

INVITATION FOR BID  
CONSTRUCTION  
NO. 23-TA004413LP  
NORTH SERVICE AREA FORCE  
MAIN REPLACEMENTS  
PROJECT NO. 6104280  
NOVEMBER 01, 2022

Manatee County BCC  
Procurement Division  
1112 Manatee Avenue West Ste 803  
Bradenton, FL 34205  
[purchasing@mymanatee.org](mailto:purchasing@mymanatee.org)



**ADVERTISEMENT**

**INVITATION FOR BID CONSTRUCTION NO. 23-TA004413LP  
NORTH SERVICE AREA FORCE MAIN REPLACEMENTS**

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 North Service Area Force Main Replacements, as specified in this Invitation for Bid Construction to include upsized discharge force mains for Lift Station (LS) 539, 546 and 557.

**DATE, TIME AND PLACE DUE:**

The Due Date and Time for submission of Bids in response to this Invitation for Bid Construction (IFBC) is **December 13, 2022 at 2:00 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 Information Conference will be held at 9:00 A.M. on November 18, 2022 at LS 539, located at 1012 Mark Ave, Ellenton, FL 34222. A non-mandatory site visit will be conducted immediately following the information conference at all three (3) lift stations, starting at LS 539, then LS 546, located at 3390 Erie Road, Parrish, FL 34219 and then LS 557, located at 2317 2<sup>nd</sup> Avenue West, Palmetto, FL 34221. Attendance to the non-mandatory information conferences and site visit are not required, but is strongly encouraged.

**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 November 29, 2022. 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:** Leslie Peer, Senior Procurement Agent  
(941) 749-3062, Fax (941) 749-3034  
Email: leslie.peer@mymanatee.org  
Manatee County Financial Management Department  
Procurement Division

AUTHORIZED FOR RELEASE: \_\_\_\_\_

## **Table of Contents**

### **Section A, Information to Bidders**

### **Section B, Bid Forms to be completed and returned with Bid**

- Appendix A, Minimum Qualifications
- Appendix B, Bidder's Questionnaire
- Appendix C, Environmental Crimes Certification
- Appendix D, Florida Trench Safety Act
- Appendix E, ePayables Application
- Appendix F, Scrutinized Company Certification
- Appendix G, Hold Harmless
- Appendix H, Insurance Statement
- Appendix I, Acknowledgement of Addenda
- Appendix J, Affidavit of No Conflict
- Appendix K, Bid Pricing Form

### **Section C, Bid Attachments**

- Bid Attachment 1- Insurance and Bond Requirements
- Bid Attachment 2 - Project Specifications
- Bid Attachment 3 - Plans/Drawings
- Bid Attachment 4 - Geotechnical Engineering Services Report

### **Section D, Sample Construction Agreement with General Conditions of the Construction Agreement and Agreement Exhibits**

## **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 **December 13 at 2:00 P.M. ET**. Bids must be delivered to the following location: Manatee County Administration Building, 1112 Manatee Avenue West, 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 AND SITE VISIT:**

A non-mandatory Information Conference will be held at 9:00 A.M. on November 18, 2022 at LS 539, located at 1012 Mark Ave, Ellenton, FL 34222. A non-mandatory site tour will be conducted immediately following at all three lift stations, starting at LS 539, then LS 546, located at 3390 Erie Road, Parrish, FL 34219 and then LS 557, located at 2317 2nd Avenue West, Palmetto, FL 34221. Attendance to the non-mandatory information conference and site visits are not required, but is strongly encouraged.

A non-mandatory County escorted site visit will be conducted for this solicitation; however, it is a minimum qualification requirement that the Bidder, or its representative(s) has made an inspection of the construction site for work specified in this IFBC.

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 and/or site visit 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. 23-TA004413LP, North Service Area Force Main Replacement, 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 Avenue West, Suite 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](http://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](mailto: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 Purchasing 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 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:
  - 1. The mistake is clearly evident in the solicitation document; or
  - 2. Bidder submits evidence which clearly and convincingly demonstrates that a mistake was made in the Bid. Request to withdraw a Bid must be in writing and approved by the Purchasing 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 one hundred twenty (120) 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 Purchasing Official, establishes reasonable grounds to believe the person or business entity will not conduct business in a responsible matter.

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

general partner(s). A Public Contracting and Environmental Crimes Certification form is attached herein for this purpose.

**A.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](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](mailto: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](http://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](http://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 [tina.mancini@manateeclerk.com](mailto:tina.mancini@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.

The County reserves the right to award to the lowest responsive, responsible bidder by individual LS or to the lowest responsive, responsible bidder of all groups combined.

Multiple schedules for completion of Work shall be considered. Two (2) bids shall be submitted and considered, Bid 'A' based on 335 calendar days completion time and Bid 'B' based on 295 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.

Remove and replace approximately 900 linear feet of 1.5 inch force main with new 4 inch force main along US 301 between LS 539 and LS 504, as shown in the plans and specifications. Construct modifications to the existing force main at LS 546 which includes an above ground bypass, new equipment pad and demolition of the existing flow meter vault, as shown in the plans and specifications. Remove and replace approximately 500 linear feet of 2 inch force main along 2<sup>nd</sup> Avenue West between LS 557 and Manhole (MH) 11839 with new 4 inch force main and line the three existing downstream manholes, as shown in the plans and specifications.

**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 335 calendar days or Bid 'B' based on 295 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 \$677.00 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 Purchasing Official.

Protest must be in writing and delivered via email at [purchasing@mymanatee.org](mailto: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 Purchasing 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](mailto: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](http://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 Information Conference and Non-Mandatory site tour, per Article A.02	November 18, 2022
Question and Clarification Deadline	November 29, 2022
Final Addendum Posted	December 06, 2022
Bid Response Due Date and Time	December 13, 2022, 2:00 P.M., ET
Projected Award	January 2023

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. 23-TA004413LP

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. Bidder must possess a General Contractor License, and subcontract with a Certified Underground Utility and Excavation Contractor with licenses issued by the Florida Department of Business and Professional Regulation for a period of at least three (3) consecutive years since November 1, 2019. Licenses must be current and valid through the Due Date for submission of bid for this IFBC

**OR**

Bidder must possess a Certified Underground Utility and Excavation Contractor License issued by the Florida Department of Business and Professional Regulation for a period of at least three (3) consecutive years since November 1, 2019. Licenses must be current and valid through the Due Date for submission of bid for this IFBC

**If Bidding as a General Contractor, provide a copy of the Bidders' General Contractors License and the subcontractors Underground Utility and Excavation Contractor License issued by the Florida Department of Business Regulation and documentation Bidder and Subcontractor have been licensed for the period of November 1, 2019, through the Due Date for submission of the Bid.**

**If Bidding as a Underground Utility and Excavation Contractor, provide a copy of the license issue by the Florida Department of Business Regulation and documentation Bidder has been licensed for the period of November 1, 2019 through the Due Date for submission of the bid.**

4. Bidder or Bidder's subcontractor has provided utilities construction services for at least five (5) projects since 2017 in which each project included the following components: (i) force main construction; (ii) roadway pavement milling and resurfacing. Project clients must be agreeable to responding to an inquiry by the County.

**Provide the following information for the three (3) qualifying project references.**

- 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 two (2) consecutive years, since 2020

**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 two years, since 2020**

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 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.

**If no conflicts of interests are present, Bidder must submit a fully completed copy of Appendix J.**

**If there is a potential conflict of interest, on a separate page submit a statement to that affect and disclose the name of any officer, director or agent who is an employee of the County. Disclose the name of any County employee who owns, directly or indirectly, any interest in Bidder's firm or any of its branches.**

**END OF APPENDIX A**

**APPENDIX B, BIDDER'S QUESTIONNAIRE**

IFBC No. 23-TA004413LP

**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: \_\_\_\_\_

---

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**

IFBC No. 23-TA004413-LP

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. 23-TA004413LP**
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:

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

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

\_\_\_\_\_

\_\_\_\_\_

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

\_\_\_\_\_  
(Authorized signature / Title)

SWORN to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.  
**(Impress official seal)**

Notary Public, State of \_\_\_\_\_ : \_\_\_\_\_

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](http://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 Via email to:

[tina.mancini@manateeclerk.com](mailto:tina.mancini@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**  
IFBC No. 23-TA004413LP

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. 23-TA004413LP

**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.

<b>PROJECT NUMBER AND/OR NAME</b>	
<b>INSURANCE AGENT</b>	
<b>RESPONDENT SIGNATURE</b>	<b>DATE</b>

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**

IFBC No. 23-TA004413LP

**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**

IFBC No. 23-TA004413LP

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**

IFBC No. 23-TA004413LP

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 North Service Area Force Main Replacements.

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. 23-TA004413LP, North Service Area Force Main Replacements

Total Bid Price/Offer for Lift Station 539, 546, 557 Bid "A":  
\$ \_\_\_\_\_ Complete. Base on a completion time of 335 calendar days.

Total Bid Price/Offer for Lift Station 539, 546, 557 Bid "B":  
\$ \_\_\_\_\_ Complete. Based on a completion time of 295 calendar days.

Total Bid Price/Offer for Lift Station 539 Bid "A": \$ \_\_\_\_\_ Complete.  
Base on a completion time of 335 calendar days.

Total Bid Price/Offer for Lift Station 539 Bid "B": \$ \_\_\_\_\_ Complete.  
Based on a completion time of 295 calendar days.

Total Bid Price/Offer for Lift Station 546 Bid "A": \$ \_\_\_\_\_ Complete.  
Base on a completion time of 335 calendar days.

Total Bid Price/Offer for Lift Station 546 Bid "B": \$ \_\_\_\_\_ Complete.  
Based on a completion time of 295 calendar days.

Total Bid Price/Offer for Lift Station 557 Bid "A": \$ \_\_\_\_\_ Complete.  
Base on a completion time of 335 calendar days.

Total Bid Price/Offer for Lift Station 557 Bid "B": \$ \_\_\_\_\_ Complete.  
Based on a completion time of 295 calendar days.

We, the undersigned, hereby declare that we have carefully reviewed the IFBC 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 IFBC 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. 23-TA004413LP PROJECT # 6104280**

**NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 539,546,557**

**Bidders must provide prices for each line item for their bid to be considered responsive.**

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE BID A	EXTENDED AMOUNT BID A	UNIT PRICE BID B	EXTENDED AMOUNT BID B
<b>NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 539</b>						
<b>I. MISCELLANEOUS</b>						
1	Mobilization	1	LS			
2	Project Signs	1	LS			
3	Preconstruction Video	1	LS			
4	Field Reconnaissance / Utility Locates & Coordination	1	LS			
5	Maintenance of Traffic	1	LS			
6	Pressure and Leakage Testing	1	LS			
7	Spoils Disposal	1	LS			
8	Permitting	1	LS			
9	Record Drawings	1	LS			
10	Demobilization	1	LS			
<b>II. PROPOSED IMPROVEMENTS</b>						
<b>EARTHWORK</b>						
11	Erosion Control (Silt Fencing)	1010	LF			
12	Seeding, Sodding, and Mulching	1	LS			
<b>CIVIL</b>						
13	Sidewalk Demolition	5300	SF			
14	Demolition of PVC Pipe/ Fittings	840	LF			
15	Protective Coatings (Piping / Appurtenances)	1	LS			
16	4" PVC Force Main (includes trenching, shoring, backfill, etc)	860	LF			
17	4" PVC - 11.25 Degree Fittings	6	EA			
18	4" PVC - 22.5 Degree Fittings	6	EA			
19	4" PVC - 45 Degree Fittings	18	EA			
20	4" PVC - 90 Degree Fittings	1	EA			
21	Tie-In Connections to Existing Wetwell (LS 504)	1	EA			
22	Tie-In Connections to Existing 1.5" Pipe	1	EA			

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price.   
 Madison County BCC IFBC No. 23-TA004413LP

APPENDIX K, BID PRICING FORM							
IFBC NO. 23-TA004413LP PROJECT # 6104280							
NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 539,546,557							
Bidders must provide prices for each line item for their bid to be considered responsive.							
ITEM	DESCRIPTION	QUANTITY	UNIT	PRICE	EXTENDED	UNIT	EXTENDED
				BID A	AMOUNT	PRICE	AMOUNT
				BID B	BID A	BID B	BID B
<b>STRUCTURAL</b>							
23	Concrete Encasement of Shallow Pipe Sections	1	LS				
<b>DRIVEWAY, ROAD, AND LAND RESTORATION</b>							
24	Sidewalk Restoration	5300	SF				
25	Driveway Restoration	680	SF				
26	Curb and Gutter Replacement	1	LS				
27	Detectable Warning on Walking Surfaces	56	SF				
28	Pavement Repair and Road Restoration	1	LS				
<b>MISCELLANEOUS</b>							
29	Miscellaneous Work Not Specifically Described in Bid Form	1	LS				
<b>NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 546</b>							
<b>I. MISCELLANEOUS</b>							
1	Mobilization	1	LS				
2	Project Signs	1	LS				
3	Preconstruction Video	1	LS				
4	Field Reconnaissance / Utility Locates & Coordination	1	LS				
5	Temporary Bypass Piping and Appurtenances	1	LS				
6	Pressure and Leakage Testing	1	LS				
7	Permitting	1	LS				
8	Record Drawings	1	LS				
9	Demobilization	1	LS				
<b>II. PROPOSED IMPROVEMENTS</b>							
<b>EARTHWORK</b>							
10	Erosion Control (Silt Fencing)	250	LF				
11	Seeding, Sodding, and Mulching	1	LS				
<b>CIVIL</b>							

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price.   
 Madras County BCC IFBC No. 23-TA004413LP

**APPENDIX K, BID PRICING FORM**

**IFBC NO. 23-TA004413LP PROJECT # 6104280**

**NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 539,546,557**

**Bidders must provide prices for each line item for their bid to be considered responsive.**

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE BID A	EXTENDED AMOUNT BID A	UNIT PRICE BID B	EXTENDED AMOUNT BID B
12	Demolition of Concrete Flowmeter Vault (LS)	1	LS				
13	Demolition of 10" DIP	30	LF				
14	Demolition of 12" DIP	30	LF				
15	Demolition of 10" x 12" Ductile Iron Reducer	2	EA				
16	Demolition of 12" Plug Valve (including valve box / concrete pad)	1	EA				
17	Demolition of 10" Flowmeter	1	EA				
18	Protective Coatings (Piping / Appurtenances)	1	LS				
19	12" Ductile Iron Pipe (includes trenching, shoring, backfill, etc)	150	LF				
20	12" Ductile Iron - 90 Degree Fittings	6	EA				
21	12" Ductile Iron - 45 Degree Fittings	2	EA				
22	12" Ductile Iron - WYE Fittings	2	EA				
23	12" Ductile Iron - Gate Valves	3	EA				
24	12" Gate Valve (Buried)	1	EA				
25	4" Ductile Iron - 90 Degree Fittings	1	EA				
26	2" Air Release Valve	1	EA				
27	Tie-In Connections To Existing Pipe (at existing 12" piping)	2	EA				
<b>STRUCTURAL</b>							
28	Flow Meter Pad	3.5	CY				
29	Miscellaneous Concrete	1	CY				
30	Tie-In Connection w/ Manhole	2	EA				
<b>NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 557</b>							
<b>I. MISCELLANEOUS</b>							
1	Mobilization	1	LS				
2	Project Signs	1	LS				
3	Preconstruction Video	1	LS				
4	Field Reconnaissance / Utility Locates & Coordination	1	LS				
5	Maintenance of Traffic	1	LS				

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price.  
 Madison County BCC IFBC No. 23-TA004413LP

**APPENDIX K, BID PRICING FORM**

**IFBC NO. 23-TA004413LP PROJECT # 6104280**

**NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 539,546,557**

**Bidders must provide prices for each line item for their bid to be considered responsive.**

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE BID A	EXTENDED AMOUNT BID A	UNIT PRICE BID B	EXTENDED AMOUNT BID B
6	Pressure and Leakage Testing	1	LS				
7	Spoils Disposal	1	LS				
8	Permitting	1	LS				
9	Record Drawings	1	LS				
10	Demobilization	1	LS				
<b>II. PROPOSED IMPROVEMENTS</b>							
<b>EARTHWORK</b>							
11	Erosion Control (Silt Fencing)	1010	LF				
12	Seeding, Sodding, and Mulching	1	LS				
<b>CIVIL</b>							
13	Sidewalk Demolition	5300	SF				
14	Demolition of PVC Pipe/ Fittings	840	LF				
15	Protective Coatings (Piping / Appurtenances)	1	LS				
16	4" PVC Force Main (includes trenching, shoring, backfill, etc)	860	LF				
17	4" PVC - 11.25 Degree Fittings	6	EA				
18	4" PVC - 22.5 Degree Fittings	6	EA				
19	4" PVC - 45 Degree Fittings	18	EA				
20	4" PVC - 90 Degree Fittings	1	EA				
21	Tie-In Connections to Existing Wetwell (LS 504)	1	EA				
22	Tie-In Connections to Existing 1.5" Pipe	1	EA				
<b>STRUCTURAL</b>							
23	Concrete Encasement of Shallow Pipe Sections	1	LS				
<b>DRIVEWAY, ROAD, AND LAND RESTORATION</b>							
24	Sidewalk Restoration	5300	SF				
25	Driveway Restoration	680	SF				
26	Curb and Gutter Replacement	1	LS				
27	Detectable Warning on Walking Surfaces	56	SF				

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price.   
 Manatee County BCC IFBC No. 23-TA004413LP

APPENDIX K, BID PRICING FORM						
IFBC NO. 23-TA004413LP PROJECT # 6104280						
NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 539,546,557						
Bidders must provide prices for each line item for their bid to be considered responsive.						
ITEM	DESCRIPTION	QUANTITY	UNIT PRICE BID A	EXTENDED AMOUNT BID A	UNIT PRICE BID B	EXTENDED AMOUNT BID B
28	Pavement Repair and Road Restoration	1	LS			
SUBTOTAL						
NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 546 & 546 & 557						
MISCELLANEOUS						
2	Construction Contingency County Authorized Use Only (10% of Subtotal Price)					
TOTAL					TOTAL	

Bidder: \_\_\_\_\_

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

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price.   
 Madison County BCC IFBC No. 23-TA004413LP

**APPENDIX K, BID PRICING FORM**

**IFBC NO. 23-TA004413LP PROJECT # 6104280**

**NORTH SERVICE AREA FORCE MAIN REPLACEMENT LS 539**

**Bidders must provide prices for each line item for their bid to be considered responsive.**

ITEM	DESCRIPTION	QUANTITY	UNIT PRICE BID A	EXTENDED AMOUNT BID A	UNIT PRICE BID B	EXTENDED AMOUNT BID B
<b>I. MISCELLANEOUS</b>						
1	Mobilization	1	LS			
2	Project Signs	1	LS			
3	Preconstruction Video	1	LS			
4	Field Reconnaissance / Utility Locates & Coordination	1	LS			
5	Maintenance of Traffic	1	LS			
6	Pressure and Leakage Testing	1	LS			
7	Spoils Disposal	1	LS			
8	Permitting	1	LS			
9	Record Drawings	1	LS			
10	Demobilization	1	LS			
<b>II. PROPOSED IMPROVEMENTS</b>						
<b>EARTHWORK</b>						
11	Erosion Control (Silt Fencing)	1010	LF			
12	Seeding, Sodding, and Mulching	1	LS			
<b>CIVIL</b>						
13	Sidewalk Demolition	5300	SF			
14	Demolition of PVC Pipe/ Fittings	840	LF			
15	Protective Coatings (Piping / Appurtenances)	1	LS			
16	4" PVC Force Main (includes trenching, shoring, backfill, etc)	860	LF			
17	4" PVC - 11.25 Degree Fittings	6	EA			
18	4" PVC - 22.5 Degree Fittings	6	EA			
19	4" PVC - 45 Degree Fittings	18	EA			

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price fields.

APPENDIX K, BID PRICING FORM							
IFBC NO. 23-TA004413LP PROJECT # 6104280							
NORTH SERVICE AREA FORCE MAIN REPLACEMENT LS 539							
Bidders must provide prices for each line item for their bid to be considered responsive.							
ITEM	DESCRIPTION	QUANTITY		UNIT PRICE BID A	EXTENDED AMOUNT BID A	UNIT PRICE BID B	EXTENDED AMOUNT BID B
20	4" PVC - 90 Degree Fittings	1	EA				
21	Tie-In Connections to Existing Wetwell (LS 504)	1	EA				
22	Tie-In Connections to Existing 1.5" Pipe	1	EA				
<b>STRUCTURAL</b>							
23	Concrete Encasement of Shallow Pipe Sections	1	LS				
<b>DRIVEWAY, ROAD, AND LAND RESTORATION</b>							
24	Sidewalk Restoration	5300	SF				
25	Driveway Restoration	680	SF				
26	Curb and Gutter Replacement	1	LS				
27	Detectable Warning on Walking Surfaces	56	SF				
28	Pavement Repair and Road Restoration	1	LS				
<b>MISCELLANEOUS</b>							
<b>SUBTOTAL</b>							
29	Construction Contingency County Authorized Use Only (10% of Subtotal Price)						
<b>TOTAL</b>						<b>TOTAL</b>	

Bidder: \_\_\_\_\_

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

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price fields.

**APPENDIX K, BID PRICING FORM**

**IFBC NO. 23-TA004413LP PROJECT # 6104280**

**NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 546**

**Bidders must provide prices for each line item for their bid to be considered responsive.**

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE BID A	EXTENDED AMOUNT BID A	UNIT PRICE BID B	EXTENDED AMOUNT BID B
<b>I. MISCELLANEOUS</b>							
1	Mobilization	1	LS				
2	Project Signs	1	LS				
3	Preconstruction Video	1	LS				
4	Field Reconnaissance / Utility Locates & Coordination	1	LS				
5	Temporary Bypass Piping and Appurtenances	1	LS				
6	Pressure and Leakage Testing	1	LS				
7	Permitting	1	LS				
8	Record Drawings	1	LS				
9	Demobilization	1	LS				
<b>II. PROPOSED IMPROVEMENTS</b>							
<b>EARTHWORK</b>							
10	Erosion Control (Silt Fencing)	250	LF				
11	Seeding, Sodding, and Mulching	1	LS				
<b>CIVIL</b>							
12	Demolition of Concrete Flowmeter Vault (LS)	1	LS				
13	Demolition of 10" DIP	30	LF				
14	Demolition of 12" DIP	30	LF				
15	Demolition of 10" x 12" Ductile Iron Reducer	2	EA				
16	Demolition of 12" Plug Valve (including valve box / concrete pad)	1	EA				
17	Demolition of 10" Flowmeter	1	EA				
18	Protective Coatings (Piping / Appurtenances)	1	LS				
19	12" Ductile Iron Pipe (includes trenching, shoring, backfill, etc)	150	LF				
20	12" Ductile Iron - 90 Degree Fittings	6	EA				

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price.   
 Macon County BCC IFBC No. 23-TA004413LP

**APPENDIX K, BID PRICING FORM**

**IFBC NO. 23-TA004413LP PROJECT # 6104280**

**NORTH SERVICE AREA FORCE MAIN REPLACEMENT - LS 546**

**Bidders must provide prices for each line item for their bid to be considered responsive.**

ITEM	DESCRIPTION	QUANTITY		UNIT PRICE BID A	EXTENDED AMOUNT BID A	UNIT PRICE BID B	EXTENDED AMOUNT BID B
21	12" Ductile Iron - 45 Degree Fittings	2	EA				
22	12" Ductile Iron - WYE Fittings	2	EA				
23	12" Ductile Iron - Gate Valves	3	EA				
24	12" Gate Valve (Buried)	1	EA				
25	4" Ductile Iron - 90 Degree Fittings	1	EA				
26	2" Air Release Valve	1	EA				
27	Tie-In Connections To Existing Pipe (at existing 12" piping)	2	EA				
<b>STRUCTURAL</b>							
28	Flow Meter Pad	3.5	CY				
29	Miscellaneous Concrete	1	CY				
30	Tie-In Connection w/ Manhole	2	EA				
<b>MISCELLANEOUS</b>							
<b>SUBTOTAL</b>							
31 Construction Contingency County Authorized Use Only (10% of Subtotal Price)							
<b>TOTAL</b>						<b>TOTAL</b>	

Bidder: \_\_\_\_\_

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

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price.  
 Madison County BCC IFBC No. 23-TA004413LP

**APPENDIX K, BID PRICING FORM**

**IFBC NO. 23-TA004413LP PROJECT # 6104280**

**NORTH SERVICE AREA FORCE MAIN REPLACEMENT LS 557**

**Bidders must provide prices for each line item for their bid to be considered responsive.**

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE BID A	EXTENDED AMOUNT BID A	UNIT PRICE BID B	EXTENDED AMOUNT BID B
<b>I. MISCELLANEOUS</b>							
1	Mobilization	1	LS				
2	Project Signs	1	LS				
3	Preconstruction Video	1	LS				
4	Field Reconnaissance / Utility Locates & Coordination	1	LS				
5	Maintenance of Traffic	1	LS				
6	Pressure and Leakage Testing	1	LS				
7	Spoils Disposal	1	LS				
8	Permitting	1	LS				
9	Record Drawings	1	LS				
10	Demobilization	1	LS				
<b>II. PROPOSED IMPROVEMENTS</b>							
<b>EARTHWORK</b>							
11	Erosion Control (Silt Fencing)	1010	LF				
12	Seeding, Sodding, and Mulching	1	LS				
<b>CIVIL</b>							
13	Sidewalk Demolition	5300	SF				
14	Demolition of PVC Pipe/ Fittings	840	LF				
15	Protective Coatings (Piping / Appurtenances)	1	LS				
16	4" PVC Force Main (includes trenching, shoring, backfill, etc)	860	LF				
17	4" PVC - 11.25 Degree Fittings	6	EA				
18	4" PVC - 22.5 Degree Fittings	6	EA				
19	4" PVC - 45 Degree Fittings	18	EA				
20	4" PVC - 90 Degree Fittings	1	EA				
21	Tie-In Connections to Existing Wetwell (LS 504)	1	EA				
22	Tie-In Connections to Existing 1.5" Pipe	1	EA				
<b>STRUCTURAL</b>							

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price.   
 Madison County BCC IFBC No. 23-TA004413LP

APPENDIX K, BID PRICING FORM							
IFBC NO. 23-TA004413LP PROJECT # 6104280							
NORTH SERVICE AREA FORCE MAIN REPLACEMENT LS 557							
Bidders must provide prices for each line item for their bid to be considered responsive.							
ITEM	DESCRIPTION	QUANTITY	UNIT	PRICE	EXTENDED	UNIT	EXTENDED
				BID A	AMOUNT BID A	BID B	AMOUNT BID B
23	Concrete Encasement of Shallow Pipe Sections	1	LS				
<b>DRIVEWAY, ROAD, AND LAND RESTORATION</b>							
24	Sidewalk Restoration	5300	SF				
25	Driveway Restoration	680	SF				
26	Curb and Gutter Replacement	1	LS				
27	Detectable Warning on Walking Surfaces	56	SF				
28	Pavement Repair and Road Restoration	1	LS				
<b>MISCELLANEOUS</b>							
<b>SUBTOTAL</b>							
29	Construction Contingency County Authorized Use Only (10% of Subtotal Price)						
<b>TOTAL</b>						<b>TOTAL</b>	

Bidder: \_\_\_\_\_

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

\*To be considered responsive, it is the sole responsibility of the bidder to correctly calculate and manually enter all sub-total, contingency and total bid price.   
 Macon County BCC IFBC No. 23-TA004413LP

**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
- \$1,000,000 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
- \$100,000 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
- \$ 1,000,000 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 \$ \_\_\_\_\_ or 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 \$ \_\_\_\_\_ or 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.

**[Remainder of Page Intentionally Left Blank]**

## **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, PROJECT SPECIFICATIONS**

# PROJECT SPECIFICATIONS

## Manatee County North Service Area Force Main Replacement

April 2022

Project #: 409042

CIP #: 6104280

ISSUED FOR CONSTRUCTION

**Prepared For:**

Manatee County  
Engineering Division  
Manatee County Public Works Department  
1022 26<sup>th</sup> Avenue East  
Bradenton, FL 34208

**Prepared By:**

Black & Veatch  
3405 W Dr Martin Luther  
King Jr Blvd, Suite 125  
Tampa, FL 33607

## TABLE OF CONTENTS

<b>SECTIONS</b>	<b>PAGES</b>
<b>DIVISION 01 — GENERAL REQUIREMENTS</b>	
01005 - General Requirements .....	13
01010 - Summary of Work .....	3
01015 - Control of Work .....	5
01030 - Special Project Procedures .....	5
01045 - Cutting and Patching .....	2
01050 - Field Engineering and Surveying .....	2
01090 - Reference Standards .....	3
01150 - Measurement and Payment .....	3
01152 - Request for Payment .....	2
01153 - Change Order Procedures .....	4
01200 - Project Meetings .....	2
01310 - Construction Schedule and Project Restraints .....	7
01340 - Shop Drawings, Project Data and Samples .....	9
01370 - Schedule of Values .....	2
01380 - Construction Photographs .....	2
01410 - Testing Laboratory Services .....	2
01500 - Temporary Facilities and Controls .....	5
01510 - Temporary and Permanent Utilities .....	2
01570 - Traffic Regulation .....	2
01580 - Project Identification and Signs .....	3
01610 - General Equipment Stipulations .....	4
01611 - Meteorological and Seismic Design Criteria (IBC 2018) .....	5
01612 - Product Delivery Requirements .....	1
01620 - Storage and Protection .....	2
01700 - Contract Closeout .....	3
01720 - Project Record Documents .....	4
01730 - Operating and Maintenance Data .....	3
01739 - Equipment Installation .....	2
01740 - Warranties and Bonds .....	2
<b>DIVISION 02 — EXISTING CONDITIONS</b>	
02050 - Demolition .....	3
02220 - Excavation .....	5
02221 - Trenching .....	7
02223 - Excavation Below Grade and Crushed Stone or Shell Refill .....	0
02260 - Finish Grading .....	2
02276 - Temporary Erosion and Sedimentation Control .....	2
02480 - Landscaping .....	7
02485 - Seeding and Sodding .....	3
02513 - Asphalt Concrete Paving .....	10
02575 - Pavement Repair and Restoration .....	3
02615 - Ductile Iron Pipe .....	4

02622 - Polyvinyl Chloride (PVC) Pressure Pipe .....	3
02627 - Sanitary Sewer Manhole Rehabilitation .....	8
02640 - Valves and Appurtenances (for the isolation Plug Valves).....	17
02720 - Sanitary Sewer Bypass Pumping .....	3
<b>DIVISION 03 — CONCRETE</b>	
03301 - Miscellaneous Cast-In-Place Concrete .....	5
<b>DIVISION 09 — FINISHES</b>	
09940 - Protective Coatings .....	15
09940 - F1 - Protective Coatings	
09940 - F2 - Protective Coatings	
09970 - Surface Protection Spray System (for manhole liner) .....	8
<b>DIVISION 15 — MECHANICAL</b>	
15140 - Pipe Supports.....	5

**APPENDIX A:**

**APPLICABLE FDOT SPECIFICATIONS (FOR FORCEMAIN ALONG US ROUTE 301, LS 539)**

**NOTE:**

This specification includes by reference the Manatee County Public Works Standards, Part I Utilities Standards Manual approved February 25, 2020.

All items and/or materials furnished and installed shall conform to the Manatee County Approved Products List. All items listed in the submittal requirements under each section shall be required to be submitted for review and/or acceptance. For work completed along US Route 301 (LS 539), and where there is a conflict between the County standards and FDOT standards, the FDOT standards shall prevail.

# SECTION 01005 GENERAL REQUIREMENTS

## PART 1 GENERAL

### 1.01 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. He shall obtain and pay for all required permits necessary for the work, other than those permits such as the DEP permit and DOT permit, which may have already been obtained. He 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. He 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 may or may not be 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 material men 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 him of all errors, omissions, conflicts, and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory work, faulty construction or improper operation resulting therefrom nor from rectifying such conditions at his own expense. He 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 so as 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 in accordance with the contract documents, 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 equal to Koppers 300M 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

Refer to the Startup Requirements Section for all equipment and systems included as Part of this Work, and detailed field startup instructions.

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 specifically 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 that meet 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 or not 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 he 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 to 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 Documents.

**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 be affected.

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 watered, as necessary, for dust suppression.

#### **1.10 CUTTING AND PATCHING**

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

Each forcemain / lift station shall be kept in operation, throughout construction, as described in the Construction Schedule and Project Constraints sections. Generally speaking, all facilities must be kept in continuous operation throughout the construction period. No interruption, unless specifically allowed by this Contract, will be permitted which adversely impacts the ability for the County to operate each forcemain / lift station included in this Project.

~~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 and local ordinances.

**1.13 TAGGING**

A. Valve Tags

All valves shall be provided with a permanent stainless steel tag. Tags shall be permanently attached to the valve with stainless steel mechanical fasteners or with stainless steel chains. The valve number shall be engraved in the tag with lettering and numerals at least 1/2 inch high. Contractor shall request valve tag numbers from the County. ~~Numerals shall be 3/4 inch high and shall be black baked enamel on an anodized aluminum plate.~~

B. Valve Plates

All buried valves shall be tagged with a brass plate cast into a 6-inch by 6-inch concrete pad at grade next to the valve box. The valve number shall be engraved in the brass plate with lettering and numerals at least 1 inch high. Contractor shall request valve tag numbers from the County.

**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. This Project involves working at the following three locations:
- Lift Station (LS) 539 Site - Project involves approximately 900-feet of new 4-inch forcemain to replace an existing 1.5-inch forcemain. This pipe connects LS 539 to LS 504. Contractor shall maintain continuous operation of this forcemain, so the new forcemain must be installed and commissioned, before demolition of the existing pipe can occur. Contractor is responsible for traffic control, utility coordination, and confirmation of existing conditions, where noted. This forcemain runs along a fairly busy road (US Route 301).
    - LS 539, address: 1012 Mark Ave, Ellenton, FL 34222
  - LS 546 Site - Project involves work at the lift station site only. Downstream of the existing valve vault is a below grade flowmeter vault, followed by a 12" plug valve. The flowmeter currently does not work. Contractor is required to demolish the vault, flowmeter and appurtenances, and piping. Additionally, the Contractor is required to demo the existing 12" plug valve. Following demolition, Contractor shall install a slab on grade with new piping and valves. Contractor is required to install temporary piping to facilitate this work, while maintaining operation of the lift station.
    - LS 546, address: 3390 Erie Road, Parrish, FL 34219
  - LS 557 Site - Project involves approximately 500-feet of new 4-inch forcemain to replace an existing 2-inch forcemain. This pipe connects LS 557 to Manhole (MH) 11839. Additionally, the Contractor shall also re-line MH-11839, in addition to 2 other manholes in this area (MH-12058 and MH-12061). Contractor shall maintain continuous operation of this forcemain, so the new forcemain must be installed and commissioned, before demolition of the existing pipe can occur. Contractor will be required to submit a sequencing plan and coordinate with the County for shutdown of the manholes, during relining activities.
    - LS 557, address: 2317 2nd Avenue West, Palmetto, FL 34221
- 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.
- D. Project sequencing and construction constraints are detailed in 01310 Construction Schedule and Project Restraints.

