE PERMITTED IN INGROUND PUL BOXES.**

PART 3 EXECUTION

(NOT USED)

END OF SECTION

SECTION 16110 CONDUITS AND FITTINGS

PART 1 GENERAL

1.01 SCOPE OF WORK

Furnish and install the conduits, fittings, devices and appurtenances as hereinafter specified and/or as shown on the Contract Drawings.

1.02 SUBMITTALS

The requirements of Section 01340 and Section 16050 shall be met.

1.03 APPLICATIONS

- A. Except where otherwise shown on the Contract Drawings, or hereinafter specified, all wiring shall be run in rigid conduits.
- D. Schedule 80 PVC conduits shall be used for all underground, under-slab, in-slab and within the electrical building except where otherwise shown on the Contract Drawings.
- E. Schedule 80 PVC conduits shall be used in highly corrosive areas such as the wet well area.
- F. All conduits of a given type shall be the product of one manufacturer.
- G. Except where otherwise shown on the Contract Drawings, or hereinafter specified, all boxes shall be metal.
- H. Flush mounted switch, receptacle and control station boxes shall be pressed steel unless noted otherwise.
- I. Surface mounted switch, receptacle and control station boxes shall be cast or malleable iron.
- J. Devices designated as NEMA Type 4X shall be 316 stainless steel, gasketed.
- K. Combination expansion-deflection fittings shall be used where conduits cross structural expansion joints.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Rigid Conduit
 - 1. Rigid PVC conduit shall be Carlon Plus 80 rigid PVC non-metallic conduit (extra heavy wall EPC-80) as manufactured by Carlon, or approved equal.
- B. Liquidtight, Flexible Conduit
 - 1. Liquidtight, flexible metal conduits shall be Sealtite, Type UA, as manufactured by Anaconda, American Flexible Conduit Co., Inc., or approved equal.
 - 2. Liquidtight, flexible non-metallic conduits shall be Carflex Liquidtight Flexible Non-Metallic Conduit as manufactured by Carlon, or approved equal.

- C. Rigid Conduit Fittings
 - 1. Rigid Non-Metallic Conduit Fittings: PVC elbows, bends, sweeps, nipples, couplings, device boxes, etc., shall be Plus 80 fittings as manufactured by Carlon, or approved equal.
- D. Flexible Conduit Fittings
 - 1. Flexible Metal Conduit Fittings: Fittings used with flexible metal conduit shall be of the screw-in type as manufactured by Thomas and Betts Company, or approved equal.
 - 2. Flexible Non-Metallic Conduit Fittings: Fittings used with flexible non-metallic conduit shall be Carflex Liquidtight Non-metallic Fittings as manufactured by Carlon, or approved equal.
- E. Flexible Couplings: Flexible couplings shall be as manufactured by Crouse-Hinds, Appleton Electric Company, or approved equal.
- F. Wall Seals: Conduit wall seals shall be type "WSK" as manufactured by the O.Z. Electrical Manufacturing Company, or approved equal.
- G. Expansion Fittings: Combination expansion-deflection fittings shall be type "XD" as manufactured by Crouse-Hinds, or approved equal.
- H. Boxes
 - 1. Device Boxes
 - a. Flush mounted wall device boxes shall be galvanized pressed steel as manufactured by the Raco Manufacturing Company, or approved equal.
 - b. Surfaced mounted wall device boxes shall be cast or malleable iron as manufactured by Crouse-Hinds, Appleton Electric Company, or approved equal.
 - c. Flush mounted in-floor device boxes shall be cast metal, shall be watertight, shall have adjustable cover frames, and shall be as manufactured by Russell & Stoll Company, Steel City Electric, or approved equal.
 - 2. Other Boxes
 - a. Terminal boxes, junction boxes, pull boxes, etc., except as otherwise specified and/or shown on the Contract Drawings, shall be hot-dipped galvanized steel.
 - b. The boxes shall have continuously welded seams which shall be ground smooth prior to being galvanized.
 - c. The box bodies shall be flanged, shall be not less than 14-gauge metal, and shall not have holes or knockouts.
 - d. The box covers shall be not less than 12-gauge metal, shall be gasketed, and shall be fastened to the box bodies with stainless steel screws.
 - e. The boxes shall be as manufactured by Hoffman Engineering Company, or approved equal.
- I. Conduit Mounting Devices: Hangers, rods, channel, backplates, clips, straps, beam clamps, etc., shall be hot-dipped galvanized iron or steel as manufactured by Appleton Electric Company, Thomas and Betts Company, Unistrut Corp., or approved equal.
- J. Fixture Support System

1. The fixture support system shall be the channel type and shall be furnished complete with all requisite mounting hardware and appurtenances.
2. The channel, mounting hardware and related appurtenances shall be 316 stainless steel.
3. The fixture support system shall be as manufactured by the Unistrut Corp., or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. No conduit smaller than 3/4-inch electrical trade size shall be used nor shall either 1-1/4-inch conduit or 3-1/2-inch conduit be used. Minimum size underground, under slab or in-slab shall be 1-inch.
- B. No wires shall be pulled until the individual conduit runs are complete in all details. Additionally, each conduit shall be cleaned and reamed and certified clear of all burrs and obstructions before any wire is pulled.
- C. The ends of all conduits shall be tightly capped to exclude dust and moisture during construction.
- D. For all galvanized steel conduits, the field-cut threads shall be thoroughly cleaned and coated with a cold galvanizing compound which contains 95% pure zinc metal. The galvanizing compound shall be as manufactured by ZRC Products Company, or approved equal. This treatment shall also be used on any nipples, elbows, etc., that are not supplied with galvanized threads.
- E. Conduits shall be supported at intervals of 8-feet or less, as required to obtain a rigid installation.
- F. Exposed conduits shall be run parallel with and/or perpendicular to the surrounding surface(s). No diagonal runs will be allowed.
- G. Single conduits shall be supported by one-hole pipe clamps in combination with one-screw backplates to provide space between the conduits and the mounting surface.
- H. Multiple horizontal runs of conduits shall be supported by trapeze type hangers (channel) suspended by threaded rod, 3/8-inch minimum diameter.
- I. Multiple vertical runs of conduits shall be supported by structurally mounted channel in combination with conduit clamps.
- J. Conduit support devices shall be attached to structural steel by welding or beam or channel clamps as indicated on the Contract Drawings.
- K. Conduit support devices shall be attached to concrete surfaces by "spot type" concrete inserts.
- L. Conduits terminating in pressed steel boxes shall have double locknuts and insulated bushings.
- M. Conduits terminating in gasketed enclosures shall be terminated with conduit hubs.
- N. Conduit wall seals, waterproof type, shall be used at all locations where conduits penetrate

walls.

- O. Liquidtight, flexible conduit - metal or non-metallic as shown on the Contract Drawings - shall be used for all motor terminations and for all connections/terminations where vibration is anticipated.
- P. Flexible couplings shall be used in hazardous locations for all motor terminations and for all connections/terminations where vibration is anticipated.
- Q. Conduit stubouts for future construction shall be capped at both ends with threaded PVC conduit caps.
- R. The cement used for PVC conduit installations shall be as manufactured by Carlon, or approved equal.
- S. Galvanized steel conduits entering manholes and/or below grade pull boxes shall be terminated with grounding type bushings which shall be connected to a 5/8-inch by 10-foot long driven ground rod with No. 6 AWG bare copper wire.
- T. Galvanized rigid steel conduit shall be used for all risers. The underground portion of the riser and a 12-inch section of the riser immediately above the ground or slab/floor level shall be painted with a bitumastic coating.
- U. The use of electrical metallic tubing shall be restricted to low voltage applications (600V or less) in non-process areas where specifically approved by the County on a "per installation" basis - e.g., above suspended ceilings in office areas.
- W. Conduit bodies shall be allowed to facilitate conduit installation as deemed necessary. All conduit bodies used shall be sized to accommodate the manufacturer's listed bending radius for TC Control cable, instrumentation cable or other conductors.

3.02 GUARANTEES AND WARRANTIES

The Contractor shall guarantee and warrant all materials and labor provided under this Section in accordance with Section 01740 and Section 16050 of these Specifications.

END OF SECTION

SECTION 16120 WIRES AND CABLES

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install all wires, cables and appurtenances as described hereinafter and/or as shown on the Contract Drawings.

1.02 SUBMITTALS

- A. The requirements of Section 01340 and Section 16050 shall be met.
- B. Samples of the actual wires and cables proposed for use shall be submitted for approval. There shall be a sample for each size and type of wire and cable proposed for use. The samples shall be of sufficient length to show the maximum rated voltage, insulation type and class, conductor size, the manufacturer's name, trademark or identifying logo, and the U.L. listing number.
- C. The wires and cables as approved for use shall be compared with the wires and cables actually installed. If any unapproved wires and cables are installed, they shall be removed and replaced solely at the Contractor's expense with no additional cost to the County.

1.03 APPLICATIONS

- A. The wire for lighting and receptacle circuits shall be type THHN/THWN, stranded.
- B. The wire for all power circuits and motor leads shall be type THHN/THWN, stranded.
- C. Single conductor wires for control, indication and metering shall be type THHN/THWN, No. 14 AWG, stranded.
- D. Multiconductor control cable shall be No. 14 AWG, stranded.
- E. The wire for process instrumentation shall be No. 16 AWG, stranded.

1.04 MINIMUM SIZES

- a. Except for control and signal leads, no conductor smaller than No. 12 AWG shall be used.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Wire and cables shall be made of annealed, 98% conductivity, soft drawn copper conductors.
- B. All conductors shall be stranded except that the uninsulated copper grounding conductors shall be solid. However, the Contractor may, at his option, install solid conductors for the lighting and receptacle circuits.

2.02 600 VOLT WIRE AND CABLE

- A. Type THHN/THWN insulation shall be used for all 600 Volt wires and cables. The insulation shall be a flame-retardant, heat-resistant thermoplastic, and shall have a nylon, or equivalent, jacket.
- B. The 600 Volt wires and cables shall be as manufactured by Anixter, Rome Cable, Southwire, or approved equal.

2.03 INSTRUMENTATION AND CONTROL WIRING

- A. Process instrumentation wiring shall be No. 16 AWG stranded twisted pair, 600 Volt, cross-linked polyethylene insulated, aluminum tape shielded, PVC jacketed. Multiconductor cables with individually twisted pairs shall be installed where shown on the Contract Drawings.
- B. Multiconductor control cables shall be Type TC Control Cable, No. 14 AWG copper, stranded, 600 Volt, THWN insulated, PVC jacketed, U. L. listed for direct burial.
- C. Instrumentation wiring shall be as manufactured by Belden catalog #8719.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Wires and cables shall be sized as shown on the Contract Drawings and/or, where applicable, sized to match existing wiring.
- B. All conductors shall be carefully handled to avoid kinks or damage to the insulation.
- C. Lubricants or pulling compounds shall be used to facilitate wire pulling. Such lubricants/compounds shall be U.L. listed for use with the insulation specified.
- D. Use pulling means - fish-tape, cable, rope, basket weave wire/cable grips, etc. - which will not damage the wire/cable insulation or the raceway.
- E. Shielded instrumentation wire shall be installed from terminal to terminal with no splicing at any intermediate point.
- F. Shielded instrumentation wire shall be installed in rigid steel conduit and pull boxes that contain only instrumentation cables. Instrumentation cables shall be separated from control cables in manholes.
- G. Shielding on instrumentation cables shall be grounded at the transmitter end only.
- H. All new wires and cables shall be continuous and without splices between points of connection to equipment terminals. However, the County will permit a splice provided that the length between the connection points exceeds the greatest standard shipping length available from the submitted manufacturer and no other manufacturer acceptable to the County is able to furnish wires or cables of the required length.
- I. All 600 volt wire and cable connections shall be made using compression type connectors.

Insulated connectors shall be used for all terminations. The connections shall be made so that both the conductivity and the insulation resistance shall be not less than that of the uncut conductor.

- J. All wires shall be numbered at both ends and at all intermediate junction points. Screw type terminations shall be made with forked tongue (spade), self-insulated, crimp terminals. All other wire terminations shall be made on appropriate terminal strips.

3.02 TESTS

- A. Upon the completion of the pulling-in of and prior to the terminating/connecting of the 600 Volt wiring, all wires shall be individually checked and tested for continuity and short circuits, and each wire/cable shall be meggered to check insulation resistance. The test voltage shall be not less than 500 Volts. Three (3) copies of these test results shall be submitted to the County.
- B. An authorized representative(s) of the County shall witness all testing. The County shall be notified at least two (2) days in advance of the testing.
- C. Any faulty conditions and/or shortcomings found during the testing shall be corrected at no cost to the County. However, a retest to demonstrate compliance shall be conducted before any hook-ups or terminations are made. Any such requisite retesting shall be witnessed by an authorized representative(s) of the County.

3.03 GUARANTEES AND WARRANTIES

- A. The Contractor shall guarantee and warrant all materials and labor provided under this Section in accordance with Section 01740 and Section 16050 of these Specifications.

END OF SECTION

SECTION 16450 GROUNDING

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install a complete grounding system in strict accordance with Article 250 of the National Electrical Code and/or as hereinafter specified and/or as shown on the Contract Drawings.

1.02 SUBMITTALS

- A. The requirements of Section 01340 and Section 16050 shall be met.
- B. Test results as indicated in 3.02 C shall be submitted.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Ground Rods: The ground rods shall be solid copper or copper-clad steel having a diameter of 5/8-inch and a length of 10-feet. The ground rods shall be as manufactured by Copperweld, or approved equal.
- B. Grounding Conductors
 - 1. All grounding conductors shall be copper. Aluminum or copper-clad aluminum grounding conductors will not be allowed.
 - 2. The grounding conductors shall be sized in accordance with the latest edition of the National Electrical Code, Table 250-94 or Table 250-95, whichever is applicable to the particular grounding conductor.
- C. Ground Rod Clamps: The ground rod clamps shall be malleable iron or cast bronze fittings suitable for use with copper conductors. The ground rod clamps shall be as manufactured by Bridgeport Fittings, Inc.; ITT Blackburn, Inc.; or approved equal.
- D. Dissimilar Metals Junctions: Connections between different metals shall be sealed using NO-OXIDE paint, Grade A, or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Wherever possible, the Contractor shall connect to an existing plant, area or building grounding grid. Where no such grounding grid exists, the Contractor shall provide grounding as hereinafter specified and/or as shown on the Contract Drawings.
- B. Building grounding grid conductors shall be embedded in backfill material around the structures.
- C. All underground conductors shall be laid slack and, where exposed to mechanical injury, shall be protected by pipes or other substantial guards. If guards are iron pipe or other magnetic material, conductors shall be electrically connected to both ends of the guard.

- D. Grounding electrodes shall be driven as required. Where rock is encountered, grounding plates may be used in lieu of grounding rods.
- E. All equipment enclosures, motor and transformer frames, conduit systems, cable armor, exposed structural steel and similar items as required by Article 250 of the NEC shall be grounded.
- F. All steel building columns shall be bonded together and connected to the building ground grid.
- G. Exposed connections shall be made utilizing approved grounding clamps. Buried connections shall be Cadweld, or approved equal, welding process.
- H. The ground bus of service entrance equipment shall be connected to the plant, area or building ground grid, whichever is applicable.
- I. For reasons of mechanical strength, grounding conductors extending from the plant, area or building grounding grid or service entrance ground bus, whichever is applicable, to the ground buses of motor control centers and/or unit substations shall be No. 1/0 AWG bare copper.
- J. Lighting transformer neutrals shall be grounded to the nearest grounding electrode.
- K. Conduits stubbed-up below a motor control center shall be fitted with insulated grounding bushings and connected to the motor control center ground bus. Boxes mounted below motor control centers shall be bonded to the motor control center ground bus. The grounding wire shall be sized in accordance with Table 250-95 of the National Electrical Code, except that a minimum No. 12 AWG shall be used.
- L. Motors shall be grounded in accordance with Section 16150, Item 3.01.A of these Specifications.
- M. The Contractor shall exercise care to insure good ground continuity, in particular between conduits and equipment frames and enclosures. Where necessary, jumper wires shall be installed.