## 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. Product storage constraints are detailed in 01620 Storage and Protection.
- F. Refer to Contract Drawings for Limits of Construction. Parking is available for 4 personnel vehicles at the LS 546 Site. Contractor is responsible for providing parking for workers at the LS 539 Site and the LS 557 Site. Contractor is also responsible for providing staging at the LS 539 Site and the LS 557 Site.

Contractor will have to reserve privately owned space and/or obtain space in the County via a permit.

**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 guarantee 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 ensure 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 section 01570 of this specification..

**1.10 WATER FOR CONSTRUCTION PURPOSES**

- A. In locations where public water supply is available, the Contractor may purchase water for all construction purposes.
- B. The Contractor shall be responsible for paying for all water tap fees incurred for the purpose of obtaining a potable water service or temporary use meter.

**1.11 MAINTENANCE OF FLOW**

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

**1.12 CLEANUP**

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

**1.13 COOPERATION WITHIN THIS CONTRACT**

- A. All firms or person authorized to perform any work under this Contract shall cooperate with the General Contractor and his subcontractors or trades and shall assist in incorporating the work of other trades where necessary or required.
- B. Cutting and patching, drilling and fitting shall be carried out where required by the trade or subcontractor having jurisdiction, unless otherwise indicated herein or directed by the County.

**1.14 PROTECTION OF CONSTRUCTION AND EQUIPMENT**

- A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions injured shall be reconstructed by the Contractor at his own expense.
- B. All structures shall be protected in a manner approved by the County. Should any of the floors or other parts of the structures become heaved, cracked, or otherwise damaged, all such damaged portions of the work shall be completely repaired and made good by the Contractor, at his own expense and to the satisfaction of the County. If, in the final inspection of the work, any defects, faults, or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the

satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the warranty period described in the Contract.

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

**1.15 CONSTRUCTION WITHIN RIGHT-OF-WAY**

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

**PART 2 PRODUCTS (NOT USED)**  
**PART 3 EXECUTION (NOT USED)**  
**END OF SECTION**

## **SECTION 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.

Contractor shall receive permission from the County and Engineer prior to connecting to existing facilities. This cannot be completed until the new facilities have successfully been tested and commissioned. Contractor shall protect existing facilities from deleterious substances and damage.

Connection to existing facilities which are in service shall be thoroughly planned in advance, and all required equipment, materials, and labor shall be on hand at the time of undertaking the connections. Work shall proceed continuously if necessary to complete connections in the minimum time and at the time specified. Operation of valves or other appurtenances on existing utilities, when required, shall be by or under the direct supervision of the County.

#### **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. The Contractor is required to verify the exact horizontal and vertical location of

underground utilities in the area of construction prior to proceeding with the work. The Contractor shall be responsible for any and all damage which might result from his failure to adequately locate and protect any and all utilities, whether above or below grade. Any damage shall be repaired at no additional cost to the County. Contractor shall perform field reconnaissance in advance of starting the work and notify Engineer of any discrepancies with the drawings, so that design modifications can be made before materials are ordered.

- B. It is the responsibility of the Contractor to ensure that all utility or other poles, the stability of which may be endangered by the close proximity of excavation, are temporarily stayed in position while work proceeds in the vicinity of the pole and that the utility or other companies concerned be given reasonable advance notice.
- C. The existing utility locations are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping to be encountered. The Contractor shall be responsible for notifying the various utility companies to locate their respective utilities in advance of construction in conformance with all requirements provided for in the Florida Underground Facilities Damage Prevention and Safety Act (Florida Statutes, Title XXXIII, Chapter 556).
- D. The existing piping and utilities that interfere with new construction shall be rerouted as shown, specified, or required. Before any piping and utilities not shown on the Drawings are disturbed, the Contractor shall notify the County and shall provide suggestions on how best to resolve the issue.
- E. The Contractor shall exercise care in any excavation to locate all existing piping and utilities. All utilities which do not interfere with complete work shall be carefully protected against damage. Any existing utilities damaged in any way by the Contractor shall be restored or replaced by the Contractor at his expense as directed by the County.
- F. It is intended that wherever existing utilities such as water, sewer, gas, telephone, electrical, or other service lines must be crossed, deflection of the pipe within recommended limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated in the Drawings. However, when in the opinion of the County this procedure is not feasible, he may direct the use of fittings for a utilities crossing as detailed on the Drawings. No deflections will be allowed in gravity sanitary sewer lines or in existing storm sewer lines.

#### **1.05 SUSPENSION OF WORK DUE TO WEATHER**

Refer to FDOT Standards and Specifications Book, Section 8.

#### **1.06 HURRICANE PREPAREDNESS PLAN**

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

contacts and a list of subcontractors and vendors with representatives' contact information.

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

#### 1.07 POWER SUPPLY

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

#### 1.08 SALVAGE

Any existing equipment or material, including, but not limited to, hatches, 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.
- C. Refer to Specification 02220 for additional dewatering requirements.

#### 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. Contractor shall notify Owner at least 21 days in advance of tie-in into existing facilities / piping.

Operation of existing facilities or shutdown of facilities, as required, must be coordinated with the Owner and Engineer. The Owner's personnel will be responsible for operating existing infrastructure.

The Owner's operation and maintenance personnel will cooperate in every way that is practical to facilitate Contractor's operation. However, certain shutdowns and connections may only be permissible at times other than normal working hours such as nights and weekend. No additional payment will be made to the Contractor for overtime / holiday work.

If it becomes necessary for the proper operation or maintenance of portions of the infrastructure, the Owner may require the Contractor to reschedule approved shutdowns or tie-ins. The Contractor shall then reschedule its operations accordingly. The Contractor, shall within 2 days of notice by the Owner that a rescheduled shutdown / tie-in is necessary, furnish the Owner a revised outage request and a plan for rescheduling the shutdown/tie-in in accordance with the requirements of the construction schedule.

- 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 readily have 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.

A sequencing plan for each site must be developed by the Contractor, to demonstrate how construction will occur without impacting operations of the existing forcemains / lift stations. Costs for the design, provision, operation, and removal of temporary facilities and piping shall be part of the Contractor's work.

#### 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,

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 any field surveying service required ~~for~~ to execute the project.

B. The Contractor shall furnish and set all necessary stakes to establish the lines and grades as to complete the work 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.

Make no changes or relocations without prior written notice to County.

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

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

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 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.

#### **1.03 ABBREVIATIONS, NAMES AND ADDRESSES OR ORGANIZATIONS**

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

AA	Aluminum Association 818 Connecticut Avenue, N.W. Washington, DC 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capital Street, N.W. Washington, DC 20001
ACI	American Concrete Institute Box 19150 Reford Station Detroit, MI 48219
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AISC	American Institute of Steel Construction 1221 Avenue of the Americas New York, NY 10020
AISI	American Iron and Steel Institute 1000 16th Street NW Washington, DC 20036

ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 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 1022 26 <sup>th</sup> Ave E Bradenton, FL 34208
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 24<sup>th</sup> 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 Contractor is responsible for completing the project as defined by the drawings and specifications, at the cost noted in the Bid Form. 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.

## Measurement and Payment

Lump sum items shall contain all costs, including labor, materials, and equipment needed to complete the work. 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.

Lump sump items are specifically described in the drawings and specifications, and noted in the Bid Form, include:

- Project signage for each lift station site
- Right of way restoration
- Protective coatings
- Demo of concrete flowmeter vault at LS 546
- Concrete encasement of shall pipe sections
- Preconstruction videos
- Field reconnaissance / utility locates
- Permitting support
- Pressure and leakage testing
- Temporary piping and appurtenances.

Miscellaneous Work Not Specifically Described in Bid Form. Contractor shall note that the Bid Form contains a line item for miscellaneous work not specifically described in Bid Form. This is a catch-all for work activities that are not accounted for in the Bid Form. Contractor shall not the work activities that fall under this bid item.

### 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. Project signs and photographs.
2. Removal, repair, replacement or relocation of all signs, walls, private irrigation systems and related items.
3. Rubbish and spoil removal.
4. Shop Drawings, Working Drawings.
5. Clearing, grubbing and grading except as hereinafter specified.
6. Trench excavation, including necessary pavement removal and rock removal, except as otherwise specified.
7. Dewatering and disposal of surplus water.
8. Structural fill, backfill, and grading.
9. Replacement of unpaved roadways, and shrubbery plots.
10. Cleanup & miscellaneous work.
11. Foundation and borrow materials, except as hereinafter specified.
12. Testing and placing system in operation.
13. Any material and equipment required to be installed and utilized for the tests.

Measurement and Payment

14. Pipe, structures, pavement replacement, asphalt and shell driveways and/or appurtenances included within the limits of lump sum work, unless otherwise shown.
15. Maintaining the existing quality of service during construction.
16. Appurtenant work as required for a complete and operable system.

**BID ITEM NO.: PVC (C-900 & C-905) FORCE MAINS AND 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 the listed diameter PVC force main (AWWA C-900, CL-150 or C-905, CL-235) pipe, fittings, and pipe supports 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, 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.

**BID ITEM NO.: DEMO OF PVC (C-900 & C-905) PIPE AND FITTINGS**

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid for demolishing PVC pipe and fittings as shown on the Contract Drawings and listed on the Bid Form. This Bid item includes all labor, material, excavation, including rock, bedding, backfill, compaction, testing and equipment required to complete these Bid Items.

**BID ITEM NO.: TAPPING SLEEVES / TIE-IN CONNECTIONS**

Payment for all work included in these Bid Items shall be at the applicable Contract unit price bid per each tapping sleeve and tapping valve for furnishing and installing the listed diameter tapping sleeve and tapping valve, box, cover and concrete pad as shown on the Contract Drawings and listed on the Bid Form. Prior to the tapping operation, the Contractor will contact the County as to the date and time of the proposed work. The tapping operation itself up to 12-inches in diameter will be performed by the County. All tapping operations larger than 12 inches in diameter shall be performed by the Contractor with the County's Representative present. Payment shall represent full compensation for all labor, material, excavation, including rock as necessary, bedding, backfill, compaction testing, disinfection and equipment required to complete these Bid Items.

This bid item applies to all connections to existing manholes, piping, and wetwells.

**BID ITEM NO.: GATE AND AIR RELEASE VALVES**

Payment for all work included in this Bid Item shall be made at the applicable Contract unit price bid per each valve for furnishing and installing the listed diameter valve, box, cover and concrete pad as shown on the Contract Drawings and listed on the Bid Form. Payment shall represent full compensation for all labor, material,

excavation, including rock as necessary, bedding, backfill, compaction, testing and disinfection and equipment required to complete these Bid Items.

**BID ITEM NO.: PRECAST CONCRETE MANHOLE REHABILITATION**

Payment for work under this Bid Item shall be made at the Contract unit price bid for each manhole rehabilitated, including relining work and other protective coatings, as noted in the drawings and specifications.

Measurement shall be for each manhole rehabilitated and accepted. Payment shall be made per each manhole. Excavation, including rock as necessary, bedding, backfill, dewatering, sheeting, testing and any and all other items necessary for a completed system in accordance with the Contract Documents shall be included. Payment shall represent full compensation for all labor, materials, equipment and incidental items necessary to complete each concrete manhole structure, ready for approval and service by the County.

**BID ITEM NO.: DUCTILE IRON FORCE MAINS, 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 DIP force main (AWWA C-150 or AWWA C-151) 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, 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. This cost includes importing fill and the disposal of unsuitable materials.

**BID ITEM NO.: 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 ductile iron fitting (Protecto 401 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, pipe supports, excavation, including rock, bedding, backfill, compaction, testing and equipment required to complete these Bid Items.

**BID ITEM NO.: DEMO OF DUCTILE IRON PIPE AND FITTINGS, WASTEWATER**

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid for demolishing ductile iron pipe and fittings as shown on the Contract Drawings and listed on the Bid Form. This includes demo of the 12" plug valve, including valve box / concrete pad, and demo of the 10" flowmeter, including proper termination of all cabling/wires. This Bid item includes all labor, material, excavation, including rock, bedding, backfill, compaction, testing and equipment required to complete these Bid Items.

**BID ITEM NO.: EROSION CONTROL (SILT FENCING)**

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid for installing the silt fencing as shown on the Contract Drawings and listed on the Bid Form. This Bid item includes all labor, materials, and equipment required to complete these Bid Items.

**BID ITEM NO.: SEEDING, SODDING, AND MULCHING**

Payment for all work included under this Bid Item shall be made at the Contract lump sum price bid listed in the Bid Form and shall represent full compensation for all labor, materials and equipment required to install the sod, alive and growing.

The lump sum price shall include, but is not limited to, cutting down the existing ground to accept sod, installation, watering, and all labor, materials, necessary equipment, and incidentals necessary to complete this bid item, ready for approval and acceptance by the County.

Sod placed at the edge of the roadway shall not create a “dam” and impede storm water runoff from existing the roadway and entering the stormwater conveyance system.

**BID ITEM NO.: PAVEMENT REPAIR AND ROAD RESTORATION**

Payment for all work included under this Bid Item will be made at the Contract unit price bid per square foot of base, subbase and tonnage of asphalt for furnishing, installing and testing the road restoration pavement section within these Specifications and as listed on the Bid Form. Measurement will be based on the actual number of square feet of road restoration installed, tested, complete and approved. The measurement will be from face of curb to face of curb or as specified, but not greater than the width of the existing roadway prior to construction. This work includes demolition of existing concrete driveways to support the work. Payment will include complete restoration of the roadway section in accordance with the applicable details on the Contract Drawings, but not less than 1-1/2 inches of FDOT Type III asphaltic concrete, the necessary base, subbase or compacted suitable excavation material all in accordance with these Specifications. No payment for restoration of a private driveway within or outside the right-of-way shall be made under this Bid Item. Payment shall include all items and incidentals necessary to complete the road restoration in accordance with the requirements of Manatee County ready for approval and acceptance by the County.

**BID ITEM NO.: MISCELLANEOUS CONCRETE**

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, placing and installing the miscellaneous concrete, measured in place, within the lines and grades 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.

## Measurement and Payment

Measurement for miscellaneous concrete 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.

This bid item includes the new concrete pad at the LS 546 site, including the floor sleeves.

### **BID ITEM NO.: CURB AND GUTTER REPLACEMENT**

Payment for all work included under these Bid Items shall be made at the Contract lump sum price bid listed in the Bid Form for removal of existing curb / gutter and for furnishing and placing new curb / gutter as required by the contract, and shall represent full compensation for all labor, materials and equipment. Curb / gutter shall be in accordance with FDOT standards. Measurement will be a lump sum amount as the amount of curb / gutter replaced is a function of the Contractor's means and methods. Payment shall represent full compensation for curb / gutter replacement including all labor, material and equipment for compacting subgrade, forming, furnishing, placing the concrete, and finishing as specified and all incidentals necessary for completion of this Bid Item, ready for approval and acceptance by the County.

### **BID ITEM NO.: DRIVEWAY RESTORATION**

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid per square foot of shell, asphaltic concrete, or concrete driveway restoration as listed on the Bid Form. Measurement of driveway restoration will be per the actual number of square feet replaced. Payment shall represent full compensation for all labor, materials and equipment for cutting the edges of existing driveways, compacting subgrade, furnishing and installing the shell, asphaltic concrete or concrete and all incidentals necessary to complete the driveway restoration as shown on the Contract Drawings and included in the Specifications, all ready for approval and acceptance by the County.

### **BID ITEM NO.: SIDEWALK RESTORATION**

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid per square foot of sidewalk restoration as listed on the Bid Form. Measurement of driveway restoration will be per the actual number of square feet replaced. Payment shall represent full compensation for all labor, materials and equipment for cutting the edges of existing sidewalk, compacting subgrade, furnishing and installing subgrade as well as all incidentals necessary to complete the sidewalk restoration as shown on the Contract Drawings and included in the Specifications, all ready for approval and acceptance by the County.

### **BID ITEM NO.: SIDEWALK DEMOLITION**

Payment for all work included in these Bid Items will be made at the applicable Contract unit price bid per square foot of sidewalk demolition as listed on the Bid

Form. Measurement will be per the actual number of square feet of sidewalk demolished. Payment shall represent full compensation for all labor, materials and equipment for cutting the edges of existing sidewalk and all incidentals necessary to complete the sidewalk demolition as required under the Contract, all ready for approval and acceptance by the County.

**BID ITEM NO.: DETECTABLE WARNING ON WALKING SURFACES**

Payment for all work included in this Bid Item will be made at the applicable Contract unit price bid for providing detectable warning devices on newly constructed and/or existing concrete or asphalt walking surfaces (curb ramps, sidewalks, etc) in accordance with FDOT Design Standards, Index No. 304 (FDOT Section 527). This Bid item includes all labor, material, and equipment required to complete this Bid Item.

**BID ITEM NO. : MAINTENANCE OF TRAFFIC**

Payment for all work included under this Bid Item shall be made at the Contract lump sum price bid listed in the Bid Form and shall represent full compensation for all labor, materials and equipment required to implement the Contractor's to develop and implement the traffic plan. Contractor shall conduct work to interfere as little as possible with public travel, whether vehicular or pedestrian. This work shall be in accordance with the Drawings and Specifications. Traffic control at LS 539 shall be in strict accordance with FDOT requirements. A traffic control plan is required for LS 557, which shall include traffic control required for the manhole rehabilitation work.

**BID ITEM NO.: MOBILIZATION / DEMOBILIZATION**

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 it not limited to: preparation and movement of personnel, equipment, supplies and incidentals such as safety and sanitary supplies/ facilities

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

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

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

Measurement and Payment

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. : RECORD DRAWINGS**

Payment for all work included under this Bid Item shall be made at the Contract lump sum price bid listed in the Bid Form and shall represent full compensation for all labor, materials and equipment required to generate and provide record drawings approved and accepted by the County. Record drawings shall be in strict accordance with Section 1.14 of the Manatee County Public Work Utility Standards.

**BID ITEM NO.: 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 Engineer, Resident Project Representative 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. Photographs from the current payment period must accompany the payment request in order to be processed.
- C.    Provide updated construction schedule in accordance with Contract Documents. An updated schedule reflecting dates and durations of completed activities must accompany the payment request in order to be processed.

#### **1.03            SUBSTANTIATING DATA FOR PROGRESS PAYMENTS**

- A.    Provide substantiating data in accordance with Contract Documents. Substantiating data must accompany the payment request in order to be processed. When the County requires additional 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 Orders 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. Any traffic closure along US Route 301 (LS 539) shall be limited from 8:00 p.m. and 5:00 a.m., Sunday through Saturday with no closures on Fridays, Saturdays, or holidays. Refer to FDOT traffic control specification for additional requirements (APPENDIX A).
- B. Night work may be established by the Contractor as regular procedure, especially if required by permit, with the written permission of the County. Such permission, however, may be revoked at any time by the County if the Contractor fails to maintain adequate equipment and supervision for the proper execution and control of the work at night.
- C. Due to potential health hazards and requirements of the State of Florida and the U.S. Environmental Protection Agency, existing facilities must be maintained in operation.
- D. The Contractor shall be fully responsible for providing all temporary piping, plumbing, electrical hook-ups, lighting, temporary structure, or other materials, equipment and systems required to maintain the existing facility's operations. All details of temporary piping and temporary construction are not necessarily shown on the Drawings or covered in the Specifications. However, this does not relieve the Contractor of the responsibility to insure that construction will not interrupt proper facility operations.
- E. The Contractor shall designate an authorized representative of his firm who shall be responsible for development and maintenance of the schedule and of progress and payment reports. This representative of the Contractor shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the commitments of the Contractor's schedule.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS**

- A. The Contractor shall submit a critical path schedule as described herein.
- B. The planning, scheduling, management and execution of the work is the sole responsibility of the Contractor. The progress schedule requirement is established to allow County to review Contractor's planning, scheduling, management and execution of the work; to assist County in evaluating work progress and make progress payments and to allow other contractors to cooperate and coordinate their activities with those of the Contractor.

**2.02 FORM OF SCHEDULES**

- A. Prepare schedules using the latest version of Microsoft Project, or other County approved software, in the form of a horizontal bar chart diagram. The diagram shall be time-scaled and sequenced by work areas. Horizontal time scale shall identify the first work day of each week.
- B. Activities shall be at least as detailed as the Schedule of Values. Activity durations shall be in whole working days. In addition, man-days shall be shown for each activity or tabulated in an accompanying report.

Project Calendars shall use workdays and calendar days as the planning unit for the schedule. Use of Global Calendars is reserved for the County. Each calendar shall be set to start on Mondays with holidays in accordance with County policy. The following calendar shall be used for each activity except as otherwise accepted by the County:

5-Day x 8 Hour Workweek (with holidays) shall be used for 5-day 40-hour workweek activities: Monday through Friday. All holidays and non-work days shall be assigned to this calendar. This calendar shall be used for all normal work activities, submittals, and fabricate and delivery activities. This calendar shall be the default calendar for the project unless otherwise specified.

The work day to calendar day correlation shall be based on a single shift and 5-day work week with adequate allowance for holidays, adverse weather and all other special requirements of the Work. As noted in the drawings, certain activities (e.g. tie-ins with existing piping) shall be done on the weekend, unless otherwise approved by the County. Under no circumstances will a schedule be accepted which allows regularly scheduled work on weekends.

- 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.
- I. Additional positive total Float in the Progress Schedule generated by efficiencies of Owner or Contractor is a shared commodity to be reasonably used by either party and belongs exclusively to the Project. Contractor is not entitled to any additional compensation for completion of the project prior to expiration of the Contract Times.

Contractor shall not use Float suppression techniques, including preferential sequencing (arranging critical path through activities more susceptible to Owner caused delay); lag logic restraints; zero total or free Float constraints; extended activity times; or imposing constraint dates other than as required by the Contract. Float suppression will be cause for rejection of the preliminary Progress Schedule or full Progress Schedule and its updates.

J. Owner initiated changes to the Work that absorb Float time will not be considered for an extension of time. Owner-initiated changes that affect the critical path of the Progress Schedule shall be grounds for extending or shortening completion dates. Use of Float time for Contractor initiated changes will require Owner's concurrence. Contractor's changes, however, shall give way to Owner-initiated changes competing for the same Float time.

K. Events outside of Contractor's control that affect the critical path of the Progress Schedule will be considered for an extension or reduction of the Contract Times.

Owner will determine Contractor's entitlement to an extension of the Contract Times as a result of weather delays, based on the flow chart in Figure 1-01310 and the data included in Tables 1 and 2. Extensions of time will be granted at the discretion of Owner for circumstances not covered by the flow chart.

Any weather-related extension of Contract Times shall be non-compensable. Efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated weather days is less than expected, shall contribute to the project Float and shall not affect the Contract Times.

Application for a weather-related extension of time shall be submitted to Owner and shall state the extension requested and be supported by the relevant weather data.

Table 1 Average Monthly Precipitation (inches) 10 year average 2007 - 2017 NOAA National Data Center, Annual Climatological Summaries											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
3.10	2.94	3.04	3.23	3.92	7.39	7.39	7.93	6.23	3.19	1.96	2.63

Table 2 Average Number of Calendar Days with Precipitation of 0.50 Inches or More in a Single 24-hour Period 10 year average 2002 - 2011 NOAA National Data Center, Annual Climatological Summaries											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	1	2	2	1	4	5	5	4	2	1	2

**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 County 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 in concurrence with the County, shall be the work plan 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

### 3.01 PROJECT CONSTRAINTS

Contractor shall schedule and sequence the construction to ensure the continuous operation of the existing forcemains, unless otherwise specifically allowed for in these Contract Documents and with written authorization from the County. The Contractor's scheduling shall be developed to include proper construction sequencing so that the Work will not adversely impact the County's operations and to ensure that the County maintains full capabilities. Contractor is responsible for pre-assembling piping/appurtenances in advance of each tie-in. The Contractor shall submit tie-in plans for each tie-in. It is the Contractor's responsibility to coordinate and plan the construction activities to integrate each schedule constraint into performance of the overall Work.

At the LS 539 site and the LS 557 site, the Contractor shall install the new forcemain, followed by startup and commissioning (pressure testing, etc), before the tie-ins can be made. Once the tie-in's are made, the Contractor may then proceed with demolition activities. All temporary piping and appurtenances required, is the responsibility of the Contractor.

At the LS 557 site, the Contractor shall bypass the existing flowmeter vault and buried valve, before initiating the demolition activities. This temporary bypass must remain in operation while the Contractor installs the new equipment pad and piping / appurtenances (and completes commissioning activities). The Contractor shall also submit sequencing plan for lining the three manholes in the vicinity of this Lift Station. This includes MH-11839, MH-12058, and MH-12061. All temporary piping and appurtenances required, is the responsibility of the Contractor.

**END OF SECTION**

# **SECTION 01340 SHOP DRAWINGS, PROJECT DATA AND SAMPLES**

## **PART 1 GENERAL**

Refer to Specification 01730 for requirements for O&M manuals / data.

### **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) that have been produced within the last three (3) years, 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. Submittals may be done electronically via PDF documents.
  
- B. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the County. The County will provide the initial submittal log in electronic format. The electronic log (excel file) shall be passed back and forth between the Contractor and the County for each submittal package. This log shall 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 contract.
  - 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.

All deviations shall be tabulated in Contractor's letter of transmittal. Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by Contractor (including modifications to other facilities that may be a result of the deviation) and all required piping and wiring diagrams.

Shop Drawings and engineering data (submittals) covering all appurtenances which will become a permanent part of the Work under this Contract shall be submitted to Owner for review, as required. Submittals shall verify compliance with the Contract Documents, and shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and the operation of component materials and devices; the external connections, anchorages, and supports required; the performance characteristics; and dimensions needed for installation and correlation with other materials and equipment.

Each submittal shall cover items from only one section of the specification unless the item consists of components from several sources. When an item consists of components from several sources, Contractor's initial submittal shall be complete including all components.

All submittals, regardless of origin, shall be approved by Contractor and clearly identified with the name and number of this Contract, Contractor's name, and references to applicable specification paragraphs and Contract Drawings. Refer to Section 1.05C. Each copy of all submittals, regardless of origin, shall be stamped or affixed with an approval statement of Contractor. Each submittal shall indicate the intended use of the item in the Work. When catalog pages are submitted, applicable items shall be clearly identified and inapplicable data crossed out. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.

- B. The Contractor shall ensure that all submitted cut sheets, product sheets, product documentation, etc. are current versions of the product information and are not older than three (3) years. Product certification(s) shall be no older than three (3) years. Any submitted documents found to be beyond the acceptable date ranges shall be rejected.
- C. 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.
- D. 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.
- E. The Contractor shall not begin any of the work covered by a drawing, data, or a sample returned for correction until a revision or correction thereof has been

reviewed and returned to him, by the County, with No Exceptions Taken or Approved As Noted.

- F. 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. Submittals are to be scheduled, submitted, reviewed, and approved prior to the acquisition of the material or equipment. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow time for potential resubmittal.
- G. No delay costs or time extensions will be allowed for time lost in late submittals or resubmittals.
- H. Unless specifically mentioned otherwise, all material & product submittals, other than samples, shall be transmitted electronically as a PDF file. All returns to the Contractor will be as a PDF file unless specifically requested otherwise. For electronic submittals, Drawings and the necessary data shall be submitted electronically to Owner as specified below. Submittal documents shall be in color to facilitate use of red line markups. PDF images must be at a readable resolution. Document should be such that text can be searched, selected and copied from the generated PDF file.  
~~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.~~
- I. 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 REVIEW OF SHOP DRAWINGS AND WORKING DRAWINGS

**Note: To clarify, the Reference to 'County' also pertains to the Engineer's review**

- A. County's review of submittals covers only general conformity to the Drawings and Specifications, external connections, and dimensions that affect the layout; it does not indicate thorough review of all dimensions, quantities, and details of the material, equipment, device, or item covered. Engineer and County's review shall not relieve Contractor of sole responsibility for errors, omissions, or deviations in the drawings and data, nor of Contractor's sole responsibility for compliance with the Contract Documents.

~~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.  
Review of Shop Drawings will result in one of the following dispositions:
1. No Exceptions Taken
  2. Returned for Confirmation or Resubmittal
  3. Record Copy
  4. Rejected
- 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.
- Resubmittals shall be made within 30 days of the date of the letter returning the material to be modified or corrected, unless within 14 days Contractor submits an acceptable request for an extension of the stipulated time period, listing the reasons the resubmittal cannot be completed within that time.
- 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 SUBMITTAL PREPARATION

- A. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.
- B. Collect required data for each specific material, product, unit of work, or system into a single submittal. Prominently mark choices, options, and portions applicable to the submittal. Partial submittals will not be accepted for expedition of construction effort. Submittal will be returned without review if incomplete.
- C. If available product data is incomplete, provide Contractor-prepared documentation to supplement product data and satisfy submittal requirements.
- D. All irrelevant or unnecessary data shall be removed from the submittal to facilitate accuracy and timely processing. Submittals that contain an excessive amount of irrelevant or unnecessary data will be returned without review.
- E. Provide a transmittal form for each submittal with the following information:
  - 1. Project title, location and number.
  - 2. Construction contract number.
  - 3. Date of the drawings and revisions.
  - 4. Name, address, and telephone number of subcontractor, supplier, manufacturer, and any other subcontractor associated with the submittal.
  - 5. List paragraph number of the specification section and page number; and sheet number of the contract drawings by which the submittal is required.
  - 6. When a resubmission, the resubmittal document name shall remain the same, but shall add an alphabetic suffix on submittal description. For example, submittal 18 would become 18A, to indicate resubmission.
  - 7. Product identification and location in project.
- F. The Contractor is responsible for reviewing and certifying that all submittals are in compliance with contract requirements before submitting to the County for review.
- G. Stamp, sign, and date each submittal transmittal form indicating action taken.

- H. Stamp used by the Contractor on the submittal transmittal form to certify that the submittal meets contract requirements is to be similar to the following:

<b>CONTRACTOR</b> (Firm Name)
____ Approved
____ Approved with corrections as noted on submittal data and/or attached sheet(s).
I certify that the following document and information has been verified to be is not more than three (3) years old.
SIGNATURE: _____
TITLE: _____
DATE: _____

#### 1.07 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.

#### 1.08 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.

#### **1.09 APPROVED SUBMITTALS**

- A. County approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory.
- B. County approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project. Non-compliant material incorporated in the work will be removed and replaced at the Contractor's expense.
- C. After submittals have been approved, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.
- D. Retain a copy of all approved submittals at project site, including approved samples.

**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. A separate schedule of value shall be provided for each of the three project sites.
- B. Upon request of the County, the Contractor shall support the values with data which will substantiate their correctness.
- C. The Schedule of Values shall be used only as the basis for the Contractor's Applications for Payment.
- D. The Schedule of Values shall have sufficient detail such that partial completion of separable items of work can easily be calculated. The Schedule of Values shall have separate lines for manufacturer's field services, O&M manuals, and performance testing for each item of equipment requiring such services.

An unbalanced Schedule of Values providing for overpayment of Contractor on items of Work which would be performed first will not be accepted. The Schedule of Values shall be revised and resubmitted until acceptable to Engineer. Final acceptance by Engineer shall indicate only consent to the Schedule of Value as a basis for preparation of applications for progress payments, and shall not constitute agreement as to the value of each indicated item.

#### **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.~~

D. 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 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.
- 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 01500 - TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 UNITS OF MEASUREMENT.

- A. When both inch-pound (English) and SI (metric) units of measurement are specified herein, the values expressed in inch-pound units shall govern.

#### 1.2 OFFICES

- A. During the performance of this Contract, Contractor, for each site, shall maintain a suitable office at or near the Site which shall be the headquarters of its representative authorized to receive drawings, instructions, or other communication or articles.
- B. Any communication given to said representative or delivered at Contractor's office at the Site in the representative's absence shall be deemed to have been delivered to the Contractor.
- C. Copies of the Drawings, Specifications, and other Contract Documents shall be kept at Contractor's office at the Site and available for use at all times.

#### 1.3 MAINTENANCE OF TRAFFIC.

- A. Contractor shall conduct its work to interfere as little as possible with public travel, whether vehicular or pedestrian. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, Contractor shall provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel, and shall give reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when Contractor has obtained permission from the owner and tenant of private property, or from the authority having jurisdiction over public property involved, to obstruct traffic at the designated point.

#### 1.4 BARRICADES AND LIGHTS.

- A. All streets, roads, highways, and other public thoroughfares which are closed to traffic shall be protected by effective barricades on which shall be placed acceptable warning signs. Barricades shall be located at the nearest intersecting public highway or street on each side of the blocked section.
- B. All open trenches and other excavations shall have suitable barricades, signs, and lights to provide adequate protection to the public. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights.

- C. All barricades and obstructions shall be illuminated with warning lights from sunset to sunrise. Material storage and conduct of the Work on or alongside public streets and highways shall cause the minimum obstruction and inconvenience to the traveling public.
- D. All barricades, signs, lights, and other protective devices shall be installed and maintained in conformity with applicable statutory requirements and, where within railroad and highway rights-of-way, as required by the authority having jurisdiction.

#### 1.5 FENCES.

- A. All existing fences affected by the Work shall be maintained by Contractor until completion of the Work. Fences which interfere with construction operations shall not be relocated or dismantled until written permission is obtained from the owner of the fence, and the period the fence may be left relocated or dismantled has been agreed upon. Where fences must be maintained across the construction easement, adequate gates shall be installed. Gates shall be kept closed and locked at all times when not in use.
- B. On completion of the Work across any tract of land, Contractor shall restore all fences to their original or to a better condition and to their original locations.