3.02 TESTS

- A. The Contractor shall test the ground resistance of the system. The Contractor shall provide all test equipment of which the County shall have approval.
- B. The dry season resistance of the system shall not exceed five (5) ohms. If a single driven rod does not produce this value, the Contractor shall drive additional rods and/or take other measures as directed by the County without any cost to the County.
- C. The Contractor shall furnish to the County three (3) copies of the test report certifying that the system is in compliance with the ohmic value requirement. The certified test report shall include, but not necessarily be limited to, the following:
 - 1. Description of the test.
 - 2. Type of test equipment used.
 - 3. Moisture content of the soil.
 - 4. Date and time of the test.
 - 5. Resistance measurement of each rod cluster.
 - 6. Name of individual(s) performing the test.

7. Contractor's certification stamp or seal.

3.03 GUARANTEES AND WARRANTIES

- A. The Contractor shall guarantee and warrant all materials and labor provided under this Section in accordance with Section 01740 and Section 16050 of these Specifications.

END OF SECTION

SECTION 16950 TESTS AND INSPECTIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall arrange for all inspections required by the local authority having jurisdiction. Approval of the installation by any such local authority shall not relieve the CONTRACTOR of any portion of his responsibility for adequate performance of the completed installation.

1.02 SUBMITTALS

- A. The CONTRACTOR shall furnish at least two copies of test records to the ENGINEER. At the completion of all tests specified herein and any others required to make operational all equipment, all records shall be viewed by the CONTRACTOR, then transmitted directly to the ENGINEER. All prints shall be corrected and verified for corrections of in-field changes by the CONTRACTOR prior to submittal.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 PREPARATION

- A. After completion and prior to being energized, the electrical installation shall be tested to the extent necessary to demonstrate that all systems are complete and ready for operation. The CONTRACTOR shall notify the ENGINEER and the OWNER for the final inspection prior to energizing the system.
- B. The CONTRACTOR shall furnish all necessary test equipment to satisfactorily perform all tests specified herein or required by applicable codes and standards.

3.02 TESTING

- A. The CONTRACTOR shall test all wire, cable, equipment, and systems installed or connected under the Agreement to assure proper installation, settings, connection, and functioning in accordance with the Drawings, Specifications and the manufacturer's recommendations.
- B. When conducting tests the CONTRACTOR shall:
 - 1. Include all tests and inspections recommended by the equipment manufacturer and applicable Codes and Standards.
 - 2. Include any additional tests required by the ENGINEER that he deems necessary because of field conditions to determine that equipment, material, and systems meet the requirements of the Specifications.
 - 3. Maintain in quadruplicate a written record of all tests showing date, personnel conducting tests, equipment or material tested, tests performed, manufacturer and serial number of testing equipment and results.

- C. Tests to be accomplished as a minimum are as follows:
1. Control Panels/Panelboards : provide temporary power source to all control/power circuits and check for proper operation prior to energizing equipment served.
 2. Wires and Cables:
 - a. The 600-volt insulated cables shall be factory tested prior to shipment in accordance with IPCEA standards for the insulation specified.
 - b. The following 600-volt wires and cable shall be tested after installation but before final connections are made up:
 - i. All feeders from motor control centers to motors 10 horsepower and larger.
 - ii. All feeders from variable speed drive units.
 - iii. All feeders from motor control centers to lighting panels and dry-type transformers.
 - c. For the above listed cables, a test voltage of 500 volts ac shall be applied for a period of 1 minute between all conductors in the same conduit, and between each conductor and ground.
 - d. All tests shall be made at the Contractor's expense, and certification of the tests shall be submitted to the Engineer. If any failures occur during the tests, the Contractor shall replace the cable.
 3. Motor Test: Motor rotation will be checked by momentary energizing of motor. Correction of rotation shall be made by changing leads on the motor. Motors shall only be energized in the presence of a representative of the OWNER.
 4. Check phase rotation on all bussing. Phasing shall be A-B-C, left to right, top to bottom, front to rear, as viewed from the front.
- D. CONTRACTOR shall be responsible for any damage to equipment or material due to improper test procedures or test apparatus handling, and shall replace or restore to original condition any damaged equipment or material.
- E. CONTRACTOR shall furnish and use safety devices such as rubber gloves and blankets, protective screens, barriers, and danger signs to adequately protect and warn all personnel in the vicinity of the tests.

3.04 DEMONSTRATION OF COMPLETED ELECTRICAL SYSTEMS

- A. Upon the completion of the installation and testing, the CONTRACTOR shall demonstrate and familiarize representatives of the OWNER with the system.

END OF SECTION

SECTION 16960 GENERATOR DOCKING STATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section Includes:

1. Equipment for docking a generator and connecting to an electrical load, transfer switch or distribution equipment. Refer to drawings for further specifics pertaining to this project requirement(s).

1.03 SUBMITTALS

A. Product Data: For each type of Generator/Power Docking Station indicated, include dimensions, elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, enclosure types, and finishes.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Manufacturer's written instructions for maintaining Generator Docking Station.

1.05 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. UL (Underwriters Laboratories, Inc.) Standards

C. cUL (Underwriters Laboratories of Canada) Standards

D. Comply with NFPA 70.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
2. Altitude: Not exceeding 6600 feet (2010 m).

1.07 COORDINATION

- A. Coordinate layout and installation of Generator Docking Station, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.08 GUARANTEE/WARRANTY

- A. New materials and equipment shall be guaranteed against defects in composition, design or workmanship for a period of one year.

PART 2 PRODUCTS

2.01 GENERATOR DOCKING STATION

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 1. TRYSTAR Model GDR-124P-LLM-IW (contact PowerLogics 800-357-8743)

2.02 GENERAL REQUIREMENTS

- A. Enclosures:
 1. Rated NEMA 4X for environmental conditions at installed location/as shown on drawings: 0.100" Aluminum 14 gauge, 304 stainless steel.
 2. Mounting:
 - a. Padmounted.
 3. Front Cover:
 - a. Hinged
 - b. Gasketed
 - c. Pad-lockable latch Keyed or Kirk key as indicated on drawings
 4. Finishes:
 - a. Paint after fabrication. Powder coated ANSI #61 gray 40% gloss unless otherwise indicated on drawings or stainless steel if indicated on drawings.

b. Warning labels must be printed using a UV Printer in conjunction with UL Listed, VOC-free UV ink.

B. Phase, Neutral, and Ground Buses:

1. Material: Silver-plated hard-drawn copper.
2. Equipment Ground Bus: bonded to box unless indicated otherwise.
3. Ground Bus: 25% of phase size unless indicated otherwise.
4. Neutral Bus: Neutral bus rated 100 percent of phase bus.
5. Neutral bus bonded to ground bus.
6. Round edges on bus.

C. Bus Connectors:

1. Located behind access plate inside front cover.
2. Lugs 1,200A 6 x 350 MCM

D. Generator Connections:

1. Located inside front cover.
2. Male Camlocks.

E. Hinged cable access door on bottom of unit.

F. Lockable rake system with reinforced support struts to reduce cable theft.

G. 4-Pole.

H. Voltage, Amperage & Phase:

1. 480V AC
2. 1,200 Amperes.
3. 3 Phase.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine elements and surfaces to receive Generator Docking Station for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Base Mounted: Install Generator Docking Station on concrete housekeeping pad and secure per manufacturers specifications.

3.03 IDENTIFICATION

- B. Label each enclosure with engraved laminated-plastic nameplate. Identify as "PORTABLE GENERATOR DOCKING STATION".
- C. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.

END OF SECTION

BID ATTACHMENT 3, PLAN SET / DRAWINGS

NOTE - This attachment is uploaded as a separate document on the Procurement page of the County website with the solicitation document and available for download.

SECTION D, SAMPLE CONSTRUCTION AGREEMENT WITH GENERAL CONDITIONS OF THE CONSTRUCTION AGREEMENT AND AGREEMENT EXHIBITS

CONSTRUCTION AGREEMENT

for

STIPULATED SUM

between

MANATEE COUNTY (AS OWNER)

and

_____ (AS CONTRACTOR)

**CONSTRUCTION AGREEMENT FOR
STIPULATED SUM
[PROJECT NAME]**

THIS AGREEMENT (“Agreement”) is made and entered into by and between Manatee County, a political subdivision of the State of Florida, referred to herein as “Owner”, and the firm of _____, incorporated in the State of _____ and registered and licensed to do business in the State of Florida (license # _____), referred to herein as “Contractor.”

WHEREAS, the Owner intends to construct **[PROJECT DESCRIPTION]**, the aforementioned improvements being hereinafter referred to and defined as the “Project”; and

WHEREAS, in response to Owner’s Invitation for Bid No. _____ (the “IFB”), Contractor has submitted its Bid (the “Contractor’s Bid”) to provide the aforementioned construction services.

NOW THEREFORE, the Owner and the Contractor, in consideration of the mutual covenants hereinafter set forth, the sufficiency of which is hereby acknowledged, agree as follows:

1. Contract Documents. The Contract Documents consist of this Agreement and attached Exhibits, the attached General Conditions of the Construction Agreement, Supplementary Conditions (if any), Special Conditions (if any), Drawings (the titles of which are attached hereto as Exhibit A), Specifications (the titles of which are attached hereto as Exhibit B), Addenda issued prior to execution of this Agreement, the Invitation for Bid (including any Instructions to Bidders, Scope of Work, Bid Summary, Supplements, and Technical Specifications), any interpretations issued pursuant to the Invitation for Bid, the Contractor’s Bid, permits, notice of intent to award, Notice to Proceed, purchase order(s), any other documents listed in this Agreement, and Modifications [to include written Amendment(s), Change Order(s), Work Directive Change(s) and Field Directive(s)] issued after execution of this Agreement. These form the Agreement, and are as fully a part of the Agreement as if attached or repeated herein. This Agreement represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. No other documents shall be considered Contract Documents.

2. Work. The Contractor shall fully execute the Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others.

3. Date of Commencement and Substantial Completion.

A. Date of Commencement. The date of commencement of the Work shall be the date fixed in a Notice to Proceed issued by the Owner.

B. Contract Time. The Contract Time shall be measured from the date of commencement.

C. Substantial Completion. The Contractor shall achieve Substantial Completion of the entire Work not later than ___ days from the date of commencement, or as follows:

Portion of Work	Substantial Completion Date
------------------------	------------------------------------

subject to adjustments of this Contract Time as provided in the Contract Documents.

Time is of the essence in the Contract Documents and all obligations thereunder. If the Contractor fails to achieve Substantial Completion of the Work within the Contract Time and as otherwise required by the Contract Documents (to include not only the entire Work but any portion of the Work as set forth above), the Owner shall be entitled to retain or recover from the Contractor, as liquidated damages and not as a penalty, the sum of \$_____ per calendar day, commencing upon the first day following expiration of the Contract Time and continuing until the actual date of Substantial Completion. Such liquidated damages are hereby agreed to be a reasonable estimate of damages the Owner will incur because of delayed completion of the Work. The Owner may deduct liquidated damages as described in this paragraph from any unpaid amounts then or thereafter due the Contractor under this Agreement. Any liquidated damages not so deducted from any unpaid amounts due the Contractor shall be payable to the Owner at the demand of the Owner, together with interest from the date of the demand at the maximum allowable rate.

4. Contract Sum.

A. Payment. The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be _____ Dollars and Zero Cents (\$_____), subject to additions and deductions as provided in the Contract Documents.

B. Alternates. The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner. *(State the numbers or other identification of accepted alternates. If decisions on other alternates are to be made by the Owner subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)*

C. Unit Prices. Unit prices, if any, are reflected in the Contractor's Bid.

5. Payments.

A. Progress Payments.

(1) Based upon Applications for Payment submitted to the Architect/Engineer by the Contractor and Certificates for Payment issued by the Architect/Engineer, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

- (2) The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.
- (3) Payments shall be made by Owner in accordance with the requirements of Section 218.735, Florida Statutes.
- (4) Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect/Engineer may require. This schedule, unless objected to by the Owner or Architect/Engineer, shall be used as a basis for reviewing the Contractor's Applications for Payment.
- (5) Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.
- (6) Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:
 - i. Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of five percent (5.00%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 3.3.B. of the General Conditions;
 - ii. Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), supported by paid receipts, less retainage of five percent (5.00%);
 - iii. Subtract the aggregate of previous payments made by the Owner; and
 - iv. Subtract amounts, if any, for which the Architect/Engineer has withheld or nullified an Application for Payment, in whole or in part as provided in Section 3.3.C. of the General Conditions.
- (7) The progress payment amount determined in accordance with Section 5.A(6) shall be further modified under the following circumstances:

- i. Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect/Engineer shall determine for incomplete Work, retainage applicable to such work and unsettled claims.
- ii. Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 3.2.B. of the General Conditions.

(8) Reduction or limitation of retainage, if any, shall be as follows:

Notwithstanding the foregoing, upon completion of at least 50% of the Work, as determined by the Architect/Engineer and Owner, the Owner may, with the concurrence of the Architect/Engineer, reduce to two and one-half percent (2.5%) the amount of retainage withheld from each subsequent progress payment.

(9) Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

B. Final Payment. Final Payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when:

(1) The Contractor has fully performed the Work except for the Contractor's responsibility to correct Work as provided in Section 2.4.C. of the General Conditions, and to satisfy other requirements, if any, which extend beyond final payment; and

(2) A final Application for Payment has been approved by the Architect/Engineer.

6. Termination or Suspension.

A. Termination. The Agreement may be terminated by the Owner or the Contractor as provided in Article XIV of the General Conditions.

B. Suspension by Owner. The Work may be suspended by the Owner as provided in Article XIV of the General Conditions.

7. Other Provisions.

A. Substantial Completion Defined. Substantial Completion shall be defined as provided in Article I of the General Conditions. In the event a temporary certificate of occupancy or completion is issued establishing Substantial Completion, the Contractor shall diligently pursue the issuance of a permanent certificate of occupancy or completion.

B. Project Meetings. There shall be a project meeting, at the jobsite or other location acceptable to the parties, on a regularly scheduled basis. The meeting will be attended by a representative of the Contractor, Architect/Engineer and Owner. These representatives shall be authorized to make decisions that are not otherwise contrary to the requirements of this Agreement.

C. Weather. Any rainfall, temperatures below 32 degrees Fahrenheit or winds greater than 25 m.p.h. which actually prevents Work on a given day, shall be considered lost time and an additional day added to the Contract Time, provided no work could be done on site, and provided written notice has been submitted to the Owner by the Contractor documenting same.

D. Shop Drawings; Critical Submittals. In consideration of the impact of timely review of submittals and shop drawings on the overall progress of the Work, it is hereby agreed that the Owner shall cause his agents and design professionals to accomplish the review of any particular "critical" submittals and/or shop drawings and return same to the Contractor within fourteen (14) days.

E. Applications for Payment. Applications for Payment shall be submitted once monthly at regular intervals and shall include detailed documentation of all costs incurred.

F. Punch List. Within 30 days after obtainment of Substantial Completion, the Owner shall generate a "punch list" of all work items requiring remedial attention by the Contractor. Within 5 days thereafter the Architect/Engineer shall assign a fair value to the punch list items, which sum shall be deducted from the next scheduled progress payment to the Contractor. Upon satisfactory completion of the punch list items, as certified by the Architect/Engineer, the previously deducted sum shall be paid to the Contractor.

G. Closeout documentation. Within 30 days after obtainment of Substantial Completion and before final payment, Contractor shall gather and deliver to Owner all warranty documentation, all manufacturer's product and warranty literature, all manuals (including parts and technical manuals), all schematics and handbooks, and all as-built drawings.

H. Governing Provisions; Conflicts. In the event of a conflict between this Agreement and the Specifications or as between the General Conditions and the Specifications, the Specifications shall govern.

I. E-Verify. The Contractor's employment of unauthorized aliens is a violation of Section 274(e) of the Federal Immigration and Employment Act. The Contractor shall utilize the U.S. Department of Homeland Security E-Verify system to verify the employment eligibility of all new employees hired during the term of this Agreement, and shall require the same verification procedure of all Subcontractors.

8. Insurance and Bonding. If and to the extent required by the Invitation for Bid documents, the Contractor shall furnish insurance coverage for (but not necessarily limited to) workers' compensation, commercial general liability, auto liability, excess liability, and builder's risk. The Contractor shall furnish to the Owner all appropriate policies and Certificate(s) of Insurance. The Contractor shall also post a Payment and Performance Bond for the Contract Sum, within ten (___) days following notification of intent to award, and otherwise in accordance with the Invitation for Bid documents.

9. Independent Contractor. The Contractor acknowledges that it is functioning as an independent contractor in performing under the terms of this Agreement, and it is not acting as an employee of the Owner.

10. Entire Agreement. This Agreement (inclusive of the Contract Documents incorporated herein by reference) represents the full agreement of the parties.

11. Amendments; Waivers; Assignment.

A. Amendments. This Agreement may be amended only pursuant to an instrument in writing that has been jointly executed by authorized representatives of the parties hereto.

B. Waivers. Neither this Agreement nor any portion of it may be modified or waived orally. However, each party (through its governing body or properly authorized officer) shall have the right, but not the obligation, to waive, on a case-by-case basis, any right or condition herein reserved or intended for the benefit or protection of such party without being deemed or considered to have waived such right or condition for any other case, situation, or circumstance and without being deemed or considered to have waived any other right or condition. No such waiver shall be effective unless made in writing with an express and specific statement of the intent of such governing body or officer to provide such waiver.

C. Assignment. The rights and obligations of either party to this Agreement may be assigned to a third party only pursuant to a written amendment hereto.

12. Validity. Each of the Owner and Contractor represents and warrants to the other its respective authority to enter into this Agreement.

13. Covenant to Defend. Neither the validity of this Agreement nor the validity of any portion hereof may be challenged by any party hereto, and each party hereto hereby waives any right to initiate any such challenge. Furthermore, if this Agreement or any portion hereof is challenged by a third party in any judicial, administrative, or appellate proceeding (each party hereby covenanting with the other party not to initiate, encourage, foster, promote, cooperate with, or acquiesce to such challenge), the parties hereto collectively and individually agree, at their individual sole cost and expense, to defend in good faith its validity through a final judicial determination or other resolution, unless all parties mutually agree in writing not to defend such challenge or not to appeal any decision invalidating this Agreement or any portion thereof.

14. Disclaimer of Third-Party Beneficiaries; Successors and Assigns. This Agreement 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 Agreement is intended or shall be construed to confer upon or give any person, corporation, partnership, trust, private entity, agency, or other governmental entity any right, privilege, remedy, or claim under or by reason of this Agreement or any provisions or conditions hereof. This Agreement shall be binding upon, and its benefits and advantages shall inure to, the successors and assigns of the parties hereto.

15. Construction.

A. Headings and Captions. The headings and captions of articles, sections, and paragraphs used in this Agreement are for convenience of reference only and are not intended to define or limit their contents, nor are they to affect the construction of or be taken into consideration in interpreting this Agreement.

B. Legal References. All references to statutory sections or chapters shall be construed to include subsequent amendments to such provisions, and to refer to the successor provision of any such provision. References to “applicable law” and “general law” shall be construed to include provisions of local, state and federal law, whether established by legislative action, administrative rule or regulation, or judicial decision.

16. Severability. The provisions of this Agreement are declared by the parties hereto to be severable. In the event any term or provision of this Agreement shall be held invalid by a court of competent jurisdiction, such invalid term or provision should not affect the validity of any other term or provision hereof; and all such terms and provisions hereof shall be enforceable to the fullest extent permitted by law as if such invalid term or provision had never been part of this Agreement; provided, however, if any term or provision of this Agreement is held to be invalid due to the scope or extent thereof, then, to the extent permitted by law, such term or provision shall be automatically deemed modified in order that it may be enforced to the maximum scope and extent permitted by law.

17. Governing Law; Venue. This Agreement shall be governed by the laws of the State of Florida. Venue for any petition for writ of certiorari or other court action allowed by this Agreement shall be in the Circuit Court of the Twelfth Judicial Circuit in and for Manatee County, Florida.

18. Attorney’s Fees and Costs. In any claim dispute procedure or litigation arising from this Agreement, each party hereto shall be solely responsible for paying its attorney’s fees and costs.

19. Notices. All notices, comments, consents, objections, approvals, waivers, and elections under this Agreement shall be in writing and shall be given only by hand delivery for which a receipt is obtained, or certified mail, prepaid with confirmation of delivery requested, or by electronic mail with delivery confirmation. All such communications shall be addressed to the applicable addressees set forth below or as any party may otherwise designate in the manner prescribed herein.

To the Owner:

Email: _____

To the Contractor:

Email: _____

Notices, comments, consents, objections, approvals, waivers, and elections shall be deemed given when received by the party for whom such communication is intended at such party's address herein specified, or such other physical address or email address as such party may have substituted by notice to the other.

20. Public Records Law. The Contractor shall comply with the Florida Public Records Act (Chapter 119, Florida Statutes), and shall:

- A. Keep and maintain public records required by the Owner to perform the services called for in this Agreement.
- B. Upon request from the Owner's custodian of public records, provide the Owner with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, Florida Statutes or as otherwise provided by law.
- C. Ensure that public records that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by law for the duration of this Agreement and following completion of this Agreement if the Contractor does not transfer the records to the Owner.
- D. Upon completion of this Agreement, transfer, at no cost, to the Owner all public records in possession of the Contractor or keep and maintain such public records. If the Contractor transfers all public records to the Owner upon completion of the Agreement, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the Contractor keeps and maintains public records upon completion of the Agreement, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the Owner, upon request from the Owner's custodian of public records, in a format that is compatible with the information technology systems of the Owner.

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS AGREEMENT, CONTACT THE OWNER'S CUSTODIAN OF PUBLIC RECORDS AT 941-748-4501, EXT. 5845; DEBBIE.SCACCIANOCE@MYMANATEE.ORG; POST OFFICE BOX 1000, BRADENTON, FLORIDA 34206.

21. Exhibits. Exhibits to this Agreement are as follows:

Exhibit A—Title(s) of Drawings

Exhibit B—Title(s) of Specifications

Exhibit C—Affidavit of No Conflict

Exhibit D—Certificate(s) of Insurance

Exhibit E—Payment and Performance Bond

Exhibit F—Standard Forms

- 1—Application for Payment
- 2—Certificate of Substantial Completion
- 3—Final Reconciliation / Warranty / Affidavit
- 4—Change Order

SAMPLE

WHEREFORE, the parties hereto have executed this Agreement as of the date last executed below.

Name of Contractor

By: _____

Printed Name: _____

Title: _____

Date: _____

MANATEE COUNTY, a political subdivision
of the State of Florida

By: _____

Printed Name: _____

Title: _____

Date: _____

SAMPLE

GENERAL CONDITIONS
of the
CONSTRUCTION AGREEMENT

SAMPLE

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GENERAL CONDITIONS
ARTICLE I
DEFINITIONS

1.1 Definitions. For purposes of the Contract Documents, the following terms shall have the following meanings.

A. Acceptance: The acceptance of the Project into the Owner's operating public infrastructure.

B. Application for Payment: The form approved and accepted by the Owner, which is to be used by Contractor in requesting progress payments or final payment and which is to include such supporting documentation as is required by the Contract Documents.

C. Architect/Engineer: _____, a _____ corporation or limited liability company, registered and licensed to do business in the State of Florida, OR _____, an employee of Owner.

D. Change Order: A written order signed by the Owner, the Architect/Engineer and the Contractor authorizing change in the Project Plans and/or Specifications and, if necessary, a corresponding adjustment in the Contract Sum and/or Contract Time, pursuant to Article V.

E. Construction Services: The Construction Services to be provided by Contractor pursuant to Section 2.4, in accordance with the terms and provisions of the Contract Documents.

F. Construction Team: The working team established pursuant to Section 2.1.1.B.

G. Contract Sum: The total compensation to be paid to the Contractor for Construction Services rendered pursuant to the Contract Documents, as set forth in Contractor's Bid (or Guaranteed Maximum Price Addendum), unless adjusted in accordance with the terms of the Contract Documents

H. Contract Time: The time period during which all Construction Services are to be completed pursuant to the Contract Documents, to be set forth in the Project Schedule.

I. Contractor's Personnel: The Contractor's key personnel designated by Contractor.

J. Days: Calendar days except when specified differently. 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.

K. Defective: When modifying the term “Work”, referring to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or that does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or that has been damaged prior to Owner’s approval of final payment (unless responsibility for the protection thereof has been assumed by Owner).

L. Field Directive: A written order issued by Owner which orders minor changes in the Work not involving a change in Contract Time, to be paid from the Owner’s contingency funds.

M. Final Completion Date: The date upon which the Project is fully constructed and all Work required on the Project and Project Site is fully performed as verified in writing by the Owner.

N. Float Time: The time available in the Project Schedule during which an unexpected activity can be completed without delaying Substantial Completion of the Work.

O. Force Majeure: Those conditions constituting excus from performance as described in and subject to the conditions described in Article XII.

P. Notice to Proceed: Written notice by Owner (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 the Work.

Q. Owner: Manatee County, a political subdivision of the State of Florida.

R. Owner’s Project Representative: The individual designated by Owner to perform those functions set forth in Section 7.8.

S. Payment and Performance Bond: The Payment and Performance Bond security posted pursuant to Section 2.4.Y to guarantee payment and performance by the Contractor of its obligations hereunder.

T. Permitting Authority: Any applicable governmental authority acting in its governmental and regulatory capacity which is required to issue or grant any permit, certificate, license or other approval which is required as a condition precedent to the commencement or approved of the Work, or any part thereof, including the building permit.

U. Procurement Ordinance: The Manatee County Procurement Code, Chapter 2-26 of the Manatee County Code of Laws, as amended from time to time.

V. Progress Report: A report to Owner that includes all information required pursuant to the Contract Documents and submitted in accordance with Section 2.4.EE, hereof.

W. Project: The total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by Owner and by separate contractors. For the purposes of the Contract Documents, the term Project shall

include all areas of proposed improvements and all areas which may reasonably be judged to have an impact on the Project.

X. Project Costs: The costs incurred by the Contractor to plan, construct and equip the Project and included within, and paid as a component of, the Contract Sum.

Y. Project Manager: Subject to the prior written consent of Owner, the individual designated to receive notices on behalf of the Contractor, or such other individual designated by the Contractor, from time to time, pursuant to written notice in accordance with the Contract Documents.

Z. Project Plans and Specifications: The one hundred percent (100%) construction drawings and specifications prepared by the Architect/Engineer, and any changes, supplements, amendments or additions thereto approved by the Owner, which shall also include any construction drawings and final specifications required for the repair or construction of the Project, as provided herein.

AA. Project Schedule: The schedule and sequence of events for the commencement, progression and completion of the Project, developed pursuant to Section 2.3., as such schedule may be amended as provided herein.

BB. Project Site: The site depicted in the Project Plans and Specifications, inclusive of all rights of way, temporary construction easements or licensed or leased sovereign lands.

CC. Subcontractor: Any individual (other than a direct employee of the Contractor) or organization retained by Contractor to plan, construct or equip the Project pursuant to Article IV.

DD. Substantial Completion and Substantially Complete: The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use; provided, however, that as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy or completion and other permits, approvals, licenses, and other documents from any governmental authority which are necessary for the beneficial occupancy of the Project or any designated portion thereof.

EE. Substantial Completion Date: The date on which the Project or designated portion thereof is deemed to be Substantially Complete, as evidenced by receipt of (i) the Architect/Engineer's certificate of Substantial Completion, (ii) written Acceptance of the Project by the Owner, and (iii) approvals of any other authority as may be necessary or otherwise required.

FF. Substitute: Materials or equipment offered by the Contractor as an alternative to that set forth in the Project Plans and Specifications, where (i) the Project Plans and Specifications do not authorize an "approved equal", or (ii) the Owner, in its reasonable discretion, determines that a pre-authorized "approved equal" will result in a substantial change to the Work because of cost, quality or other difference in comparison to the materials or equipment specified.

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

HH. Work: The term “Work” means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations. The Work may constitute the whole or a part of the Project.

II. Work Directive Change: A written directive to Contractor, issued on or after the effective date of the Agreement pursuant to Section 5.8 and signed by Owner’s 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 responding to emergencies.

ARTICLE II RELATIONSHIP AND RESPONSIBILITIES

2.1 Relationship between Contractor and Owner. The Contractor accepts the relationship of trust and confidence established with Owner pursuant to the Contract Documents. The Contractor shall furnish its best skill and judgment and cooperate with Owner and Owner’s Project Representative in furthering the interests of the Owner. The Contractor agrees to provide the professional services required to complete the Project consistent with the Owner’s direction and the terms of the Contract Documents. All services provided hereunder by Contractor, either directly or through Subcontractors, shall be provided in accordance with sound construction practices and applicable professional construction standards.

A. Purpose. The purpose of the Contract Documents is to provide for the provision of construction services for the Project on the Project Site by the Contractor, and construction of the Project by the Contractor in accordance with the Project Plans and Specifications. The further purpose of the Contract Documents is to define and delineate the responsibilities and obligations of the parties to the Contract Documents and to express the desire of all such parties to cooperate to accomplish the purposes and expectations of the Contract Documents.

B. Construction Team. The Contractor, Owner and Architect/Engineer shall be called the “Construction Team” and shall work together as a team commencing upon full execution of the Contract Documents through Substantial Completion. As provided in Section 2.2, the Contractor and Architect/Engineer shall work jointly through completion and shall be available thereafter should additional services be required. The Contractor shall provide leadership to the Construction Team on all matters relating to construction. The Contractor understands, acknowledges and agrees that the Architect/Engineer shall provide leadership to the Construction Team on all matters relating to design.

C. Owner’s Reliance on Bid (or Guaranteed Maximum Price Addendum). The Contractor acknowledges that the representations, statements, information and pricing contained in its Bid (or Guaranteed Maximum Price Addendum) have been relied upon by the Owner and have resulted in the award of this Project to the Contractor.

2.2 General Contractor Responsibilities. In addition to the other responsibilities set forth herein, the Contractor shall have the following responsibilities pursuant to the Contract Documents:

A. Personnel. The Contractor represents that it has secured, or shall secure, all personnel necessary to perform the Work, none of whom shall be employees of the Owner. Primary liaison between the Contractor and the Owner shall be through the Owner's Project Representative and Contractor's Project Manager. All of the services required herein shall be performed by the Contractor or under the Contractor's supervision, and all personnel engaged in the Work shall be fully qualified and shall be authorized or permitted under law to perform such services.

B. Cooperation with Architect/Engineer. The Contractor's services shall be provided in conjunction with the services of the Architect/Engineer. In the performance of professional services, the Contractor acknowledges that time is critical for Project delivery. The Contractor acknowledges that timely construction utilizing the services of an Architect/Engineer and a Contractor requires maximum cooperation between all parties.

C. Timely Performance. The Contractor shall perform all services as expeditiously as is consistent with professional skill and care and the orderly progress of the Work, in accordance with the Project Schedule. Verification of estimated Project Schedule goals will be made as requested by the Owner.

D. Duty to Defend Work. In the event of any dispute between the Owner and any Permitting Authority that relates to the quality, completeness or professional workmanship of the Contractor's services or Work, the Contractor shall, at its sole cost and expense, cooperate with the Owner to defend the quality and workmanship of the Contractor's services and Work.

E. Trade and Industry Terminology. 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. 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 (or at the time of execution of the Guaranteed Maximum Price Addendum), 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 Owner or Contractor, or any of their agents or employees from those set forth in the Contract Documents. Computed dimensions shall govern over scaled dimensions.

2.3 Project Schedule. The Contractor, within ten (10) days after being awarded the Agreement, shall prepare and submit for the Owner's and Architect/Engineer's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the

extent required by the Contract Documents, and shall provide for expeditious and practicable execution of Work.