#### 1.6 PROTECTION OF PUBLIC AND PRIVATE PROPERTY.

- A. Contractor shall protect, shore, brace, support, and maintain all underground pipes, conduits, drains, and other underground construction uncovered or otherwise affected by its construction operations. All pavement, surfacing, driveways, curbs, walks, buildings, utility poles, guy wires, fences, and other surface structures affected by construction operations, together with all sod and shrubs in yards, parkways, and medians, shall be restored to their original condition, whether within or outside the easement. All replacements shall be made with new materials.
- B. No trees shall be removed outside the permanent easement, except where authorized by the Engineer. Whenever practicable, Contractor shall tunnel beneath trees in yards and parking lots when on or near the line of trench. Hand excavation shall be employed as necessary to prevent injury to trees. Trees left standing shall be adequately protected against damage from construction operations.
- C. Contractor shall be responsible for all damage to streets, roads, highways, shoulders, ditches, embankments, culverts, bridges, and other public or private property, regardless of location or character, which may be caused by transporting equipment, materials, or workers to or from the Work or any part or site thereof, whether by Contractor or its Subcontractors. Contractor shall make satisfactory and acceptable arrangements with the owner of, or the agency or authority having jurisdiction over, the damaged property concerning its repair or replacement or payment of costs incurred in connection with the damage.
- D. All fire hydrants and water control valves shall be kept free from obstruction and available for use at all times.

1.7 DAMAGE TO EXISTING PROPERTY.

- A. Contractor will be held responsible for any damage to existing structures, Work, materials, or equipment because of his operations and shall repair or replace any damaged structures, Work, materials, or equipment to the satisfaction of, and at no additional cost to, Owner.
- B. Contractor shall protect all existing structures and property from damage and shall provide bracing, shoring, or other work necessary for such protection.
- C. Contractor shall be responsible for all damage to streets, roads, curbs, sidewalks, highways, shoulders, ditches, embankments, culverts, bridges, or other public or private property, which may be caused by transporting equipment, materials, or workers to or from the Work. Contractor shall make satisfactory and acceptable arrangements with the agency having jurisdiction over the damaged property concerning its repair or replacement.

1.8 TREE AND PLANT PROTECTION.

- A. All trees and other vegetation which must be removed to perform the Work shall be removed and disposed of by Contractor; however, no trees or cultured plants shall be unnecessarily removed unless their removal is indicated on the Drawings. All trees and plants not removed shall be protected against injury from construction operations.
- B. Trees considered by the Engineer to have any significant effect on construction operations are indicated on the Drawings and those which are to be preserved are so indicated.
- C. Contractor shall take extra measures to protect trees designated to be preserved, such as erecting barricades, trimming to prevent damage from construction equipment, and installing pipe and other Work by means of hand excavation or tunneling methods. Such trees shall not be endangered by stockpiling excavated material or storing equipment against their trunks.
- D. When injury to or removal of trees designated to be preserved cannot be avoided, or when removal and replacement is indicated on the Drawings, each tree injured beyond repair or removed shall be replaced with a similar tree of the nearest size possible.
- E. All trimming, repair, and replacement of trees and plants shall be performed by qualified nurserymen or horticulturists.

1.9 SECURITY.

- A. Contractor shall be responsible for protection of the Site, and all Work, materials, equipment, and existing facilities thereon, against vandals and other unauthorized persons.
- B. No Claim shall be made against Owner by reason of any act of an employee or trespasser, and Contractor shall make good all damage to Owner's property resulting from Contractor's failure to provide security measures as specified.
- C. Security measures shall be at least equal to those usually provided by Owner to protect Owner's existing facilities during normal operation, but shall also include such additional security

fencing, barricades, lighting, watchman services,, and other measures as required to protect the Site.

1.10 PARKING.

- A. Contractor shall provide and maintain suitable parking areas for the use of all workers and others performing work or furnishing services in connection with the Project, as required to avoid any need for parking personal vehicles where they may interfere with public traffic, Owner's operations, or construction activities. Four spaces for Contractor personnel vehicles exist at the LS 546 Site. Contractor shall be responsible for providing parking at LS 539 Site and the LS 557 Site.

1.11 NOISE CONTROL.

- A. Contractor shall take reasonable measures to avoid unnecessary noise. Such measures shall be appropriate for the normal ambient sound levels in the area during working hours. All construction machinery and vehicles shall be equipped with practical sound-muffling devices, and operated in a manner to cause the least noise consistent with efficient performance of the Work.
- B. During construction activities on or adjacent to occupied buildings, and when appropriate, Contractor shall erect screens or barriers effective in reducing noise in the building and shall conduct its operations to avoid unnecessary noise which might interfere with the activities of building occupants.

1.12 DUST CONTROL.

- A. Contractor shall take reasonable measures to prevent unnecessary dust. Earth surfaces subject to dusting shall be kept moist with water or by application of a chemical dust suppressant. When practicable, dusty materials in piles or in transit shall be covered to prevent blowing dust.
- B. Buildings or operating facilities which may be affected adversely by dust shall be adequately protected from dust. Existing or new machinery, motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens.

1.13 TEMPORARY DRAINAGE PROVISIONS.

- A. Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the Site in performance of the Work. Drainage facilities shall be adequate to prevent damage to the Work, the Site, and adjacent property.
- B. Existing drainage channels and conduits shall be cleaned, enlarged, or supplemented as necessary to carry all increased runoff attributable to Contractor's operations. Dikes shall be constructed as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect Owner's facilities and the Work, and to direct water to drainage channels or conduits. Ponding shall be provided as necessary to prevent downstream flooding.

1.14 EROSION CONTROL.

- A. Contractor shall prevent erosion of soil on the Site and adjacent property resulting from its construction activities. Effective measures shall be initiated prior to the commencement of clearing, grading, excavation, or other operation that will disturb the natural protection.
- B. Work shall be scheduled to expose areas subject to erosion for the shortest possible time, and natural vegetation shall be preserved to the greatest extent practicable. Temporary storage and construction buildings shall be located, and construction traffic routed, to minimize erosion. Temporary fast-growing vegetation or other suitable ground cover shall be provided as necessary to control runoff.

1.15 POLLUTION CONTROL.

- A. Contractor shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes shall be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substance shall be permitted to enter sanitary sewers, and reasonable measures shall be taken to prevent such materials from entering any drain or watercourse.

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 fittings 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

This section pertains to the LS 539 site (along US Route 301) and the LS 557 site (along 2<sup>nd</sup> Ave W). Contractor is required to develop and implement the traffic control plan.

### 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 102 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 along County Road 2<sup>nd</sup> Ave W, 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. This includes development of a traffic control plan for the manhole rehabilitation work along 2<sup>nd</sup> Ave W.
  - 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. Should there be the necessity to close any portion of a roadway carrying vehicles or pedestrians along State Road US Route 301, the Contractor shall submit a

Traffic Control Plan (TCP) at least 60 days before a partial, full day closure, and multi-day closure. TCP shall be submitted, along with a copy of their accreditation, by a certified IMSA or ATSA Traffic Control Specialist.

1. Lane closures will be allowed 8:00 PM - 5:00 AM, Sunday through Saturday with no closures on Fridays, Saturdays, or Holidays. At no time will more than one (1) lane of a roadway be closed to vehicles and pedestrians. The contractor must obtain an approved road closure from the FDOT. 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 3 day in advance of the closure. Multi-day closures notification signs shall be in place at least 14 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.
- D. 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.
- E. 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.
- F. 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.
- G. 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.
- H. 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. For each of the three sites, Contractor shall provide 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.
  - 1. Size of signs and lettering: as required by regulatory agencies, or as appropriate to usage.
  - 2. Colors: as required by regulatory agencies, otherwise of uniform colors throughout project.
- B. Erect at appropriate locations to provide required information.

#### **1.04 QUALITY ASSURANCE**

- A. Sign Painter: Professional experience in type of work required.
- B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.

#### **1.05 PUBLIC NOTIFICATION**



1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.
- C. Rough Hardware: Galvanized.
- D. Paint: Exterior quality, as specified in the Contract Documents.

### **PART 3 EXECUTION**

#### **3.01 PROJECT IDENTIFICATION SIGN**

- A. Paint exposed surface or supports, framing and surface material; one coat of primer and one coat of exterior paint.
- B. Paint graphics in styles, size and colors selected.

#### **3.02 MAINTENANCE**

The Contractor shall maintain signs and supports in a neat, clean condition; repair damages to structures, framing or sign.

#### **3.03 REMOVAL**

The Contractor shall remove signs, framing, supports and foundations at completion of project.

**END OF SECTION**

## **SECTION 01610 - GENERAL EQUIPMENT STIPULATIONS**

### **PART 1 - GENERAL**

#### **1.1 SCOPE.**

- A. When an equipment specification section in this Contract references this section, the equipment shall conform to the general stipulations set forth in this section, except as otherwise specified in other sections.

#### **1.2 COORDINATION.**

- A. Contractor shall coordinate all details of the equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alterations in the Work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Drawings or Specifications.

#### **1.3 MANUFACTURER'S EXPERIENCE.**

- A. Unless specifically named in the Specifications, a manufacturer shall have furnished equipment of the type and size specified which has been in successful operation for not less than the past 5 years.

#### **1.4 WORKMANSHIP AND MATERIALS.**

- A. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage, or other failure. Materials shall be suitable for service conditions.
- B. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and thicknesses so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required by tests.
- C. Except where otherwise specified, structural and miscellaneous fabricated steel used in equipment shall conform to AISC standards. All structural members shall be designed for shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment shall be at least 1/4 inch thick. When dissimilar metal components are used, consideration shall be given to prevention of galvanic corrosion.

1.5 STRUCTURAL DESIGN REQUIREMENTS.

- A. All equipment, including non-structural components and non-building structures as defined in ASCE 7, and their anchorage, shall be designed and detailed in accordance with the Meteorological and Seismic Design Criteria section.

1.6 LUBRICATION.

- A. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during startup or shutdown and shall not waste lubricants.
- B. Lubricants of the types recommended by the equipment manufacturer shall be provided in sufficient quantities to fill all lubricant reservoirs and to replace all consumption during testing, startup, and operation prior to acceptance of equipment by Owner. Lubricants for equipment where the lubricants may come in contact with water before or during a potable water treatment process or with potable water, shall be food grade lubricants. This includes lubricants for equipment not normally in contact with water, but where accidental leakage of the lubricants may contaminate the water.
- C. Lubrication facilities shall be convenient and accessible. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal installed position.

1.7 ELEVATION.

- A. The elevation of the site shall be as indicated in the Meteorological and Seismic Design Criteria section. All equipment furnished shall be designed to meet stipulated conditions and to operate satisfactorily at the specified elevation.

1.8 ANCHOR BOLTS.

- A. Equipment suppliers shall design and detail suitable anchor bolts for each item of equipment. Anchor bolts shall be designed for all operating conditions of the equipment, including wind and seismic loadings when applicable. Wind and seismic loads shall be as indicated in the Meteorological and Seismic Design Criteria section.
- B. Requirements for anchor bolt type, material, and minimum diameter shall be as indicated in the Anchorage in Concrete and Masonry section.
- C. Anchor bolts, together with templates or setting drawings, shall be delivered sufficiently early to permit setting the anchor bolts when the structural concrete or masonry grout is placed.
- D. Unless otherwise indicated or specified, anchor bolts for items of equipment mounted on baseplates shall be long enough to permit 1-1/2 inches of grout beneath the baseplate and to provide adequate anchorage into structural concrete.

1.9 SPECIAL TOOLS AND ACCESSORIES.

- A. Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

1.10 SHOP PAINTING.

- A. All iron and steel surfaces of the equipment shall be protected with suitable protective coatings applied in the shop. Surfaces of the equipment that will be inaccessible after assembly shall be protected for the life of the equipment. Coatings shall be suitable for the environment where the equipment is installed. Exposed surfaces shall be finished, thoroughly cleaned, and filled as necessary to provide a smooth, uniform base for painting. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed or finished with an epoxy or polyurethane enamel or universal type primer suitable for top coating in the field with a universal primer and aliphatic polyurethane system.
- B. Surfaces to be coated after installation shall be prepared for painting as recommended by the paint manufacturer for the intended service, and then shop painted with one or more coats of a universal primer.
- C. Machined, polished, and nonferrous surfaces which are not to be painted shall be coated with rust-preventive compound as recommended by the equipment manufacturer.

1.11 PREPARATION FOR SHIPMENT.

- A. Equipment shall be prepared for shipment as specified in the Product Delivery Requirements section.

1.12 STORAGE.

- A. Handling and storage of equipment shall be as specified in the Product Storage and Handling Requirements section.

1.13 INSTALLATION AND OPERATION.

- A. Installation and operation shall be as specified in respective equipment sections and the Startup Requirements section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

End of Section



**SECTION 01611 -METEOROLOGICAL AND SEISMIC DESIGN CRITERIA**

**PART 1 - GENERAL**

**1.1 SCOPE**

- A. Buildings, non-structural components and non-building structures shall be designed in accordance with this section. In the event of conflict with requirements in other sections, the more stringent criteria shall be followed.

**1.2 DESIGN CRITERIA.**

- A. Non-structural components, non-building structures, including anchorage of such items, shall be designed in accordance with the following criteria.

<b>1. General Design Data</b>		
	Building code and references	IBC 2018, ASCE 7-16 “Minimum Design Loads and Associated Criteria for Buildings and Other Structures”, AISC 360 “Specification for Structural Steel Buildings”, AISC 341 “Seismic Provisions for Structural Steel Buildings”
	Site elevation	Refer to Drawings
	Design flood elevation (ft)	At grade
	Design groundwater elevation (ft)	At grade
<b>2. Wind Design Data</b>		
	Basic (Ultimate) design wind speed, V (mph)	146
	Allowable Stress (Nominal) design wind speed, $V_{asd}$ (mph)	113
	Exposure category	C
	Ground elevation factor, $K_e$	1.0
	Risk Category	III
<b>5. Seismic Design Data</b>		
	Mapped MCE short period spectral response acceleration, $S_s$	0.056
	Mapped MCE one second period spectral	0.029

	response acceleration, $S_1$	
	Design short period spectral response acceleration, $S_{DS}$	0.056
	Design one second period spectral response acceleration, $S_{D1}$	0.046
	Non-Structural Components Importance Factor, $I_p$	1.0
	Non-Structural Components Seismic Design Category	A
	Non-Building Structures Importance Factors, $I$	1.25

### 1.3 WIND ANCHORAGE

- A. Equipment that is to be located outdoors shall have anchor bolts designed for the effects of wind forces, as determined in accordance with ASCE 7, Chapters 26-31.
- B. Design of anchorage shall be in accordance with the Anchorage in Concrete and Masonry section.

### 1.4 SEISMIC DESIGN

- A. General.
  - 1. Structural systems shall provide continuous load paths, with adequate strength and stiffness to transfer all seismic forces from the point of application to the point of final resistance.
- B. Non-Structural Components.
  - 1. Non-structural components are architectural, mechanical, and electrical items that are permanently attached to and supported by a structure but are not part of the structural system, as indicated in Chapter 13 of ASCE 7. The Non-Structural Components Schedule identifies the components that require seismic design. The requirements of this paragraph are applicable only to the items listed in the Non-Structural Components Schedule.
  - 2. General
    - a. Design of non-structural components shall be in accordance with all applicable provisions of ASCE 7, Chapter 13.
    - b. “ $W_p$ ” shall include the total operating weight of the component or system, including, but not limited to, any insulation, fluids, and concentrated loads such as valves, condensate traps, and similar components.

3. Submerged Components
  - a. Components that are to be submerged in water shall be designed to withstand loads from the effects of water sloshing during the seismic event.
  - b. The calculation of the sloshing effects shall be in accordance with the latest edition of ACI 350.3.
4. Anchorage Design
  - a. Every component in the Non-Structural Components Schedule shall have its anchorage to the supporting structure designed in accordance with ASCE 7, Chapter 13.
  - b. Design of anchorage shall be in accordance with the Anchorage in Concrete and Masonry section.
  - c. Components shall be attached so that seismic forces are transferred to the structural system. Curbs that support roof-mounted equipment shall be designed to transfer forces from the equipment into the main structural roof members. All structural attachments shall be bolted, welded, or otherwise positively fastened. Frictional resistance due to gravity shall not be considered in evaluating the required resistance to seismic forces.
5. Component Design
  - a. Components indicated in the Non-Structural Components Schedule to require design of the component itself, as opposed to an anchorage design alone, shall be designed in accordance with ASCE 7, Chapter 13.
  - b. Components shall have sufficient strength and ductility to resist the specified seismic effects, and shall meet all of the design, proportioning, detailing, inspection, and quality assurance provisions of the specified building code and other referenced codes. Components shall be designed to be operable during and following a design level seismic event without collapsing, breaking away from supports, creating an ignition hazard, or releasing any contents.
  - c. Seismic effects that shall be analyzed in the design of piping systems include the dynamic effects of the piping system, contents, and supports. The interaction between piping systems and the supporting structures, including other mechanical and electrical equipment, shall also be considered. Where pipe supports are to be designed by Contractor, as required by the Pipe Supports section, both the piping and support systems shall be designed to meet the applicable requirements of ASCE 7, Chapter 13.
6. Seismic Certification
  - a. Design of components and their anchorage shall be certified by one of the following methods.
    - 1) Analysis and design by a design professional registered in the state of the project. Certification by analysis shall be permitted only for nonactive components, and shall be based on seismic demand considering  $R_p/I_p$  equal to 1.0.
    - 2) Shake table testing based upon a nationally recognized testing standard procedure, such as ICC-ES AC 156, acceptable to the authority having jurisdiction.

- 3) Experience data, based upon nationally recognized procedures acceptable to the authority having jurisdiction.
  - b. Components indicated in the Non-Structural Components Schedule to require special seismic certification shall be certified only by methods 2 or 3 above, except that certification for containment of hazardous materials may be by any of the three methods.
7. Construction Documents
- a. Construction documents (fabrication or shop drawings) of non-structural components shall be sealed by a design professional that is registered in the state of the project.
  - b. Documents shall be sealed whether the basis for certification is analysis and design, shake table testing, or experience data.
  - c. The sealing method shall clearly indicate that the anchorage system, and the component itself when applicable, have been designed for the code required seismic forces.
8. Submittals
- a. The construction documents, structural design calculations, shake table certification, and experience data certification, as applicable, shall be submitted in accordance with the Submittal Procedures section.
- C. Non-Building Structures
1. Non-building structures are the items described as such in Chapter 15 of ASCE 7. The Non-Building Structures Schedule identifies the items that require seismic design.
  2. The requirements of this paragraph are applicable only to the items listed in the Non-Building Structures Schedule.
  3. General
    - a. Design of non-building structures shall be in accordance with all applicable provisions of ASCE 7, Chapter 15.
    - b. Design of anchorage shall be in accordance with the Anchorage in Concrete and Masonry section.
    - c. "W" shall include the total dead load and shall also include all normal operating contents of tanks, vessels, bins, and piping.
    - d. Non-building structures shall provide sufficient strength and ductility to resist the specified seismic effects, and shall meet all of the design, proportioning, detailing, inspection, and quality assurance provisions of the specified building code and other referenced codes.
    - e. The seismic design of non-building structures shall provide sufficient stiffness, strength and ductility to resist the effects of seismic ground motions during the design level earthquake.
    - f. Non-building structures shall be designed to be operable during and following a design level seismic event, without collapsing, breaking away from supports, creating an ignition hazard, or releasing any contents.

4. Construction Documents

- a. Construction documents (fabrication or shop drawings) depicting all seismic force resisting elements of non-building structures shall be sealed by a design professional that is registered in the state of the project.

5. Submittals

- a. The construction documents shall be submitted in accordance with the Submittal Procedures section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

End of Section

## **SECTION 01612 - PRODUCT DELIVERY REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 SCOPE.**

- A. This section covers packaging and shipping of materials and equipment.

#### **1.2 PREPARATION FOR SHIPMENT.**

- A. All equipment shall be suitably packaged to facilitate handling and to protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.
- B. Painted and coated surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted and coated surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of Engineer.
- C. Grease and lubricating oil shall be applied to all bearings and similar items.

#### **1.3 SHIPPING.**

- A. Before shipping each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.

### **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 accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Exterior Storage

1. Provide substantial platform, blocking or skids to support fabricated products above ground to prevent soiling or staining.

a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.

b. Prevent mixing of refuse or chemically injurious materials or liquids.

\_\_\_\_\_ C. Arrange storage in manner to provide easy access for inspection.

D. No storage or contractor laydown area is designated, except for the LS 546 site. Storage is not allowed within FDOT ROW along US Route 301. Contractor can obtain permission for storage when obtaining County ROW permit or reserve space from private businesses at their own discretion.

#### 1.03 MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.

2. Required environmental conditions are maintained on continuing basis.

3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings and finishes is not acceptable under requirements of these Contract Documents.

B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.

1. Equipment shall not be shipped until approved by the County. The intent of this requirement is to reduce on-site storage time prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than one month prior to installation without written authorization from the County.
2. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the County until such time as the equipment is to be installed.
3. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.
4. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at least half load, once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.
5. Lubricants shall be changed upon completion of installation and as frequently as required, thereafter during the period between installation and acceptance.
6. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guaranty the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

**1.04 PROTECTION AFTER INSTALLATION**

- A. Provide protection of installed products to prevent damage from subsequent operations. Remove when no longer needed, prior to completion of work.
- B. Control traffic to prevent damage to equipment and surfaces.
- C. Provide coverings to protect finished surfaces from damage.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 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.
  - 3. Red line markups that the Engineer will use to create Record Drawings. Markups shall clearly depict as-built conditions. Contractor shall document elevations of existing utilities, at each crossing, and also note utilities that aren't shown on the drawings, but are encountered in the field.
- 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).

- H. Survey / Utility Locate Data - As collected by the Contractor in accordance with the execution of the Work. Data will be used to create record drawings.
- I. Construction photographs/videos
- J. Copies of all permits and permit clearances/closures.

**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 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 a background for all record information. Original drawings in CAD format may be requested by the County.
- B. Drawings shall meet the criteria of paragraph 2.04 D below and as mentioned in Section 1.14 Record Drawings in the Manatee County Public Works Standards, Part I Utilities Standards Manual approved June 2015.

### **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. Drawings; Legibly mark to record actual construction:  
Baseline is the proposed FM, follow MC standards. (1.16.3.D) FOR AS-BUILT DRAWINGS

1. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc. Locations of drainage ditches, swales, water lines and force mains shall be shown every 200 feet (measured along the centerline) or alternate lot lines, whichever is closer. Dimensions at these locations shall indicate distance from centerline of right-of-way to the facility.
2. Field changes of dimension and detail.
3. Changes made by Field Order or by Change Order.
4. Details not on original contract drawings.
5. Equipment and piping relocations.
6. Locations of all valves, fire hydrants, manholes, water and sewer services, water and force main fittings, underdrain cleanouts, catch basins, junction boxes and any other structures located in the right-of-way or easement, shall be located by elevation and by station and offset based on intersection P.I.'s and centerline of right-of-way. For facilities located on private roads, the dimensioning shall be from centerline of paving or another readily visible baseline.
7. Elevations shall be provided for all manhole rim and inverts; junction box rim and inverts; catch basin rim and inverts; and baffle, weir and invert elevations in control structures. Elevations shall also be provided at the PVI's and at every other lot line or 200 feet, whichever is less, of drainage swales and ditches. Bench marks and elevation datum shall be indicated.
8. Slopes for pipes and ditches shall be recalculated, based on actual field measured distances, elevations, pipe sizes, and type shown. Cross section of drainage ditches and swales shall be verified.
9. Centerline of roads shall be tied to right-of-way lines. Elevation of roadway centerline shall be given at PVI's and at all intersections.
10. Record drawings shall show bearings and distances for all right-of-way and easement lines, and property corners.
11. Sidewalks, fences and walls, if installed at the time of initial record drawing submittal, shall be located every 200 feet or alternate lot lines, whichever is closer. Dimensions shall include distance from the right-of-way line and the back of curb and lot line or easement line.
12. Sanitary sewer mainline wyes shall be located from the downstream manhole. These dimensions shall be provided by on-site inspections or televising of the sewer following installation.

13. Elevations shall be provided on the top of operating nuts for all water and force main valves.
  14. Allowable tolerance shall be  $\pm 6.0$  inches for horizontal dimensions. Vertical dimensions such as the difference in elevations between manhole inverts shall have an allowable tolerance of  $\pm 1/8$  inch per 50 feet (or part thereof) of horizontal distance up to a maximum tolerance of  $\pm 2$  inch.
  15. Properly prepared record drawings on mylar, together with two copies, shall be certified by a design professional (Engineer and/or Surveyor registered in the State of Florida), employed by the Contractor, and submitted to the County.
- D. 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.
- E. 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 an AutoCAD version on a recordable compact disk (CD).
- C. The CD shall contain media in AutoCad Version 2004 or later, or in any other CAD program compatible with AutoCad in DWG or DXF form. All fonts, line types, shape files, external references, or other pertinent information used in the drawing and not normally included in AutoCad shall be included on the media with a text file or attached noted as to its relevance and use.
- D. Accompany submittal with transmittal letter, containing:
  1. Date.
  2. Project title and number.
  3. Contractor's name and address.
  4. Title and number of each Record Document.
  5. Signature of Contractor or his authorized representative.

Note: The data required to properly prepare these record drawings shall be obtained at the site, at no cost to the County by the responsible design professional or his/her duly appointed representative. The appointed representative shall be a qualified employee of the responsible design professional or a qualified inspector retained by the responsible design professional on a project-by-project basis.

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

## **SECTION 01730 OPERATING AND MAINTENANCE DATA**

### **PART 1 GENERAL**

Refer to Specification 01340 for Submittal Requirements.

#### **1.01 REQUIREMENTS INCLUDED**

- A. Compile product data and related information appropriate for County's maintenance and operation of products furnished under Contract.  
  
Prepare operating and maintenance data as specified in this and as referenced in other pertinent sections of Specifications.
- B. Instruct County's personnel in maintenance of products and equipment and systems.
- C. 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:
    - 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 manufacture'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 01739- EQUIPMENT INSTALLATION

### PART 1 - GENERAL

#### 1.1 SCOPE.

- A. This section covers general installation requirements of new equipment units that have been purchased by Contractor as part of this Work. Equipment specific installation requirements are covered in the equipment, pipng, and material specifications. ~~sections.~~

#### 1.2 GENERAL.

- A. Equipment installed under this section shall be erected and placed in proper operating condition in full conformity with Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by Engineer.
- B. Any existing equipment which is removed and salvaged for reinstallation shall be handled as indicated in the Demolition Specification (02050).
- C. Coordination.
  - 1. When manufacturer's field services are provided by the equipment manufacturer, Contractor shall coordinate the services with the equipment manufacturer. Contractor shall give Engineer written notice at least 30 days prior to the need for manufacturer's field services furnished by others.
  - 2. Submittals for equipment furnished by others under each procurement contract will be furnished to Contractor upon completion of review by Engineer. Contractor shall review equipment submittals and coordinate with the requirements of the Work and the Contract Documents. Contractor accepts sole responsibility for determining and verifying all quantities, dimensions, and field construction criteria.
  - 3. Flanged connections to equipment including the bolts, nuts, and gaskets are covered in the appropriate pipe specification section.

#### 1.3 DELIVERY, STORAGE, AND HANDLING.

- A. Storage.
  - 1. Upon delivery, all equipment and materials shall immediately be stored and protected by Contractor in accordance with the Storage and Protection specification until installed in the Work.
  - 2. Equipment shall be protected by Contractor against damage and exposure from the elements. At no time shall the equipment and materials be stored on or come into contact with the ground, grass, or any other type of vegetation.

3. Contractor shall keep the equipment and materials dry at all times.

## PART 2 - PRODUCTS

### 2.1 MATERIALS.

- A. Materials shall be as follows:
  1. Grout: As specified in the Grouting section.
  2. Anti-Seize thread lubricant for SS bolts: As specified in the Anchorage in Concrete and Masonry section.

## PART 3 - EXECUTION

### 3.1 INSTALLATION.

- A. Equipment shall not be installed or operated except by, or with the guidance of, qualified personnel having the knowledge and experience necessary to obtain proper results as specified in the Startup Requirements section.
- B. Each equipment unit shall be leveled, aligned, and shimmed into position. Installation procedures shall be as recommended by the equipment manufacturer and as required herein. Shimming between machined surfaces will not be permitted.
- C. Anti-seize thread lubricant shall be liberally applied to the threaded portion of all stainless steel bolts during assembly.
- D. When specified, the manufacturer shall provide installation supervision and installation checks. For installation supervision, the manufacturer's field representative will observe, instruct, guide, and direct Contractor's erection or installation procedures as specified in the equipment specifications. For installation checks, the manufacturer's field representative will inspect the equipment installation immediately following installation by Contractor, and observe the tests indicated in the Startup Requirements section. The manufacturer's representatives will revisit the site as often as necessary to ensure installation satisfactory to Owner.
- E. All equipment and materials shall be protected after installation, prior to final acceptance by Owner. Protection provisions shall be as recommended by the manufacturer, and shall include provisions to prevent rust, mechanical damage, and foreign objects entering the equipment.

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:
    - 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 prerequisite to requesting a final inspection and final payment

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

## **SECTION 02050 - DEMOLITION**

### **PART 1 - GENERAL**

#### **1.1 SCOPE**

- A. This section covers the demolition of existing structures, piping, equipment, and sitework as indicated on the Drawings and as specified herein.

#### **1.2 GENERAL**

- A. Contractor shall be responsible for all work under this section. Contractor shall provide 21 days written notice prior to beginning demolition activities.
- B. All structures and facilities (lift stations and forcemains) at all three sites must remain in continuous operation during the work.
- C. Demolition work shall create minimum interference with County's operations and minimum inconvenience to County and Public. Contractor shall provide protection and safety of all roadways, sidewalks, and all accessible areas during demolition activities.
- D. Blasting will not be permitted.

#### **1.3 SUBMITTALS**

- A. Demolition Plan.
  - 1. Contractor shall submit a detailed demolition plan indicating the major demolition activities, planned dates, County coordination requirements, permit requirements (if any), and any special planning considerations that require coordination with third-parties.

### **PART 2 - PRODUCTS**

Not used.

### **PART 3 - EXECUTION**

#### **3.1 DEMOLITION**

- A. Removal of equipment or facilities shall include removal of all accessories, piping, wiring, supports, associated electrical starters and devices, baseplates and frames, and all other appurtenances, unless otherwise directed. Existing materials and equipment removed, and not indicated to be reused as a part of the Work, shall become Contractor's property unless

otherwise specified, and shall be removed from the Site and properly disposed of or recycled in accordance with state laws.

B. Contractor shall conduct demolition activities in a manner that prevents damage to existing facilities which are indicated to remain and shall provide all necessary protection for existing facilities. Any remaining facilities damaged during demolition shall be repaired by Contractor to a condition equal to or better than the original condition.

C. When demolition is complete, all debris shall be removed from the Site and the Site graded back to the original condition.

D. Structure Demolition

1. The following structures shall be demolished, and the debris shall be removed from the jobsite.

- a. LS 539
  - 1) Not used.
- b. LS 546
  - 1) Plug valve and valve box
  - 2) Flow meter vault
- c. LS 557
  - 1) Not used.

E. Piping and Equipment Demolition

1. The following piping and equipment shall be removed and shall become the property of Contractor. All such items shall be promptly removed from the jobsite.

- a. LS 539 – LS 504
  - 1) 1.5” PVC forcemain, as identified on the drawings.
- b. LS 546
  - 1) 10” DIP forcemain / appurtenances, as indicated on the drawings.
- c. LS 557
  - 1) 2” PVC forcemain, as identified on the drawings.

F. Sitework Demolition

1. Sitework demolition shall include the following:

- a. LS 539
  - 1) Removal (and replacement) of concrete drives, pavement, sidewalks, curb, and gutters within the limits indicated on the Drawings, and as needed to support the construction / demolition Work.
- b. LS 546

- 1) Not used.
- c. LS 557
- 1) Removal (and replacement) of concrete drives and pavement within the limits indicated on the Drawings, and as needed to support the construction / demolition Work.

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 (BACKFILL)**

- 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 STRUCTURAL FILL, SELECT COMMON FILL, AND COMMON FILL**

- A. Refer to Specification 02221 for product requirements for Structural Fill, Select Common Fill, and Common Fill.

### **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 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.

### **3.05 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.

**3.06 FIELD QUALITY CONTROL**

- A. The density of soil in place shall be a minimum of 95 percent in accordance with ASTM test 1557-70T, 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 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

1. 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.
2. Upon approval by County, existing SP/SP-SM soils may be used for pipe bedding, provided it is free of organic materials, clay, debris or any other material deemed unsuitable for construction. The appropriate FDOT (Specification 125) and/or jurisdictional requirements should be consulted to determine the specific use/suitability of the soil types encountered during construction.
3. Clayey soils (A-2-6/A-4/A-6/A-7) are not suitable within 1 foot of the bottom of structure and/or pipe invert elevations. Such soils shall be removed and backfilled with suitable coarse sand or approved granular material as approved by Owner (placed and compacted in accordance with FDOT Specification 125). The clayey soils may be utilized from a point 12 inches above the top of pipe to finished grade.

### C. 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.

D. Selected Common Fill - shall have the same material classification and requirements as Structural Fill, as described above.

### E. 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.
- E. 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 as required to complete the work as required in the drawings and specifications. ~~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 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 back to original conditions. ~~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.
- D. Finish grading shall be completed to match existing grade; the grade before construction activities commenced

#### **1.02 PROTECTION**

The Contractor shall prevent damage to existing fencing, trees, landscaping, natural features, bench marks, pavement, ~~and~~ utility lines, mailboxes, and other existing structures / facilities. 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 or as to match existing grade. ~~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.
- E. Contractor shall follow the erosion control measures on the drawings, at a minimum. Additional erosion control shall be provided as required and shall meet this Specification.

### **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 required. ~~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 02480 LANDSCAPING**

### **PART 1 GENERAL**

#### **1.10 SCOPE OF WORK**

- A. The Contractor shall furnish all labor, materials, equipment, and incidentals required to install trees, ground cover, and shrubs, to place accessory planting materials, to maintain and guarantee all planted areas. All work shall be in strict accordance with sound nursery practice and shall include maintenance and watering of all of the work of this Contract until final completion and acceptance by the County.
- B. The landscaping shall be performed by a contractor or subcontractor who specializes in landscaping and who is fully familiar and experienced in projects of this type and scope. The landscaping contractor or subcontractor shall be subject to the approval of the County.
- C. The Contractor shall provide all landscaping complete and ready for use as required to return grade back to existing conditions, and as specified in the Contract Documents and as shown on the Drawings.