- A. The Project Schedule shall show a breakdown of all tasks to be performed, and their relationship in achieving the completion of each phase of Work, subject to review of Owner and Architect/Engineer and approval or rejection by Owner. The Project Schedule shall show, at 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 Project Schedule shall include all phases of procurement, approval of shop drawings, proposed Change Orders in progress, schedules for Change Orders, and performance testing requirements. The Project Schedule shall include a construction commencement date and Project Substantial Completion Date, which dates shall accommodate known or reasonably anticipated geographic, atmospheric and weather conditions.
- B. The Project Schedule shall serve as the framework for the subsequent development of all detailed schedules. The Project Schedule shall be used to verify Contractor performance and to allow the Owner's Project Representative to monitor the Contractor's efforts.
- C. The Project Schedule may be adjusted by the Contractor pursuant to Article V. The Owner shall have the right to reschedule Work provided such rescheduling is in accord with the remainder of terms of the Contract Documents.
- D. The Contractor shall prepare a submittal schedule, promptly after being awarded the Agreement and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect/Engineer's approval. The Architect/Engineer's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect/Engineer reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.
- E. The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect/Engineer.

2.4 Construction Services. The Contractor shall provide the following Construction Services:

- A. Construction of Project. The Contractor shall work from the receipt of a Notice to Proceed through the Substantial Completion of the Project in accordance with the terms of the Contract Documents to manage the construction of the Project. The Construction Services provided by the Contractor to construct the Project shall include without limitation (1) all services

necessary and commensurate with established construction standards, and (2) all services described in the Invitation for Bid (or Request for Proposal) and the Bid (or Guaranteed Maximum Price Addendum).

B. Notice to Proceed. A Notice to Proceed may be given at any time within thirty (30) days after the effective date of the Agreement. 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 issuance of the Notice to Proceed.

C. Quality of Work. If at any time the labor used or to be used appears to the Owner as insufficient or improper for securing the quality of Work required or the required rate of progress, the Owner may order the Contractor to increase its efficiency or to improve the character of its Work, and the Contractor shall conform to such an order. Any such order shall not entitle Contractor to any additional compensation or any increase in Contract Time. The failure of the Owner to demand any increase of such efficiency or any improvement shall not release the Contractor 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 Documents. The Owner may require the Contractor to remove such personnel as the Owner deems incompetent, careless, insubordinate or otherwise objectionable, or whose continued employment on the Project is deemed to be contrary to the Owner's interest. The Contractor shall provide good quality workmanship and shall promptly correct construction defects without additional compensation. Acceptance of the Work by the Owner shall not relieve the Contractor of the responsibility for subsequent correction of any construction defects.

D. Materials. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by Architect/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.

E. Accountability for Work. The Contractor shall be solely accountable for its Work, including plans review and complete submittals. The Contractor shall be solely responsible for means, methods, techniques, sequences and procedures of construction. If a specific means, method, technique, sequence or procedure of construction is required by the Contract Documents, the Contractor may utilize an alternative means, method, technique, sequence or procedure acceptable to the Architect/Engineer if the Contractor submits sufficient information to allow the Architect/Engineer to determine that the alternative is equivalent to that required by the Contract Documents.

F. Contract Sum. The Contractor shall construct the Project so that the Project can be built for a cost not to exceed the Contract Sum.

G. Governing Specifications. In the absence of specified Owner design standards or guidelines, the Architect/Engineer shall use, and the Contractor shall comply with, the most recent version of the applicable FDOT or AASHTO design standards. In general, the Project shall be constructed by the Contractor in accordance with applicable industry standards. The Contractor shall be responsible for utilizing and maintaining current knowledge of any laws,

ordinances, codes, rules, regulations, standards, guidelines, special conditions, specifications or other mandates relevant to the Project or the services to be performed.

H. Adherence to Project Schedule. The development and equipping of the Project shall be undertaken and completed in accordance with the Project Schedule, and within the Contract Time described therein.

I. Superintendent. The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project Site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

(1) The Contractor, as soon as practicable after award of the Agreement, shall furnish in writing to the Owner through the Architect/Engineer the name and qualifications of the proposed superintendent. The Architect/Engineer may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect/Engineer has reasonable objection to the proposed superintendent or (2) that the Architect/Engineer requires additional time to review. Failure of the Architect/Engineer to reply within 14 days shall constitute notice of no reasonable objection.

(2) The Contractor shall not employ a proposed superintendent to whom the Owner or Architect/Engineer has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not be unreasonably withheld or delayed.

J. Work Hours. 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 shall not permit overtime work or the performance of Work on Saturday, Sunday or legal holiday without Owner's written consent given after prior notice to Architect/Engineer (at least seventy-two (72) hours in advance).

K. Overtime-Related Costs. Contractor shall pay for all additional Architect/Engineer charges, inspection costs and Owner staff time for any overtime work which may be authorized. Such additional charges shall be an obligation of Contractor and no extra payment shall be made by Owner because of such overtime work. At Owner's option, such overtime costs may be deducted from Contractor's monthly payment request or Contractor's retainage prior to release of final payment. Contractor's obligation to pay all overtime-related costs shall not apply if Contractor is directed by Owner to work overtime solely for Owner's convenience.

L. Insurance, Overhead and Utilities. 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.

M. Cleanliness. The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project Site. Contractor shall restore to original conditions all property not designated for alteration by the Contract Documents. If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from Contractor.

N. Loading. 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.

O. Safety and Protection. Contractor shall comply with all applicable federal, state and 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:

- (1) All employees on the Work and other persons and organizations who may be affected thereby;
- (2) All the Work and materials and equipment to be incorporated therein, whether in storage on or off the Project Site; and
- (3) Other property at the Project Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement during construction.

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 for the public and preservation of the Owner's business, taking into full consideration all local conditions. Contractor's duties and responsibilities for safety and protection with regard to the Work shall continue until such time as all the Work is completed.

P. Emergencies. In emergencies affecting the safety or protection of persons or the Work or property at the Project Site or adjacent thereto, Contractor, without special instruction or authorization from Architect/Engineer or Owner, shall act to prevent threatened damage, injury or loss. Contractor shall give Owner prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If Owner determines that a change in the Project 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.

Q. Substitutes. For Substitutes not included with the Bid (or Guaranteed Maximum Price Addendum), but submitted after the effective date of the Agreement (or

Guaranteed Maximum Price Addendum), Contractor shall make written application to Architect/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 provision 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 Architect/Engineer in evaluating the proposed Substitute. Architect/Engineer may require Contractor to furnish at Contractor's expense, additional data about the proposed Substitute. In rendering a decision, Owner, Architect/Engineer and Contractor shall have access to any available Float Time in the Project Schedule. If Substitute materials or equipment not included as part of the Bid (or Guaranteed Maximum Price Addendum), but proposed after the effective date of the Agreement, are accepted and are less costly than the originally specified materials or equipment, then the net difference in cost shall be credited to the Owner and an appropriate Change Order executed to adjust the Contract Sum.

- (1) Architect/Engineer will be allowed a reasonable time within which to evaluate each proposed Substitute. Architect/Engineer will be the sole judge of acceptability and no Substitute will be ordered, installed or utilized without Architect/Engineer's prior written acceptance which will be evidenced by either a Change Order or an approved shop drawing. Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any Substitute.
- (2) Contractor shall reimburse Owner for the charges of Architect/Engineer and Architect/Engineer's Consultants for evaluating each proposed Substitute submitted after the effective date of the Agreement and all costs resulting from any delays in the Work while the Substitute was undergoing review.

R. Surveys and Stakes. The Contractor shall furnish, as part of the Contract Sum, 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 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 shall 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 shall be held responsible for the preservation of all stakes and marks and if for any reason any of the stakes or marks or batter boards become destroyed or disturbed, they shall be immediately and accurately replaced by the Contractor.

S. Suitability of Project Site. The Contractor has, by careful examination, satisfied itself as to the nature and location of the Work and all other matters which can in any way affect the Work, including, but not limited to details pertaining to borings, as shown on the drawings. Such boring information is not guaranteed to be more than a general indication of the materials likely to be found adjacent to holes bored at the Project Site, approximately at the locations indicated. The Contractor has examined boring data, where available, made its own interpretation of the subsurface conditions and other preliminary data, and has based its Bid (or Guaranteed Maximum Price Addendum) on its own opinion of the conditions likely to be

encountered. Except as specifically provided in Sections 2.4.U., 5.4 and 5.5, no extra compensation or extension of time will be considered for any Project Site conditions that existed at the time of bidding (or at the time of execution of the Guaranteed Maximum Price Addendum). No verbal agreement or conversation with any officer, agent or employee of the Owner, before or after the execution of the Agreement, shall affect or modify any of the terms or obligations herein contained.

T. Project Specification Errors. If the Contractor, during the Work, finds that the drawings, specifications or other Contract Documents cannot be followed, the Contractor shall immediately inform the Owner in writing, and the Owner 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 sole risk of non-payment and delay.

U. Remediation of Contamination. Owner and Contractor recognize that remediation of subsurface conditions may be necessary due to potential hazardous materials contamination. Because the presence or extent of any contamination is not known, Contractor shall include no cost in the Contract Sum, and no time in the Project Schedule, for cost or delays that might result from any necessary remediation. The Project Schedule will provide a period of time between demolition activities and the start of the next activity to commence any remediation if needed. Contractor shall use all reasonable efforts in scheduling the Project to minimize the likelihood that remediation delays construction. Any hazardous materials remediation Work which Contractor agrees to perform shall be done pursuant to a Change Order or amendment consistent with the following:

- (1) The dates of Substantial Completion shall be equitably adjusted based on delays, if any, incurred in connection with remediation efforts.
- (2) Contractor and any Subcontractors which have mobilized on the Project Site, shall be paid for demonstrated costs of overhead operations at the Project Site during any period of delay of more than seven (7) days, except to the extent that Work proceeds concurrently with remediation. The categories of costs to be reimbursed are limited to those reasonably incurred at the jobsite during the delay period (such as trailers or offices, telephones, faxes, and the like); equipment dedicated to the Project and located at the Project Site; salaries and associated costs of personnel dedicated to the Project to the extent that they do not perform work on other projects; and other jobsite costs that are reasonable and which are incurred during the delay period. Subcontractors and suppliers which have not mobilized are limited to the costs set forth in Section 2.4.U(3).
- (3) Contractor and any Subcontractor or supplier on the Project who is eligible for compensation shall be paid any demonstrated costs of escalation in materials or labor, and reasonable costs of off-site storage of materials identified to the Project, arising because of any delay of more than seven (7) days. Such Contractor, Subcontractors and suppliers are obligated to take all reasonable steps to mitigate escalation costs, such as through early purchase of materials.

- (4) Contractor, for itself and all Subcontractors and suppliers on the Project, hereby agrees that the extension of time for delays under Section 2.4.U(1), and payment of the costs identified in Sections 2.4.U(2) and/or Section 2.4.U(3), are the sole remedies for costs and delays described in this Section, and waives all claims and demands for extended home office overhead (including, but not limited to, "Eichleay" claims), lost profit or lost opportunities, and any special, indirect, or consequential damages arising as a result of delays described in this Section. The Contract Sum shall be adjusted to reflect payment of allowable costs.
- (5) If any delay described in this section causes the time or cost for the Project to exceed the Contract Time or the Contract Sum, then the Owner may terminate the Agreement pursuant to Section 14.2.
- (6) Contractor and any Subcontractor or supplier seeking additional costs under this Section 2.4.U. shall promptly submit estimates or any costs as requested by Owner, and detailed back-up for all costs when payment is sought or whenever reasonably requested by Owner. All costs are auditable, at Owner's discretion. Bid, estimate and pricing information reasonably related to any request for additional compensation will be provided promptly upon request.
- (7) Contractor shall include provisions in its subcontracts and purchase orders consistent with this Section.

V. Interfacing.

- (1) The Contractor shall take such measures as are necessary to ensure proper construction and delivery of the Project, including but not limited to providing for the procurement of long-lead items, the separate construction subcontracts, and the general conditions items are performed without duplication or overlap to maintain completion of all Work on schedule. Particular attention shall be given to provide that each Subcontractor bid package clearly identifies the Work included in that particular separate subcontract, its scheduling for start and completion, and its relationship to other separate contractors.
- (2) Without assuming any design responsibilities of the Architect/Engineer, the Contractor shall include in the Progress Reports required under this Section 2.4 comments on overlap with any other separate subcontracts, omissions, lack of correlation between drawings, and any other deficiencies noted, in order that the Architect/Engineer may arrange for necessary corrections.

W. Job Site Facilities. The Contractor shall arrange for all job site facilities required and necessary to enable the Contractor and Architect/Engineer to perform their respective duties and to accommodate any representatives of the Owner which the Owner may choose to have present on the Project Site.

X. Weather Protection. The Contractor shall provide temporary enclosures of building areas to assure orderly progress of the Work during periods when extreme weather conditions are likely to be experienced. The Contractor shall also be responsible for providing weather protection for Work in progress and for materials stored on the Project Site. A contingency plan shall be prepared upon request of the Owner for weather conditions that may affect the construction.

Y. Payment and Performance Bond. Prior to the construction commencement date, the Contractor shall obtain, for the benefit of and directed to the Owner, a Payment and Performance Bond satisfying the requirements of Section 255.05, Florida Statutes, covering the faithful performance by the Contractor of its obligations under the Contract Documents, including but not limited to the construction of the Project on the Project Site and the payment of all obligations arising thereunder, including all payments to Subcontractors, laborers, and materialmen. The surety selected by the Contractor to provide the Payment and Performance Bond shall be approved by the Owner prior to the issuance of such Bond, which approval shall not be unreasonably withheld or delayed provided that the surety is rated A or better by Best's Key Guide, latest edition. For Changes in the Work that result in an increase in the Contract Sum, Owner reserves the right to require the Contractor to secure and deliver additional riders to the Payment and Performance Bond.

Z. Construction Phase; Building Permits; Code Inspections. Unless otherwise provided, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work.

- (1) Building Permits. The Owner and Architect/Engineer shall provide such information to any Permitting Authority as is necessary to obtain approval from the Permitting Authority to commence construction prior to beginning construction. Contractor shall pull any required building permit, and shall be responsible for delivering and posting the building permit at the Project Site prior to the commencement of construction. The cost of the building permit is included in the Contract Sum. The Owner and Architect/Engineer shall fully cooperate with the Contractor when and where necessary.
- (2) Code Inspections. The Project requires detailed code compliance inspection during construction in disciplines determined by any Permitting Authority. These disciplines normally include, but are not necessarily limited to, structural, mechanical, electrical, plumbing, general building and fire. The Contractor shall notify the appropriate inspector(s) and the Architect/Engineer, no less than 24 hours in advance, when the Work is ready for inspection and before the Work is covered up. All inspections shall be made for conformance with the applicable ordinances and building codes. Costs for all re-inspections of Work found defective and subsequently repaired shall not be included as Project Costs and shall be borne by the Contractor or as provided in the contract between Contractor and Subcontractor.

- (3) Contractor's Personnel. The Contractor shall maintain sufficient off-site support staff and competent full-time staff at the Project Site authorized to act on behalf of the Contractor to coordinate, inspect, and provide general direction of the Work and progress of the Subcontractors. At all times during the performance of the Work, the Owner shall have the right to demand replacement of Contractor Personnel to whom the Owner has reasonable objection, without liability to the Contractor.
- (4) Lines of Authority. To provide general direction of the Work, the Contractor shall establish and maintain lines of authority for its personnel and shall provide this information to the Owner and all other affected parties, such as the code inspectors of any Permitting Authority, the Subcontractors, and the Architect/Engineer. The Owner and Architect/Engineer may attend meetings between the Contractor and his Subcontractors; however, such attendance is optional and shall not diminish either the authority or responsibility of the Contractor to administer the subcontracts.

AA. Quality Control. The Contractor shall develop and maintain a program, acceptable to the Owner and Architect/Engineer, to assure quality control of the construction. The Contractor shall be responsible for and supervise the Work of all Subcontractors, providing instructions to each when their Work does not conform to the requirements of the Project Plans and Specifications, and the Contractor shall continue to coordinate the Work of each Subcontractor to ensure that corrections are made in a timely manner so as to not affect the efficient progress of the Work. Should a disagreement occur between the Contractor and the Architect/Engineer over the acceptability of the Work, the Owner, at its sole discretion and in addition to any other remedies provided herein, shall have the right to determine the acceptability, provided that such determination is consistent with standards for construction projects of this type and generally accepted industry standards for workmanship in the State of Florida.

BB. Management of Subcontractors. All Subcontractors shall be compensated in accordance with Article IV. The Contractor shall solely control the Subcontractors. The Contractor shall negotiate all Change Orders and Field Orders with all affected Subcontractors and shall review the costs and advise the Owner and Architect/Engineer of their validity and reasonableness, acting in the Owner's best interest. When there is an imminent threat to health and safety, and Owner's Project Representative concurrence is impractical, the Contractor shall act immediately to remove the threats to health and safety and shall subsequently fully inform Owner of all such action taken. The Contractor shall also carefully review all shop drawings and then forward the same to the Architect/Engineer for review and actions. The Architect/Engineer will transmit them back to the Contractor, who will then issue the shop drawings to the affected Subcontractor for fabrication or revision. The Contractor shall maintain a suspense control system to promote expeditious handling. The Contractor shall request the Architect/Engineer to make interpretations of the drawings or specifications requested of him by the Subcontractors and shall maintain a business system to promote timely response. The Contractor shall inform the Architect/Engineer which shop drawings or requests for clarification have the greatest urgency, to enable the Architect/Engineer to prioritize requests coming from the Contractor. The Contractor shall advise the Owner and Architect/Engineer when timely response is not occurring on any of the above.

CC. Job Requirements.

- (1) The Contractor shall provide each of the following as a part of its services hereunder:
 - (a) Maintain a log of daily activities, including manpower records, equipment on site, weather, delays, major decisions, etc;
 - (b) Maintain a roster of companies on the Project with names and telephone numbers of key personnel;
 - (c) Establish and enforce job rules governing parking, clean-up, use of facilities, and worker discipline;
 - (d) Provide labor relations management and equal opportunity employment for a harmonious, productive Project;
 - (e) Provide and administer a safety program for the Project and monitor for subcontractor compliance without relieving them of responsibilities to perform Work in accordance with best acceptable practice;
 - (f) Provide a quality control program as provided under Section 2.4.C above;
 - (g) Provide miscellaneous office supplies that support the construction efforts which are consumed by its own forces;
 - (h) Provide travel to and from its home office to the Project Site and to those other places within Manatee County as required by the Project;
 - (i) Verify that tests, equipment, and system start-ups and operating and maintenance instructions are conducted as required and in the presence of the required personnel and provide adequate records of same to the Architect/Engineer;
 - (j) 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 after execution of the Agreement, Owner/Architect/Engineer's clarifications and interpretations of the Contract Documents, Progress Reports, as-built drawings, and other project related documents;
 - (k) 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, and provide copies of same to Owner/Architect/Engineer;

- (l) Record names, addresses and telephone numbers of all Contractors, Subcontractors and major suppliers of materials and equipment;
 - (m) Furnish Owner/Architect/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;
 - (n) Consult with Owner/Architect/Engineer in advance of scheduling major tests, inspections or start of important phases of the Work;
 - (o) Verify, during the course of the Work, that certificates, maintenance and operations manuals and other data required to be assembled and furnished are applicable to the items actually installed, and deliver same to Owner/Architect/Engineer for review prior to final Acceptance of the Work; and
 - (p) Cooperate with Owner in the administration of grants.
- (2) The Contractor shall provide personnel and equipment, or shall arrange for separate Subcontractors to provide each of the following as a Project Cost:
- (a) Services of independent testing laboratories, and provide the necessary testing of materials to ensure conformance to contract requirements; and
 - (b) Printing and distribution of all required bidding documents and shop drawings, including the sets required by Permitting Authority inspectors.

DD. As-Built Drawings. The Contractor shall continuously review as-built drawings and mark up progress prints to provide as much accuracy as possible. Prior to, and as a requirement for authorizing final payment to the Contractor due hereunder, the Contractor shall provide to the Owner an original set of marked-up, as-built Project Plans and Specifications and an electronic format of those records showing the location and dimensions of the Project as constructed, which documents shall be certified as being correct by the Contractor and the Architect/Engineer. Final as-built drawings shall be signed and sealed by a registered Florida surveyor.

EE. Progress Reports. The Contractor shall forward to the Owner, as soon as practicable after the first day of each month, a summary report of the progress of the various parts of the Work, to include those parts of the Work 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 Owner's review

and approval. In addition, more detailed schedules may be required by the Owner for daily traffic control.

FF. Contractor's Warranty. The Contractor warrants to the Owner and Architect/Engineer that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements will be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect/Engineer, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

- (1) Contractor shall use its best efforts and due diligence to ensure that during the warranty period, those entities or individuals who have provided direct warranties to the Owner as required by the Contract Documents perform all required warranty Work in a timely manner and at the sole cost and expense of such warranty providers. Any such cost or expense not paid by the warranty providers shall be paid by the Contractor, to include any costs and attorney's fees incurred in warranty-related litigation between Contractor and any Subcontractors.
- (2) The Contractor shall secure guarantees and warranties of Subcontractors, equipment suppliers and materialmen, and assemble and deliver same to the Owner in a manner that will facilitate their maximum enforcement and assure their meaningful implementation. The Contractor shall collect and deliver to the Owner any specific written guaranties or warranties given by others as required by subcontracts.
- (3) At the Owner's request, the Contractor shall conduct, jointly with the Owner and the Architect/Engineer, no more than two (2) warranty inspections within three (3) years after the Substantial Completion Date.

GG. Apprentices. If Contractor employs apprentices, their performance of Work shall be governed by and shall comply with the provisions of Chapter 446, Florida Statutes.

HH. Schedule of Values. Unit prices shall be established for this Agreement by the submission of a schedule of values within ten (10) days of receipt of the Notice to Proceed. The schedule shall include quantities and prices of items equaling the Contract Sum and will subdivide the Work into components in sufficient detail to serve as the basis for progress payments during construction. Such prices shall 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.

II. Other Contracts. The Owner 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 III COMPENSATION

3.1 Compensation. The Contract Sum 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 Contractor's expense without change in the Contract Sum.

A. Adjustments. The Contract Sum may only be changed by Change Order or by a written amendment. Any claim for an increase or decrease in the Contract Sum 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 fifteen (15) days from the beginning of such occurrence and shall be accompanied by claimant's written statement that the amount claimed covers all amounts to which the claimant is entitled as a result of the occurrence of said event. Failure to deliver a claim within the requisite 15-day period shall constitute a waiver of the right to pursue said claim.

B. Valuation. The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Sum shall be determined in one of the following ways (at Owner's discretion):

- (1) In the case of Unit Price Work, in accordance with Section 3.1.C, below; or
- (2) By mutual acceptance of a lump sum; or
- (3) On the basis of the cost of the Work, plus a negotiated Contractor's fee for overhead and profit. Contractor shall submit an itemized cost breakdown together with supporting data.

C. Unit Price Work. The unit price of an item of Unit Price Work shall be subject to re-evaluation and adjustment pursuant to a requested Change Order under the following conditions:

- (1) If the total cost of a particular item of Unit Price Work amounts to 5% or more of the Contract Sum 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 Agreement; and
- (2) If there is no corresponding adjustment with respect to any other item of Work; and
 - (i) If Contractor believes that it has incurred additional expense as a result thereof; or
 - (ii) If Owner believes that the quantity variation entitles it to an

adjustment in the unit price; or

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

3.2 Schedule of Compensation. All payments for services and material under the Contract Documents shall be made in accordance with the following provisions.

A. Periodic Payments for Services. The Contractor shall be entitled to receive payment for Construction Services rendered pursuant to Section 2.4 in periodic payments which shall reflect a fair apportionment of cost and schedule of values of services furnished prior to payment, subject to the provisions of this Section.

B. Payment for Materials and Equipment. In addition to the periodic payments authorized hereunder, payments may be made for material and equipment not incorporated in the Work but delivered and suitably stored at the Project Site, or another location, subject to prior approval and acceptance by the Owner on each occasion.

C. Credit toward Contract Sum. All payments for Construction Services made hereunder shall be credited toward the payment of the Contract Sum as Contractor's sole compensation for the construction of the Project.

3.3 Invoice and Payment. All payments for services and materials under the Contract Documents shall be invoiced and paid in accordance with the following provisions.

A. Invoices. The Contractor shall submit to the Owner periodic invoices for payment, in a form acceptable to the Owner, which shall include a sworn statement certifying that, to the best of the Contractor's knowledge, information and belief, the construction has progressed to the point indicated, the quality of the Work covered by the invoice is in accord with the Project Plans and Specifications, and the Contractor is entitled to payment in the amount requested, along with the cost reports required pursuant to Article II, showing in detail all monies paid out, Project Costs accumulated, or Project Cost incurred during the previous period. This data shall be attached to the invoice.

B. Additional Information; Processing of Invoices. Should an invoiced amount appear to exceed the Work effort believed to be completed, the Owner may, prior to processing of the invoice for payment, require the Contractor to submit satisfactory evidence to support the invoice. All Progress Reports and invoices shall be delivered to the attention of the Owner's Project Representative. Invoices not properly prepared (mathematical errors, billing not reflecting actual Work done, no signature, etc.) shall be returned to the Contractor for correction.

C. Architect/Engineer's Approval. Payment for Work completed shall be subject to the Architect/Engineer approving the payment requested by the Contractor and certifying the amount thereof that has been properly incurred and is then due and payable to the Contractor, and identifying with specificity any amount that has not been properly incurred and that should not be paid.

D. Warrants of Contractor with Respect to Payments. The Contractor warrants that (1) upon payment of any retainage, materials and equipment covered by a partial payment request will pass to Owner either by incorporation in construction or upon receipt of payment by the Contractor, whichever occurs first; (2) Work, materials and equipment covered by previous partial payment requests shall be free and clear of liens, claims, security interests, or encumbrances; and (3) no Work, materials or equipment covered by a partial payment request which has been acquired by the Contractor or any other person performing Work at the Project Site, or furnishing materials or equipment for the Project, shall be subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or any other person.

E. All Compensation Included. Contractor's compensation includes full payment for services set forth in the Contract Documents, including but not limited to overhead, profit, salaries or other compensation of Contractor's officers, partners and/or employees, general operating expenses incurred by Contractor and relating to this Project, including the cost of management, supervision and data processing staff, job office equipment and supplies, and other similar items.

ARTICLE IV SUBCONTRACTORS

4.1 Subcontracts. At the Owner's request, the Contractor shall provide Owner's Project Representative with copies of all proposed and final subcontracts, including the general and supplementary conditions thereof.

A. Subcontract Generally. All subcontracts shall: (1) require each Subcontractor to be bound to Contractor to the same extent Contractor is bound to Owner by the terms of the Contract Documents, as those terms may apply to the portion of the Work to be performed by the Subcontractor, (2) provide for the assignment of the subcontracts from Contractor to Owner at the direction of Owner, upon termination of Contractor, (3) provide that Owner will be an additional indemnified party of the subcontract, (4) provide that Owner will be an additional insured on all insurance policies required to be provided by the Subcontractor, except workers' compensation, (5) assign all warranties directly to Owner, and (6) identify Owner as an intended third-party beneficiary of the subcontract.

(1) A Subcontractor is a person or entity who has a direct contract with Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

(2) A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

B. No Damages for Delay. Except when otherwise expressly agreed to by Owner in writing, all subcontracts shall provide:

“LIMITATION OF REMEDIES – NO DAMAGES FOR DELAY. The Subcontractor's exclusive remedy for delays in the performance of the contract caused by events beyond its control, including delays claimed to be caused by the Owner or Architect/Engineer or attributable to the Owner or Architect/Engineer and including claims based on breach of contract or negligence, shall be an extension of its contract time and shall in no way involve any monetary claim.”

Each subcontract shall require that any claims by the Subcontractor for delay must be submitted to the Contractor within the time and in the manner in which the Contractor must submit such claims to the Owner, and that failure to comply with the conditions for giving notice and submitting claims shall result in the waiver of such claims.

C. Subcontractual Relations. The Contractor shall require each Subcontractor to assume all the obligations and responsibilities which the Contractor owes the Owner pursuant to the Contract Documents, by the parties to the extent of the Work to be performed by the Subcontractor. Said obligations shall be made in writing and shall preserve and protect the rights of the Owner and Architect/Engineer, with respect to the Work to be performed by the Subcontractor, so that the subcontracting thereof will not prejudice such rights. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with its sub-subcontractors.

D. Insurance; Acts and Omissions. Insurance requirements for Subcontractors shall be no more stringent than those requirements imposed on the Contractor by the Owner. The Contractor shall be responsible to the Owner for the acts and omissions of its employees, agents, Subcontractors, their agents and employees, and all other persons performing any of the Work or supplying materials under a contract to the Contractor.

4.2 Relationship and Responsibilities. Except as specifically set forth herein with respect to direct materials acquisitions by Owner, nothing contained in the Contract Documents or in any Contract Document does or shall create any contractual relation between the Owner or Architect/Engineer and any Subcontractor. Specifically, the Contractor is not acting as an agent of the Owner with respect to any Subcontractor. The utilization of any Subcontractor shall not relieve Contractor from any liability or responsibility to Owner, or obligate Owner to the payment of any compensation to the Subcontractor or additional compensation to the Contractor.

4.3 Payments to Subcontractors; Monthly Statements. The Contractor shall be responsible for paying all Subcontractors from the payments made by the Owner to Contractor pursuant to Article III, subject to the following provisions:

A. Payment. The Contractor shall, no later than ten (10) days after receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's Work, pay to each Subcontractor the amount to which the Subcontractor is entitled in accordance with the terms of the Contractor's contract with such Subcontractor. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make

payments to sub-Subcontractors in a similar manner. After receipt of payment from Owner, if the need should arise to withhold payments to Subcontractors for any reason, as solely determined by Contractor, the Contractor shall promptly restore such monies to the Owner, adjusting subsequent pay requests and Project bookkeeping as required.

B. Final Payment of Subcontractors. The final payment of retainage to Subcontractors shall not be made until the Project has been inspected by the Architect/Engineer or other person designated by the Owner for that purpose, and until both the Architect/Engineer and the Contractor have issued a written certificate that the Project has been constructed in accordance with the Project Plans and Specifications and approved Change Orders. Before issuance of final payment to any Subcontractor without any retainage, the Subcontractor shall submit satisfactory evidence that all payrolls, material bills, and other indebtedness connected with the Project have been paid or otherwise satisfied, warranty information is complete, as-built markups have been submitted, and instruction for the Owner's operating and maintenance personnel is complete. Final payment may be made to certain select Subcontractors whose Work is satisfactorily completed prior to the completion of the Project, but only upon approval of the Owner's Project Representative.

4.4 Responsibility for Subcontractors. As provided in Section 2.4.BB, Contractor shall be fully responsible to Owner 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.

4.5 Contingent Assignment of Subcontracts. Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that:

- (1) assignment is effective only after termination of the Contract by the Owner for cause pursuant to Article XIV and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- (2) assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Agreement.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract. Upon such assignment, if the Work has been suspended for more than thirty (30) days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension. Upon such assignment to the Owner, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE V CHANGES IN WORK

5.1 General. Changes in the Work may be accomplished after execution of the Agreement, and without invalidating the Agreement, by Change Order, Work Directive Change

or order for a minor change in the Work, subject to the limitations stated in this Article V and elsewhere in the Contract Documents. A Change Order shall be based upon agreement among the Owner, Contractor and Architect/Engineer; a Work Directive Change requires agreement by the Owner and Architect/Engineer and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect/Engineer alone. Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Work Directive Change or order for a minor change in the Work.