#### **1.02 SUBMITTALS**

- A. The Contractor shall submit to the County for review and approval, shop drawings and complete written maintenance instructions for each type of plant furnished under this Contract.
- B. The Contractor shall submit representative samples of any or all of required accessory planting materials as requested by the County.

#### **1.03 OBSTRUCTIONS BELOW GROUND**

- A. The County may change the location of plant material if underground construction, utilities or obstructions are encountered in excavation of planting areas or pits.
- B. The Contractor shall make such changes without additional compensation from the County.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Plant species and size shall match existing plants that are damaged due to construction activities. ~~conform to those indicated in the Plant List and in plan locations shown on the Drawings. Nomenclature shall conform to the Florida Department of Agriculture: "Grades and Standards for Nursery Plants".~~ The designated authority for identification of plants shall be in conformance with FDOT Standard Specification Section 580-2.1.1 Plants.

- B. Plants shall be sound, healthy, vigorous, 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.
- C. Shape and Form
1. Plant material shall be symmetrical, typical for the variety and species, and shall conform to the measurements specified in the Plant List.
  2. Plants used where symmetry is required shall be matched as nearly as possible.
  3. Plants shall not be pruned prior to delivery except as authorized by the County.
  4. All plants shall have been transplanted or root pruned at least once in the past three years.
  5. Unless otherwise noted, street trees shall be free of branches up to six feet, with the single leader well branched, and with straight trunks.
  6. Shrubs shall have been transplanted twice, have fully developed root systems, be heavily canned with foliage to base, fulfill dimensions required, and be typical of species.
  7. Ground covers shall have sturdy fibrous root systems and shall be heavily leafed.
- D. Measurement: The height and/or width of trees shall be measured from the ground or across the normal spread of branches with the plants in their normal position. This measurement shall not include the immediate terminal growth.
- E. Substitutions in plant species or size shall be made only with the written approval of the County.
- F. Ground cover plants shall be planted in beds of four inches of approved topsoil. The beds shall be thoroughly disked into the soil. The compacted and settled finished surface shall be set to the required grade. Plants shall be spaced to match existing conditions ~~as described in the Contract Documents or shown on the Contract Drawings~~, or otherwise directed by the County in accordance with the best practices of the trade.
- G. Planting Soil
1. Soil for backfilling around plants and planting beds shall be a good grade of garden loam as approved by the County. Soil shall be free of heavy clay, coarse sand, stones, lumps, sticks, or other foreign material. The soil shall not be delivered or used in a muddy condition.
  2. The soil shall be taken from ground that has never been stripped. There shall be a slight acid reaction to the soil with no excess of calcium or carbonate. The soil shall be free from excess weeds or other objectionable material.
  3. Soil for trees and shrubs shall be delivered in a loose, friable condition. All trees shall average approximately one cubic yard per tree, except Sabal Palmetto, which shall be planted with clean sand. There shall be a minimum

of 4-inches of planting soil in ground cover areas and 1/8 cubic yard per shrub or vine.

4. No marl shall be allowed in ground cover planting beds.
- H. Before plants are backfilled with planting soil, fertilizer tablets, Agriform 20-10-5 or equal, shall be placed in each pit. The Contractor shall provide three tablets for each tree and one for each shrub or vine.
- I. Tree Staking: All tree staking and bracing shall be included herein in accordance with sound nursery practice. ~~and shall be in accordance with the Contract Documents.~~ The Contractor shall furnish all materials required for staking and bracing as approved.
- J. Landscaping stones shall be inert and nonleaching. The Contractor shall provide physical samples for approval prior to installation. Crushed limerock shall not be acceptable.

## **PART 3 EXECUTION**

### **3.01 PLANTING PROCEDURES**

- A. Plant Locations: All plants shall be located to match existing conditions. ~~as shown on the Drawings, to dimensions if shown, to scale if not dimensioned.~~ Large areas or beds shall be scaled and the plants spaced evenly. Approval by the County is required before any plants may be installed.
- B. Tree Pits: Pits for trees shall be at least two feet greater in diameter than the specified diameter of the ball. Pits shall be of sufficient depth to allow a 12-inch layer of planting soil under the ball when it is set to grade. Bottom of pit shall be loosened prior to backfilling.
- C. Digging and Handling
  1. Plants shall be handled at all times so that roots or balls are adequately protected from sun or drying winds. Tops or roots of plant allowed to dry out will be rejected.
  2. Balled and burlapped plants shall be moved with firm, natural balls of soil, not less than one foot diameter of ball to every one inch caliper of trunk, and a depth of not less than 2/3 of ball diameter. No plant shall be accepted when the ball of earth surrounding its roots has been cracked or broken. All trees, except palms, shall be dug with ball and burlapped. Root pruning shall have been done at minimum of four weeks before planting at the job.
  3. Bare root plants shall be dug with spread of root and of sufficient depth to insure full recovery of plant.
- D. Cabbage Palms (Sable Palmetto):
  1. Cabbage Palms shall be taken from moist black sand areas. Only a minimum of fronds shall be removed from the crown to facilitate moving and handling. Clear trunk or overall height shall be as specified after the minimum of fronds have been removed.

2. Cabbage Palms buds shall be tied to a suitable support with a burlap strip, to be left in place until the tree is well established in its new location.
  3. Cabbage Palms shall be planted in sand, thoroughly washed in during planting operations, and with a dished or saucer depression left at the soil line for future waterings. Palms with marred or burned trunks will be accepted at the discretion of the County only.
  4. Trees moved by winch or crane shall be thoroughly protected from chain marks, girdling or bark slippage by means of burlap, wood battens, or other approved method.
- E. When balled or burlapped plants are set, planting soil shall be carefully tamped under and around the base of the balls to prevent voids. All burlap, rope, wires, etc., shall be removed from the sides and tops of balls, but no burlap shall be pulled from underneath. Roots of bare rooted plants shall be properly spread out and planting soil carefully worked in among them.
- F. All plants shall be set straight or plumb. ~~in locations shown on the Drawings.~~ Except as otherwise specified, plants shall be planted in pits which shall be set at such level that, after settlement, they bear the same relation to the finished grade or the surrounding ground as they bore to the grade of the soil from which they are taken.
- G. Pruning shall be carefully done by experienced plantsmen. Prune immediately upon acceptance by the County, including any broken branches, thinning small branches and tipping back main branches (except main leaders).
- H. Excess soil and debris shall be disposed of off the project site unless ordered stockpiled by the County.

### **3.02 NORMAL MAINTENANCE OF PLANT MATERIALS**

- A. Plant material maintenance shall begin when planting operations start and shall extend until final acceptance of work.
- B. Maintain all plant materials under this Contract to the satisfaction of the County. Maintenance shall include necessary watering, cultivation, weeding, pruning, spraying, tightening and repair to guy wires, removal of dead material, resetting, and other work required to conform with referenced standards and accepted nursery standards as approved.
- C. Plant materials which are in a tilted or in a leaning position shall be properly righted.
- D. After final acceptance by the County and until one calendar year after acceptance of all plantings, the landscaping contractor or subcontractor shall make monthly inspections of materials and report in writing to the County the conditions of the plants and the necessary requirements to keep the plants in a healthy growing condition.

### **3.03 TREE AND PLANT PROTECTION**

- A. The Contractor shall remove all trees (if any) within the limit of landscaping shown on the detail sheet except those designated to be salvaged (if any). Prior to removal of said trees, the Contractor shall obtain a tree removal permit, if required. All other trees in the vicinity of the work shall be protected against damage by the Contractor until all work under the Contract has been completed.
- B. Consult with the County, and remove agreed-on roots and branches which interfere with construction. Employ qualified tree surgeon to remove, and to treat cuts.
- C. Provide temporary barriers to a height of six feet around each group of trees and plants.
- D. Protect root zones of trees and plants
  - 1. Do not allow vehicular traffic or parking.
  - 2. Do not store materials or products.
  - 3. Prevent dumping or refuse or chemically injurious materials or liquids.
  - 4. Prevent puddling or continuous running water.
- E. Carefully supervise excavating, grading, and filling, and subsequent construction operations, to prevent damage.
- F. In case of inadvertent damage to any tree or plant by the Contractor or any of his subcontractors or employees, the Contractor shall provide replacement of each such damaged tree or plant with a new one of acceptable type, size and quality.
- G. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed, and when approved by the County.
- H. Clean and repair damage caused by installation, fill and grade the areas of the site to required elevations and slopes, and clean the area.

**3.04 GUARANTEE**

The life and satisfactory condition of all plant material planted shall be guaranteed by the Contractor for a minimum of one calendar year. Guarantee shall include complete replacement with material of the same kind and size as in the original work if not in a healthy condition, as determined by the County, at the end of the guarantee period.

**3.05 REPLACEMENT**

- A. At the end of the guarantee period, any plant required under this Contract that is dead or not in satisfactory growth as determined by the County, shall be removed. Plants replaced shall be guaranteed for 90 days after date of replacement.
- B. Replacement of plants necessary during guarantee period shall be the responsibility of the Contractor, except for possible replacements of plants resulting from removal, vandalism, acts of neglect on the part of others, or acts of God.

- C. All replacements shall be plants of the same kind and size. ~~as specified in the Drawings.~~ They shall be furnished and planted as herein specified. The cost shall be the responsibility of the Contractor.

**END OF SECTION**



## **SECTION 02485 SEEDING AND SODDING**

### ***PART 1 GENERAL***

#### **1.01 SCOPE OF WORK**

- A. The Contractor shall furnish all labor, materials and equipment necessary to satisfactorily return all construction areas to their original conditions or better.
- B. Work shall include furnishing and placing seed or sod, fertilizing, planting, watering and maintenance until acceptance by County.
- C. This specification applies to the following areas:

##### LS 539 Site:

- In the area around LS 539 and LS 504 and along forcemain routing along US 301.

##### LS 546 Site:

- Applies to entire site.

##### LS 557 Site:

- Applies to area around LS 557, and along forcemain routing along 2<sup>nd</sup> Ave W.

#### **1.02 RELATED WORK NOT INCLUDED**

Excavation, filling and grading required to establish elevation shown on the Drawings are included under other sections of these Specifications.

#### **1.03 QUALITY ASSURANCE**

- A. It is the intent of this Specification that the Contractor is obliged to deliver a satisfactory stand of grass as specified. If necessary, the Contractor shall repeat any or all of the work, including grading, fertilizing, watering and seeding or sodding at no additional cost to the County until a satisfactory stand is obtained. For purposes of grassing, a satisfactory stand of grass is herein defined as a full lawn cover over areas to be sodded or seeded, with grass free of weeds, alive and growing, leaving no bare spots larger than 3/4 square yard within a radius of 8 feet.
- B. All previously grassed areas where pipelines are laid shall be sodded. All sodding and grassing shall be installed in accordance with these Specifications or as directed by the County.

### ***PART 2 PRODUCTS***

## 2.01 MATERIALS

- A. Fertilizer: The fertilizer shall be of the slow-release type meeting the following minimum requirements: 12 percent nitrogen, 8 percent phosphorus, 8 percent potassium; 40 percent other available materials derived from organic sources. At least 50 percent of the phosphoric acid shall be from normal super phosphate or an equivalent source which will provide a minimum of two units of sulfur. The amount of sulfur shall be indicated on the quantitative analysis card attached to each bag or other container. Fertilizer shall be uniform in composition, dry and free flowing delivered to sites in original unopened containers bearing manufacturer's statement or guarantee.
- B. Seeding/Grassing: The Contractor shall grass all unpaved areas disturbed during construction which do not require sod. All grassing shall be completed in conformance with FDOT Specifications, Sections 570 and 981. The grassed areas shall be mulched and fertilized in accordance with FDOT Specifications, except that no additional payment will be made for mulching, fertilizing and/or watering.
- C. Sodding: Sod shall be provided as required on the construction drawings or at locations as directed by the County in accordance with Florida Department of Transportation, Specifications Section 575 and 981. The Contractor shall furnish bahia grass sod or match existing sod. Placement and watering requirements shall be in accordance with FDOT Specifications Section 575, except that no additional payment will be made for placement and/or watering. This cost shall be included in the Contract price bid for sodding.
- D. Topsoil: Topsoil stockpiled during excavation may be used as necessary. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the County. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants and grassing specified herein.
- E. Water: It is the Contractor's responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements that may be necessary to ensure an adequate supply of water to meet the needs for his work. He shall also furnish all necessary hose, equipment, attachments and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

## **PART 3 EXECUTION**

### 3.01 INSTALLATION

- A. When the trench backfill has stabilized sufficiently, the Contractor shall commence work on lawns and grassed areas, including fine grading as necessary and as directed by the County.

- B. Finish Grading: Areas to be seeded or sodded shall be finish graded, raked, and debris removed. Soft spots and uneven grades shall be eliminated. The County shall approve the finish grade of all areas to be seeded or sodded prior to seed or sod application.
- C. Areas to be sodded shall be excavated or cut-down to accept the approximate 2” thick sod, so finish grade matches existing. Sod shall not be thrown over top of existing sod or debris.
- D. Protection: Seeded and sodded areas shall be protected against traffic or other use by placing warning signs or erecting barricades as necessary. Any areas damaged prior to acceptance by the County shall be repaired by the Contractor as directed by the County.

**3.02 CLEANUP**

Soil or similar materials spilled onto paved areas shall be removed promptly, keeping those areas as clean as possible at all times. Upon completion of seeding and sodding operations, all excess soil, stones and debris remaining shall be removed from the construction areas.

**3.03 LANDSCAPE MAINTENANCE**

- A. Any existing landscape items damaged or altered during construction by the Contractor shall be restored or replaced as directed by the County.
- B. Maintain landscape work for a period of 90 days immediately following complete installation of work or until County accepts project. Watering, weeding, cultivating, restoration of grade, mowing and trimming, protection from insects and diseases, fertilizing and similar operations as needed to ensure normal growth and good health for live plant material shall be included at no additional cost to the County.

**3.04 REPAIRS TO LAWN AREAS DISTURBED BY CONTRACTOR'S OPERATORS**

Lawn areas planted under this Contract and all lawn areas damaged by the Contractor's operation shall be repaired at once by proper soil preparation, fertilizing and sodding, in accordance with these Specifications.

**END OF SECTION**

## SECTION 02513 ASPHALT CONCRETE PAVING

### PART 1 GENERAL

#### 1.01 SCOPE OF WORK

The Contractor shall furnish all labor, materials and equipment necessary to complete all milling asphalt pavement and asphalt concrete paving (including restoration of driveways) as called out on the Contract Documents or as shown on the Drawings.

#### 1.02 QUALITY ASSURANCE

- A. Qualifications of Asphalt Concrete Producer: The only materials permitted shall be furnished by a bulk asphalt concrete producer exclusively engaged in the production of hot-mix, hot-laid asphalt concrete.
- B. Qualification of Testing Agency: The County may employ a commercial testing laboratory to conduct tests and evaluations of asphalt concrete materials and design. The Contractor shall:
  - 1. Provide asphalt concrete testing and inspection service acceptable to County.
  - 2. Include sampling and testing asphalt concrete materials proposed, and tests and calculations for asphalt concrete mixtures.
  - 3. Provide field testing facilities for quality control testing during paving operations.
- C. Requirements of Regulatory Agencies: The Contractor shall comply with the applicable requirements of:
  - 1. Manatee County Utility Operations Department
  - 2. Manatee County Transportation Department
  - 3. State of Florida Dept. of Transportation

#### 1.03 PAVING QUALITY REQUIREMENTS

- A. General: In addition to other specified conditions, the Contractor shall comply with the following minimum requirements:
  - 1. In-place asphalt concrete course shall be tested for compliance with requirements for density, thickness and surface smoothness.
  - 2. Final surface shall be provided of uniform texture, conforming to existing ~~required~~ grades and cross sections.
  - 3. A minimum of four inch diameter pavement specimens for each completed course shall be taken from locations as directed by the County.
  - 4. Holes from test specimens shall be repaved as specified for patching defective work.

- B. Density:
  - 1. When subjected to 50 blows of standard Marshall hammer on each side of an in place material specimen, densities shall be comparable to a laboratory specimen of same asphalt concrete mixture.
  - 2. The minimum acceptable density of in-place course material shall be 98% of the recorded laboratory specimen density.
  
- C. Thickness: In-place compacted thicknesses shall not be acceptable if less than the minimum thicknesses shown on the Drawings.
  
- D. Surface Smoothness:
  - 1. Finished surface of each asphalt concrete course shall be tested for smoothness, using a 10 ft. straightedge applied parallel to and at right angles to centerline of paved areas.
  - 2. Surface areas shall be checked at intervals directed by County.
  - 3. Surfaces shall not be acceptable if they exceed the following:
    - a. Base Course: 1/4 in. in 10 ft.
    - b. Surface Course: 3/16 in. in 10 ft.
    - c. Crowned Surfaces:
      - (0) Test crowned surfaces with a crown template, centered and at right angles to the crown.
      - (2) Surfaces will not be acceptable if varying more than 1/4 in. from the template.

**1.04 SUBMITTALS**

- A. Samples: The Contractor may be required to provide samples of materials for laboratory testing and job-mix design.
  
- B. Test Reports: The Contractor shall submit laboratory reports for following materials tests:
  - 1. Coarse and fine aggregates from each material source and each required grading:
    - a. Sieve Analysis: ASTM C 136 (AASHTO T 27).
    - b. Unit Weight of Slag: ASTM C29 (AASHTO T 19).
    - c. Soundness: ASTM C 88 (AASHTO T 104) for surface course aggregates only.
    - d. Sand Equivalent: ASTM D 2419 (AASHTO T 176).
    - e. Abrasion of Coarse Aggregate: ASTM C131 (AASHTO T 96),for surface course aggregates only.
  - 2. Asphalt cement for each penetration grade:
    - a. Penetration: ASTM D5 (AASHTO T49).
    - b. Viscosity (Kinematic): ASTM D2170 (AASHTO T 201).
    - c. Flash Point: ASTM D92 (AASHTO T 48).
    - d. Ductility: ASTM D 113 (AASHTO T 51).
    - e. Solubility: ASTM D 4 (AASHTO T 44).
    - f. Specific Gravity: ASTM D 70 (AASHTO T 43).
  - 3. Job-mix design mixtures for each material or grade:

- a. Bulk Specific Gravity for Coarse Aggregate: ASTM C 117(AASHTO T 85).
- b. Bulk Specific Gravity for Fine Aggregate: ASTM C 128(AASHTO T 84).
4. Uncompacted asphalt concrete mix: Maximum Specific Gravity: ASTM D 2041 (AASHTO T 209).
5. Compacted asphalt concrete mix:
  - a. Bulk Density: ASTM D 1188 (AASHTO T 166).
  - b. Marshall Stability and Flow: ASTM D 1559.
6. Density and voids analysis:
  - a. Provide each series of asphalt concrete mixture test specimens, in accordance with A.I. MS-2 "Mix Design Methods for Asphalt Concrete".
  - b. Use Marshall method of mix design unless otherwise directed or acceptable to the County.
  - c. Report the quantity of absorbed asphalt cement in pounds of dry aggregate, percent air voids, and percent voids in mineral aggregate.
7. Sampling and testing of asphalt concrete mixtures for quality control during paving operations:
  - a. Uncompacted asphalt concrete mix.
    - (1) Asphalt Cement Content: ASTM D 2172 (AASHTO T 164).
    - (2) Penetration of Recovered Asphalt Cement: ASTM D 5(AASHTO T 49).
    - (3) Ductility of Recovered Asphalt Cement: ASTM D 113(AASHTO T 51).
  - b. Compacted asphalt concrete mix:
    - (1) Bulk Density: ASTM D 1188 (AASHTO T 166).
    - Marshall Stability and Flow: ASTM D1559).
  - c. Perform at least one test for each day's paving.
8. Asphalt plant inspection: ASTM D 290.
9. Additional testing:
  - a. Retesting shall be required if previous tests indicate insufficient values, or if directed by the County.
  - b. Testing shall continue until specified values have been attained.
10. Asphalt concrete materials which do not comply with specified requirements shall not be permitted in the work.

## 1.05 JOB CONDITIONS

### A. Weather Limitations:

1. Apply bituminous prime and tack coats only when the ambient temperature in the shade is 50 degrees F. and when the temperature has not been below 35 degrees F. for 12 hours immediately prior to application.
2. Do not apply when the base surface is wet or contains an excess of moisture which would prevent uniform distribution and the required penetration.
3. Construct asphalt concrete surface course only when atmospheric temperature is above 40 degrees F., when the underlying base is dry, and when weather is not rainy.

4. Base course may be placed when air temperature is not below 30 degrees F. and rising, when acceptable to the County.
- B. Grade Control: Establish and maintain the required lines and grades, including crown and cross-slope, for each course during construction operations.
  - C. Traffic Control: Maintain vehicular and pedestrian traffic during paving operations, as required for other construction activities.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Soil Cement or Shell Base Course: as specified in FDOT Section 270, "Material for Base and Stabilized Base", and as called for in the Contract Documents.
- B. Aggregate for Asphalt Concrete, General:
  1. Sound, angular crushed stone, crushed gravel, or crushed slag: ASTM D 692.
  2. Sand, stone, or slag screening: ASTM D 1073.
  3. Provide aggregate in gradations for various courses to comply with local highway standards.
- C. Surface Course Aggregates:
  1. Provide natural sand, unless sand prepared from stone, slag, or gravel or combinations are required to suit local conditions.
- D. Asphalt Cement: Comply with ASTM D 946 for 85-100 penetration grade.
- E. Prime Coat:
  1. Cut-back liquid asphalt.
  2. Medium-Curing type: ASTM D 2027, Grade MC-70.

### **2.02 ASPHALT-AGGREGATE MIXTURES**

- A. Job-mix criteria:
  1. Provide job-mix formulas for each required asphalt-aggregate mixture.
  2. Establish a single percentage of aggregate passing each required sieve size, a single percentage of asphalt cement to be added to aggregate, and a single temperature at which asphalt concrete is to be produced.
  3. Comply with the mix requirements of local governing highway standards.
  4. Maintain material quantities within allowable tolerances of the governing standards.

### **2.03 TRAFFIC AND PARKING MARKING MATERIALS**

- A. Traffic lane marking paint with chlorinated rubber base.

- B. Factory mixed, quick drying and non bleeding, FS TT-P-115C, Type III.
- C. Color: Driving Lane Dividers - White  
No Parking Zone - Yellow  
Parking Dividers - White

### **PART 3 EXECUTION**

#### **3.01 SURFACE PREPARATION**

- A. Subbase Preparation:
  - 1. The Contractor shall remove from the area all organic substance encountered to a depth of six or eight inches (6" or 8"), or to such depth and width as directed by the County. The entire area shall be plowed and dragged prior to placing a stabilizing additive, if required to meet minimum bearing value.
  - 2. Subbase shall be compacted to a minimum density of 98 percent of the maximum as determined by the Modified Proctor Density AASHTO T180, and shall have a minimum bearing value of 40 pounds per square inch as determined by the Florida Bearing Test.
- B. Base Course:
  - 1. Check subgrade for conformity with elevations and section immediately before placing base material.
  - 2. Place base material in compacted layers not more than 6 inches thick, unless continuing tests indicate the required results are being obtained with thicker layers.
  - 3. In no case will more than 8-inches of compacted base be placed in one lift.
  - 4. Spread, shape, and compact all base material deposited on the subgrade during the same day.
  - 5. Compact base course material to be not less than 98% of maximum density: ASTM D 1557, Method D (98 percent maximum density: AASHTO T-180).
  - 6. Test density of compacted base course: ASTM D 2167.
  - 7. Conduct one test for each 250 sq. yds. of in-place material, but in no case not less than one daily for each layer.
- C. Loose and Foreign Material:
  - 1. Remove loose and foreign material from compacted subbase surface immediately before application of paving.
  - 2. Use power brooms or blowers, and brooming as required.
  - 3. Do not displace subbase material.
- D. Prime Coat:
  - 1. Uniformly apply at rate of 0.20 to 0.5 gal. per sq. yd. over compacted and cleaned subbase surface.
  - 2. Apply enough material to penetrate and seal, but not flood the surface.

3. Allow to cure and dry as long as required to attain penetration and evaporation of volatile, and in no case less than 24 hours unless otherwise acceptable to the County.
4. Blot excess asphalt with just enough sand to prevent pick-up under traffic.
5. Remove loose sand before paving.

E. Tack Coat:

1. Dilute material with equal parts of water and apply to contact surfaces of previously constructed asphalt concrete or portland cement concrete and similar surfaces.
2. Apply at rate of 0.05 to 0.15 gal. per sq. yd. of surface.
3. Apply tack coat by brush to contact surfaces of structures projecting into or abutting asphalt concrete pavement.
4. Allow surfaces to dry until material is at condition of tackiness to receive pavement.

### 3.02 MANHOLE FRAME / VALVE BOX ADJUSTMENTS (IF APPLICABLE)

A. Placing Manhole frames:

1. Surround manhole frames set to elevation with a ring of compacted asphalt concrete base prior to paving.
2. Place asphalt concrete mixture up to 1 in. below top of frame, slope to grade, and compact by hand tamping.

B. Adjust manhole frames to proper position to meet paving.

C. If permanent covers are not in place, provide temporary covers over openings until completion of rolling operations.

D. Set cover manhole frames to grade, flush with surface of adjacent pavement.

### 3.03 PREPARING THE MIXTURE

A. Comply with ASTM D 995 for material storage, control, and mixing, and for plant equipment and operation.

B. Stockpiles:

1. Keep each component of the various-sized combined aggregates in separate stockpiles.
2. Maintain stockpiles so that separate aggregate sizes shall not be intermixed.

C. Heating:

1. Heat the asphalt cement at the mixing plant to viscosity at which it can be uniformly distributed throughout mixture
2. Use lowest possible temperature to suit temperature-viscosity characteristics of asphalt.

3. Do not exceed 350 degrees F. (176.6 degrees C.).
- D. Aggregate:
1. Heat-dry aggregates to reduce moisture content to not more than 2.0%.
  2. Deliver dry aggregate to mixer at recommended temperature to suit penetration grade and viscosity characteristics of asphalt cement, ambient temperature, and workability of mixture.
  3. Accurately weigh or measure dry aggregates and weigh or meter asphalt cement to comply with job-mix formula requirements.
- E. Mix aggregate and asphalt cement to achieve 90-95% of coated particles for base mixtures and 85-90% of coated particles for surface mixture, when tested in accordance with ASTM D 2489.
- F. Transporting:
1. Transport asphalt concrete mixtures from mixing site in trucks having tight, clean compartments.
  2. Coat hauling compartments with a lime-water mixture to prevent asphalt concrete mixture from sticking.
  3. Elevate and drain compartment of excess solution before loading mix.
  4. Provide covers over asphalt concrete mixture when transporting to protect from weather and to prevent loss of heat.
  5. During periods of cold weather or for long-distance deliveries, provide insulation around entire truck bed surfaces.

### **3.04 EQUIPMENT**

- A. Provide size and quantity of equipment to complete the work specified within project time schedule.
- B. Bituminous Pavers: Self-propelled that spread hot asphalt concrete mixtures without tearing, shoving or gouging surfaces, and control pavement edges to true lines without use of stationary forms.
- C. Rolling Equipment:
1. Self-propelled, steel-wheeled and pneumatic-tired rollers that can reverse direction without backlash.
  2. Other type rollers may be used if acceptable to the County.
- D. Hand Tools: Provide rakes, lutes, shovels, tampers, smoothing irons, pavement cutters, portable heaters, and other miscellaneous small tools to complete the work specified.

### **3.05 PLACING THE MIX**

- A. Place asphalt concrete mixture on prepared surface, spread and strike-off using paving machine.

- B. Spread mixture at a minimum temperature of 225 degrees F. (107.2 degrees C.).
- C. Inaccessible and small areas may be placed by hand.
- D. Place each course at thickness so that when compacted, it will conform to the indicated grade, cross-section, finish thickness, and density indicated.
- E. Paver Placing:
  - 1. Unless otherwise directed, begin placing along centerline of areas to be paved on crowned section, and at high side of sections on one-way slope, and in direction of traffic flow.
  - 2. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips.
  - 3. Complete base courses for a section before placing surface courses.
  - 4. Place mixture in continuous operation as practicable.
- F. Hand Placing:
  - 1. Spread, tamp, and finish mixture using hand tools in areas where machine spreading is not possible, as acceptable to County.
  - 2. Place mixture at a rate that will ensure handling and compaction before mixture becomes cooler than acceptable working temperature.
- G. Joints:
  - 1. Carefully make joints between old and new pavements, or between successive days' work, to ensure a continuous bond between adjoining work.
  - 2. Construct joints to have same texture, density and smoothness as adjacent sections of asphalt concrete course.
  - 3. Clean contact surfaces free of sand, dirt, or other objectionable material and apply tack coat.
  - 4. Offset transverse joints in succeeding courses not less than 24 inches.
  - 5. Cut back edge of previously placed course to expose an even, vertical surface for full course thickness.
  - 6. Offset longitudinal joints in succeeding courses not less than 6 inches.
  - 7. When the edges of longitudinal joints are irregular, honeycombed, or inadequately compacted, cut back unsatisfactory sections to expose an even, vertical surface for full course thickness.

### **3.06 COMPACTING THE MIX**

- A. Provide sufficient rollers to obtain the required pavement density.
- B. Begin rolling operations as soon after placing when the mixture will bear weight of roller without excessive displacement.
- C. Do not permit heavy equipment, including rollers to stand on finished surface before it has thoroughly cooled or set.

- D. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- E. Start rolling longitudinally at extreme lower side of sections and proceed toward center of pavement. Roll to slightly different lengths on alternate roller runs.
- F. Do not roll centers of sections first under any circumstances.
- G. Breakdown Rolling:
  - 1. Accomplish breakdown or initial rolling immediately following rolling of transverse and longitudinal joints and outside edge.
  - 2. Operate rollers as close as possible to paver without causing pavement displacement.
  - 3. Check crown, grade, and smoothness after breakdown rolling.
  - 4. Repair displaced areas by loosening at once with lutes or rakes and filling, if required, with hot loose material before continuing rolling.
- A. Second Rolling:
  - 1. Follow breakdown rolling as soon as possible, while mixture is hot and in condition for compaction.
  - 2. Continue second rolling until mixture has been thoroughly compacted.
- I. Finish Rolling:
  - 1. Perform finish rolling while mixture is still warm enough for removal of roller marks.
  - 2. Continue rolling until roller marks are eliminated and course has attained specified density.
- J. Patching:
  - 1. Remove and replace defective areas.
  - 2. Cut-out and fill with fresh, hot asphalt concrete.
  - 3. Compact by rolling to specified surface density and smoothness.
  - 4. Remove deficient areas for full depth of course.
  - 5. Cut sides perpendicular and parallel to direction of traffic with edges vertical.
  - 6. Apply tack coat to exposed surfaces before placing new asphalt concrete mixture.

### **3.07 MARKING ASPHALT CONCRETE PAVEMENT**

- A. Cleaning:
  - 1. Sweep surface with power broom supplemented by hand brooms to remove loose material and dirt.
  - 2. Do not begin marking asphalt concrete pavement until acceptable to the County.

- B. Apply paint with mechanical equipment.
  - 1. Provide uniform straight edges.
  - 2. Not less than two separate coats in accordance with manufacturer's recommended rates.

**3.08 CLEANING AND PROTECTION**

- A. Cleaning: After completion of paving operations, clean surfaces of excess or spilled asphalt materials to the satisfaction of the County.
- B. Protection:
  - 1. After final rolling, do not permit vehicular traffic on asphalt concrete pavement until it has cooled and hardened, and in no case sooner than 6 hours.
  - 2. Provide barricades and warning devices as required to protect pavement.
  - 3. Cover openings of structures in the area of paving until permanent coverings are placed (if applicable).

**END OF SECTION**

## **SECTION 02575 PAVEMENT REPAIR AND RESTORATION**

### ***PART 1 GENERAL***

#### **1.01 SCOPE OF WORK**

The Contractor shall furnish all labor, materials, equipment, obtain County or State right-of-way permits and incidentals required and remove and replace pavements over trenches excavated for installation of ~~water or sewer lines~~ forcemains and appurtenances as shown on the Contract Drawings.

#### **1.02 GENERAL**

- A. The Contractor shall take before and after photographs.
- B. The Contractor shall repair in a manner satisfactory to the County or State, all damage done to existing structures, pavement, driveways, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, utility poles, utility pipe lines, conduits, drains, catch basin, flagstones, or stabilized areas or driveways and including all obstructions not specifically named herein, which results from this Project.
- C. The Contractor shall keep the surface of the backfilled area of excavation in a safe traffic bearing condition and firm and level with the remaining pavement until the pavement is restored in the manner specified herein. All surface irregularities that are dangerous or obstructive to traffic are to be removed. The repair shall conform to applicable requirements of Manatee County Transportation Department requirements for pavement repair and as described herein, including all base, subbase and asphalt replacement.
- D. All materials and workmanship shall meet or exceed the County requirements and as called for in the Contract Documents and nothing herein shall be construed as to relieve the Contractor from this responsibility.
- E. All street, road and highway repair shall be made in accordance with the FDOT and County details indicated on the Drawings and in accordance with the applicable requirements and approval of affected County and State agencies.

### ***PART 2 PRODUCTS***

#### **2.01 PAVEMENT SECTION**

- A. Asphaltic concrete shall consist of asphalt cement, coarse aggregate, fine aggregate and mineral filler conforming to FDOT Type S-III Asphalt. Pavement replacement thickness shall match that removed but in no case shall be less than 1-1/2" compacted thickness. All asphalt concrete pavement shall be furnished, installed and tested in accordance with FDOT Specifications for Road and Bridge Construction.

- B. Asphalt or crushed concrete or approved equal base material shall be furnished and installed under all pavement sections restored under this Contract. Asphalt base shall have a minimum 6" compacted thickness, meet requirements for FDOT ABC III (Minimum Marshall Stability of 1000) and be furnished, installed and tested in accordance with the requirements of the FDOT Standards. Crushed concrete base shall be 10" minimum compacted thickness. Crushed concrete aggregate material shall have a minimum LBR of 140 compacted to 98% T-180 AASHTO density. Asphalt base and crushed concrete base are acceptable. Other bases shall be submitted for approval.
- C. Prime and tack will be required and applied in accordance with Section 300 - FDOT Specifications: Prime and Tack Coat for Base Courses.