5.2 Minor Changes in the Work. The Owner or Architect/Engineer shall have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such change will be effected by written order signed by the Architect/Engineer and shall be binding on the Owner and Contractor. The Contractor shall abide by and perform such minor changes. Such changes shall be effected by a Field Directive or a Work Directive Change. Documentation of changes shall be determined by the Construction Team, and displayed monthly in the Progress Reports. Because such changes shall not affect the Contract Sum to be paid to the Contractor, they shall not require a Change Order pursuant to Section 5.6.

5.3 Emergencies. In any emergency affecting the safety of persons or property, the Contractor shall act at its discretion to prevent threatened damage, injury, or loss. Any increase in the Contract Sum or extension of time claimed by the Contractor because of emergency Work shall be determined as provided in Section 5.6. However, whenever practicable, the Contractor shall obtain verbal concurrence of the Owner's Project Representative and Architect/Engineer where the act will or may affect the Contract Sum or Contract Time.

5.4 Concealed Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect/Engineer before conditions are disturbed and in no event later than ten (10) days after first observance of the conditions. The Architect/Engineer will promptly investigate such conditions and, if the Architect/Engineer determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect/Engineer determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect/Engineer shall promptly notify the Owner and Contractor in writing, stating the reasons. If the Contractor disputes the Architect/Engineer's determination or recommendation, the Contractor may proceed as provided in Article VIII. If the Owner disputes the Architect/Engineer's determination or recommendation, the Owner may appeal directly to the Purchasing Official and shall thereafter follow the process set forth in Section 8.5.

5.5 Hazardous Materials. In the event the Contractor encounters on the Project Site material reasonably believed to be hazardous, petroleum or petroleum related products, or other hazardous or toxic substances, except as provided in Section 2.4.U, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and the

Architect/Engineer in writing. The Work in the affected area shall not thereafter be resumed except by Change Order or written amendment, if in fact the material or substance has not been rendered harmless. The Work in the affected area shall be resumed when the Project Site has been rendered harmless, in accordance with the final determination by the Architect/Engineer or other appropriate professional employed by Owner. The Contractor shall not be required to perform without its consent any Work relating to hazardous materials, petroleum or petroleum related products, or other hazardous or toxic substances. In the event the Contractor encounters on the Project Site materials believed in good faith to be hazardous or contaminated material, and the presence of such hazardous or contaminated material was not known and planned for at the time the Contractor submitted its Bid (or Guaranteed Maximum Price proposal), and it is necessary for the Contractor to stop Work in the area affected and delays Work for more than a seven (7) day period, adjustments to the Contract Sum and/or Contract Time shall be made in accordance with this Article V.

5.6 Change Orders; Adjustments to Contract Sum.

A. Change Orders Generally. The increase or decrease in the Contract Sum resulting from a change authorized pursuant to the Contract Documents shall be determined:

- (1) By mutual acceptance of a lump sum amount properly itemized and supported by sufficient substantiating data, to permit evaluation by the Architect/Engineer and Owner;
- (2) By unit prices stated in the Agreement or subsequently agreed upon; or
- (3) By any other method mutually agreeable to Owner and Contractor.

If Owner and Contractor are unable to agree upon increases or decreases in the Contract Sum and the Architect/Engineer certifies that the work needs to be commenced prior to any such agreement, the Contractor, provided it receives a written Change Order signed by or on behalf of the Owner, shall promptly proceed with the Work involved. The cost of such Work shall then be determined on the basis of the reasonable expenditures of those performing the Work attributed to the change. However, in the event a Change Order is issued under these conditions, the Owner, through the Architect/Engineer, will establish an estimated cost of the Work and the Contractor shall not perform any Work whose cost exceeds that estimated without prior written approval by the Owner. In such case, the Contractor shall keep and present in such form as the Owner may prescribe an itemized accounting, together with appropriate supporting data of the increase in overall costs of the Project. The amount of any decrease in the Contract Sum to be allowed by the Contractor to the Owner for any deletion or change which results in a net decrease in costs will be the amount of the actual net decrease.

5.7 Owner-Initiated Changes. Without invalidating the Agreement and without notice to any Surety, Owner may, at any time, order additions, deletions or revisions in the Work. These will be authorized by a written amendment, a Field Directive, a Change Order, or a Work Directive Change, as the case may be. 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). A Work Directive Change may not change the Contract Sum or the 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 Sum or Contract Time.

5.8 Unauthorized Work. Contractor shall not be entitled to an increase in the Contract Sum or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents.

5.9 Defective Work. Owner and Contractor shall execute appropriate Change Orders (or written amendments) covering changes in the Work which are ordered by Owner, or which may be required because of acceptance of defective Work, without adjustment to the Contract Sum.

5.10 Estimates for Changes. At any time Architect/Engineer may request a quotation from Contractor for a proposed change in the Work. Within twenty-one (21) calendar days after receipt, Contractor shall submit a written and detailed proposal for an increase or decrease in the Contract Sum or Contract Time for the proposed change. Architect/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 Architect/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 shall be considered non-prejudicial.

5.11 Form of Proposed Changes. 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 Owner. Standard Owner forms shall be utilized.

5.12 Changes to Contract Time. The Contract Time may only be changed pursuant to a Change Order or a written amendment to the Contract Documents. 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 to because of the occurrence of said event. 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 Owner or others performing additional Work; or to fires, floods, epidemics, abnormal weather conditions or acts of God. Failure to deliver a written notice of claim within the requisite 15-day period shall constitute a waiver of the right to pursue said claim.

ARTICLE VI ROLE OF ARCHITECT/ENGINEER

6.1 General.

A. Retaining. The Owner shall retain an Architect/Engineer (whether an individual or an entity) lawfully licensed to practice in Florida. That person or entity is identified as the Architect/Engineer in the Agreement and is referred to throughout the Contract Documents as if singular in number.

B. Duties. Duties, responsibilities and limitations of authority of the Architect/Engineer as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner and Architect/Engineer. Consent shall not be unreasonably withheld.

C. Termination. If the employment of the Architect/Engineer is terminated, the Owner shall employ a successor Architect/Engineer as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect/Engineer.

6.2 Administration. The Architect/Engineer will provide administration of the Agreement as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect/Engineer approves the final Application for Payment. The Architect/Engineer will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

A. Site Visits. The Architect/Engineer will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work complete, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. Unless specifically instructed by Owner, the Architect/Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect/Engineer will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

B. Reporting. Based on the site visits, the Architect/Engineer will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect/Engineer will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect/Engineer will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

6.3 Interpretation of Project Plans and Specifications. The Architect/Engineer will be the interpreter of the requirements of the Project Plans and Specifications. Upon receipt of comments or objections by Contractor or Owner, the Architect/Engineer will make decisions on all claims, disputes, or other matters pertaining to the interpretation of the Project Plans and Specifications.

6.4 Rejection of Non-Conforming Work. Upon consultation with Owner, the Architect/Engineer shall have the authority to reject Work which does not conform to the Project Plans and Specifications.

6.5 Correction of Work. The Contractor shall promptly correct all Work rejected by the Architect/Engineer for being defective or as failing to conform to the Project Plans and Specifications, whether observed before or after the Substantial Completion Date and whether or not fabricated, installed, or completed. The Contractor shall bear all costs of correcting such rejected Work, including compensation for Architect/Engineer's additional services made necessary thereby.

6.6 Timely Performance of Architect/Engineer. The Contractor shall identify which requests for information or response from the Architect/Engineer have the greatest urgency and those items which require prioritizing in response by the Architect/Engineer. The Contractor shall also identify the preferred time period for response and shall request a response time which is reasonably and demonstrably related to the needs of the Project and Contractor. If Architect/Engineer claims that Contractor's expectations for a response are unreasonable, Owner shall require Architect/Engineer to communicate such claim to Contractor in writing together with the specific time necessary to respond and the date upon which such response will be made. If Contractor believes that Architect/Engineer is not providing timely services or responses, Contractor shall notify Owner of same in writing not less than two (2) weeks before Contractor believes performance or response time from Architect/Engineer is required without risk of delaying the Project.

ARTICLE VII OWNER'S RIGHTS AND RESPONSIBILITIES

7.1 Project Site: Title. The Owner shall provide the lands upon which the Work under the Contract Documents 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. The Owner hereby represents to the Contractor that it currently has and will maintain up through and including the Substantial Completion Date, good title to all of the real property constituting the Project Site. Owner agrees to resolve, at its expense, any disputes relating to the ownership and use of the Project Site which might arise during construction.

7.2 Project Plans and Specifications; Architect/Engineer. The parties hereto acknowledge and agree that Owner has previously entered into an agreement with Architect/Engineer. Pursuant to the terms of such agreement, the Architect/Engineer, as an agent and representative of Owner, is responsible for the preparation of Project Plans and Specifications which consist of drawings, specifications, and other documents setting forth in detail the requirements for the construction of the Project. All such Project Plans and Specifications shall be provided either by Owner or the Architect/Engineer, and Contractor shall be under no obligation to provide same and shall be entitled to rely upon the accuracy and completeness of the Project Plans and Specifications provided by the Architect/Engineer and all preliminary drawings prepared in connection therewith. The Contractor will be furnished a reproducible set of all drawings and specifications reasonably necessary for the performance of Contractor's services hereunder and

otherwise ready for printing. The Contractor shall be notified of any written modification in the agreement between Owner and Architect/Engineer.

7.3 Surveys; Soil Tests and Other Project Site Information. Owner shall be responsible for providing a legal description and certified land survey of the Project Site in a form and content and with such specificity as may be required by the Architect/Engineer and Contractor to perform their services. To the extent deemed necessary by Owner and Architect/Engineer, and solely at Owner's expense, Owner may engage the services of a geotechnical consultant to perform test borings and other underground soils testing as may be deemed necessary by the Architect/Engineer or the Contractor. Contractor shall not be obligated to provide such surveys or soil tests and shall be entitled to rely upon the accuracy and completeness of the information provided; subject, however, to the provisions of Section 2.4.S hereof. Owner shall provide Contractor, as soon as reasonably possible following the execution of the Contract Documents, all surveys or other survey information in its possession describing the physical characteristics of the Project Site, together with soils reports, subsurface investigations, utility locations, deed restrictions, easements, and legal descriptions then in its possession or control. Upon receipt of all surveys, soils tests, and other Project Site information, Contractor shall promptly advise Owner of any inadequacies in such information and of the need for any additional surveys, soils or subsoil tests. In performing this Work, Contractor shall use the standard of care of experienced contractors and will use its best efforts timely to identify all problems or omissions. Owner shall not be responsible for any delay or damages to the Contractor for any visible or disclosed site conditions or disclosed deficiencies in the Project Site which should have been identified by Contractor and corrected by Owner prior to the execution of the Contract Documents.

7.4 Information; Communication; Coordination. The Owner's Project Representative shall examine any documents or requests for information submitted by the Contractor and shall advise Contractor of Owner's decisions pertaining thereto within a reasonable period of time to avoid unreasonable delay to the progress of the Contractor's services. Contractor shall indicate if any such documents or requests warrant priority consideration. However, decisions pertaining to approval of the Project Schedule as it relates to the date of Substantial Completion, the Project Cost, Contractor's compensation, approving or changing the Contract Sum shall only be effective when approved by Owner in the form of a written Change Order or amendment to the Contract Documents. Owner reserves the right to designate a different Owner's Project Representative provided Contractor is notified in writing of any such change. Owner and Architect/Engineer may communicate with Subcontractors, materialmen, laborers, or suppliers engaged to perform services on the Project, but only for informational purposes. Neither the Owner nor the Architect/Engineer shall attempt to direct the Work of or otherwise interfere with any Subcontractor, materialman, laborer, or supplier, or otherwise interfere with the Work of the Contractor. Owner shall furnish the data required of Owner under the Contract Documents promptly.

7.5 Governmental Body. The Contractor recognizes that the Owner is a governmental body with certain procedural requirements to be satisfied. The Contractor has and will make reasonable allowance in its performance of services for such additional time as may be required for approvals and decisions by the Owner and any other necessary government agency.

7.6 Pre-Completion Acceptance. The Owner 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.

7.7 Ownership and Use of Drawings, Specifications and Other Instruments of Service.

- (1) The Architect/Engineer and the Architect/Engineer's consultants shall be deemed the authors and owners of their respective instruments of service, including the Project Plans and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the instruments of service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect/Engineer's or Architect/Engineer's consultants' reserved rights.
- (2) The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the drawings and specifications provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Project Plans and Specifications or other instruments of service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the drawings or specifications on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect/Engineer and the Architect/Engineer's consultants.

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

A. Responsibilities. Except as otherwise instructed in writing by Owner, the Owner's Project Representative will:

- (1) Attend preconstruction conferences; arrange a schedule of progress meetings and other job conferences as required in consultation with Owner/Architect/Engineer and notify those expected to attend in advance; and attend meetings and maintain and circulate copies of minutes thereof;
- (2) Serve as Owner/Architect/Engineer's liaison with Contractor, working principally through Contractor's superintendent, to assist in understanding the intent of the Contract Documents. As requested by Owner/Architect/Engineer, assist in obtaining additional details or information when required at the job site for proper execution of the Work;

- (3) Report to Owner/Architect/Engineer whenever he believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents;
- (4) Accompany visiting inspectors representing public or other agencies having jurisdiction over the project; record the outcome of these inspections and report to Owner/Architect/Engineer;
- (5) Review applications for payment with Contractor for compliance with the established procedure for their submission and forward them with recommendations to Owner/Architect/Engineer; and
- (6) Perform those duties as set forth elsewhere within the Contract Documents.

B. Limitations. Except upon written instructions of Owner, Owner's Project Representative shall not:

- (1) Authorize any deviation from the Contract Documents or approve any substitute materials or equipment;
- (2) Exceed limitations on Owner/Architect/Engineer's authority as set forth in the Contract Documents;
- (3) Undertake any of the responsibilities of Contractor, Subcontractors or Contractor's superintendent, or expedite the Work;
- (4) Advise 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;
- (5) Advise or issue directions as to safety precautions and programs in connection with the Work;
- (6) Authorize Owner to occupy the project in whole or in part; or
- (7) Participate in specialized field or laboratory tests.

ARTICLE VIII RESOLUTION OF DISAGREEMENTS; CLAIMS FOR COMPENSATION

8.1 Owner to Decide Disputes. The Owner shall reasonably decide all questions and disputes (with the exception of matters pertaining to the interpretation of the Project Plans and Specifications which shall be resolved by the Architect/Engineer pursuant to Section 6.3) that may arise in the execution and fulfillment of the services provided for under the Contract Documents, in accordance with the Procurement Ordinance.

8.2 Finality. The decision of the Owner upon all claims, questions, disputes and conflicts shall be final and conclusive, and shall be binding upon all parties to the Contract Documents, subject to judicial review as provided in Section 8.5 below.

8.3 No Damages for Delay. If at any time Contractor is delayed in the performance of Contractor's responsibilities under the Contract Documents as the result of a default or failure to perform in a timely manner by Owner or Owner's agents or employees, Contractor shall not be entitled to any damages except for compensation specifically authorized in Article III. Contractor's sole remedy will be a right to extend the time for performance. Nothing herein shall preclude Contractor from any available remedy against any responsible party other than Owner. Contractor shall be responsible for liquidated damages for delay if otherwise provided for in the Contract Documents.