### **PART 3 EXECUTION**

#### **3.01 CUTTING PAVEMENT**

- A. The Contractor shall saw cut in straight lines and remove pavement as necessary to install the new pipelines and appurtenances and for making connections to existing pipelines.
- B. Prior to pavement removal, the Contractor shall mark the pavement for cuts nearly paralleling pipe lines and existing street lines. Asphalt pavement shall be cut along the markings with a rotary saw or other suitable tool. Concrete pavement shall be scored to a depth of approximately two (2) inches below the surface of the concrete along the marked cuts. Scoring shall be done by use of a rotary saw, after which the pavement may be broken below the scoring with a jackhammer or other suitable equipment.
- C. The Contractor shall not machine pull the pavement until it is completely broken and separated along the marked cuts.
- D. The pavement adjacent to pipe line trenches shall neither be disturbed nor damaged. If the adjacent pavement is disturbed or damaged, irrespective of cause, the Contractor shall remove and replace the pavement. In addition, the base and sub-base shall be restored in accordance with these Specifications, Florida Dept. of Transportation Standard Specifications and as directed by the County.

#### **3.02 PAVEMENT REPAIR AND REPLACEMENT**

- A. The Contractor shall repair, to meet or exceed original surface material, all existing concrete or asphaltic pavement, driveways, or sidewalks cut or damaged by construction under this Contract. He shall match the original grade unless otherwise specified or shown on the Drawings. Materials and construction procedures for base course and pavement repair shall conform to those of the Florida Dept. of Transportation.
- B. The Contractor's repair shall include the preparation of the subbase and base, place and maintain the roadway surface, any special requirements whether

specifically called for or implied and all work necessary for a satisfactory completion of this work. Stabilized roads and drives shall be finished to match the existing grade. Dirt roads and drives shall have the required depth of backfill material as shown on the Contract Drawings.

- C. The asphaltic concrete repairs shall be in accordance with the Manatee County Public Works Standards, Part I Utilities Standards Manual, Detail UG-12. The asphaltic concrete repairs shall extend the full width and length of the excavation or to the limits of any damaged section. The edge of the pavement to be left in place shall be cut to a true edge with a saw or other approved method so as to provide a clean edge to abut the repair. The line of the repair shall be reasonably uniform with no unnecessary irregularities. The existing asphalt beyond the excavation or damaged section shall be milled 25' back from the saw cut. Final overlay shall match existing with no discernable "bump" at joint.

### **3.03 MISCELLANEOUS RESTORATION**

Sidewalks or driveways cut or damaged by construction shall be restored in full sections or blocks to a minimum thickness of four inches. Concrete curb or curb and gutter shall be restored to the existing height and cross section in full sections or lengths between joints. RCP pipe shall be repaired or installed in accordance with manufacturer's specifications. Grassed yards, shoulders and parkways shall be restored to match the existing sections with grass sod of a type matching the existing grass.

### **3.04 SPECIAL REQUIREMENTS**

The restoration of all surfaces, as described herein, disturbed by the installation of pipelines shall be completed as soon as is reasonable and practical. The complete and final restoration of both paved and shell stabilized roads within a reasonable time frame is of paramount importance. To this end, the Contractor shall, as part of his work schedule, complete the restoration of any area of road within five weeks after removing the original surface. Successful leak testing shall be performed prior to restoring any area of road. All restoration and replacement or repairs are the responsibility of the Contractor.

### **3.05 CLEANUP**

After all repair and restoration or paving has been completed, all excess asphalt, dirt and other debris shall be removed from the roadways. All existing storm sewers and inlets shall be checked and cleaned of any construction debris.

### **3.06 MAINTENANCE OR REPAIR**

All wearing surfaces shall be maintained by the Contractor in good order suitable for traffic prior to completion and acceptance of the work.

**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 and restrained joint ductile iron pipe and cast iron or ductile iron restrained joint 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 him from laying and jointing different or additional items where required.
- C.    The Contractor shall furnish all labor, materials, equipment and incidentals required to install ~~push-on 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 installed underground shall be poly 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. Pipe shall be Pressure Class 350. All ductile iron pipe used in above ground applications shall be Special Thickness Class 53. ~~All pipe materials used in potable water systems shall comply with NSF Standard 61.~~
- B.    ~~Unrestrained joint pipe shall be supplied in lengths not to exceed 21 ft. and shall be either the rubber ring compression type push-on joint or standard mechanical joint pipe as manufactured by the American Cast Iron Pipe Company, U.S. Pipe and Foundry Company, or an approved equal.~~
- C.    All mechanical joint fittings shall be pressure rated for 350 psi for sizes 4-24 inches and 250 psi for sizes 30 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.

- D. ~~Rubber gaskets shall conform to AWWA C111 for mechanical and push-on type joints and shall be Ethylene Propylene Diene Monomer (EPDM) rubber for potable water and reclaimed water pipelines. Standard gaskets shall be such as Fastite as manufactured by American Cast Iron Pipe Company, or an approved equal. Acrylonitrile butadiene (NBR) gaskets shall be used for potable 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 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.~~
- E. ~~Water Main and Reclaimed Water Main Coatings: All ductile iron pipe used in water and reclaimed water systems 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 ductile iron or gray iron fittings used in water and reclaimed water systems shall have standard thickness cement linings on the inside per AWWA C104 and an asphaltic exterior coating or they shall have factory applied fusion bonded epoxy coatings both inside and outside in accordance with AWWA C550.~~
- F. Wastewater Main Coatings: All ductile iron pipe and fittings used in wastewater sewer systems shall have a factory applied dry film thickness of 40-mil Protecto 401 or 40-mil Novocoat SP2000W amine cured novalac ceramic epoxy lining on the inside. The interior lining application is to be based on the manufacturer's recommendation for long-term exposure to raw sewage. To ensure a holiday-free lining, documentation must be provided, prior to shipment, showing each section of lined pipe has passed holiday testing at the time of production per ASTM G62. The lining shall have a minimum one year warranty covering failure of the lining and bond failure between liner and pipe.

~~Exterior coatings shall be in accordance with the Protective Coatings Specification. for ductile iron pipe and fittings used in wastewater systems shall be either an asphaltic coating per AWWA C151 or a factory applied epoxy coating per AWWA C550.~~

- G. Thrust restraint devices shall be provided at all horizontal and vertical 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 or~~ restraining glands as manufactured by Star Pipe Products, Stargrip 3000 and 3100, Allgrip 3600, or as manufactured by EBAA Iron Sales, Megaflange, 2000 PV, or other approved equal restraining gland products. Restrained joints, where used, shall be installed at bend and fitting locations and at pipe joint locations both upstream and downstream from the bends or fittings at distances as required by these Standards. Restrained joint pipe fittings shall be designed and rated for the following pressures:

350 psi for pipe sizes up to and including 24" diameter  
250 psi for pipe sizes 30" diameter and above

## 2.02 DETECTION

- A. Pipe shall have a 3-inch wide warning tape of the proper color placed directly above the pipe 12 inches below finished grade or a 6-inch warning tape between 12 inches and 24 inches below finished grade.
- B. Pipe shall have a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color installed along the pipe alignment as detailed in these standards. Tracer wire shall be manufactured by Copperhead Industries or Manatee County approved equal.

## **2.03 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 12 inches and smaller shall be entirely polyethylene-wrapped blue for water mains, purple (Pantone 522 C) for reclaimed water mains and green for sewer mains, per AWWA C105.
- C. All ductile iron pipe greater than 12 inches shall be spiral wrapped with color coded polyethylene at a six-inch minimum spacing. If soil testing, in accordance with AWWA C105, indicates that the soil at the site is corrosive, the ductile iron pipe shall be entirely polyethylene-wrapped with color coded polyethylene.
- D. Poly-wrap shall be by V-Bio™ Enhanced Polyethylene Encasement (or equivalent).
- E. ~~All above ground potable water mains and appurtenances shall be painted safety blue.~~ Pipeline coding and color shall be defined by County. Refer to the Protective Coating Specification.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

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

### **3.02 INSPECTION AND TESTING**

All pipelines shall be subjected to a hydrostatic pressure and leak testing. Refer to Manatee County Public Works Utility Standards Part 1-Utility Standards Manual Section 1.9.7. Prior to testing, the pipe lines shall be supported in a manner approved by the County to prevent movement during tests. Contractor is responsible for providing temporary equipment to support the pressure and leakage testing.

**END OF SECTION**



## **SECTION 02622 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS (AWWA SPECIFICATIONS C-900 & C-905)**

### **PART 1 GENERAL**

#### **1.01 SCOPE OF WORK**

- A. Furnish all labor, materials, equipment and incidentals required to install the PVC piping, iron 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.
- B. The Contractor shall submit to the County, samples of all materials specified herein.
- C. The Contractor shall submit and shall comply with pipe 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. Polyvinyl chloride (PVC) pressure pipe, 4 - 12 inches in diameter, shall be Class 235, DR 18, meeting the requirements of AWWA C900 used for potable and reclaimed water. Mains shall be cast-iron-pipe-equivalent outside diameters (also known as ductile iron pipe size (DIPS)). Each length of pipe shall be hydrostatically tested to four times its pressure class of the pipe by the manufacturer in accordance with AWWA C900.
- B. ~~Polyvinyl chloride (PVC) pressure pipe, 14 inches in diameter, shall be ductile iron pipe size (DIPS) outside diameter and shall meet the requirements of AWWA C905. Pipe used in water, sewer, and reclaimed water service shall be DR 18 and Pressure Class 235. Each length of pipe shall be hydrostatically tested at twice its pressure class in accordance with AWWA C905. Pipe shall be furnished in standard lengths of approximately 20 feet.~~  
  
PVC pipe shall not be used for potable and reclaimed water mains 16 inches and larger.
- C. ~~Polyvinyl chloride (PVC) pressure pipe, 2-3 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 2-3 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. PVC Pipe shall not be used in applications which require pipes that are less than 3 inches in diameter for potable water piping and reclaimed water piping.~~
- 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 F 477 and shall be EPDM rubber for potable and reclaimed water pipes.
- 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 provided at all horizontal and vertical bends and fittings, in casings under roads and railroads and at other locations as indicated on the construction drawings. Thrust restraint devices for PVC pipe and fittings shall be ~~either concrete thrust blocks or~~ restraining glands as manufactured by Star Pipe Products, Stargrip 3000 and 3100, Allgrip 3600, or as manufactured by EBAA Iron Sales, Megaflange, 2000PV or other approved equal restraining gland products. Restrained joints, where used, shall be installed at bend and fitting locations and at pipe joint locations both upstream and downstream from bends or fittings at distances as required by these Standards.
- G. All fittings for PVC pipe shall be ductile iron or gray iron with mechanical joints and shall conform to AWWA C110 or AWWA C153 and to the applicable sections of these Standards for ductile iron and gray iron fittings.

- H. ~~All pipe materials used in potable water systems shall comply with NSF Standard 61.~~

**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. Direct buried pipe shall have 3" warning tape of the proper color placed directly above the pipe 12" below finished grade or 6" warning tape between 12" and 24" below grade.
- B. PVC pipe shall have a solid, 10 gauge, high strength, copper clad steel wire with a polyethylene jacket of appropriate color installed along the pipe alignment as detailed in these standards. Tracer wire shall be manufactured by Copperhead Industries or Manatee County approved equal.

**3.03 IDENTIFICATION**

- A. PVC pipe shall bear identification markings in accordance with AWWA C900, AWWA C905 or ASTM D2241.
- B. PVC pipe shall be color coded ~~blue for water, purple (Pantone purple 522C) for reclaimed water or~~ green for pressure sewer using a solid pipe color pigment.

**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 Utility Standards Part 1-Utility Standards Manual Section 1.9.7. Prior to testing, the pipe lines shall be supported in a manner approved by the County to prevent movement during tests. Contractor is responsible for providing temporary equipment to support the pressure and leakage testing.

**END OF SECTION**

# SECTION 02627 SANITARY SEWER MANHOLE REHABILITATION

## PART 1 GENERAL

### 1.01 DESCRIPTION

- A. The Contractor is required to rehabilitate and re-line the following manholes in the vicinity of LS 557: MH-11839, MH-12058, and MH-12061. The locations for these manholes are shown on Drawing C-07. This specification consists of all work, materials, labor and equipment required for manhole rehabilitation for the purpose of eliminating infiltration and exfiltration, providing corrosion protection, ~~adjusting final grade of manhole top,~~ and the repair of voids. ~~and restoration of the structural integrity of the manhole.~~ All such work shall comply with these Specifications and the specific product manufacturer's recommendations. Any conflict between the product manufacturer's recommendations and any portion of the Contract Documents shall be resolved prior to beginning the work.

### 1.02 PRODUCT AND MANUFACTURER QUALIFICATION REQUIREMENTS

- A. Since sewer products are intended to have a 50 year design life, and in order to minimize the County's risk, only proven products with substantial successful long term track records will be allowed. At a minimum, products and installers must meet all of the following criteria to be deemed commercially acceptable:
1. For a Product to be considered commercially acceptable, the product must have a minimum of two (2) million square feet and ten (10) year history of successful wastewater collection system installations in the United States. In addition, products must provide Third Party Test Results supporting the long-term performance and structural strength of the product and such data shall be satisfactory to the Owner. No product will be allowed without Independent Third Party Testing verification.
  2. For an installing Contractor to be considered commercially acceptable, the installer must have a certification from the manufacturer as a licensed and fully trained installer of the product. The installer must also have a minimum of one (1) million square feet of successful wastewater collection system installations on underground concrete/masonry structures and ten (10) years of rehabilitation experience.

### 1.03 SUBMITTALS:

- A. Product
1. Technical data sheets showing the physical and chemical properties.
  2. Material Safety Data Sheets (MSDS).
  3. Third Party Testing results.
  4. Verification of minimum installation requirements set forth in section 1.02.A.1 above.
- B. Installer

1. Verification of “certified applicator” status.
  2. Verification of minimum installation requirements set forth in section 1.02.A.2 above.
- C. Written certification from the product manufacturer that each of the proposed rehabilitation products is compatible with each other.
- D. Submit with Each Project:
1. Description, layout, and application sequencing plan.
  2. Rehabilitation system application requirements including material handling and storage requirements, mixing and proportioning requirements (as applicable), maximum pot life, film/coating thickness, curing, testing and certification requirements of all rehabilitation materials. Product Material Safety Data Sheets.
  3. Detailed instructions and methodology for finishing all pipe and manhole connections to rehabilitated manholes to prevent infiltration and exfiltration.
  4. Wastewater Flow Control/Bypassing Plan.
  5. Confined Space Entry Plan/Permit.
  6. Plan for capturing extraneous debris during rehabilitation processes and debris disposal.

#### **1.04 MATERIALS**

- A. Refer to the latest Manatee County Public Works Utility Standards Section 12 Precast Concrete Manholes and Wetwells for material requirements and details.

##### **1.04.1 CEMENTITIOUS MORTAR**

- A. Mortar shall be made of one part Portland cement and two parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C 150. Sand shall meet the requirements of ASTM C 144.

##### **1.04.2 PATCHING MATERIAL**

- A. A quick setting fiber reinforced cementitious material shall be used as a patching material and is to be mixed and applied according to manufacturer’s recommendations.

##### **1.04.3 HYDRAULIC CEMENT**

- A. A rapid setting, high-early-strength, cementitious product specifically formulated for leak control shall be used to stop water infiltration. The material shall be mixed and applied according to the manufacturer’s recommendations.

##### **1.04.4 CHEMICAL GROUT**

- A. A chemical grout shall be used for stopping very active infiltration and filling voids.

##### **1.04.5 LINER MATERIAL**

- A. CEMENTITIOUS MATERIAL

1. Cementitious liner products shall be used to form a structural monolithic liner covering all interior manhole surfaces and shall have the following minimum requirements:
  - a. Compressive Strength (ASTM C109): 7,000 psi, 28days
  - b. Tensile Strength (ASTM C496): 700 psi, 28 days
  - c. Flexural Strength (ASTM C293): 1,300 psi, 28 days
  - d. Shrinkage (ASTM C596): 0.02% at 28 days
  - e. Minimum Bond (ASTM C952): 200 psi, 28 days

When used as the final rehabilitation liner material (no epoxy liner), product shall be made with calcium aluminate cement. Calcium aluminate is not required when the cementitious liner is used as the underlayment for a protective coating liner application.

**B. PROTECTIVE COATING LINER MATERIAL**

1. The protective coating liner is to be applied where corrosion is anticipated. The protective coating liner material shall be applied over the completed cementitious liner material (without the calcium aluminate). The liner shall be spray applied or spin cast. The manufacturer of the selected protective coating liner material shall approve in writing that their protective coating liner is compatible with cementitious repair and liner material.
2. The protective coating liner material shall conform to Section 09970 Surface Protection Spray Systems of the specifications.

**C. WATER**

1. Water shall be clean and potable.

**1.04.6 INTERNAL MANHOLE CHIMNEY SEAL MATERIAL**

- A.** An aromatic urethane rubber material or flexible epoxy mastic used to prevent leakage of water into the manhole through the frame joint area and the area above the manhole cone and shall have the following minimum requirements:
1. Elongation (ASTM D412): 600%
  2. Tensile Strength (ASTM D412): 1,150 psi
  3. Adhesive Strength (ASTM D903): 175 lb. /in.
  4. Tear Resistance (ASTM D1004): 155 lb. /in.

The seal shall extend from the inside of the manhole frame down to the cone or corbel of the manhole.

**1.04.7 EXTERNAL MANHOLE SEAL WRAP**

- ~~A. External Manhole Seal Wrap: When work consists of adjusting manholes or cone replacements, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. The external seal wrap shall conform with Manatee County Public Works Department Utility Standards Section 12 and be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.~~

**1.05 PREPARATION**

- A. Perform traffic control in accordance with the approved traffic control submittal.
- B. Store materials in accordance with manufacturer's recommendations.
- C. Schedule and perform the work in a manner that does not cause or contribute to overflows or spills of sewage from the sewer system.
- D. Install devices to prevent extraneous material from entering the sewer system and to prevent upstream line from flooding the manhole. If extraneous material or debris falls into a "live" manhole during adjustment operations, the Contractor shall remove debris at no cost to the Owner.
- E. Dispose of wastes in accordance with applicable regulations.
- F. Schedule and perform any bypass pumping that will be necessary to properly rehabilitate the manhole.
- G. If present in the manhole, Contractor shall remove all access steps. Removal shall consist of neatly cutting steps flush with the wall prior to any lining installation. Contractor shall be responsible for proper disposal of steps.
- H. For manholes that are located within pavement areas and require resetting or replacement of concrete riser rings, cones, and /or frames, the Contractor shall sawcut, remove, and replace a 6 ft. x 6 ft. square or round section of pavement and base for rehabilitation operations. Costs for removal and replacement of pavement and base beyond these limits shall be borne by the Contractor.

## 1.06 INSTALLATION

- A. Prior to any lining all other miscellaneous work must be complete.
- B. Prior to man entry into any structure to be rehabilitated, proper ventilation and strict confined space OSHA regulations shall be followed. Failure to do so shall be grounds for removal from the project.

### 1.06.1 ~~CONE REPLACEMENT~~

- ~~A. The Contractor shall replace existing deteriorated manhole cone section with new precast concrete cone section. A preformed rubber gasket shall be placed in all keyways between existing manhole riser section and cone joints. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Manatee County Public Works Department Utility Standards. If the existing manhole is of brick construction, the cone shall be set in a full bed of mortar on the top course of bricks.~~

### 1.06.2 RISER RINGS

- A. The Contractor shall replace existing, deteriorated riser rings with new precast concrete riser rings. All manholes designated to receive casting adjustment and/or alignment shall be adjusted to meet existing finished grade unless an alternative elevation is specified. A cementitious mortar shall be placed in between individual precast concrete riser rings, and precast concrete riser ring and cone joints. The

mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils. Prior to backfilling, rubber external seal wraps shall be applied to the cone and manhole section joint, riser rings and frame in accordance with Manatee County Public Works Department Utility Standards.

### **1.06.3 MANHOLE FRAME AND COVER**

- A. Existing frames and covers which must be removed to facilitate manhole rehabilitation, riser reconstruction, and/or casting alignment or grade adjustments shall be salvaged, cleaned and given two coats of an approved bituminous coating by the Contractor for replacement unless determined to be defective by County. If manhole frame and/or cover are determined to be defective, Contractor shall replace with new frame and/or cover. Replacement frames and/or covers shall be furnished and installed in accordance with the Contract Documents. Frames shall be set in full mortar bed. The mortar shall be struck smooth with the interior surface of the manhole and floated with a sponge float to a surface profile of 8-10 mils.

#### **1.06.3.A MANHOLE FRAME AND COVER ADJUSTMENT RINGS**

- A. Existing manhole covers, which must be adjusted to existing or new pavement surfaces, shall be adjusted by modifying the existing precast concrete adjustment rings to bring the entire existing ring and cover to grade.
- B. No manhole cover adjustment rings shall be allowed.

### **1.06.4 CEMENTITIOUS LINER**

- A. Active leaks shall be stopped using hydraulic cement or chemical grout as necessary. Installation shall be in accordance with the manufacturer's recommendations.
- B. All manholes to be lined shall be cleaned and scarified with a minimum of 5,000 psi water jet at a minimum water temperature of 180 degrees F. The water jet shall hit the manhole wall surface at as near perpendicular angle as possible. Cleaning the manhole walls from the ground surface without the appropriate angled nozzles will not be accepted. Manhole surface build-up of debris and loose manhole construction materials shall be removed during the cleaning process.
- C. The intent of the surface preparation and cleaning work is to remove debris, films (oil, greases, etc or unsound, deteriorated concrete and to provide a structurally sound, clean surface that will enable lining materials to bond to the original substrate at adhesion strengths of that specified herein, a substrate pH of 8.3 is the minimum pH that will be considered acceptable to demonstrate that the surface preparation and cleaning have been properly performed.
- D. Additional aggressive surface preparation and cleaning methods may be necessary to remove carbonated cementitious lining concrete or contaminants that remain after the cleaning performed as described above. The Contractor shall test the pH of the cleaned manhole interior surface at various locations of the manhole and when the results indicate a pH less than 8.3 then additional surface

preparations and cleaning will be required. As a minimum level of effort the Contractor shall either dry sand blasting or pneumatic jackhammering with a bushing bit followed by a minimum 5,000 psi water blast.

- E. Any bench, invert or service line repairs shall be made at this time using quick setting grout or repair mortar per the manufacturer's recommendations.
- F. Invert repair shall be performed on all inverts with visible damage or where infiltration is present. After blocking flow through the manhole and thoroughly cleaning the invert, quick setting patch material shall be applied to the invert in an expeditious manner. The finished invert surfaces shall have a smooth surface and form a continuous monolithic conduit with the sewer pipe entering and leaving the manhole. The bench and invert shall form a watertight seal with the manhole walls, base and pipe seal.
- G. Wastewater flow shall be controlled by methods which prevent contact with the new bench and invert for 6-8 hours after mortar placement. If 6-8 hours set time is not possible, a fast setting, high early strength mortar shall be used with provisions for flow control until concrete has set.
- H. Fill all cracks, holes and joints that have voids using non-shrink grouts in accordance with the manufacturer's recommendations.
- I. Apply Cementitious Liner Material per the Manufacturer's recommendations. Apply Cementitious Liner material so that the final thickness is 0.5-inch minimum or per the thickness required by the manufacturer's minimum specification, whichever is greater. The material shall start at the bottom of the manhole frame and extend to the water level of the invert.
- J. Finishing: Trowel the surface of the liner to create a uniform smooth finish. Caution shall be taken to prevent over working the material. Once the initial cure has taken place, the exposed surface area should be given a broom finish. Thickness may be verified at any point with a wet gage.
- K. If the cementitious lining material is not immediately coated with a protective coating liner, apply a seal coat compatible with the repair material to aid in curing and minimize recontamination of the substrate prior to application of the protective coating liner material.

#### **1.06.5 PROTECTIVE COATING LINER**

- A. Prior to any protective coating lining perform all work shown in Section 1.06.4 above.
- B. Remove any curing compounds, sealers or contaminates prior to protective coating lining.
- C. Apply protective coating lining material in accordance with the manufacturer's recommendations over the waterproofing/structural repair material shown in Section 1.06.4.

- D. Apply protective coating lining material to all internal surface area of the structure.
- E. Apply protective coating lining material in accordance to Section 09970 Surface Protection Spray System of the specifications.

**1.06.6 INTERNAL MANHOLE CHIMNEY SEALANT**

- A. Perform all work shown in Sections 1.06.4 and 1.06.5 (if 1.06.5 is required) prior to any Internal Manhole Chimney Sealant.
- B. Clean all contaminates from manhole frame by sandblasting or mechanical methods as recommended by the chimney sealant manufacturer.
- C. Install Internal Manhole Chimney Sealant in accordance with the manufacturer's recommendations. The Contractor shall contact the manufacture for thickness recommendations however; the final liner material shall be made no less than 170 mils.

**1.06.7 EXTERNAL MANHOLE SEAL WRAP**

- ~~A. When Work consists of adjusting sewer manholes or cone replacement, an external seal wrap shall be installed to the outside of concrete risers, steel risers and joints of the precast manhole in order to eliminate infiltration. Frame and cover shall be completely coated prior to installation of the external seal wrap. The external seal wrap shall be installed in accordance with the details of the Contract Documents and the manufacturer's recommendations.~~

**1.06.8 MANHOLE INSERT**

- A. If existing manhole is not equipped with a watertight manhole insert, Contractor shall furnish and install a new manhole insert per Manatee County Public Works Utility Standards Section 12 and in accordance with the manufacturer's recommendations.
- B. If existing manhole is equipped with a watertight manhole insert to prevent intrusion of storm water, the insert shall be cleaned and reinstalled by the Contractor, unless determined to be defective by the County. If insert is determined to be defective, Contractor shall furnish a new watertight manhole insert and install in accordance with manufacturer's recommendations at the completion of manhole rehabilitation operations.

**1.07 TESTING**

- A. After completion of any rehabilitation operation and prior to backfilling (if required), the Contractor shall conduct the following tests on the manholes:
  - 1. Visual Inspection: The County and Contractor shall make a final visual inspection. Any deficiencies in the finished system shall be marked and repaired.
- B. If a protective coating liner is applied, the following additional tests will be required:

1. Wet Film Thickness Gage: During application a wet film thickness gage, meeting ASTM D4414 - Standard Practice for Measurement of Wet Film Thickness of Organic Coatings by Notched Gages, shall be used to ensure a monolithic coating and uniform thickness during application.

## **1.08 WARRANTY**

- A. The Contractor shall guarantee the work to be free of defects in materials and workmanship for five-year period, unless otherwise stated, after completion and acceptance of the work. The Contractor shall repair defects in materials or workmanship, which may develop during the warranty period; and any damage to other work caused by such defects or discovered within the same period at no additional cost to the County.

### **1.08.1 WARRANTY INSPECTIONS**

- A. Conduct visual inspection prior to expiration of warranty to determine integrity of rehabilitation materials and water-tightness.
  1. Complete post inspection during first high groundwater period (spring or fall) following acceptance of work.
  2. Contractor should accompany County on inspections.
  3. Inspect a minimum of 25 percent of the manholes rehabilitated at locations selected by County.
    - a. Infiltration and Inflow: None
    - b. Structural Repair: Sound
    - c. If more than one manhole fails warranty inspection, inspect all manholes with similar characteristics.
    - d. Repair defects in accordance with Warranty.

**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 and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.
- B. All of the 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 Section 8 of 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, wastewater, etc., 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 of the valve 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 stainless steel extension stems and alignment rings where needed to bring the operating nut to within 4 feet below the box lid.
- H. Water and reclaimed water system isolation valves shall be gate valves for sizes 2-inch through 12-inch and shall be butterfly valves for sizes 16-inch and larger.
- I. Isolation valves for sewer force main pipelines shall be gate valves, unless otherwise noted on the plans. Tapping valves shall be used for tapping force mains. Plug valves shall be full port, have a 100% circular cross section, and must have prior written authorization from the County for use.
- J. Valves shall open when turning the operating nut or wheel counterclockwise and shall close when turning clockwise.

- K. All bonnet bolts, gland bolts, flange connection bolts, nuts, washers, and other trim hardware exposed to the outside environment shall be stainless steel. Thrust collar tie-rod bolts shall be stainless steel. All MJ-type underground bolts, nuts, and washers shall be COR-TEN or stainless steel.
- L. All valves shall have a factory applied, holiday free, fusion bonded epoxy coating on the interior and exterior unless otherwise noted in the plans or the following specification. All other painted items exposed to sunlight, including field painted box lids, etc., shall be painted the appropriate color with an epoxy type paint.
- M. No valves with a break-way stem shall be allowed.
- N. 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 (Sec. 2.03)
  4. ~~Butterfly Valves (Sec. 2.04)~~
  5. ~~Plug Valves (Sec. 2.05)~~
  6. Valve Actuators (Sec. 2.06)
  7. Air Release Valves (Sec. 2.07)
  8. Valves Boxes (Sec. 2.08)
  9. ~~Corporation Stops and Saddles (Sec. 2.09)~~
  10. Flange Adapters and Plain End Couplings (Sec. 2.10)
  11. ~~Hose Bibs (Sec. 2.11)~~
  12. ~~Swing Check Valves (Sec. 2.12)~~
  13. ~~Hydrants (Sec. 2.13)~~
  14. Restrained Joints (Sec. 2.14)
  15. Tapping Sleeves and Tapping Valves (Sec. 2.15)
  16. Tracer Wire Boxes (Sec. 2.16)

**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. Stainless steel or equivalent 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 2 inches to 14 inches in diameter shall be resilient seated, manufactured to meet or exceed the requirements of AWWA C509 or 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. The valves shall have a non-rising stainless steel stem to eliminate lead content. All bolts, nuts and washers shall be stainless steel to eliminate exterior corrosion and maintain fastener strength. Manufacturer shall use Never-Seez or equivalent during assembly of bolt and nut sets to prevent galling of similar metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the thrust collar. Valves that are located above grade and located in valve vaults shall be OS&Y with flanged joints.
- E. The wedge shall be ductile iron fully encapsulated with an EPDM rubber. The Elastomer type shall be permanently indicated on the disc or body of the valve. 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, bonnet, and bonnet cover shall meet or exceed all the requirements of AWWA C515.
- G. Valves meeting AWWA C515 requirements 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 left or counterclockwise.
- 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 9001:2000 manufacturing facility within the United States and provide their certification of meeting internationally recognized quality control procedures.

~~2.02 COMBINATION PRESSURE REDUCING & PRESSURE SUSTAINING WITH CHECK VALVE OPTION~~

- A. ~~Pressure sustaining and check valve shall be pilot operated diaphragm actuated valve with cast iron body, bronze trim, and 125 pound flanged ends. The valve 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. Valve shall be single chamber type, with 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 303 stainless steel trim. Valve shall be similar in all respects to Cla-Val Company, Model 92-01 or a similar control valve such as Bernad Model 723, GA Industries Model 4700 or an approved equal.~~

2.03

BALL VALVES

- A. Ball valves for water and reclaimed water, in sizes 3/4-inch through 2-inch, shall be brass body, stem and ball per ASTM B 62, alloy 85-5-5-5, full port, full flow, 1/4-turn check, ball curb valves, rated for 300 psi, Mueller 300 (as specified in the table below), Ford B-Series, or approved equal, with compression, pack joint, flare, threaded or flanged ends as required. Ball valves for wastewater, 2-inch through 3-inch, shall be 316 stainless steel body, cap, stem and ball per ASTM A351, full port, full flow, 1/4-turn check, ball valves, steam rated for 150 psi, pressure rating 1,000 psi CWT, Apollo 76F or approved equal, with threaded or flanged ends as required.

Curb Stops for Water and Reclaimed Water

Pipe Material	Type of Connection	Model
HDPE	Compression x FIP	B-25170 *
HDPE	Pack Joint x FIP	P-25170 *
Copper	Compression x FIP	B-25170
Copper	Flare x FIP	B-25166
Stainless Steel	FIP x FIP Thread	B-20200
* Insert required, part number per manufacturer product information		

- B. 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, handle nut, and lever packing gland shall be 304 or 316 stainless steel.

- C. Potable 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.

## ~~2.04 BUTTERFLY VALVES~~

- ~~A. Butterfly valves shall conform to AWWA C504, Class 250 B, Mueller Lineseal XPII, DeZurik AWWA, Pratt HP-250II, or an approved equal.~~
- ~~B. Valve seats shall be an EPDM elastomer. Valve seats 24 inches and larger shall be field adjustable and replaceable without dismounting operator disc or shaft and without removing the valve from the line. Valves 20 inches and smaller shall have bonded or mechanically restrained seats as outlined in AWWA C504.~~
- ~~C. All valves shall be subject to hydrostatic and leakage tests at the point of manufacture. The hydrostatic test for Class 250 valves shall be performed with an internal hydrostatic pressure equal to 500 psi applied to the inside of the valve body of each valve. During the hydrostatic test, there shall be no leakage through the metal, the end joints or the valve shaft seal. The leakage test for the Class 250 valves shall be performed at a differential pressure of 250 psi and against both sides of the valve. No adjustment of the valve disc shall be necessary after pressure test for normal operation of valve. All valves shall be leaktight in both directions.~~
- ~~D. Butterfly valve actuators shall conform to AWWA C504. Gearing for the actuators shall be totally enclosed in a gear case. Actuators shall be capable of seating and unseating the disc against the full design pressure and shall transmit a minimum torque to the valve. Actuators shall be rigidly attached to the valve body.~~
- ~~E. The valve shaft shall be constructed of 18-8, ASTM A-276, Type 304 stainless steel and designed for both torsional and shearing stresses when the valve is operated under its greatest dynamic or seating torque. Shaft shall be of either a one piece unit extending full size through the valve disc and valve bearing or it may be of a stub shaft design. Shaft bearings shall be teflon or nylon, self-lubricated type.~~
- ~~F. Gearing for the operators shall be totally enclosed in a gear case in accordance with paragraph 3.8.3 of the above mentioned AWWA Standard Specification.~~
- ~~G. Operators shall be capable of seating and unseating the disc against the full design pressure of velocity, as specified for each class, into a dry system downstream and shall transmit a minimum torque to the valve. Operators shall be rigidly attached to the valve body.~~
- ~~H. The manufacturer shall certify that the required tests on the various materials and on the completed valves have been satisfactory and that the valves conform with all requirements of this Specification and the AWWA standard.~~
- ~~I. Where indicated on the Drawings, extension stems, floor stands, couplings, stem guides, and floor boxes as required shall be furnished and installed.~~

## 2.05 PLUG VALVES

- A. ~~Plug valves shall be eccentric, non-lubricating type with integral plug and shafts and 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 when tested according to the Leakage Test method of AWWA C504 with a hydrostatic pressure of 150 psi.~~
- B. ~~Plug valves shall also be subjected to the internal, full body Hydrostatic Test of AWWA C504 at a pressure two times the rated pressure or a minimum pressure of 300 psi, whichever is greater. 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. Plug valves shall be Kennedy or Dezurik.~~
- C. ~~Flanged valve ends shall be faced and drilled according to ANSI B 16.1, 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 ductile iron per ASTM A 126, Class B. The integral plug and shafts shall be cast iron ASTM A 126, Class B, or 316 stainless steel. The entire plug, except for the shafts, shall be covered with nitrile (Buna-N) rubber. The rubber compound shall have been vulcanized to the metal plug and shall have a peel strength of not less than 75 pounds per inch when tested according to ASTM D 429, method B. The valve seat shall be at least 90 percent pure nickel, welded in overlay into the cast iron body. The top and bottom bearings shall be 316 stainless steel.~~
- E. ~~Plug valves shall have a full port area of 100 percent of the nominal pipe size area.~~
- F. ~~Valves shall have worm gear type actuators with 2-inch square operating nuts.~~
- G. ~~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.~~
- H. ~~Plug valves shall be coated inside with Protecto 401 or amine-cured novolac ceramic epoxy or another two-part epoxy suitable for sanitary sewer service which has been approved by Manatee County.~~

## 2.06 VALVE ACTUATORS

- A. ~~Butterfly valve and plug valve actuators.~~

~~Butterfly valve and plug valve actuators shall conform to the requirements for actuators presented in AWWA C 504 and shall be either manual or motor operated. 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.~~

- B. Manual Actuators.

Manual actuators shall have permanently lubricated, totally enclosed gearing with handwheel and gear ratio sized on the basis of actual line pressure and velocities. Actuators shall be equipped with handwheel, position indicator, and 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. 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. 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.

**C. ~~Motor Actuators (Modulating)~~**

- ~~(1) 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.~~
- ~~(2) 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 hobbled 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.~~
- ~~(3) 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.~~
- ~~(4) 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.~~

- ~~(5) 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.~~
- ~~(6) 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.~~
- ~~(7) All units shall have strip heaters in both the motor and limit switch compartments.~~
- ~~(8) 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.~~
- ~~(9) The electronics for the electric operator shall be protected against temporary submergence.~~
- ~~(10) Actuators shall be Limitorque L120 with Modutronic Control System containing a position transmitter with a 4-20MA output signal or equal.~~

~~D. Motor Actuators (Open-Close)~~

- ~~(1) 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.~~
- ~~(2) 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.~~

- ~~(3) 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.~~
- ~~(4) The motor shall be prelubricated and all bearings shall be of the anti-friction type.~~
- ~~(5) 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.~~
- ~~(6) 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.~~
- ~~(7) 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.~~
- ~~(8) 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.~~

- ~~(9) 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.~~
- ~~(10) 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.~~
- ~~(11) Motor operators shall be as manufactured by Limitorque Corporation, Type L120 or approved equal.~~

## 2.07 AIR RELEASE VALVES

- A. Air release valves shall be automatic float operated, GA Industries fig-929 for sewer applications, Fig-920 for water and reclaimed water application, or an approved equal, with inlet size and working pressure ratings as required and NPT connections.
- B. Valve bodies shall be ductile iron per ASTM A 126, Class B. The orifice, float and linkage shall be stainless steel. The seat shall be (Buna N) nitrile elastomer.

## 2.08 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” cast into the top. Lids shall be painted green for sanitary sewer.
- B. Cast iron boxes shall be two-piece, or three-piece, as required, screw type, Tyler Pipe, 6850 Series, Box 461-S through 668-S, with extensions, as required to make the desired box length, or an approved equal. 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 stainless steel adjustable stem, Trench Adapter, as manufactured by American Flow Control, or an approved equal. Bottom barrel shall have flanged bottom to prevent settling. All bolts, screws and pins shall be stainless steel.
- D. Reclaimed Valve Boxes shall be square 9-inch x 9-inch load bearing marked “Reclaimed Water” and painted Pantone 522C purple.
- E. All valves shall either have operating nuts within 4 feet below the top of the lid or shall have 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 a stainless steel fastener.
- F. All potable water, sewer, and reclaimed water grade-adjustment risers shall be cast iron material just like the valve box. No plastic or steel risers shall be allowed.

- G. A centering device BoxLok or equal shall be installed in the valve box.
- H. Stand pipe shall match color code of the system being installed (green for sanitary sewer).

**2.09 CORPORATION STOPS AND SADDLES**

A. Corporation stops for connections to ductile iron and PVC water and reclaimed water mains shall be all red brass, alloy 85-5-5-5, per ASTM B 62, and shall conform to AWWA C800. 1-inch through 2-inch corporation stops shall be ball type, 300 psi working pressure rated, with AWWA MIP threaded inlets and compression, pack joint, flare, or FIP threaded joint outlets, Mueller as shown in the table below, or an approved equal. All joints made to CTS size HDPE tubing shall use stainless steel insert stiffeners.

**Corporation Stops**

Pipe Material	Type of Connection	Mueller 300 Model
HDPE	Compression x AWWA IP Thread	B-25028 (Saddle) *
HDPE	Compression x AWWA Taper Thread	B-25008 (Direct Tap) *
HDPE	Pack Joint x AWWA IP Thread	P-25028 (Saddle) *
HDPE	Pack Joint x AWWA Taper Thread	P-25008 (Direct Tap) *
Copper	Compression x AWWA IP Thread	B-25028 (Saddle)
Copper	Pack Joint x AWWA Taper Thread	B-25008 (Direct Tap)
Copper	Pack Joint x AWWA IP Thread	P-25028 (Saddle)
Copper	Pack Joint x AWWA Taper Thread	P-25008 (Direct Tap)
Copper	Flare x AWWA IP Thread	B-25025 (Saddle)
Copper	Flare x AWWA Taper Thread	B-25000 (Direct Tap)
Stainless Steel	FIP Thread x AWWA IP Thread	B-20046 (Saddle)
Stainless Steel	FIP Thread x AWWA Taper Thread	B-20045 (Direct Tap)
* Insert required, part number per manufacturer product information		

- B. Potable 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 red brass saddles, alloy 85-5-5-5, per ASTM B 62. Straps, washers and nuts shall be brass or stainless steel. No ductile iron, cast iron or steel saddles will be allowed. Saddles shall be Smith Blair 325 Bronze saddles with Stainless Steel or brass extra wide strap or equivalent.
- D. Connections to PVC sanitary force mains for services up to 2 inches shall be made using Romac Style 306 double bolt stainless steel service saddles or equivalent.
- E. Service and air release valve (ARV) connections to HDPE water, reclaimed water and sewer mains may be made using Romac Style 306H saddle or approved equal. All saddles shall be properly sized per the manufacturer product information and be installed according to the manufacturer's written instructions. Connections

~~to HDPE mains shall not be made using narrower saddles similar to the Smith-Blair 325.~~

## **2.10 FLANGED ADAPTERS AND PLAIN END COUPLINGS**

Plain end couplings and adapters shall be fusion-bonded epoxy coated carbon steel with Ethylene Propylene Diene Monomer (EPDM) rubber gaskets and stainless steel nuts, bolts and spacers. Acrylonitrile butadiene (NBR) gaskets shall be used for potable 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 water mains that are located in soil that is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons. Fluorocarbon (FKM) gaskets shall be used for potable water mains if the soil is contaminated with aromatic hydrocarbons or chlorinated hydrocarbons, and is also contaminated with low molecular-weight petroleum products or organic solvents. Couplings shall be Dresser Style 38, or another approved equal. Flange adapters shall have a plain end compression seal similar to the style 38, with an ANSI 125 Class flange on the opposite end, and shall be Dresser Style 128W or an approved equal. Stainless steel backup rings shall be used for force mains that are located in corrosive environments including wetwells and valve vaults.

## **2.11 HOSE BIBS**

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

## **2.12 SWING CHECK VALVES**

- ~~A. Check valves shall be swing type, weighted lever, conforming to AWWA C508. Valves shall be iron body, bronze mounted, single disk, 175 psi working pressure for 2- through 12-inch, 150 psi for 14- through 30-inch, with ANSI B16.1 Class 125 flanged ends, by Mueller; No. A-2600-6-01 (sewer), No. A-2602-6-01 (water), or AVK Series 41, or an approved equal.~~
- ~~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, extended bronze or stainless steel hinge pins and stainless steel nuts and bolts on bolted covers.~~
- ~~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.~~

## **2.13 HYDRANTS**

~~Hydrants shall be dry barrel, nostalgic style, and shall be AVK Series 2780, American Darling B-84-B, Mueller Super Centurian 250, or approved equal and shall conform to AWWA C502 and UL/FM certified, and shall in addition meet the specific requirements and exceptions which follow:~~

- A. ~~Hydrants shall be according to manufacturer's standard pattern or nostalgic style and of standard size, and shall have one 5-inch Storz connection or equivalent with two 2½-inch hose nozzles.~~
- B. ~~Hydrant inlet connections shall have mechanical joints for 6-inch pipe.~~
- C. ~~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.~~
- D. ~~The upper and lower stem rod shall be stainless steel and shall have a breakable stem rod coupling of stainless steel, or cast iron or ductile iron with a fusion bonded epoxy coating, with stainless steel pins and clips.~~
- E. ~~Hydrants shall be hydrostatically tested as specified in AWWA C502 and shall be rated at 250 psi minimum.~~
- F. ~~The operating nut shall be 1½-inch pentagon-shaped with a protective weather cover, and open counter-clockwise.~~
- G. ~~All nozzle threads shall be American National Standard.~~
- H. ~~Each nozzle cap shall be provided with a Buna-N rubber washer.~~
- I. ~~All hydrants shall be traffic break-away type and allow for 360-degree rotation to position the Storz connection/nozzle in the desired direction after installation.~~
- J. ~~Hydrants must be capable of being extended without removing any operating parts.~~
- K. ~~Hydrant extensions shall be fusion bonded epoxy coated inside and outside with a stainless steel stem. The breakaway coupling can be fusion bonded epoxy coated or stainless steel. Only one hydrant extension is allowed per hydrant.~~
- L. ~~Weepholes shall be excluded from fire hydrants.~~
- M. ~~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.~~
- N. ~~Hydrant bonnets, weather cover, nozzle section, caps and shoe shall be cast iron or ductile iron, and shall be holiday free fusion bonded epoxy coated at the factory, per AWWA C550, inside and outside. Lower barrel shall be fusion bonded epoxy coated inside and outside. Aboveground parts shall also have a top coat of Sherwin-Williams Acrolon 218 HS acrylic~~

~~polyurethane or approved equal; color Safety Yellow for fire hydrants that are connected to the potable water system or Pantone 522C purple for fire hydrants that are connected to the reclaimed water system.~~

~~O. Exterior nuts, bolts and washers shall be stainless steel. Bronze nuts may be used below grade.~~

~~P. All internal operating parts shall be removable without requiring excavation.~~

## 2.14 RESTRAINED JOINTS

A. Pipe joints shall be restrained by mechanical methods, including tie rods, Stargrip and Allgrip, as manufactured by Star Pipe Products or Megaflange and 2000 PV, as manufactured by EBAA Iron Sales. Flanged joints may be used above ground.

B. All T-bolts, bolts, nuts, washers, and all thread rods shall meet ASTM A-588 requirements (Cor-ten or equivalent) "weathering steel" or be 316 stainless steel. The use of rebar with welded thread is prohibited.

A certification from the supplier shall be provided to the County during the shop drawing review process ensuring all T-bolts, bolts, nuts, washers, and all thread rods meet the A-588 requirements and shall state the project name and contractor in the certification letter. If stainless steel is to be used, no certification letter is required.

C. Restrained joints may also be Lok-Ring, as manufactured by American Cast Iron Pipe Company, or an approved equal.

D. Restrained joint designs, which require wedges and/or shims to be driven into the joints in order to disassemble the pipe shall not be allowed.

## 2.15 TAPPING SLEEVES AND VALVES

A. Tapping valves shall meet the requirements of AWWA C509/C515 with ductile iron body and shall be rated for a pressure of 250 psi. The valves shall be flanged with alignment ring by mechanical joint with a nonrising stainless steel stem. All bolts, nuts and washers shall be stainless steel. Manufacturer shall use Never-Seez or equivalent during assembly of bolt and nut sets to prevent galling of similar metals. Stem seals shall be provided and shall be of the O-ring type, two above and one below the valve's thrust collar. Valve shall be designed for vertical burial and shall open counterclockwise. Operating nut shall be AWWA standard 2-inch square for valves 2 inches and up. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve to accommodate full size shell cutter. Gaskets shall cover the entire area of the flange surface and be 1/8-inch minimal thickness of red rubber. The wedge shall be ductile iron fully encapsulated with EPDM rubber. All bolts, nuts and washers between the sleeve and valve shall be stainless steel.

B. Tapping sleeves and saddles shall be stainless steel, 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 stainless steel 3/4-inch NPT test plug shall be provided for pressure testing. All bolts joining the two halves shall be stainless steel and shall be included with the sleeve or saddle; Romac SST III or Romac SST-H.

## 2.16 TRACER WIRE TEST STATION BOXES

Tracer wire test station boxes shall be provided at plug valves, butterfly 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, P200NFGT as manufactured by Bingham & Taylor, or equal approved by Manatee County. Where test boxes will be in streets or subject to vehicular traffic, use B&T Model P525RD, 5 ¼ -inch diameter or equal, centered in a separate concrete pad similar to a valve box pad.

## **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 corresponding to the class of pipe, 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. Flanged joints and mechanical joints shall be made with high strength, low alloy Corten or 316 stainless steel bolts, nuts and washers.
- F. 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.

- G. 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.
- H. 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 INSURE THAT CONCRETE DOES NOT PLUG THE DRAIN PORTS. Concrete used for backing shall be as specified herein.~~
- ~~B. 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.~~
- ~~C. 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.~~
- ~~D. 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.~~
- ~~E. 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.~~
- ~~F. Tapping sleeves and valves with boxes shall be set vertically or horizontally as indicated on the Drawings and shall be squarely centered on the main to be tapped. Adequate support shall be provided under the sleeve and valve during the tapping operation. Sleeves shall be no closer than 30" from water main joints. 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.~~

**3.03 SHOP PAINTING**

Ferrous surfaces of valves and appurtenances shall receive a coating of rust-inhibitive primer. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

**3.04 FIELD PAINTING**

All metal valves and appurtenances specified herein and exposed to view shall be painted green. Refer to the Coating specification for additional information.

**3.05 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 Utility Standards Part 1-Utility Standards Manual Section 1.8.7. 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. All existing facilities shall remain in operation throughout the construction process. Contractor is also required to provide bypass pumping when completing the manhole rehabilitation work activity.

#### **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 where 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 to 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 03301    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**

Perform cast-in-place concrete work in accordance with ACI 318, unless specified otherwise in this Section.

#### **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.    Three concrete test cylinders will be taken for every 100 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 - Concrete Aggregates
- B.    ASTM C150 - Portland Cement
- C.    ACI 318 - Building Code Requirements for Reinforced Concrete
- D.    ASTM C260 - Air Entraining Admixtures for Concrete
- E.    ASTM C94 - Ready-Mixed Concrete
- F.    ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete

- G. ACI 305 - Recommended Practice for Hot Weather Concreting

**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.

**2.02 ADMIXTURES**

- A. Air Entrainment: ASTM C260.
- B. Chemical: ASTM C494 Type A - water reducing admixture.

**2.03 ACCEPTABLE MANUFACTURERS**

Acceptable Products:

- 1. Pozzolith
- 2. WRDA

**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. Select proportions for normal weight concrete in accordance with ACI 301 3.8 Method 1, Method 2, or Method 3. Add air entraining agent to concrete to entrain air as indicated in ACI 301 Table 3.4.1.
  - 3. All mixes shall be in accordance with 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

### FORMS

- A. Forms shall be used for all concrete masonry, including footings. Forms shall be constructed and placed such that the resulting concrete will be of the shape, lines, dimensions, appearance and to the elevations indicated on the Drawings.
- B. Forms shall be made of wood, metal, or other approved material. Wood forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots; where used for expose surfaces, boards shall be dressed and matched. Plywood shall be sanded smooth and fitted with tight joints between panels. Metal forms shall be of an approved type for the class of work involved and of the thickness and design required for rigid construction.
- C. Edges of all form panels in contact with concrete shall be flush within 1/32-inch and forms for plane surfaces shall be such that the concrete will be plane within 1/16-inch in four feet. Forms shall be tight to prevent the passage of mortar and water and grout.
- D. Forms for walls shall have removable panels at the bottom for cleaning, inspection and scrubbing-in of bonding paste. Forms for walls of considerable height shall be arranged with tremies and hoppers for placing concrete in a manner that will prevent segregation and accumulation of hardened concrete on the forms or reinforcement above the fresh concrete.
- E. Molding or bevels shall be placed to produce a 3/4-inch chamfer on all exposed projecting corners, unless otherwise shown on the Drawings. Similar chamfer strips shall be provided at horizontal and vertical extremities of all wall placements to produce "clean" separation between successive placements as called for on the Plans.
- F. Forms shall be sufficiently rigid to withstand vibration, to prevent displacement or sagging between supports and constructed so the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy.
- G. Forms, including new pre-oiled forms, shall be oiled before reinforcement is placed, with an approved nonstaining oil or liquid form coating having a non-paraffin base.
- H. Before form material is re-used, all surfaces in contact with concrete shall be thoroughly cleaned, all damaged places repaired, all projecting nails withdrawn, all protrusions smoothed and in the case of wood forms pre-oiled.
- I. Form ties encased in concrete shall be designed so that after removal of the projecting part, no metal shall be within 1-inch of the face of the concrete. That part of the tie to be removed shall be at least 1/2-inch diameter or be provided with a wood or metal cone at least 1/2-inch in diameter and 1-inch long. Form ties in concrete exposed to view shall be the cone-washer type equal to the Richmond "Tyscru". Throughbolts or common wire shall not be used for form ties.

**PART 3 EXECUTION**

**3.01 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304.
- B. Notify County minimum 24 hours prior to commencement of concreting operations.
- C. Verify anchors, seats, plates and other items to be cast into concrete are placed, held securely and will not cause hardship in placing concrete. Rectify same and proceed with work.
- D. Maintain records of poured concrete items. Record date, location of pour, quantity, air temperature and test samples taken.
- E. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- F. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Apply bonding agent in accordance with manufacturer's recommendations.
- G. Pour concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur.
- H. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solidly with non-shrink grout.
- I. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify County upon discovery.
- J. Conform to ACI 305 when concreting during hot weather.

**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.

### **3.05 CONCRETE FINISHING**

Provide concrete surfaces to be left exposed, columns, beams and joists with smooth rubbed finish.

### **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.

### **1.07 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 ½ inch expansion joint between back of curb and new concrete. Area beneath restoration shall be mechanically tamped prior to placing concrete.

### **1.08 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 ½ 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 09940 - PROTECTIVE COATINGS

### PART 1 - GENERAL

#### 1.1 SCOPE

- A. This section covers field applied protective coatings, including surface preparation, protection of surfaces, inspection, and other appurtenant work for equipment and surfaces designated to be coated with heavy-duty maintenance coatings. Regardless of the number of coats previously applied, at least two field coats in addition to any shop coats or field prime coats shall be applied to all surfaces unless otherwise specified.

#### 1.2 GENERAL

- A. Cleaning, surface preparation, coating application, and thickness shall be as specified herein and shall meet or exceed the coating manufacturer's recommendations. When the manufacturer's minimum recommendations exceed the specified requirements, Contractor shall comply with the manufacturer's minimum recommendations. When equivalent products are acceptable to Engineer, Contractor shall comply with this Specification and the coating manufacturer's recommendations.
- B. Governing Standards
  - 1. All cleaning, surface preparation, coating application, thickness, testing, and coating materials (where available) shall be in accordance with the referenced standards of the following AWWA, ANSI, NACE, SSPC, NSF, and ASTM.
- C. Delivery and Storage
  - 1. All coating products shall be received and stored in accordance with the coating manufacturer's recommendations.
- D. Coatings, Painting, and Linings Covered in Other Sections
  - 1. Manhole lining
  - 2. Shop / Factory Coatings

#### 1.3 SUBMITTALS

- A. General Submittals and Data
  - 1. Contractor shall submit color cards for all coatings proposed for use, together with complete descriptive specifications, manufacturer's product data sheet and the completed Coating System Data Sheets, to Engineer for review and color selection. Each product data sheet shall include application temperature limits including recoat time requirements for

the ambient conditions at the site, including temperatures up to 130°F. Requests for review submitted directly to Engineer by coating suppliers will not be considered.

B. Data Sheets

1. Contractor shall submit a Coating System Data Sheet for each separately identified surface in the Metal Surfaces Coating Schedule, Concrete and Masonry Surfaces Coating Schedule, and the Miscellaneous Surfaces Coating Schedule that will be used in the Project, using the appropriate Coating System Data Sheet forms (Figures 1-09940 and 2-09940) at the end of this section. Each field coating system shall be acceptable to the coating material manufacturer.

a. Coating System Data Sheets shall be assigned a unique number with a prefix letter based on the following:

Prefix	Surfaces	Fig. 09940
A	Iron and steel (coated entirely in field)	1
A	Iron and steel (shop primed)	2
C	Concrete and concrete block	1
E	Equipment - submerged	1
E	Equipment – nonsubmerged	2
F	Nonferrous metal	1
G	Galvanized	1
H	High temperature	1
P	PVC and FRP	1

b. Each coating system that will be applied entirely in the field shall be assigned only a prefix letter and no suffix letter. Fig 1-09940 shall be submitted for each surface coated entirely in the field.

c. Each shop-applied coating system that includes one or more field applied coats shall be assigned both a prefix letter and suffix letter “F.” Fig 2-09940 shall be submitted for each surface having a shop applied coating and one or more field applied finish coats.

d. A separate Coating System Data Sheet shall be developed and submitted for each surface scheduled to be coated or variation or change in a coating system. The number identifying the surface and coating system shall be of the form A<sub>1</sub> or A<sub>1</sub>-F. The subscript number shall be assigned by the Contractor so that each surface and coating system combination is uniquely identified. For example:

- 1) A<sub>1</sub>-F may be assigned to “Epoxy – one coat to metal curbs for skylights and power roof ventilators that have been shop primed.”
- 2) A<sub>2</sub> may be assigned to “Epoxy – two coats to non-galvanized structural and miscellaneous steel exposed to view inside buildings.”
- 3) C<sub>2</sub> may be assigned to “Epoxy – two coats to all concrete and concrete block in corrosive area (Except floors and surfaces scheduled to receive other coatings) which are exposed to view.”

- 4) C2<sub>2</sub> may be assigned to “Epoxy – two coats to walls, floors, and curbed areas, adjacent to corrosive chemical storage and feed equipment as indicated on the Drawings.”

C. Color Submittals

1. Colors shall be coordinated with the County.

QUALITY ASSURANCE

D. Coating System Data Sheet Certifications

1. The coating applicator and coating manufacturer shall review and approve in writing the coating manufacturer’s written recommendations for the coating system and the intended service. Any variations from the Specifications or the coating manufacturers published recommendations shall be submitted in writing and approved by the coating manufacturer.
2. The coating manufacturer shall observe the surface preparation, mixing, and application of the coating systems and submit a written report of his observations and any additional recommendations.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Alternative Manufacturers

1. In addition to the coatings listed herein, equivalent products of other manufacturers that distribute globally will also be acceptable.

B. Equivalent Coatings

1. Whenever a coating is specified by the name of a proprietary product or of a particular manufacturer or vendor, it shall be understood as establishing the desired type and quality of coating. Other manufacturers’ coatings will be accepted, provided that sufficient information is submitted to enable Engineer to determine that the proposed coatings are equivalent to those named. Information on proposed coatings shall be submitted for review in accordance with the Submittals Procedures section. Requests for review of equivalency will be accepted only from Contractor and will be considered only after the contract has been awarded.

2.2 MATERIALS

- A. All coatings shall be delivered to the job in original, unopened containers, with labels intact. Coatings shall be stored indoors and shall be protected against freezing. No adulterant, unauthorized thinner, or other material not included in the coating formulation shall be added to the coating for any purpose.

- B. All coatings shall conform to the air quality regulations applicable at the location of use. Coating materials that cannot be guaranteed by the manufacturer to conform, whether or not specified by product designation, shall not be used.
- C. With the exception of heat resistant coatings, the coatings specified have been selected on the basis of the manufacturer's statement that the VOC content of the product is 2.8 lbs per gallon or less; however, it shall be the Contractor's responsibility to use only coating materials that are in compliance with the requirements of all regulatory agencies. Local regulations may require some coatings to have a lower VOC content than specified herein. The coatings specified may meet the VOC limits in the unthinned (as shipped) condition but may exceed the limits if thinned according to the manufacturer's recommendations. In such case, the coatings shall not be thinned beyond the 2.8 lbs per gallon limit, and if the product cannot be thinned to suit the application method or temperature limits, another manufacturer's coating shall be used, subject to acceptance by Engineer.
- D. Contractor shall be responsible for ensuring the compatibility of field coatings with each other or with any previously applied coatings. Coatings used in successive field coats shall be produced by the same manufacturer. The first field coat over shop coated or previously coated surfaces shall cause no wrinkling, lifting, or other damage to underlying coats.
- E. All intermediate and finish coating materials that will be in contact with wastewater atmosphere shall be guaranteed by the manufacturer to be fume proof and suitable for wastewater plant atmosphere that contains hydrogen sulfide. Coatings that cannot be so guaranteed shall not be used. Leadfree, chromium-free, and mercury free coatings shall be used.

F. Primers

Universal Primer (tie coat)	PPG "Amerlock Sealer," Carboline "Rustbond Series," International Devoe "Devran 201H," Tnemec "Series 27 F.C. Typoxy," or Sherwin-Williams "Dura Plate 235."
<hr/>	
Zinc Primer	PPG "Dimetate 9 Series," Carboline "Carbo Zinc II Series," International Devoe "Catha-Coat 302H," Tnemec «Series 90-97 Zinc Primer », or Sherwin-Williams "Zinc Clad II Series."

G. Intermediate and Finish Coatings

Epoxy	
Concrete Floors	PPG "Amerlock 2/400," Carboline "Carboguard 890," International Devoe "Devran 224V," Tnemec "Series N69 Hi-Build Epoxoline II," or Sherwin-Williams "Armorseal 1000HS"; nonskid.
Ferrous Metal Surfaces and Masonry or Concrete Surfaces Other Than Floors	PPG "Amercoat 385 Epoxy," Carboline "Carboguard 890," International Devoe Devran "224V," Tnemec "Series N69 Hi-Build Epoxoline II," or Sherwin-Williams "Dura Plate 235."
<hr/>	

Aliphatic Polyurethane	PPG “Pitthane Ultra,” Carboline “Carbothane 134HG,” International “Intervane 990V” Tnemec “Series 1074 Endura-Shield II,” or Sherwin-Williams “Acrolon 218HS.”
Coal Tar Epoxy/ High-build coal tar epoxy	PPG Amercoat “78HB Coal Tar Epoxy,” Carboline “Bitumastic 300 M,” Tnemec “46H-413 Hi-Build Tneme-Tar,” International “Interzone 954 Black” or Sherwin-Williams “Targuard Coal Tar Epoxy”
Medium Consistency Coal Tar	PPG Amercoat 240 Black, Carboline “Bitumastic 50” International “Devoe Bar-Rust 236 Black” or Tnemec “46-465 H.B. Tnemecol.”
Vinyl Ester	Tnemec “Series 120 Vinester” Carboline “Plasite 4110” or Sherwin-Williams “Magnalux 304FF.” International Paint «Ceilcote 232 Flakeline »

## PART 3 - EXECUTION

### 3.1 SURFACE PREPARATION

- A. All surfaces to be coated shall be clean and dry and shall meet the recommendations of the coating manufacturer for surface preparation. Freshly coated surfaces shall be protected from dust and other contaminants. Oil and grease shall be completely removed by use of solvents or detergents before mechanical cleaning is started. The gloss on previously coated surfaces shall be dulled if necessary, for proper adhesion of topcoats.
- B. Surfaces shall be free of cracks, pits, projections, or other imperfections that would interfere with the formation of a smooth, unbroken coating film, except for concrete block construction where a rough surface is an inherent characteristic.
- C. When applying touchup coating or repairing previously coated surfaces, the surfaces to be coated shall be cleaned as recommended by the coating manufacturer, and the edges of the repaired area shall be feathered by sanding or wire brushing to produce a smooth transition that will not be noticeable after the coating is applied. All coatings made brittle or otherwise damaged by heat of welding shall be completely removed.
- D. Galvanized Surfaces
  - 1. When a coating is required, galvanized surfaces shall be prepared for coating according to the instructions of the manufacturer of the epoxy. Any chemical treatment of galvanized surfaces shall be followed by thorough rinsing with clean water.
- E. Ferrous Metal Surfaces
  - 1. Ungalvanized ferrous metal surfaces shall be prepared for coating by using one or more of the following cleaning procedures specified here-in: solvents (SSPCSP1); abrasive blasting (SSPC-SP5, -SP10, -SP6, or -SP7) power tools (SSPCSP3 or -SP11); or hand tools

(SSPCSP2). Oil and grease shall be completely removed in accordance with SSPCSP1 before beginning any other cleaning method. Surfaces of welds shall be scraped and ground as necessary to remove all slag and weld spatter. Tools which produce excessive roughness shall not be used.

2. All components of equipment that can be properly prepared and coated after installation shall be installed prior to surface preparation. Components that will be inaccessible after installation shall have the surfaces prepared and coated before installation. Motors, drive trains, and bearings shall be protected during surface preparation in accordance with the equipment manufacturer's recommendations.
3. All cut or sheared edges shall be ground smooth to a 1/8 inch minimum radius for all material 1/4 inch thickness and larger. For material thickness less than 1/4 inch all cut or sheared edges shall be ground smooth to a radius equal to 1/2 the material thickness. Grinding of rolled edges on standard shapes with a minimum radius of the 1/16 inch will not be required.
4. All ferrous metal surfaces shall have all welds ground smooth and free of all defects in accordance with NACE Standard SP0178, Appendix C, Designation C and sharp edges ground smooth, if not previously prepared in the shop. Instead of blending of the weld with the base metal as required by the NACE standard, it will be acceptable to furnish a welded joint that has a smooth transition of the weld to the base metal. All welds shall be ground smooth to ensure satisfactory adhesion of paint.
5. The cleaning methods and surface profiles specified herein are minimums, and if the requirements printed in the coating manufacturer's data sheets exceed the limits specified, the value printed on the data sheets shall become the minimum requirement.
6. Ferrous Metal Surfaces – Non-immersion Service
  - a. Ferrous metal surfaces, including fabricated equipment, in non-immersion service shall be cleaned to the degree recommended by the coating manufacturer for surfaces to be coated with coal tar epoxy, epoxy, and heat-resistant coatings, except galvanized surfaces. Surface preparation of ferrous metal surfaces in non-immersion service shall consist of abrasive blast cleaning to SSPC-SP6, and the first application of coating shall be performed on the same day. If more surface area is prepared than can be coated in one day, the uncoated area shall be blast cleaned again to the satisfaction of Engineer. Surface profile shall be as recommended by coating manufacturer, but not less than 2.0 mils.

#### F. Copper Tubing

1. All flux residue shall be removed from joints in copper tubing. Immediately before coating is started, tubing shall be wiped with a clean rag soaked in xylol.

#### G. Plastic Surfaces

1. All wax and oil shall be removed from plastic surfaces that are to be coated, including PVC and FRP, by wiping with a solvent compatible with the specified coating.

#### H. Hardware

1. Hardware items such as bolts, screws, washers, springs, and grease fittings need not be cleaned prior to coating if there is no evidence of dirt, corrosion, or foreign material.

I. Aluminum

1. When a coating system is required, remove all oil or deleterious substance with neutral detergent or emulsion cleaner or blast lightly with fine abrasive.

J. Stainless Steel

1. When a coating system is required, surface preparation shall conform to the coating manufacturer's recommendations.

K. Existing Coated Surfaces.

1. Existing surfaces which are anticipated to be modified or disturbed by the Work have been tested for lead and chromium and the results are presented in the existing Hazardous Environmental Condition report identified in the Supplemental Conditions. Some surfaces tested positive for lead and chromium. As indicated in the Project Requirements section, Contractor shall abate all paint, protective coatings, and linings containing detectable quantities of lead, chromium, or other heavy metals that are in areas potentially impacted, damaged, or disturbed during execution of the Work.
2. Existing Piping. Testing of the existing coatings on existing piping to be coated shall be conducted to determine adhesion capability and compatibility with the coatings specified herein. Existing coatings on piping shall be checked and prepared as recommended by the coating manufacturer and topcoated with the specified coatings. If necessary, existing coatings shall be removed to bare substrate. The piping shall be cleaned, primed, and coated as specified.
3. Existing Concrete and Concrete Block Surfaces. Existing concrete and concrete block surfaces which have been coated shall be prepared in accordance with ASTM D4261 and ASTM D4258 and the coating manufacturer's recommendations.
4. Existing Equipment Surfaces. Existing surfaces of equipment that is modified shall be prepared as indicated above for non-immersion or immersion service as applicable.

- 3.2 Other Existing Coated Surfaces. Other existing coated surfaces which are indicated on the drawings to be recoated shall be prepared in accordance with the coating manufacturer's recommendations.

3.3 MIXING AND THINNING

- A. Coating shall be thoroughly mixed each time any is withdrawn from the container. Coating containers shall be kept tightly closed except while coating is being withdrawn.
- B. Coating shall be factory mixed to proper consistency and viscosity for hot weather application without thinning. Thinning will be permitted only as necessary to obtain recommended coverage at lower application temperatures. In no case shall the wet film thickness of applied

coating be reduced, by addition of coating thinner or otherwise, below the thickness recommended by the coating manufacturer. Thinning shall be done in compliance with all applicable air quality regulations.