8.4 Permitted Claims Procedure. Where authorized or permitted under the Contract Documents, all claims for additional compensation by Contractor, extensions of time affecting the Substantial Completion Date, for payment by the Owner of costs, damages or losses due to casualty, Force Majeure, Project Site conditions or otherwise, shall be governed by the following:

- (1) All claims must be submitted as a request for Change Order in the manner as provided in Article V.
- (2) The Contractor must submit its notice of claim to Owner's Project Representative and to the Architect/Engineer within fifteen (15) days of the beginning of such occurrence. Failure to submit a claim within the requisite 15-day period shall constitute a waiver of the right to pursue said claim.
- (3) Within twenty (20) days of submitting its notice of claim, the Contractor shall submit to the Owner's Project Representative its request for Change Order, which shall include a written statement of all details of the claim, including a description of the Work affected.
- (4) After receipt of a request for Change Order, the Owner's Project Representative, in consultation with the Architect/Engineer, shall deliver to the Contractor, within twenty (20) days after receipt of request, its written response to the claim.
- (5) In the event the Owner and Contractor are unable to agree on the terms of a Change Order, the Owner shall have the option to instruct the Contractor to proceed with the Work. In that event, the Owner shall pay for those parts of the Work, the scope and price of which are not in dispute. The balance of the disputed items in the order to proceed will be resolved after completion of the Work, based upon completed actual cost.
- (6) The rendering of a decision by Owner with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment) will be a condition precedent to any exercise by Owner or Contractor of such right or remedies as either may otherwise have under the Contract Documents or by laws or regulations in respect of any such claim, dispute or other matter.

8.5 Contract Claims and Disputes. After completion of the process set forth in Section 8.4 above, any unresolved dispute under this Agreement shall be decided by the Purchasing Official in accordance with Section 2-26-63 of the Manatee County Code of Laws, subject to an administrative hearing process as provided in Section 2-26-64. The decision of the hearing officer in accordance with Section 2-26-64 of the Manatee County Code of Laws shall be the final and conclusive decision subject to exclusive judicial review in circuit court by a petition for certiorari.

8.6 Claims for Consequential Damages. The Contractor and Owner waive claims against each other for consequential damages arising out of or relating to this Agreement. This mutual waiver includes:

- (1) damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons, unless any of such damages or losses are covered by insurance placed by the Contractor; and
- (2) damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article XIV. Nothing contained in this Section 8.6 shall be deemed to preclude assessment of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.

ARTICLE IX INDEMNITY

9.1 Indemnity.

A. Indemnification Generally. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect/Engineer, Architect/Engineer's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor or anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 9.1.

B. Indemnification; Enforcement Actions. The Contractor's duty to indemnify and hold harmless the Owner in Section 9.1 above shall extend to fines, penalties and costs incurred by the Owner as related to any enforcement action taken by local, state, regional or federal regulatory entities. The Owner may deduct any of such fines, penalties and costs as described in this Section from any unpaid amounts then or thereafter due the Contractor under the Contract Documents. Any of such fines, penalties and costs not so deducted from any unpaid amounts due the Contractor shall be payable to the Owner at the demand of the Owner, together with interest from the date of the demand at the maximum allowable rate.

C. Claims by Employees. In claims against any person or entity indemnified under this Section 9.1 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 9.1.A. shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

9.2 Duty to Defend. The Contractor shall defend the Owner in any action, lawsuit, mediation or arbitration arising from the alleged negligence, recklessness or intentionally wrongful conduct of the Contractor and other persons employed or utilized by the Contractor in the performance of the Work. Notwithstanding any other provisions within this Article IX, so long as Contractor, through its own counsel, performs its obligation to defend the Owner pursuant to this Section, Contractor shall not be required to pay the Owner's costs associated with the Owner's participation in the defense.

ARTICLE X ACCOUNTING RECORDS; OWNERSHIP OF DOCUMENTS

10.1 Accounting Records. Records of expenses pertaining to all services performed shall be kept in accordance with generally accepted accounting principles and procedures.

10.2 Inspection and Audit. The Contractor's records shall be open to inspection and subject to examination, audit, and/or reproduction during normal working hours by the Owner's agent or authorized representative to the extent necessary to adequately permit evaluation and verification of any invoices, payments or claims submitted by the Contractor or any of its payees during the performance of the Work. These records shall include, but not be limited to, accounting records, written policies and procedures, Subcontractor files (including proposals of successful and unsuccessful bidders), original estimates, estimating worksheets, correspondence, Change Order files (including documentation covering negotiated settlements), and any other supporting evidence necessary to substantiate charges related to the Contract Documents. They shall also include, but not be limited to, those records necessary to evaluate and verify direct and indirect costs (including overhead allocations) as they may apply to costs associated with the Contract Documents. For such audits, inspections, examinations and evaluations, the Owner's agent or authorized representative shall have access to said records from the effective date of the

Contract Documents, for the duration of Work, and until three (3) years after the date of final payment by the Owner to the Contractor pursuant to the Contract Documents.

10.3 Access. The Owner's agent or authorized representative shall have access to the Contractor's facilities and all necessary records to conduct audits in compliance with this Article. The Owner's agent or authorized representative shall give the Contractor reasonable advance notice of intended inspections, examinations, and/or audits.

10.4 Ownership of Documents. Upon obtainment of Substantial Completion or termination of the Agreement, all records, documents, tracings, plans, specifications, maps, evaluations, reports, transcripts and other technical data, other than working papers, prepared or developed by the Contractor shall be delivered to and become the property of the Owner. The Contractor at its own expense may retain copies for its files and internal use.

ARTICLE XI PUBLIC CONTRACT LAWS

11.1 Equal Opportunity Employment

A. Employment. The Contractor shall not discriminate against any employee or applicant for employment because of race, creed, sex, color, national origin, disability or age, and will take affirmative action to ensure that all employees and applicants are afforded equal employment opportunities without discrimination because of race, creed, sex, color, national origin, disability or age. Such action shall be taken with reference to, but shall not be limited to, recruitment, employment, job assignment, promotion, upgrading, demotion, transfer, layoff or termination, rates of training or retaining, including apprenticeship and on-the-job training.

B. Participation. No person shall, on the grounds of race, creed, sex, color, national origin, disability or age, be excluded from participation in, be denied the proceeds of, or be subject to discrimination in the performance of the Agreement.

11.2 Immigration Reform and Control Act of 1986. Contractor acknowledges that it is responsible for complying with the provisions of the Immigration Reform and Control Act of 1986, located at 8 U.S.C. Section 1324, et seq., and regulations relating thereto. Failure to comply with the above statutory provisions shall be considered a material breach and shall be grounds for immediate termination of this Agreement.

11.3 No Conflict of Interest. The Contractor warrants that it has not employed or retained any company or person, other than a bona fide employee working solely for the Contractor to solicit or secure this Agreement, and that it has not paid or agreed to pay any person, company, corporation, individual, or firm other than a bona fide employee working solely for the Contractor, any fee, commission, percentage, gift or any other consideration, contingent upon or resulting from the award or making of this Agreement.

A. No Interest in Business Activity. By accepting award of this Agreement, the 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 services required hereunder, including without limitation as described in the Contractor's own professional ethical requirements. An interest in a business or activity which shall be deemed a conflict includes but is not limited to direct financial interest in any of the material and equipment manufacturers, suppliers, distributors, or contractors who will be eligible to supply material and equipment for the Project for which the Contractor is furnishing its services required hereunder.

B. No Appearance of Conflict. The Contractor shall not knowingly engage in any contractual or professional obligations that create an appearance of a conflict of interest with respect to the services provided pursuant to the Agreement. The Contractor has provided the Affidavit of No Conflict, incorporated into the Contract Documents as Exhibit "C", as a material inducement for Owner entering the Agreement. If, in the sole discretion of the County Administrator or designee, a conflict of interest is deemed to exist or arise during the term of this Agreement, the County Administrator or designee may cancel this Agreement, effective upon the date so stated in a written notice of cancellation, without penalty to the Owner.

11.4 Truth in Negotiations. By execution of the Contract Documents, the Contractor certifies to truth-in-negotiations and that wage rates and other factual unit costs supporting the compensation are accurate, complete and current at the time of contracting. Further, the original Contract Sum and any additions thereto shall be adjusted to exclude any significant sums where the Owner determines the Contract Sum was increased due to inaccurate, incomplete or non-current wage rates and other factual unit costs. Such adjustments must be made within one (1) year after final payment to the Contractor.

11.5 Public Entity Crimes. The Contractor is directed to the Florida Public Entity Crimes Act, Section 287.133, Florida Statutes, specifically section 2(a), and the Owner's requirement that the Contractor comply with it in all respects prior to and during the term of the Agreement.

ARTICLE XII FORCE MAJEURE, FIRE OR OTHER CASUALTY

12.1 Force Majeure.

A. Unavoidable Delays. Delays in any performance by any party contemplated or required hereunder due to fire, flood, sinkhole, earthquake or hurricane, acts of God, unavailability of materials, equipment or fuel, war, declaration of hostilities, revolt, civil strife, altercation or commotion, strike, labor dispute, or epidemic, archaeological excavation, lack of or failure of transportation facilities, or any law, order, proclamation, regulation, or ordinance of any government or any subdivision thereof, or for any other similar cause to those enumerated, beyond the reasonable control and which with due diligence could not have been reasonably anticipated, shall be deemed to be events of Force Majeure and any such delays shall be excused. In the event such party is delayed in the performance of any Work or obligation pursuant to the Contract Documents for any of the events of Force Majeure stated in this Section 12.1, the date for

performance required or contemplated by the Contract Documents shall be extended by the number of calendar days such party is actually delayed.

B. Concurrent Contractor Delays. If a delay is caused for any reason provided in Section 12.1.A. and during the same time period a delay is caused by Contractor, the date for performance shall be extended as provided in 12.1.A. but only to the extent the time is or was concurrent.

C. Notice; Mitigation. The party seeking excuse for nonperformance based on Force Majeure shall give written notice to the Owner, if with respect to the Contractor, or to the Contractor if with respect to the Owner, specifying its actual or anticipated duration. Each party seeking excuse from nonperformance based on Force Majeure shall use its best efforts to rectify any condition causing a delay and will cooperate with the other party, except that neither party shall be obligated to incur any unreasonable additional costs and expenses to overcome any loss of time that has resulted.

12.2 Casualty; Actions by Owner and Contractor. During the construction period, if the Project or any part thereof shall have been damaged or destroyed, in whole or in part, the Contractor shall promptly make proof of loss; and Owner and Contractor shall proceed promptly to collect, or cause to be collected, all valid claims which may have arisen against insurers or others based upon such damage or destruction. The Contractor shall diligently assess the damages or destruction and shall prepare an estimate of the cost, expenses, and other charges, including normal and ordinary compensation to the Contractor, necessary for reconstruction of the Project substantially in accordance with the Project Plans and Specifications. Within fifteen (15) days following satisfaction of the express conditions described in subsections (1), (2) and (3) below, the Contractor covenants and agrees diligently to commence reconstruction and to complete the reconstruction or repair of any loss or damage by fire or other casualty to the Project to substantially the same size, floor area, cubic content, and general appearance as prior to such loss or damage:

- (1) Receipt by the Owner or the trustee of the proceeds derived from collection of all valid claims against insurers or others based upon such damage or destruction, and receipt of other sums from any source such that the funds necessary to pay the Project Cost and any additions to the Project Cost necessitated for repair or reconstruction are available;
- (2) Written agreement executed by the Contractor and the Owner, by amendment to the Contract Documents or otherwise, authorizing and approving the repair or reconstruction and any additions to the Project Cost necessitated thereby, including any required adjustment to the Contract Sum; and
- (3) Final approval by the Owner of the Project Plans and Specifications for such repair or reconstruction and issuance of any required building permit.

12.3 Approval of Plans and Specifications. The Owner agrees to approve the plans and specifications for such reconstruction or repair if the reconstruction or repair contemplated by such plans and specifications is economically feasible, and will restore the Project, or the damaged portion thereof, to substantially the same condition as prior to such loss or damage, and such plans

and specifications conform to the applicable laws, ordinances, codes, and regulations. The Owner agrees that all proceeds of any applicable insurance or other proceeds received by the Owner or the Contractor as a result of such loss or damage shall be used for payment of the costs, expenses, and other charges of the reconstruction or repair of the Project.

12.4 Notice of Loss or Damage. The Contractor shall promptly give the Owner written notice of any significant damage or destruction to the Project, defined as loss or damage which it is contemplated by Contractor will increase the Contract Sum or extend the Substantial Completion Date, stating the date on which such damage or destruction occurred, the then expectations of Contractor as to the effect of such damage or destruction on the use of the Project, and the then proposed schedule, if any, for repair or reconstruction of the Project. Loss or damage which the Contractor determines will not affect the Contract Sum or Substantial Completion Date will be reported to Owner and Architect/Engineer immediately, and associated corrective actions will be undertaken without delay.

ARTICLE XIII REPRESENTATIONS, WARRANTIES AND COVENANTS

13.1 Representations and Warranties of Contractor. The Contractor represents and warrants to the Owner each of the following.

A. The Contractor is a construction company, organized under the laws of the State of _____, authorized to transact business in the State of Florida, with _____ as the primary qualifying agent. Contractor has all requisite power and authority to carry on its business as now conducted, to own or hold its properties, and to enter into and perform its obligations hereunder and under each instrument to which it is or will be a party, and is in good standing in the State of Florida.

B. Each Contract Document to which the Contractor is or will be a party constitutes, or when entered into will constitute, a legal, valid, and binding obligation of the Contractor enforceable against the Contractor in accordance with the terms thereof, except as such enforceability may be limited by applicable bankruptcy, insolvency, or similar laws from time to time in effect which affect creditors' rights generally and subject to usual equitable principles in the event that equitable remedies are involved.

C. There are no pending or, to the knowledge of the Contractor, threatened actions or proceedings before any court or administrative agency, within or without the State of Florida, against the Contractor or any partner, officer, or agent of the Contractor which question the validity of any document contemplated hereunder, or which are likely in any case, or in the aggregate, to materially adversely affect the consummation of the transactions contemplated hereunder, or materially adversely affect the financial condition of the Contractor.

D. The Contractor has filed or caused to be filed all federal, state, local, or foreign tax returns, if any, which were required to be filed by the Contractor, and has paid, or caused to be paid, all taxes shown to be due and payable on such returns or on any assessments levied against the Contractor.

E. Neither Contractor nor any agent or person employed or retained by Contractor has acted fraudulently or in bad faith or in violation of any statute or law in the procurement of this Agreement.

F. The Contractor shall timely fulfill or cause to be fulfilled all of the terms and conditions expressed herein which are within the control of the Contractor or which are the responsibility of the Contractor to fulfill. The Contractor shall be solely responsible for the means and methods of construction.

G. It is recognized that neither the Architect/Engineer, the Contractor, nor the Owner has control over the cost of labor, materials, or equipment, over a Subcontractor's methods of determining bid prices, or over competitive bidding, market, or negotiating conditions.

H. During the term of the Contract Documents, and the period of time that the obligations of the Contractor under the Contract Documents shall be in effect, the Contractor shall cause to occur and to continue to be in effect those instruments, documents, certificates, and events contemplated by the Contract Documents that are applicable to, and the responsibility of, the Contractor.

I. The Contractor shall assist and cooperate with the Owner and shall accomplish the construction of the Project in accordance with the Contract Documents and the Project Plans and Specifications, and will not knowingly violate any laws, ordinances, rules, regulations, or orders that are or will be applicable thereto.

J. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective, and that Owner, representatives of Owner, and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. Contractor shall give Architect/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 Owner.

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

L. 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, Owner 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 Architect/Engineers, attorneys and other professionals and any additional expenses experienced by Owner 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 the schedule and shall not be entitled to an extension of the Contract Time or the recovery of delay damages due to correcting or removing defective Work.

M. 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, Owner may correct and remedy any such deficiency to the extent necessary to complete corrective and remedial action. Owner may temporarily exclude Contractor from all or part of the site, temporarily take possession of all or part of the Work, Contractor's tools, construction equipment and machinery at the site or for which Owner has paid Contractor but which are stored elsewhere, all for such duration as is reasonably necessary to correct the deficiency. All direct and indirect costs of Owner in exercising such rights and remedies will be charged against Contractor in an amount approved as to reasonableness by Architect/Engineer and a Change Order will be issued incorporating the necessary revisions.