### 3.4 APPLICATION

- A. Coating shall be applied in a neat manner that will produce an even film of uniform and proper thickness, with finished surfaces free of runs, sags, ridges, laps, and brush marks. Each coat shall be thoroughly dry and hard before the next coat is applied. Each coat shall be a different color, if available. In no case shall coating be applied at a rate of coverage greater than the maximum rate recommended by the coating manufacturer.
- B. Coating failures will not be accepted and shall be entirely removed down to the substrate and the surface recoated. Failures include but are not limited to sags, checking, cracking, teardrops, fat edges, fisheyes, or delamination.
- C. Priming
  - 1. Edges, corners, crevices, welds, and bolts shall be given a brush coat (stripe coat) of primer before application of the primer coat. The stripe coat shall be applied by a brush and worked in both directions. Special attention shall be given to filling all crevices with coating. When using zinc primers the stripe coat shall follow the initial prime coat.
  - 2. Abraded and otherwise damaged portions of shop-applied coating shall be cleaned and recoated as recommended by the manufacturer of the finish coating. Welded seams and other uncoated surfaces, heads and nuts of field-installed bolts, and surfaces where coating has been damaged by heat shall be given a brush coat of the specified primer. Before the specified spot or touchup coating of metal surfaces, edges, corners, crevices, welds, and bolts in the area of the spot or touchup coating shall be given a brush coat of primer. This patch, spot, or touchup coating shall be completed, and the paint film shall be dry and hard, before additional coating is applied.
- D. Epoxy
  - 1. When used, epoxy shall be applied in accordance with the coating manufacturer's recommendations, including temperature limitations and protection from sunlight until top-coated.
  - 2. When concrete is to be coated, coatings shall not be applied to concrete surfaces in direct sunlight or when the temperature of the concrete is rising. Preferably the coating shall be applied when the temperature of the concrete is dropping.
  - 3. When applying high build epoxy coatings with a roller or brush and where a dry film thickness of at least 4-6 mils per coat is required, two or more coats shall be applied to achieve the recommended dry film thickness equal to a spray applied coating.
- E. Coal Tar Epoxy
  - 1. When used, the application of coal tar epoxy, including time limits for recoating, shall conform to the recommendations of the coating manufacturer.

2. When concrete is to be coated, coatings shall not be applied to concrete surfaces in direct sunlight or when the temperature of the concrete is rising. Preferably the coating shall be applied when the temperature of the concrete is dropping.

F. Film Thickness

1. The total coating film thickness including intermediate coats and finish coat, shall be not less than the following:

Type of Coating	Minimum Dry Film Thickness
Medium consistency coal tar	20 mils
Coal tar epoxy (two coats)	20 mils
Epoxy	
Floors (two coats)	10 mils
Surfaces with first coat of epoxy and final coat of aliphatic polyurethane	7 mils (5 mils DFT for epoxy plus 2 mils DFT for aliphatic polyurethane).
Surfaces with first and second coat of epoxy and final coat of aliphatic polyurethane	12 mils (10 mils DFT for epoxy plus 2 mils DFT for aliphatic polyurethane).
Other surfaces (two coats)	10 mils
Immersion service (three coats)	15 mils
Flake-filled epoxy (two coats)	30 mils
Vinyl ester	30 mils
Zinc, epoxy, polyurethane	
Surfaces with first coat of zinc, intermediate coat of epoxy, and final coat of aliphatic polyurethane	10 mils 3 mils zinc, 5 mils epoxy, plus 2 mils for aliphatic polyurethane.
Heat-resistant (silicone)	3 mils
High heat-resistant (silicone)	3 mils
Other (one coat)	5 mils
Other (two coats)	10 mils

G. Weather Conditions

1. Coatings shall not be applied, except under shelter, during wet, damp, or foggy weather, or when windblown dust, dirt, debris, or insects will collect on freshly applied coating.
2. Coatings shall not be applied at temperatures lower than the minimum temperature recommended by the coating manufacturer, or to metal surfaces such as tanks or pipe containing cold water, regardless of the air temperature, when metal conditions are likely to cause condensation. When necessary for proper application, a temporary enclosure shall be erected and kept heated until the coating has fully cured.

3. Coatings shall not be applied at temperatures higher than the maximum temperature recommended by the coating manufacturer. Where coatings are applied during periods of elevated ambient temperatures, Contractor and the coatings manufacturer shall be jointly responsible to ensure that proper application is performed including adherence to all re-coat window requirements. Precautions shall be taken to reduce the temperature of the surface application, especially for metal, at elevated temperatures above 100°F including shading application area from direct sunlight, applying coating in the evening or at night, and ventilating the area to reduce the humidity and temperature,
4. Vinyl ester coating materials, when required, shall be maintained during transportation, storage, mixing, and application at the temperature required by the coating manufacturer, 35°F to 90°F.

### 3.5 REPAIRING FACTORY FINISHED SURFACES

- A. Factory finished surfaces damaged prior to acceptance by Owner shall be spot primed and recoated with materials equivalent to the original coatings. If, in the opinion of Engineer, spot repair of the damaged area is not satisfactory, the entire surface or item shall be recoated.

### 3.6 PROTECTION OF SURFACES

- A. Throughout the work Contractor shall use drop cloths, masking tape, and other suitable measures to protect adjacent surfaces. Contractor shall be responsible for correcting and repairing any damage resulting from its or its subcontractors' operations. Coatings spilled or splattered on adjacent surfaces which are not being coated at the time shall be immediately removed. Exposed concrete or masonry not specified to be coated which is damaged by coatings shall be either removed and rebuilt or, where authorized by Owner, coated with two coats of masonry coating.

### 3.7 FIELD QUALITY CONTROL

- A. The following inspection and testing shall be performed: surface profile, visual inspection, and wet and dry film thickness testing.
- B. Surface Profile Testing
  1. The surface profile for ferrous metal surfaces shall be measured for compliance with the specified minimum profile. The surface profile for concrete shall comply with SSPC 13/NACE 6 Table 1 for severe service.
- C. Visual Inspection
  1. The surface of the protective coatings shall be visually inspected.
- D. Film Thickness
  1. Coating film thickness shall be verified by measuring the film thickness of each coat as it is applied and the dry film thickness of the entire system. Wet film thickness shall be

measured with a gauge that will measure the wet film thickness within an accuracy of  $\pm 0.5$  mil. Dry film thickness shall be measured in accordance with SSPC-PA 2.

### 3.8 FIELD PRIMING SCHEDULE

- A. In general, steel and cast-iron surfaces are specified to be shop primed. Any such surfaces which have not been shop primed shall be field primed. Damaged or failed shop coatings which have been determined unsuitable by Engineer shall be removed and the surfaces shall be field coated, including prime coat (if any). Galvanized, aluminum, stainless steel, and insulated surfaces shall be field primed. Primers used for field priming, unless otherwise required for repair of shop primers, shall be:

<u>Surface to Be Primed</u>	<u>Material</u>
Equipment, surfaces to be coated with	
Aliphatic polyurethane	Universal primer.
Epoxy	Same as finish coats.
Coal tar coating	Same as finish coats.
Vinyl ester	Same as finish coats.
Steel and cast iron, surfaces to be coated with	
Epoxy	Same as finish coats or inorganic zinc.
Coal tar coating	Same as finish coats.
Aluminum	Epoxy.
Galvanized	Epoxy.
Copper	Epoxy.
Stainless steel	Epoxy.
Plastic surfaces, including PVC and FRP	Same as finish coats.
Insulated steel or cast-iron piping	Universal primer.
Piping Insulation	As Recommended by manufacturer of finish coats.
Concrete, surfaces to be coated with epoxy	
For damp-proofing	Epoxy.
For all other surfaces	Epoxy concrete filler and surfacer.
Concrete block exposed in exterior locations	Epoxy concrete block filler.
Concrete block to be coated with epoxy	Epoxy concrete block filler.

- B. Unless otherwise recommended by the coating manufacturer or specified herein, priming will not be required on concrete, or concrete block, nor on metal surfaces specified to be coated with coal tar epoxy, and heat-resistant coatings. Concrete surfaces to be coated with epoxy shall be filled with epoxy concrete filler and surfacer so that a continuous film is obtained, except where concrete is damp-proofed with epoxy.

### 3.9 FINISH COATING SYSTEMS

- A. The following schedule lists coatings systems and coating surface designations. See Article 1-3 for a definition of the surface designations.

No.	Finish Coating Systems	Coating Surface Designation						
		A	C	E	F	G	H	P
1.	Epoxy – One coat	x			x	x		
2.	Epoxy – Two coats	x	x	x	x	x		x
3.	Epoxy / NSF – Two coats		x	x				
4.	Epoxy – Three coats	x	x	x				
5.	Epoxy / NSF – Three coats	x	x	x				
6.	Epoxy – First coat Aliphatic polyurethane – Finish coat	x	x	x	x	x		x
7.	Epoxy – First and second coat Aliphatic polyurethane – Finish coat	x	x	x	x	x		
8.	Universal primer – First coat Aliphatic polyurethane – Finish coat	x		x				
9.	Medium consistency coal tar – Two coats	x	x	x				
10.	Coal tar epoxy – Two coats	x	x	x				
11.	Vinyl ester – Two coats	x	x	x				
12.	Heat resistant – Two coats						x	
13.	High heat resistant – Two coats						x	
14.	Zinc primer – First coat Epoxy – Intermediate coat Aliphatic polyurethane – Final coat	x		x				
15.	Flake-filled epoxy	x		x				
16.	Acrylic Latex Emulsion		x					x

#### B. Surfaces Not To Be Coated

1. Unless otherwise specified, the following surfaces shall be left uncoated:
  - a. Exposed aluminum.
  - b. Polished or finished stainless steel. Unfinished stainless steel, except flashings and counter flashings, shall be coated.
  - c. Nickel or chromium.
  - d. Galvanized surfaces, except piping, conduit, ductwork, and other items specifically noted. Hot dipped galvanized fabrications, including fabricated pipe supports, except where specifically noted.
  - e. Rubber and plastics, except as specified.
  - f. Exterior concrete.

- g. Surfaces specified to be factory finished.

C. Shop Finishing

- 1. Items to be shop finished including the following. Shop finishing shall be in accordance with the coating manufacturer’s recommendations.
  - a. Other surfaces where blast cleaning cannot be or is not recommended to be performed in the field.
  - b. Other items as otherwise specified.

D. Field Coating

- 1. Items to be field coated include the following. Field coating shall be in accordance with the field priming schedule, the coating schedule, and the manufacturer’s recommendations.
  - a. Surfaces not indicated to be shop finished and surfaces where blast cleaning can be performed in the field.
  - b. All interior ferrous metal surfaces.
  - c. Other items as otherwise specified.

3.10 METAL SURFACES COATING SCHEDULE

Surfaces to be coated shall include new work, including Owner furnished equipment and surfaces disturbed by the Work. Surfaces that are not disturbed will not require recoating unless noted otherwise on the Drawings.

<u>Surface To Be Coated</u>	<u>Finish Coating System</u>
Cast Iron and steel piping above grade exposed to the elements and to view outdoors, including piping to be insulated, valves, fittings, flanges, bolts, pipe support, hangers, and accessories and galvanized surfaces after proper priming.	A7
Pipe supports, hangers, bolts, and accessories above grade exposed to the elements and to view outdoors and galvanized surfaces after proper priming	A7
All metal surfaces, unless otherwise specified, which will be submerged or buried, all or in part, including valves, including piping laid in the ground.	E4
Miscellaneous castings, including manhole rings and covers, and manhole steps. (One coat, if not shop coated.)	E2
All metal harness anchorage for buried piping.	A10

3.11 MISCELLANEOUS SURFACES COATING SCHEDULE.

Plastic Surfaces, including PVC. Outdoor – P6

3.12 PIPING IDENTIFICATION SCHEDULE

- A. Exposed piping and piping in accessible chases shall be identified with lettering or tags designating the service of each piping system, marked with flow directional arrows, and color coded.
- B. Piping scheduled to be color coded shall be completely coated with the indicated colors, except surfaces specified to remain uncoated shall include sufficiently long segments of the specified color to accommodate the lettering and arrows. All other piping shall be coated to match adjacent surfaces, unless otherwise directed by Engineer.
- C. Location
  - 1. Lettering and flow direction arrows shall be provided on pipe near the equipment served, adjacent to valves, on both sides of wall and floor penetrations, at each branch or tee, and at least every 50 feet in straight runs of pipe. If, in the opinion of Engineer, this requirement will result in an excessive number of labels or arrows, the number required shall be reduced as directed.
- D. Lettering
  - 1. Lettering shall be painted or stenciled on piping or shall be applied as snapon markers. Snapon markers shall be plastic sleeves, Brady “BradysnapOn B915,” Seton “Setmark,” or equal. Letter size shall be as noted below. Lettering instructions for all pipe will be provided by County.

<u>Outside Diameter of Pipe or Covering</u>	<u>Minimum Height of Letters</u>
3/4 to 4 inches	3/4 inch
5 inches and larger	2 inches
- E. Color Coding and Lettering
  - 1. All piping shall be color coded. Bands shall be 6 inches wide spaced along the pipe at 5 foot intervals. Color coding instructions will be provided by the County.

End of Section

SURFACE DESCRIPTION	SYSTEM NO.

SURFACE PREPARATION DESCRIPTION
<input type="checkbox"/> Solvent SSPC-SP1 <input type="checkbox"/> Ferrous Metal Nonimmersion SSPC-SP6 <input type="checkbox"/> Ferrous Metal Immersion <input type="checkbox"/> SSPC-SP10 <input type="checkbox"/> SSPC-SP-5 <input type="checkbox"/> Other

COATING	DFT mils [	MANUFACTURER AND PRODUCT
<b>First Coat (Primer)</b>		
<b>Second Coat</b>		
<b>Third Coat</b>		
<b>Total System</b>		Not less than minimum thickness specified.

Notes: (Attached if needed.)

Project:	
Coatings Manufacturer:	Initials _____
Painting Applicator:	Initials _____

<b>BLACK &amp; VEATCH</b>	COATING SYSTEM DATA SHEET	Fig 1-09940
---------------------------	---------------------------	-------------

<b>SHOP PRIMED SURFACE DESCRIPTION</b> <b>SYSTEM NO. -</b> <b>-F</b>

<b>SURFACE PREPARATION DESCRIPTION</b>
<input type="checkbox"/> Solvent SSPC-SP1 <input type="checkbox"/> Other

<b>COATING</b>	<b>DFT mils [µm]</b>	<b>MANUFACTURER AND PRODUCT</b>
<b>Shop Primer</b>		(Identify Product/Type)
<b>Touchup</b>		
<b>Intermediate Coat</b>		
<b>Finish Coat</b>		
<b>Total System</b>		Not less than minimum thickness specified.

Notes: (Attached if needed.)

Project:	
Coatings Manufacturer:	Initials _____
Painting Applicator:	Initials _____

<b>BLACK &amp; VEATCH</b>	COATING SYSTEM DATA SHEET	Fig 2-09940
---------------------------	---------------------------	-------------

## **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 or Specifications. This includes, but is not limited to, manholes 11839, 12058, and 12061 shown on Drawing C-07. ~~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. Development of a manhole bypass plan and bypass pumping is the responsibility of the General Contractor.
- B. Concrete surface cleaning in each lift station 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 1.05 A) 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.
    - 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 his 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. Approved materials include
  - 1. Aquatapoxy A-6 and Raven 405 epoxy by Raven Lining Systems
  - 2. Green Monster
  - 3. Sauereisen 210 system (210T & 210GL - Manatee County Light Brown Formula)
- 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 manufactures 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 manufactures 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 <sup>2</sup> 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**

## SECTION 15140 – PIPE SUPPORTS

### PART 1 - GENERAL

#### 1.1 SCOPE

- A. This section covers the furnishing and installation of pipe hangers, brackets, supports, bracing, anchorage, and the design for the pipe support system for pipes 12 inches and smaller. Pipe supports shall be furnished complete with all necessary inserts, bolts, nuts, rods, washers, and other accessories. This section also covers the spacing of expansion joints in pipes 12 inches in diameter and smaller. Expansion joint products and materials are covered in the respective piping sections.
- B. This section covers pipe supports for the following pipe materials:
  - 1. Cast or ductile iron
  - 2. PVC (C-900)

#### 1.2 GENERAL

- A. Contractor shall provide pipe supports, anchors, flexible couplings, and expansion joints for all piping systems. The Drawings indicate pipe supports, anchors, flexible couplings, and expansion joints for pipes that are 12 inches and smaller. Contractor shall design anchors, pipe supports, expansion joints, and flexible couplings not already shown on the Drawings, in accordance with the requirements specified herein.
- B. Contractor's design shall include pipe supports, bracing, and anchorage adjacent to expansion joints, couplings, valves, in-line devices, equipment, wyes and tees, or changes in direction as required for dismantling piping, removing valves or other in-line devices, disconnecting piping from equipment, and pipe support, in addition to supports in accordance with the maximum spacing specified herein. The pipe support system design by Contractor shall rigidly support pipe so there is no visible movement or visible sagging between supports. The system shall comply with specified piping code requirements.
- C. Contractor shall not delete or relocate the supports, expansion joints, or couplings indicated on the Drawings without written approval of Engineer.
- D. General Equipment Stipulations
  - 1. The General Equipment Stipulations shall apply to all supports furnished under this section. If requirements in this specification differ from those in the General Equipment Stipulations, the requirements specified herein shall take precedence.

### 1.3 SUBMITTALS

#### A. General Drawings and Data.

1. Complete data, catalog information, and drawings covering fabricated pipe supports, fabricated inserts, and stainless steel, galvanized, and copper-plated and plastic-coated pipe supports shall be submitted in accordance with the Submittals Procedures section.

#### B. Intended Use and Location Schedule.

1. Data shall include a listing of the intended use and general location of each item submitted.

#### C. Meteorological and Seismic Certification.

1. When a wind and/or seismic design is required, Contractor shall submit confirmation of compliance with the Meteorological and Seismic Design Criteria section.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Unless otherwise indicated, all pipe supports shall comply with ANSI/MSS SP-58 and MSS SP-69. Materials of construction for fabricated steel supports shall be stainless. All pipe support materials shall be packaged as necessary to ensure delivery in satisfactory condition.
- B. Unless otherwise specified or indicated on the Drawings, pipe supports shall be fabricated of manufacturer's standard materials and provided with manufacturer's standard finish.
- C. Design loads for inserts, brackets, clamps, and other support items shall not exceed the manufacturer's recommended loads.
- D. Unless accepted by Engineer, the use of supports which rely on stressed thermoplastic components to support the pipe will not be permitted.
- E. Contact between dissimilar metals, including contact between stainless steel and carbon steel, shall be prevented. Portions of pipe supports which come into contact with other metals that are dissimilar shall be rubber or vinyl coated.
- F. Stainless steel supports shall be AISI Type 304 or 316 stainless steel, except for stainless steel supports fabricated by welding which shall be AISI Type 304L or 316L.
- G. Pipe support types and application shall comply with Table 1.

2.2 WIND AND SEISMIC LOADS

- A. Wind and seismic loads for worst case conditions of either full, partially full, or empty pipes shall be considered in the design. Seismic design requirements for products specified herein shall be as indicated in the Meteorological and Seismic Design Criteria section.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Concrete inserts or anchor bolts shall be used to support piping from new cast-in-place concrete. Fastening of supports to existing concrete and masonry shall be in accordance with the Anchorage in Concrete and Masonry section.
- B. Anchorage shall be provided to resist thrust due to temperature changes, changes in diameter or direction, or dead-ending. Anchors shall be located as specified to force expansion and contraction movement to occur at expansion joints, loops, or elbows, and as needed to prevent excessive bending stresses and opening of mechanical couplings. Anchorage for temperature changes shall be centered between elbows and mechanical joints used as expansion joints. Anchorage for bellows type expansion joints may be located adjacent to the joint.
- C. When expansion joints are required, pipe guides shall be provided adjacent to bellows type expansion joints. Guides will not be required where mechanical couplings are permitted as expansion joints. Guides shall be located on both sides of expansion joints, except where anchors are adjacent to the joint. Unless otherwise indicated on the Drawings, one guide shall be within four pipe diameters from the joint and a second guide within 14 pipe diameters from the first guide. Pipe supports shall allow adequate movement; pipe guides shall not be used for anchoring pipe against longitudinal forces. Pipe guides shall be provided at locations as recommended by the manufacturer.
- D.

3.2 TYPES OF SUPPORTS

- A. The products for pipe supports shall be as indicated in Table 1 for the specified type and size of support. Where stainless steel is specified for pipe supports but is not available from the name suppliers for the model specified in Table 1, Contractor shall provide a heavier duty support that is available in stainless steel.
- B.

TABLE 1 - TYPES OF SUPPORTS

<u>Description and Service</u>	<u>MSS SP 69</u> <u>Type (Note 1)</u>	<u>Specification</u>
Floor Supports, Steel or Cast Iron		

TABLE 1 - TYPES OF SUPPORTS

<u>Description and Service</u>	<u>MSS SP 69 Type (Note 1)</u>	<u>Specification</u>
8 through 12 inch pipe	38	B-Line “B3093,” Anvil “264” or Piping Technology & Products Fig. 46.
Pipe Alignment Guides	--	B-Line “B3281” through “B3287,” Anvil “255,” or Piping Technology & Products Fig. 6.

Table 1 Notes:

1. MSS SP-69 supports and hangers are illustrated on Figure 1-15140.
2. Pipe clamps or other devices which rely on the application of a clamping force to the supported pipe in order to maintain the clamp position or location in a prefabricated channel or track will not be acceptable for use with nonmetallic pipe or tubing.

3.3 SUPPORT SPACINGS

- A. Pipe supports and expansion joints shall be spaced in accordance with Tables 2. At a minimum, pipe supports shall be located as noted on the drawings. The types of pipes to be supported are as specified herein. Table 2 covers spacings for the standard operating conditions specified for each pipe material. Spacing in the tables is the maximum spacing considering gravity loads. Where Contractor’s design includes lateral and longitudinal forces due to seismic loads, wind loads, and other forces, the spacing requirement may be less than that indicated in the tables.

TABLE 2 – MAXIMUM PIPE SUPPORT SPACING AT STANDARD TEMPERATURES AND SERVICES

<u>Type of Pipe</u>	<u>Pipe Support Max Spacing</u>	<u>Max Run Without Expansion Joint, Loop, or Bend</u>	<u>Expansion Joint Max Spacing</u>	<u>Type of Expansion Joints</u>
Cast iron or Ductile iron	15	80	80	Note 1

Notes:

1. Expansion joints shall be mechanical couplings.

### 3.4 INSTALLATION

#### A. General

1. All piping shall be supported in a manner which will prevent undue stress on any valve, fitting, or piece of equipment. In addition, pipe supports shall be provided at changes in direction or elevation, and adjacent to flexible couplings. Pipe supports and hangers shall not be installed in equipment access areas.
2. Anchorage shall be provided to resist both lateral and longitudinal seismic forces.

#### B. Inserts

1. Concrete inserts or anchor bolts shall be used to support piping from new cast-in-place concrete. Fastening of supports to existing concrete and masonry shall be in accordance with the Anchorage in Concrete and Masonry section. Reference building structural concrete Drawings for concrete inserts. When not provided as part of the building concrete structure, provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

#### C. Pipe Hangers and Supports

1. Support horizontal cast iron, ductile iron and no-hub piping systems adjacent to each joint.
2. Support vertical piping at every floor using riser clamps.
3. Support riser piping independently of connected horizontal piping.

### 3.5 PLACEMENT

- A. The maximum spacing for pipe supports and expansion joints shall be as indicated in Table 2.
- B. Rubber hose and flexible tubing shall be provided with continuous angle or channel support.

End of Section

**APPENDIX A**

**FLORIDA  
DEPARTMENT  
OF  
TRANSPORTATION**



**STANDARD SPECIFICATIONS  
FOR  
ROAD AND BRIDGE  
CONSTRUCTION  
JANUARY 2022**

**ABRIDGED FOR THIS PROJECT**

## DIVISION II

### Construction Details

#### GENERAL CONSTRUCTION OPERATIONS

#### SECTION 100 CONSTRUCTION EQUIPMENT-GENERAL REQUIREMENTS

##### **100-1 General.**

Unless restricted to a specific type by the Contract Documents or the Engineer, the Contractor may perform the work using equipment, tools, machinery, etc., of his own choosing. Provide a unique alphanumeric identification number on all equipment (other than small tools) used on the project. This number shall be a minimum of 2 inches high and appear on both sides of the equipment. Place the number in such a manner so as to contrast sharply in color with the background on which it is placed. Ensure that the number, which may be painted or otherwise permanently affixed to the equipment, is clearly legible at all times. Upon submittal of Notice of Intent to Claim or Preliminary Time Extension Request, submit in accordance with 5-12.2, a list showing all equipment (other than small tools) for which the Contractor may request compensation, it's identification number with serial number, manufacturer, year manufactured, model and description. Update this list to account for equipment moving to or from the project and submit certification weekly, by close of business on Friday, the equipment, its unique number and the dates and hours that the equipment was assigned to this project for the proceeding week. No compensation will be made for any equipment used during any time period when the said equipment is not listed in the weekly certification. Failure to submit this information in the time specified may result in the Engineer withholding all Contract Payments until receipt of such information. Note that facilities to be constructed under the Contract are adequate to support only their design loads in their completed construction stage. If the Contractor's equipment or procedures during construction damage any part of the facility, the Contractor will replace or repair it as directed by the Engineer at no expense to the Department.

##### **100-2 Equipment Condition and Approval.**

**100-2.1 Approval:** Provide on site and in due time prior to its need, in working condition, all equipment to be used in construction of the project, subject to approval or disapproval by the Engineer. Use only factory recommended exhaust mufflers on internal combustion engines. Remove from the job, alter, or repair equipment which is disapproved by the Engineer. Ensure that the number of units, the sizes, etc., of the equipment on hand are adequate to complete the work within the Contract Time.

**100-2.2 Maintenance:** Consistent with public interest, safety, and good practice, maintain all equipment, tools, and machinery used in a satisfactory working condition throughout the period they are on the job site. Also, provide adequate equipment maintenance procedures to promote continuous satisfactory working condition and minimize noise pollution caused by construction equipment.

**100-2.3 Stationary Equipment:** Screen all stationary equipment such as pumps, compressors, generators, etc., from noise sensitive receivers if that equipment is to operate

beyond normal working hours. If it is feasible, screen this equipment during normal working hours to reduce noise impacts.

### **100-3 Experimental Equipment.**

**100-3.1 General:** To encourage the development and use of new or improved equipment, the Engineer may grant the Contractor permission to use equipment other than that normally used and currently accepted, upon approval of the Contractor's written request for permission to use such equipment in place of the normally used equipment. The Engineer, before considering or granting such request, may require that the Contractor establish, at his own expense, satisfactory evidence that the proposed equipment will produce work equal in quality to that produced by the specified equipment, and meets any applicable local, state or federal noise abatement laws, by-laws, ordinances and regulation in effect.

**100-3.2 Conditions of Approval:** When the Engineer grants permission for the use of new or improved equipment, understand that the Engineer gives such permission for the purpose of testing the quality of work this equipment actually produces. The Engineer will maintain the right to retract permission for use of the equipment at any time that, in his opinion, the Contractor does not obtain results that are at least equal to the results obtainable with currently accepted equipment. Upon the Engineer's withdrawal of such permission for the use of the equipment, use the equipment currently accepted and normal for the work, and remove and dispose of, or otherwise remedy, at no expense to the Department, any work which the Engineer considers defective or unsatisfactory as a result of the use of such experimental equipment. If the Engineer approved the use of particular equipment on a particular project, the Engineer's approval does not extend to the use of the particular equipment on any other project. Furthermore, the Contractor is fully responsible for producing finished work of the quality required by the Contract Documents.

**SECTION 102  
MAINTENANCE OF TRAFFIC**

**102-1 Description.**

Maintain traffic within the limits of the project for the duration of the construction period, including any temporary suspensions of the work. Construct and maintain detours. Provide facilities for access to residences, businesses, etc., along the project. Furnish, install and maintain traffic control and safety devices during construction. Furnish and install work zone pavement markings for maintenance of traffic (MOT) in construction areas. Provide any other special requirements for safe and expeditious movement of traffic specified in the Plans. MOT includes all facilities, devices and operations as required for safety and convenience of the public within the work zone.

Do not maintain traffic over those portions of the project where no work is to be accomplished or where construction operations will not affect existing roads. Do not obstruct or create a hazard to any traffic during the performance of the work, and repair any damage to existing pavement open to traffic.

**102-2 Materials.**

Meet the following requirements:

- Raised Pavement Marker Adhesive .....Section 970
- Temporary Raised Pavement Markers.....Section 990
- Paint .....Section 971
- Removable Tape .....Section 990
- Glass Spheres .....Section 971
- Temporary Traffic Control Device Materials .....Section 990
- Retroreflective and Nonreflective Sheeting  
for Temporary Traffic Control Devices .....Section 994

**102-2.1 Temporary Traffic Control Devices:** Use only the materials meeting the requirements of Section 990, Section 994, Standard Plans and the Manual on Uniform Traffic Control Devices (MUTCD).

**102-2.2 Detour:** Provide all materials for the construction and maintenance of all detours.

**102-2.3 Commercial Materials for Driveway Maintenance:** Provide materials of the type typically used for base, including reclaimed asphalt pavement (RAP) material, and having stability and drainage properties that will provide a firm surface under wet conditions.

**102-3 Specific Requirements.**

**102-3.1 Beginning Date of Contractor’s Responsibility:** Maintain traffic starting the day work begins on the project or on the first day Contract Time is charged, whichever is earlier.

**102-3.2 Worksite Traffic Supervisor:** Provide a Worksite Traffic Supervisor who is responsible for initiating, installing, and maintaining all temporary traffic control devices as described in this Section and the Contract Documents. Provide all equipment and materials needed to set up, take down, maintain traffic control, and handle traffic-related situations. Use approved alternate Worksite Traffic Supervisors when necessary.

The Worksite Traffic Supervisor must meet the personnel qualifications specified in Section 105.

The Worksite Traffic Supervisor is to perform the following duties:

1. On site direction of all temporary traffic control on the project.
2. Is on site during all set up and take down, and performs a drive through inspection immediately after set up.
3. Is on site during all nighttime operations ensuring proper temporary traffic control.
4. Immediately corrects all safety deficiencies and corrects minor deficiencies that are not immediate safety hazards within 24 hours.
5. Is available on a 24 hour per day basis and present at the site within 45 minutes after notification of an emergency situation and is prepared to respond to maintain temporary traffic control or to provide alternate traffic arrangements.
6. Conducts daily daytime and weekly nighttime inspections of projects with predominately daytime work activities, and daily nighttime and weekly daytime inspections of projects with predominantly nighttime work activities of all traffic control devices, traffic flow, pedestrian, bicyclist, and business accommodations.

Advise the project personnel of the schedule of these inspections and give them the opportunity to join in the inspection as deemed necessary.

The Department may disqualify and remove from the project a Worksite Traffic Supervisor who fails to comply with the provisions of this Section. The Department may temporarily suspend all activities, except traffic, erosion control and such other activities that are necessary for project maintenance and safety, for failure to comply with these provisions.

**102-3.3 Lane Closures:** Approval for all lane closures, mobile operations, and traffic pacing operations is required. Submit routine requests to the Engineer fourteen calendar days in advance of planned lane closures, mobile operations, and traffic pacing operations. For unforeseen events that require cancelling or rescheduling lane closures, mobile operations, and traffic pacing operations, revise the lane closure request as soon as possible.

**102-3.3.1 Traffic Pacing:** In addition to dates and locations, include a pacing plan outlining the expected equipment and number of traffic control officers required, the proposed traffic pacing lengths and durations, the available existing egresses in the event of an emergency, and a contingency plan in the event of an equipment failure.

**102-3.4 Pedestrian and Bicycle Accommodations:** When an existing pedestrian or bicycle way is located within a traffic control work zone, accommodation must be maintained and provision for the disabled must be provided. Pedestrians are to be accommodated with a safe, accessible travel path around work sites separated from mainline traffic in compliance with the Americans with Disabilities Act (ADA) Standards for Transportation Facilities. Maintain existing or detour bicycle facilities satisfactorily throughout the project limits. Advanced notification of sidewalk closures and marked detours shall be provided by appropriate signs. Only approved pedestrian longitudinal channelizing devices may be used to delineate temporary traffic control zone pedestrian walkway. Existing businesses in work areas are to be provided with adequate entrances for vehicular and pedestrian traffic during business hours.

#### **102-4 Alternative Traffic Control Plan.**

The Contractor may propose an alternative traffic control plan (TCP) to the plan presented in the Contract Documents. The Contractor's Engineer of Record must sign and seal the alternative plan and submit to the Engineer. Prepare the TCP in conformance with and in the

form outlined in the current version of the FDOT Design Manual. Indicate in the plan a TCP for each phase of activities. Take responsibility for identifying and assessing any potential impacts to a utility that may be caused by the alternate TCP proposed by the Contractor, and notify the Department in writing of any such potential impacts to utilities.

For projects with nighttime lane closure restrictions where paving is expected to extend into the winter months, the Contractor may propose an alternative TCP allowing for daytime lane closures for friction course paving. The alternative TCP must be a lane closure analysis based on actual traffic counts and prepared in accordance with the FDOT Design Manual.

Engineer's approval of the alternate TCP does not relieve the Contractor of sole responsibility for all utility impacts, costs, delays or damages, whether direct or indirect, resulting from Contractor initiated changes in the design or construction activities from those in the original Contract Specifications, Design Plans (including TCPs) or other Contract Documents and which effect a change in utility work different from that shown in the Utility Plans, joint project agreements or utility relocation schedules.

The Department reserves the right to reject any alternative TCP. Obtain the Engineer's written approval before beginning work using an alternate TCP. The Engineer's written approval is required for all modifications to the TCP. The Engineer will only allow changes to the TCP in an emergency without the proper documentation.

The Contractor may propose to extend lane closure times up to one hour in advance of the lane closure start times shown in the Plans for the following conditions:

1. Limited Access roadways with a traffic count of less than 1,300 vehicles per hour per lane
2. Arterials and Collector roadways with a traffic count of less than 1,550 vehicles per hour per lane.

To determine traffic count, record the number of vehicles in the direction of the closure during a 15-minute period. Multiply the number of vehicles by four and divide by the number of lanes in the direction of the closure.