N. If within three (3) years after the Substantial Completion Date 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 Owner and in accordance with Owner's written instructions, either correct such defective Work, if it has been rejected by Owner, remove it from the site and replace it with non-defective Work. If Contractor does not promptly comply with the terms of such instruction, Owner may have the defective Work corrected/removed and all direct, indirect and consequential costs of such removal and replacement will be paid by Contractor. Failing payment by the Contractor notwithstanding any other provisions of the Contract Documents to the contrary, Owner shall have the right to bring a direct action in the Circuit Court to recover such costs.

13.2 Representations of the Owner. To the extent permitted by law, the Owner represents to the Contractor that each of the following statements is presently true and accurate:

- A. The Owner is a validly existing political subdivision of the State of Florida.
- B. The Owner has all requisite corporate or governmental power and authority to carry on its business as now conducted and to perform its obligations under the Contract Documents and each Contract Document contemplated hereunder to which it is or will be a party.
- C. The Contract Documents and each Contract Document contemplated hereby to which the Owner is or will be a party has been duly authorized by all necessary action on the part of, and has been or will be duly executed and delivered by, the Owner, and neither the execution and delivery thereof nor compliance with the terms and provisions thereof or hereof:
 - (a) requires the approval and consent of any other person or party, except such as have been duly obtained or as are specifically noted herein;
 - (b) contravenes any existing law, judgment, governmental rule, regulation or order applicable to or binding on the Owner; or
 - (c) contravenes or results in any breach of, default under, or result in the creation of any lien or encumbrance upon the Owner under any indenture, mortgage, deed of trust, bank loan, or credit agreement, the charter, ordinances, resolutions, or any other agreement or instrument to which the Owner is a

party, specifically including any covenants of any bonds, notes, or other forms of indebtedness of the Owner outstanding on the date of the Contract Documents.

D. The Contract Documents and each document contemplated hereby to which the Owner is or will be a party constitutes, or when entered into will constitute, a legal, valid, and binding obligation of the Owner enforceable against the Owner in accordance with the terms thereof, except as such enforceability may be limited by applicable bankruptcy, insolvency, or similar laws from time to time in effect which affect creditors' rights generally, and subject to usual equitable principles in the event that equitable remedies are involved.

E. There are no pending or, to the knowledge of the Owner, threatened actions or proceedings before any court or administrative agency against the Owner which question the validity of the Contract Documents or any document contemplated hereunder, or which are likely in any case or in the aggregate to materially adversely affect the consummation of the transactions contemplated hereunder or the financial or corporate condition of the Owner.

F. The Owner shall use due diligence to timely fulfill or cause to be fulfilled all of the conditions expressed in the Contract Documents which are within the control of the Owner or which are the responsibility of the Owner to fulfill.

G. During the pendency of the Work and while the obligations of the Owner under the Contract Documents shall be in effect, the Owner shall cause to occur and to continue to be in effect and take such action as may be necessary to enforce those instruments, documents, certificates and events contemplated by the Contract Documents that are applicable to and the responsibility of the Owner.

H. The Owner shall assist and cooperate with the Contractor in accomplishing the construction of the Project in accordance with the Contract Documents and the Project Plans and Specifications, and will not knowingly violate any laws, ordinances, rules, regulations, orders, contracts, or agreements that are or will be applicable thereto or, to the extent permitted by law, enact or adopt any resolution, rule, regulation, or order, or approve or enter into any contract or agreement, including issuing any bonds, notes, or other forms of indebtedness, that will result in the Contract Documents or any part thereof, or any other instrument contemplated by and material to the timely and effective performance of a party's obligations hereunder, to be in violation thereof.

ARTICLE XIV TERMINATION AND SUSPENSION

14.1 Termination for Cause by Owner. This Agreement may be terminated by Owner upon written notice to the Contractor should Contractor fail substantially to perform a material obligation in accordance with the terms of the Contract Documents through no fault of the Owner. In the event Owner terminates for cause and it is later determined by a court of competent jurisdiction that such termination for cause was not justified, then in such event such termination for cause shall automatically be converted to a termination without cause pursuant to Section 14.2.

A. Nonperformance. If the Contractor fails to timely perform any of its

obligations under the Contract Documents, including any obligation the Contractor assumes to perform Work with its own forces, or if it persistently or repeatedly refuses or fails, except in case for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or fails, without being excused, to maintain an established schedule (failure to maintain schedule shall be defined as any activity that falls thirty (30) days or more behind schedule) which has been adopted by the Construction Team, or it fails to make prompt payment to Subcontractors for materials or labor, or disregards laws, rules, ordinances, regulations, or orders of any public authority having jurisdiction, or otherwise is guilty of substantial violations of the Agreement the Owner may, after seven (7) days written notice, during which period the Contractor fails to perform such obligation, make good such deficiencies and perform such actions. The Contract Sum shall be reduced by the cost to the Owner of making good such deficiencies, and the Contractor's compensation shall be reduced by an amount required to manage the making good of such deficiencies. Provided, however, nothing contained herein shall limit or preclude Owner from pursuing additional damages from Contractor because of its breach.

B. Insolvency. If the Contractor is adjudged bankrupt, or if it makes a general assignment for the benefit of its creditors, or if a receiver is appointed because its insolvency, then the Owner may, without prejudice to any other right or remedy, and after giving the Contractor and its surety, if any, fourteen (14) days written notice, and during which period the Contractor fails to cure the violation, terminate the Agreement. In such case, the Contractor shall not be entitled to receive any further payment. Owner shall be entitled to recover all costs and damages arising because of failure of Contractor to perform as provided in the Contract Documents, as well as reasonable termination expenses, and costs and damages incurred by the Owner may be deducted from any payments left owing the Contractor.

C. Illegality. Owner may terminate the Agreement if Contractor disregards laws or regulations of any public body having jurisdiction.

D. Rights of Owner. The Owner may, after giving Contractor (and the surety, if there is one) seven (7) days written notice, terminate the services of Contractor for cause; exclude Contractor from the Project Site and take possession of the Work and of all Contractor's tools, construction equipment and machinery at the Project Site and use the 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 Project Site or for which Owner has paid Contractor but which are stored elsewhere, and finish the Work as Owner may deem expedient. In such case, 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. If the direct and indirect costs of completing the Work exceed the unpaid balance of the Contract Sum, Contractor shall pay the difference to Owner. Such costs incurred by Owner shall be verified by Owner in writing; but in finishing the Work, Owner shall not be required to obtain the lowest quote for the Work performed. Contractor's obligations to pay the difference between such costs and such unpaid balance shall survive termination of the Agreement. In such event and notwithstanding any other provisions of the Contract Documents to the contrary, Owner shall be entitled to bring a direct action in the Circuit Court to recover such costs.

14.2 Termination without Cause by Owner. The Owner, through its County Administrator or designee, shall have the right to terminate the Agreement, in whole or in part, without cause upon sixty (60) calendar days' written notice to the Contractor. In the event of

such termination for convenience, the Owner shall compensate Contractor for payments due through the date of termination, and one subsequent payment to cover costs of Work performed through the date of termination, subject to the terms and conditions of Section 3.1. The Contractor shall not be entitled to any other further recovery against the Owner, including, but not limited to, anticipated fees or profit on Work not required to be performed, or consequential damages or costs resulting from such termination.

A. Release of Contractor. As a condition of Owner's termination rights provided for in this subsection, Contractor shall be released and discharged from all obligations arising by, through, or under the terms of the Contract Documents, and the Payment and Performance Bond shall be released. Owner shall assume and become responsible for the reasonable value of Work performed by Subcontractors prior to termination plus reasonable direct close-out costs, but in no event shall Subcontractors be entitled to unabsorbed overhead, anticipatory profits, or damages for early termination.

B. Waiver of Protest. Contractor hereby waives any right to protest the exercise by Owner of its rights under this Section that may apply under the Procurement Ordinance.

14.3 Suspension without Cause. Owner may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than 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 Sum or an extension of the Contract Time, or both, directly attributable to any suspension if Contractor makes an approved claim therefor.

14.4 Termination Based Upon Abandonment, Casualty or Force Majeure. If, after the construction commencement date (i) Contractor abandons the Project (which for purposes of this paragraph shall mean the cessation of all construction and other activities relating to the Project, excluding those which are necessary to wind down or otherwise terminate all outstanding obligations with respect to the Project, and no recommencement of same within one hundred twenty (120) days following the date of cessation), or (ii) the Project is stopped for a period of thirty (30) consecutive days due to an instance of Force Majeure or the result of a casualty resulting in a loss that cannot be corrected or restored within one hundred twenty (120) days (excluding the time required to assess the damage and complete the steps contemplated under Section 12.2), the Owner shall have the right to terminate the Agreement and pay the Contractor its compensation earned or accrued to date.

14.5 Vacation of Project Site; Delivery of Documents. Upon termination by Owner pursuant to Section 14.2 or 14.4, Contractor shall withdraw its employees and its equipment, if any, from the Project Site on the effective date of the termination as specified in the notice of termination (which effective date shall not be less than two (2) working days after the date of delivery of the notice), regardless of any claim the Contractor may or may not have against the Owner. Upon termination, the Contractor shall deliver to the Owner all original papers, records, documents, drawings, models and other material set forth and described in the Contract Documents.

14.6 Termination by the Contractor. If, through no act or fault of Contractor, the

Work is suspended for a period of more than ninety (90) consecutive days by Owner or under an order of court or other public authority, or Owner fails to act on any Application for Payment or fails to pay Contractor any sum finally determined to be due; then Contractor may, upon fourteen (14) days written notice to Owner terminate the Agreement and recover from Owner payment for all Work executed, any expense sustained plus reasonable termination expenses. In lieu of terminating the Agreement, if Owner has failed to act on any Application for Payment or Owner has failed to make any payment as aforesaid, Contractor may upon fourteen (14) days written notice to Owner stop the Work until payment of all amounts then due.

SAMPLE

Exhibit A
Title(s) of Drawings

SAMPLE

Exhibit B
Title(s) of Specifications

SAMPLE

Exhibit C
Affidavit of No Conflict

SAMPLE

Exhibit D
Contractor's Certificate(s) of Insurance

SAMPLE

Exhibit E
Contractor's Payment and Performance Bond

SAMPLE

Exhibit F
Standard Forms

SAMPLE

APPLICATION FOR PAYMENT

Request No.: _____ Project No.: _____
 Purchase Order No.: _____
 County Bid No.: _____
 Consultant: _____

Project: _____
 From: _____ To: _____

CONTRACT PAYMENT SUMMARY

Original Contract Amount:				\$	-
Change Order(s):				\$	-
Change order summary:					
Number	Date Approved	Additive	Deductive		
SUBTOTALS:		\$	-	\$	-
Net change order subtotal (Additive less Deductive):				\$	-
Current Contract Amount (CCA): (Original Amount + Change Order(s))				\$	-
		Previous Status	Total WIP		
Value of the Work in Place (WIP)	\$	-	\$	-	
Value of Stored Materials	\$	-	\$	-	
Total Earned (\$ and % of CCA)	\$	-	\$	-	
Retainage (\$ and % of CCA)	\$	-	\$	-	
Net Earned (Total earned minus retainage)				\$	-
TOTAL PREVIOUS PAYMENTS				\$	-
AMOUNT DUE THIS PAYMENT (Net Earned minus Previous Payments)				\$	-

CONTRACTOR'S AFFIDAVIT OF NOTICE

CERTIFICATE: The undersigned CONTRACTOR certifies that all items and amounts shown on this Application for Payment are on account of work performed, materials supplied and/or materials stored on site and paid for by Contractor in accordance with the Contract Documents with due consideration for previous Payment(s), if any, received by the Contractor from the County, and that the Amount Due this Payment shown is now due.

NOTARY:

CONTRACTOR:

State of Florida, County of _____

 Name of person authorized to sign Affidavit of Notice

Sworn to (or affirmed) and subscribed before me this _____ day of _____ by

 TITLE

 (Name of person giving notice)

Contractor name, address and telephone no.:

 (Signature of Notary Public - State of Florida)
 Print, Type or Stamp Commissioned Name of
 Notary Public:

Personally Known _____ or Produced Identification _____
 Type of Identification Produced: _____

VERIFICATION, RECOMMENDATION, CONCURRENCES AND APPROVALS

(Signatures)

(Date)

Quantities verified by: _____

Consultant/Engineer: _____

Project Management: _____

Department Head: _____

Payment approved by the
 Board of County Commissioners: _____

Attested to by the Clerk of Circuit Court: _____

**FINAL RECONCILIATION, WARRANTY PERIOD DECLARATION
AND CONTRACTOR'S AFFIDAVIT**

Project Title: _____	Date Submitted: _____
----------------------	-----------------------

Contractor Data: Name: _____ Address: _____ City/State/Zip: _____	Project No: _____
	Warranty (months): _____

This Final Reconciliation is for the work performed for Manatee County by the above named contractor, hereinafter called CONTRACTOR, pursuant to the contract dated _____ as amended, and acts as an addendum thereto.

It is agreed that all quantities and prices in the attached Final Pay Estimate No. _____ are correct and that the amount of \$ _____ including retainage is due to the CONTRACTOR, that no claims are outstanding as between the parties, and that the above stated sum represents the entirety of monies owed the CONTRACTOR.

It is further agreed that the warranty period for CONTRACTOR'S work pursuant to the Contract is from _____ to _____

As (title) _____ for CONTRACTOR, I have authority to bind said CONTRACTOR, and as such make this final reconciliation, declaration and affidavit for the purpose of inducing Manatee County to make final payment to CONTRACTOR for work done at/upon _____ under said contract:

CONTRACTOR has paid all social security and withholding taxes accrued in connection with the construction project.

CONTRACTOR has paid all workers' compensation and other insurance premiums incurred in connection with this construction project.

CONTRACTOR has paid for all required permits in connection with this construction project.

All laborers, material, men, suppliers, subcontractors and service professionals who worked for and/or supplied materials, equipment and/or services to the CONTRACTOR under this construction contract have been paid in full.

(Affiant Signature)

NOTARY:
State of Florida, County of _____, Sworn to (or affirmed) and subscribed before me this _____ day of _____, _____, by _____ (person giving notice).

Signature of Notary Public - State of Florida: _____
Print, Type or Stamp Commissioned Name of Notary Public: _____

Personally Known or Produced Identification
Type of Identification Produced _____

CONTRACT CHANGE ORDER

(for Total Contract Adjusted Amount Greater than \$1,000,000)

PROJECT: _____

Change Order No.: _____

**Contract Amount
(Present Value)** _____

Project Number: _____

NO. OF ITEM	DESCRIPTION OF ITEM AND CHANGE	DECREASE	INCREASE

BY EXECUTION OF THIS CHANGE ORDER THE CONTRACTOR AGREES THAT ALL CLAIMS FOR ADDITIONAL CONTRACT TIME AND FEES FOR THE ITEMS IN THIS CHANGE ORDER HAVE BEEN SATISFIED.

TOTAL DECREASE: _____

TOTAL INCREASE: _____

Contractor: _____
Address: _____
City / State: _____

THE NET CHANGE OF
 ADJUSTS THE CURRENT CONTRACT AMOUNT FROM
 _____ TO

Contractor Signature: _____ **Date:** _____

____ CALENDAR DAYS ARE ADDED TO THE SCHEDULE
 WHICH CHANGES THE FINAL COMPLETION DATE TO
 MONTH DAY, YEAR

RECOMMENDATION, CONCURRENCES AND APPROVALS

SIGNATURES

DATE

Consultant / Engineer: _____

Project Manager: _____

Division Manager: _____

Project Management Division Manager

Manatee County Purchasing: _____

Purchasing Official

Authority to execute this contract per Manatee County Code, Chapter 2-26,
 and per the delegation by the County Administrator effective 1/26/2009

JUSTIFICATION FOR CHANGE

Change Order No :

Project Number:

1. NECESSITY FOR CHANGE:



2. Is change an alternate bid? (If yes, explain)

3. Does change substantially alter the physical size of the project? (If yes, explain)

4 Effect of this change on other "Prime" contractors?

5 Has the Surety and insurance company been notified, if applicable? CONTRACTOR RESPONSIBILITY