## **102-5 Traffic Control.**

**102-5.1 Standards:** FDOT Standard Plans are the minimum standards for the use in the development of all TCPs. The MUTCD, Part VI is the minimum national standard for traffic control for highway construction, maintenance, and utility operations. Follow the basic principles and minimum standards contained in these documents for the design, application, installation, maintenance, and removal of all traffic control devices, warning devices and barriers which are necessary to protect the public and workers from hazards within the project limits.

**102-5.2 Maintenance of Roadway Surfaces:** Maintain all lanes that are being used for the MOT, including those on detours and temporary facilities, under all weather conditions. Keep the lanes reasonably free of dust, potholes and rutting. Provide the lanes with the drainage facilities necessary to maintain a smooth riding surface under all weather conditions.

**102-5.3 Number of Traffic Lanes:** Maintain one lane of traffic in each direction. Maintain two lanes of traffic in each direction at existing four (or more) lane cross roads, where necessary to avoid undue traffic congestion. Do not allow traffic control and warning devices to encroach on lanes used for MOT.

The Engineer may allow the Contractor to restrict traffic to one-way operation for short periods of time provided that the Contractor employs adequate means of traffic control and does not unreasonably delay traffic. When a construction activity requires restricting traffic to one-way operations, locate the flaggers within view of each other when possible. When visual

contact between flaggers is not possible, equip them with 2-way radios, official, or pilot vehicles, or use traffic signals.

**102-5.4 Crossings and Intersections:** Provide and maintain adequate accommodations for intersecting and crossing traffic. Provide signing for the control of traffic entering and leaving work zones by way of intersecting cross roads to make drivers aware of work zone conditions. Do not block or unduly restrict any median opening, road or street crossing the project unless approved by the Engineer. Before beginning any construction, submit to the Engineer the names and phone numbers of persons that can be contacted when signal operation malfunctions.

**102-5.5 Access for Residences and Businesses:** Provide continuous access to all residences and all places of business.

**102-5.6 Protection of the Work from Injury by Traffic:** Where traffic would be injurious to a base, surface course, or structure constructed as a part of the work, maintain all traffic outside the limits of such areas until the potential for injury no longer exists.

**102-5.7 Flagger:** Provide flaggers to control traffic when traffic in both directions must use a single lane and in other situations as required. All flaggers must meet the personnel qualifications specified in Section 105.

**102-5.8 Conflicting Pavement Markings:** Remove all existing pavement markings (paint, tape, thermoplastic, raised pavement markers, etc.) that conflict with temporary paths of vehicles, bicycles or pedestrians when the conflict will exceed 24 hours. Use any method, other than paint or sprayed asphalt, approved by the Engineer to remove existing pavement markings. Remove conflicting pavement markings using a method that will not damage the surface texture of the pavement and which will eliminate the previous marking pattern regardless of weather and light conditions.

Remove all pavement markings that will conflict with “the next phase of operation” for vehicle, bicycle, and pedestrian paths as described above, before opening to vehicle or bicycle traffic or use by pedestrians.

Cost for removing conflicting pavement markings (paint, tape, thermoplastic, raised pavement markers, etc.) to be included in Maintenance of Traffic, lump sum.

**102-5.9 Vehicle and Equipment Visibility:** Equip all pickups and automobiles used on the project with a minimum of one Class 2 warning light that meets the Society of Automotive Engineers Recommended Practice SAE J595, dated November 1, 2008, or SAE J845, dated December 1, 2007, and incorporated herein by reference. Existing lights that meet SAE J845, dated March, 1992, or SAE J1318, dated April, 1986, may be used to their end of service life. The warning lights must be a high intensity amber or white rotating, flashing, oscillating or strobe light. Lights must be unobstructed by ancillary vehicle equipment such as ladders, racks or booms and be visible 360 degrees around the vehicle. If the light is obstructed, additional lights will be required. The lights must be operating when the vehicle is in a work area where a potential hazard exists, when operating at less than the average speed for the facility while performing work activities, making frequent stops or called for in the Plans or Standard Plans.

Equip all other vehicles and equipment with a minimum of 4 square feet of retroreflective sheeting or warning lights.

**102-5.10 No Waiver of Liability:** Conduct operations in such a manner that no undue hazard results due to the requirements of this Article. The procedures and policies described herein in no way acts as a waiver of any terms of the liability of the Contractor or his surety.

**102-5.11 Work Zone Speed:** Use the work zone speed in the TTCP. When field conditions warrant work zone speeds different from those in the TTCP, submit signed and sealed documentation to justify reducing the work zone speed limit to the Engineer for approval, or the Engineer may request the District Traffic Operation Engineer to investigate the need.

Sign work zone speed reductions in accordance with Standard Plans, Index 102-600 and the TTCP.

**102-5.12 Limited Access Temporary Openings:** When required by the Contract Documents, construct temporary openings in accordance with the Standard Plans. Submit a written request identifying the specific locations within the project limits to the Engineer.

Locate temporary openings in areas with adequate sight distance. Do not locate temporary openings with 1.5 miles of interchanges or within 2000 feet of the acceleration-deceleration lanes at rest areas, median openings, other access openings, or other highway service areas. Do not remove existing guardrail or barrier for temporary openings.

Use temporary pavement for the acceleration-deceleration lane surface of the temporary opening. Commercial material may be used for the driveway surface of the temporary opening. Install a gate at the limited access fence and keep the gate locked when the temporary opening is not in use.

Do not use temporary openings to transport materials to or from any other project.

Failure to comply with this Section and the Standard Plans, 102 Series shall be cause for the Engineer to terminate usage of the temporary opening. When the temporary opening is no longer needed, remove immediately and restore the area to pre-construction condition.

## **102-6 Detours.**

**102-6.1 General:** Construct and maintain detour facilities wherever it becomes necessary to divert traffic, including pedestrians and bicyclists, from any existing facility, or wherever construction operations block the flow of traffic.

**102-6.2 Construction:** Plan, construct, and maintain detours for the safe passage of traffic in all conditions of weather. Provide the detour with all facilities necessary to meet this requirement.

Where pedestrian facilities are detoured, blocked or closed during the work, provide safe alternate accessible routes through or around the work zone meeting the requirements of the ADA Standards for Transportation Facilities. When temporary walkway surfaces and ramps are required to be constructed, ensure surfaces are stable, firm, slip resistant, and kept free of any obstructions and hazards such as holes, debris, mud, construction equipment and stored materials. Install detectable warnings on temporary ramps in accordance with Section 522.

When the Plans call for the Department to furnish detour bridge components, construct the pile bents in accordance with the Plans, unless otherwise authorized by the Engineer.

Provide two Contractor representatives, who will be directly involved in the erection of Department-owned temporary bridging, to attend a mandatory one-day training session to be conducted at the Department's storage facility. No bridging will be released to the Contractor prior to the completion of this training.

Submit the following: company name, phone number, office address, project contact person, names of the representatives who will attend the training described above, project number, detour bridge type, bridge length, span length, location and usage time frames, to the

Engineer at least 30 calendar days before the intended pick-up date, to obtain the storage facility location and list of components for the project. Upon receipt, the Engineer will, within 10 calendar days submit an approved material list to the Contractor and the appropriate Department storage yard.

Submit the name of the representative with authority to pick up components, to the Engineer at least 10 calendar days before the proposed pick-up date. The Department is not obligated to load the bridge components without this notice. Take responsibility and sign for each item loaded at the time of issuance.

Provide timber dunnage, and transport the bridge components from the designated storage facility to the job site. Unload, erect, and maintain the bridge, then dismantle the bridge and load and return the components to the designated storage facility.

Notify the Engineer in writing at least 10 calendar days before returning the components. Include in this notice the name of the Contractor's representative authorized to sign for return of the bridge components. The yard supervisor is not obligated to unload the bridge components without this notice.

The Department will provide equipment and an operator at the Department's storage facility to assist in loading and unloading the bridge components. Furnish all other labor and equipment required for loading and unloading the components.

The Department's representative will record all bridge components issued or returned on the Detour Bridge Issue and Credit Ticket. The tickets must be signed by a Department and a Contractor representative, after loading or unloading each truck to document the quantity and type of bridging issued or returned.

Bind together all bridge components to be returned in accordance with the instructions given by the storage facility. The yard supervisor will repack components that are not packed in compliance with these instructions. Upon request, written packing instructions will be made available to the Contractor, before dismantling of the bridge for return to the Department's storage facility.

Assume responsibility for any shortage or damage to the bridge components. Monies due the Contractor will be reduced at the rate of \$35.00 per hour plus materials for repacking, repairs or replacement of bridge components.

The skid resistance of open steel grid decking on the detour bridge may decrease gradually after opening the bridge to traffic. The Department will furnish a pneumatic floor scabbler machine for roughening the roadway surface of the detour bridge decking. Provide an air compressor at the job site with 200 cubic feet per minute capacity, 90 psi air pressure for the power supply of the machine, and an operator. Transport the scabbler machine to and from the Department's structures shop. Repair any damage to the scabbler machine caused by operations at no expense to the Department. Perform scabbling when determined necessary by the Engineer. The Department will pay for the cost of scabbling as Unforeseeable Work in accordance with 4-4.

Return the bridge components to the designated storage facility beginning no later than 10 calendar days after the date the detour bridge is no longer needed, the date the new bridge is placed in service, or the date Contract Time expires, whichever is earliest. Return the detour bridging at an average of not less than 200 feet per week. Upon failure to return the bridge components to the Department within the time specified, compensate the Department for the bridge components not returned at the rate of \$5.00 per 10 feet, per day, per bridge, for single

lane; and \$10.00 per 10 feet, per day, per bridge, for dual lane until the bridge components are returned to the Department.

**102-6.3 Construction Methods:** Select and use construction methods and materials that provide a stable and safe detour facility. Construct the detour facility to have sufficient durability to remain in good condition, supplemented by maintenance, for the entire period that the detour is required.

**102-6.4 Removal of Detours:** Remove detours when they are no longer needed and before the Contract is completed. Take ownership of all materials from the detour and dispose of them, except for the materials on loan from the Department with the stipulation that they are returned.

**102-6.5 Detours Over Existing Roads and Streets:** When the Department specifies that traffic be detoured over roads or streets outside the project area, do not maintain such roads or streets. However, maintain all signs and other devices placed for the purpose of the detour.

**102-6.6 Operation of Existing Movable Bridges:** The Department will maintain and operate existing moveable bridges that are to be removed by the Contractor until such time as they are closed to traffic. During this period, make immediate repairs of any damage to such structures caused by use or operations related to the work at no expense to the Department, but do not provide routine repairs or maintenance. In the event that use or operations result in damage to a bridge requiring repairs, give such repairs top priority to any equipment, material, or labor available.

**102-6.7 Special Detour:** A special detour is defined as a diversion or lane shift for vehicular traffic that requires temporary pavement.

**102-6.8 Pedestrian or Bicycle Special Detour:** A pedestrian or bicycle special detour is defined as a temporary pedestrian or bicycle way that requires temporary pavement or other stable, firm, slip-resistant surface.

### **102-7 Traffic Control Officer.**

Provide uniformed law enforcement officers, including marked law enforcement vehicles, to assist in controlling and directing traffic in the work zone when the following types of work is necessary on projects:

1. When directing traffic/overriding the signal in a signalized intersection.
2. When Standard Plans, Index 102-607 is used on freeway facilities (interstates, toll roads, and expressways) at nighttime for work within the travel lane.
3. When Standard Plans, Index 102-655 Traffic Pacing is called for in the Plans or approved by the Engineer.
4. When pulling conductor/cable above an open traffic lane on limited access facilities, when called for in the Plans or approved by the Engineer.
5. When Standard Plans, Index 102-625 Temporary Road Closure 5 Minutes or Less is used.
6. When performing lane closures during nighttime operations on roadways with posted speed limits 55 mph or greater.

At no additional cost to the Department, traffic control officers may be used for operations other than those listed above.

The Department will not consider any claim arising from the failure of a traffic control officer to be present or available on the project. A noncompensable time extension may be granted when a state or local emergency requires all area law enforcement officers to be on-duty and not available for hire.

## **102-8 Driveway Maintenance.**

**102-8.1 General:** Ensure that each residence and business has safe, stable, and reasonable access.

**102-8.2 Construction Methods:** Place, level, manipulate, compact, and maintain the material, to the extent appropriate for the intended use.

As permanent driveway construction is accomplished at a particular location, the Contractor may salvage and reuse previously placed materials that are suitable for reuse on other driveways.

## **102-9 Temporary Traffic Control Devices.**

**102-9.1 General:** Use only devices that are listed on the APL. Immediately remove or cover, using any method of covering approved by the Engineer, any existing or temporary devices that do not apply to current conditions.

The use of NCHRP Report 350 Recommended Procedures for the Safety Performance Evaluation of Highway Features devices purchased prior to January 1, 2020 is permitted on projects let prior to January 1, 2030. All devices manufactured or purchased on or after January 1, 2020, must be MASH compliant in accordance with Section 990.

The APL number is to be permanently marked on the device at a readily visible location. Sheeting used on devices and pavement markings are exempt from this requirement.

Notify the Engineer in writing of any scheduled operation that will affect traffic patterns or safety sufficiently in advance of commencing such operation to permit review of the plan for the proposed installation of temporary traffic control devices.

Assign an employee the responsibility of maintaining the position and condition of all temporary traffic control devices throughout the duration of the Contract. Keep the Engineer advised at all times of the identification and means of contacting this employee on a 24 hour basis.

Maintain temporary traffic control devices in the correct position, properly oriented, clearly visible and clean, at all times. All applicable temporary traffic control devices must meet the classification category of Acceptable as defined in the American Traffic Safety Services Association (ATSSA) Quality Guidelines for Temporary Traffic Control Devices and Features. Temporary concrete barriers must meet the classification category of Acceptable defined in the Department's Temporary Concrete Barrier Evaluation Guide, which may be viewed at the following URL:

[https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/docs/default-source/content-docs/programmanagement/implemented/urlinspecs/files/temporaryconcretebarrierguide.pdf.pdf?sfvrsn=343b4c97\\_10](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/docs/default-source/content-docs/programmanagement/implemented/urlinspecs/files/temporaryconcretebarrierguide.pdf.pdf?sfvrsn=343b4c97_10). Pedestrian longitudinal channelizing devices (LCDs) must meet the classification category of Acceptable as defined in the Pedestrian LCD Evaluation Guide, which may be viewed at the following URL:

[https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/lcdevaluationguide.pdf?sfvrsn=166e0f16\\_2](https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/urlinspecs/files/lcdevaluationguide.pdf?sfvrsn=166e0f16_2). Immediately repair, replace or clean damaged, defaced or dirty devices. Traffic control devices must not be cleaned while installed/used. Use of warning lights on any temporary traffic control device is prohibited, with the exception of the trailer mounted portable regulatory signs.

Employ an approved independent Channelizing Device Supplier (CDS) to provide and maintain the condition of the following non-fixed channelizing devices: drums, cones,

vertical panels, barricades, temporary tubular markers, and pedestrian longitudinal channelizing devices. Cones may be provided and maintained by the Contractor.

The CDS shall not be affiliated with the Contractor and must be approved by the Department. Department approved CDSs are listed on the State Construction Office website. CDSs seeking inclusion on the list must meet the requirements of 102-9.1.1. The CDS shall submit a monthly certification on letterhead that the channelizing devices mentioned above installed/used within the work zone meet classification category of Acceptable as defined in the Pedestrian LCD Evaluation Guide and the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features. The CDS shall submit the monthly certification on letterhead for channelizing devices installed/used within the work zone. The CDS certification shall include the following statement, “I certify that I have provided and maintained the following devices <list devices covered under the certification> in accordance with Pedestrian LCD Evaluation Guide and the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.” If the Contractor chooses to provide and maintain cones, the Contractor must submit a monthly Contractor certification on letterhead that all cones installed/used within the work zone meet acceptable standards as outlined in the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features. The Contractor certification shall include the following statement, “I certify that I have provided and maintained cones in accordance with the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.”

**102-9.1.1 Approved Independent Channelizing Device Supplier (CDS)**

**Requirements:** Submit the following documents to the State Construction Office for review and approval

1. A letter on company letterhead signed and dated by the owner of the company or company officer with the following information and statements:
  - a. The company’s owners, stockholders, and officers.
  - b. A statement declaring that the company will not perform as a CDS on any project where there is common ownership, directly or indirectly, between the company and the Contractor.
  - c. A statement declaring that the company will furnish and maintain the condition of all channelizing devices with the exception of cones as required in 102-9.1 with its own forces.
  - d. A statement declaring at least five years of experience in providing channelizing device supplier services, with its own inventory of channelizing devices.
  - e. On a separate sheet, list a sample project history of the company’s experience as a channelizing device supplier for the five years declared in item 1(d) above including the following information:
    1. Project name and number and a brief description of CDS work performed,
    2. Beginning and ending date of CDS project activities,
    3. Location of project (city, state),
    4. Monetary amount of CDS work on project,
    5. Owner of project, contact person and phone number with area code,
    6. Name of Contractor (client) that the work was performed for and phone number with area code.

2. A maintenance plan for approval by the Department that outlines the frequency and methods for maintaining the condition of all channelizing devices, except cones owned and maintained by the Contractor, installed/used in the work zone.

**102-9.2 Work Zone Signs:** Furnish, install, maintain, remove and relocate signs in accordance with the Plans and Standard Plans, Index 102-600.

**102-9.2.1 Post Mounted Signs:** Meet the requirements of 990-8.

**102-9.2.2 Portable Signs:** Use only approved systems, which includes sign stands and attachment hardware (nuts, bolts, clamps, brackets, braces, etc.), meeting the vendor requirements specified on the APL drawings.

**102-9.2.3 Barrier Mounted Signs:** If post mounting criteria cannot be achieved in accordance with Standard Plans, Index 102-600 and a barrier or traffic railing exists, use temporary sign criteria provided in Standard Plans, Index 700-012 or Index 700-013. Use Standard Plans, Index 700-012 only when mounting the sign to the top of the barrier or traffic railing places the sign panel closer than two feet from the traveled way.

**102-9.3 Business Signs:** Provide and place signs in accordance with the Plans and Standard Plans, Index 102 series. Furnish signs having retroreflective sheeting meeting the requirements of Section 990.

**102-9.4 Channelizing Devices:** Furnish, install, maintain, remove and relocate channelizing devices in accordance with the Plans and Standard Plans.

**102-9.4.1 Retroreflective Collars for Traffic Cones:** Use collars for traffic cones listed on the APL that meet the requirements of Section 990. Use cone collars at night designed to properly fit the taper of the cone when installed. Place the upper 6 inch collar a uniform 3-1/2 inches distance from the top of the cone and the lower 4 inch collar a uniform 2 inches distance below the bottom of the upper 6 inch collar.

Collars must be capable of being removed for temporary use or attached permanently to the cone in accordance with the manufacturer's recommendations. Provide a white sheeting having a smooth outer surface and that has the property of a retroreflector over its entire surface.

**102-9.4.2 Pedestrian Longitudinal Channelizing Devices (LCDs):** Use LCDs listed on the APL for pedestrian use and meeting the requirements of Section 990 and the Standard Plans. Pedestrian LCDs must be interlocked except for the stand-alone unit placed perpendicular to a sidewalk. For pedestrian LCDs requiring internal ballasting, an indicator that clearly identifies the proper ballast level will be required. For pedestrian LCDs requiring external ballasting, the ballasting methods must be detailed in the APL drawings including ballasting type and minimum weight.

Ensure that joints on the pedestrian LCDs are free of sharp edges and have a maximum offset of 1/2 inch in any plane.

**102-9.5 Temporary Barrier:** Furnish, install, maintain, remove and relocate temporary barrier in accordance with the Plans and Standard Plans. Obtain and use precast temporary concrete barrier from a manufacturing plant that is on the Department's Production Facility Listing. Temporary concrete barrier must meet the material and construction requirements of Section 521 unless noted otherwise in the Standard Plans. Proprietary temporary concrete, steel, or water filled barrier used must be listed on the APL.

The maximum allowable height increase between consecutive temporary barrier units in the direction of traffic is 1 inch.

Temporary barrier must comply with Standard Plans, Index 102-100 or 102-120. Install temporary barriers as either anchored or freestanding as shown in the Plans or the

Standard Plans. An anchored unit is defined as having at least one stake or bolt into the underlying pavement or bridge deck. All other units, including those with keeper pins, are considered freestanding.

Remove temporary asphalt pads and repair all attachment scars to permanent structures and pavements after barrier removal. Make necessary repairs due to defective material, work, or Contractor operations at no cost to the Department. Restore barrier damaged by the traveling public within 24 hours after notification as authorized by the Engineer.

Trailer mounted barriers listed on the APL may be used at the option of the Contractor. Trailer mounted barriers listed on the APL must have an FHWA eligibility letter and be successfully crash tested in accordance with MASH TL-3 criteria. All trailer mounted barriers must be equipped with an APL listed truck mounted attenuator, an APL listed vehicle mounted arrow board and vehicle warning lights in accordance with this Section.

**102-9.5.2.1 Temporary Barrier Meeting the Requirements of Standard Plans, Index 102-120 and 102-110:** Ensure the marking requirements of the respective Index are met.

**102-9.6.2.2: Proprietary Precast Temporary Concrete Barrier Fabricated prior to 2005:** Submit a certification stating that all unmarked barrier units meet the requirements of the Specifications and the Standard Plans. Certifications will be project specific and non-transferable.

**102-9.5.2.3 Proprietary Precast Temporary Concrete Barrier Fabricated in 2005 or later:** Ensure each barrier unit has permanent clear markings, showing the manufacture date, serial number, manufacturer’s name or symbol, and the APL number. Label the markings on a plate, plaque, or cast in the unit. Proprietary barrier fabricated prior to 2016 and marked with the “INDX 521” in lieu of the APL number will be permitted.

**102-9.5.2.4 Temporary Concrete Barrier Repair:** Before beginning the repair, remove all laitance, loose material, and any other deleterious matter to sound concrete or a minimum depth of one inch. Additionally, when reinforcing bars, inserts or weldments are exposed, remove the concrete to provide a minimum one inch clearance all around. Fill the repair area with an approved high performance concrete repair material in accordance with 930-5 and the manufacturer’s recommendations. Restore surfaces and edges to the original dimensions and shape of the barrier.

Repairs are not allowed on barrier units that have one or more of the following deficiencies: structural cracking or cracks that exist through the entire cross-section; unit-to-unit connection assemblies or anchor slots are broken or no longer in a fixed position.

Do not paint repaired barriers.

**102-9.6 Barrier Delineators:** Install barrier delineators on top of temporary barrier and vehicular LCDs meeting the requirements of Section 705.

**102-9.7 Temporary Glare Screen:** Use temporary glare screens listed on the APL that meet the requirements of Section 990. Furnish, install, maintain, remove and relocate glare screen systems in conjunction with temporary barrier at locations identified in the Plans.

The anchorage of the glare screen to the barrier must be capable of safely resisting an equivalent tensile load of 600 pounds per foot of glare screen, with a requirement to use a minimum of three fasteners per barrier section.

When glare screen is utilized on temporary barrier, barrier delineators will not be required.

**102-9.8 Temporary Crash Cushion (Redirective or Gating):** Furnish, install, maintain and subsequently remove temporary crash cushions in accordance with the details and notes shown in the Plans, Standard Plans, and requirements of the pre-approved alternatives listed on the APL.

Temporary crash cushions can be either new or used functionally sound refurbished devices. Performance of intended function is the only condition for acceptance. All metallic components must be galvanized in accordance with Section 967.

Anchor abutting temporary barrier in accordance the Standard Plans or APL drawings, as required. Bidirectional installations must have a transition panel installed between the crash cushion and the abutting barrier. Delineate the crash cushion in accordance with Section 544. Maintain the crash cushions until their authorized removal. Do not place any materials or equipment within the length of the crash cushion.

Remove temporary asphalt or concrete pads and repair all attachment scars to permanent structures and pavements after crash cushion removal. Make necessary repairs due to defective material, work, or Contractor operations at no cost to the Department. Restore crash cushions damaged by the traveling public within 24 hours after notification as authorized by the Engineer.

**102-9.9 Temporary Guardrail:** Furnish temporary guardrail in accordance with the Plans and Standard Plans. Meet the requirements of Section 536.

**102-9.10 Arrow Board:** Furnish arrow boards that meet the requirements of Section 990 as required by the Plans and Standard Plans to advise approaching traffic of lane closures or shoulder work. Ensure that the arrow board display panel is raised to a fully upright position and is fully visible to motorists. Type B arrow boards may be used on low to intermediate speed (0 mph to 50 mph) facilities or for maintenance or moving operations on any speed facility. Type C arrow boards must be used for all other operations on high-speed (50 mph and greater) facilities and may be substituted for Type B arrow boards on any speed facility.

**102-9.11 Portable Changeable Message Sign (PCMS):** Use PCMSs or truck mounted changeable message signs that meet the requirements of Section 990 as required by the Plans and Standard Plans to supplement other temporary traffic control devices used in work zones. Ensure that the PCMS display panel is raised to a fully upright position and is fully visible to motorists. Reduce the intensity of the flashers when using PCMS at night. Use PCMS with a minimum letter height of 18 inches. For facilities with posted speed limits of 45 mph or less, PCMS with a minimum letter height of 12 inches may be used.

Messages must have no more than two phases. The display time for each phase must be at least two seconds but no more than three seconds. The sum of the display time must be a maximum of six seconds.

**102-9.12 Portable Regulatory Signs (PRS):** Furnish PRSs that meet the requirements of Section 990 as required by the Plans and Standard Plans. Ensure that the PRS sign panel is raised to a fully upright position and is fully visible to motorists.

Activate portable regulatory signs only during active work activities and deactivate when no work is being performed.

**102-9.13 Radar Speed Display Unit (RSDU):** Furnish RSDUs that meet the requirements of Section 990 as required by the Plans and Standard Plans to inform motorists of the posted speed and their actual speed. Ensure that the RSDU display panel is mounted in accordance with the manufacturer's recommendations.

Activate the radar speed display unit only during active work activities and deactivate when no work is being performed.

**102-9.14 Temporary Signalization and Maintenance:** Provide temporary signals and maintain signalization at existing, temporary, and new intersections including, but not limited to, the following:

1. Installation of temporary poles and span wire assemblies as shown in the Plans,

2. Temporary portable traffic signals as shown in the Plans,

3. Adding or shifting signal heads,

4. Trouble calls,

5. Maintaining intersection and coordination timing and preemption devices. Coordination timing will require maintaining functionality of system communications.

Restore any loss of operation within 12 hours after notification. Provide alternate temporary traffic control until the signalization is restored.

Provide temporary pedestrian signalization in accordance with the TTCP, and maintain pedestrian signalization at existing, temporary, and new intersections.

Provide traffic signal equipment that meets the requirements of the Standard Plans and 603-2. The Engineer may approve used signal equipment if it is in acceptable condition. Replacement components for traffic signal cabinet assemblies will be provided by the maintaining agency. For temporary signals used for lane closure operations on two-lane, two-way roadways meet the requirements in 102-9.20.

**102-9.15 Temporary Traffic Detection and Maintenance:** Provide temporary traffic detection and maintenance at existing, temporary, and new signalized intersections. Provide temporary traffic detection equipment listed on the APL. Restore any loss of detection within 12 hours. Ensure 90% accuracy per signal phase, measured at the initial installation and after any lane shifts, by comparing sample data collected from the detection system with ground truth data collected by human observation. Collect the sample and ground truth data for a minimum of five minutes during a peak and five minutes during an off-peak period with a minimum three detections for each signal phase. Perform the test in the presence of the Engineer.

**102-9.16 Truck Mounted Attenuators and Trailer Mounted Attenuators:** Furnish, operate and maintain APL listed truck mounted and trailer mounted attenuators in accordance with the manufacturer's recommendations.

For posted speeds of 50 mph or greater, use either truck mounted attenuators or trailer mounted attenuators that meet TL-3 criteria. For posted speeds of 45 mph or less, use either truck mounted attenuators or trailer mounted attenuators that meet TL-2 or TL-3 criteria.

Attenuators will not be paid for separately. Include the cost of the truck with either a truck mounted attenuator or a trailer mounted attenuator in Maintenance of Traffic, lump sum. Payment includes all costs, including furnishing, operating maintaining and removal when no longer required, and all materials, labor, tools, equipment and incidentals required for attenuator maintenance.

**102-9.17 Temporary Raised Rumble Strip Set:** Use temporary raised rumble strips per the manufacturer's recommendations and in accordance with Standard Plans, Index 102-603.

The temporary raised rumble strip may be either a removable striping type or a portable type. Use a consistent type and color throughout the work zone.

**102-9.18 Automated Flagger Assistance Devices (AFAD):** Furnish, install, maintain, remove, and relocate AFADs in accordance with the Plans, Standard Plans, Index 102-603, and APL vendor drawings.

Position AFADs where they are clearly visible to oncoming traffic. AFADs may be placed on the centerline if they have been successfully crash tested in accordance with MASH TL-3 criteria. A gate arm is required in accordance with Section 990 if a single AFAD is used on the shoulder to control one direction of traffic.

The devices may be operated either by a single flagger at one end of the traffic control zone, from a central location, or by a separate flagger near each device location. Use only flaggers trained in accordance with Section 105 and in the operation of the AFAD. When in use, each AFAD must be in view of, and attended at all times by, the flagger operating the device.

Provide two flaggers on-site and use one of the following methods in the deployment of AFADs:

1. Place an AFAD at each end of the temporary traffic control zone, or
2. Place an AFAD at one end of the temporary traffic control zone and a flagger at the opposite end.

A single flagger may simultaneously operate two AFADs as described in (1) or a single AFAD as described in (2) if all of the following conditions are met:

1. The flagger has an unobstructed view of the AFAD(s),
2. The flagger has an unobstructed view of approaching traffic in both directions,

3. In the event of an AFAD malfunction, restore normal flagging operations with flaggers or immediately cease the flagging operation and reopen the roadway.

AFADs may be either a remotely controlled Stop/Slow AFAD mounted on either a trailer or a movable cart system, or a remotely controlled Red/Yellow Lens AFAD.

Illuminate the flagging station when the AFAD is used at night. When the AFAD is not in use, remove or cover signs and move the AFAD device outside the clear zone or shield it with a barrier.

AFADs will not be paid for separately. AFADs may be used as a supplement or an alternate to flaggers in accordance with the Plans, Standard Plans, Index 102-603, and the APL vendor drawings. Include the cost for AFADs in Maintenance of Traffic, Lump Sum.

**102-9.19 Temporary Lane Separator:** Furnish, install, maintain, remove and relocate temporary lane separator in accordance with the Plans and Standard Plans, Index 102-600. Anchor the portable temporary lane separator with a removable anchor bolt. Use epoxy on bridge decks where anchoring is not allowed. Remove the epoxy from the bridge deck by hydroblasting or other method approved by the Engineer. Repair any damage to the existing pavement caused by the removal of temporary lane separator.

**102-9.20 Temporary Signals for Lane Closures on Two-Lane, Two-Way Roadways:** Furnish, install, maintain, remove, and relocate temporary signals for lane closure operations on two-lane, two-way roadways at the locations shown in the Plans. Temporary signals may be used, at the Contractor's option, as an alternate to flaggers for lane closure operations on two-lane, two-way roadways in accordance with Standard Plans, Index 102-606. Temporary signals can either be portable signals or span wire signals and must be listed on the APL. Provide two signal faces for each approach.

**102-9.21 Type III Barricades:** Use type III barricades in accordance with the TTCP and Standard Plans. Ensure stripes are sloping downward in the direction road users are to pass.

Mount sign panels in accordance with the manufacturer's instructions. Do not place ballast on any rails, or higher than 13 inches above the driving surface. Do not splice the retroreflective sheeting.

**102-10 Work Zone Pavement Marking.**

**102-10.1 Description:** Furnish and install work zone pavement markings for MOT in construction areas and in close conformity with the lines and details shown in the Plans and Standard Plans.

Centerlines, lane lines, edge lines, stop bars, standard crosswalks, and turn arrows will be required in work zones prior to opening the road to traffic.

**102.10.2 Painted Pavement Markings:**

**102-10.2.1 General:** Use painted pavement markings meeting the requirements of Section 710. Use standard paint unless otherwise identified in the Plans or approved by the Engineer.

**102-10.3 Removable Tape:**

**102-10.3.1 General:** Use removable tape listed on the APL as shown in the Plans and meeting the requirements of 990-4.

**102-10.3.2 Application:** Apply removable tape with a mechanical applicator to provide pavement lines that are neat, accurate and uniform. Equip the mechanical applicator with a film cut-off device and with measuring devices that automatically and accumulatively measure the length of each line placed within an accuracy tolerance of plus or minus 2%. Ensure removable tape adheres to the road surface. Removable tape may be placed by hand on short sections, 500 feet or less, if it is done in a neat accurate manner.

**102-10.3.3 Retroreflectivity:** Apply white and yellow pavement markings that will attain an initial retroreflectivity of not less than 300 mcd/lx·m<sup>2</sup> for white and contrast markings and not less than 250 mcd/lx·m<sup>2</sup> for yellow markings. Black portions of contrast tapes and black masking tapes must be non-reflective and have a reflectance of less than 5 mcd/lx m<sup>2</sup>. At the end of the six month service life, the retro reflectance of white and yellow removable tape shall not be less than 150 mcd/lx·m<sup>2</sup>.

**102-10.3.4 Removability:** Provide removable tape capable of being removed from bituminous concrete and portland cement concrete pavement intact or in substantially large strips, either manually or by a mechanical roll-up device, at temperatures above 40°F, without the use of heat, solvents, grinding or blasting.

**102-10.4 Temporary Raised Pavement Markers (RPMs):** Use Class B RPMs except for work that consists of ground-in rumble strips at centerline locations. For ground-in rumble strips at centerline locations, use temporary RPMs in accordance with Section 710. Provide only temporary RPMs listed on the APL. Install all markers in accordance with the manufacturer's recommendations, the Standard Plans, and Section 706. After initial installation, replace broken or missing temporary RPMs in locations where more than three consecutive temporary RPMs are broken or missing at no expense to the Department.

**102-11 Method of Measurement.**

**102-11.1 General:** Devices installed/used on the project on any calendar day or portion thereof, within the Contract Time, including time extensions which may be granted, will be paid for at the Contract unit price for the applicable pay item. Include the cost of any work that is necessary to meet the requirements of the Contract Documents for MOT under Maintenance of Traffic, lump sum when separate payment is not provided.

**102-11.2 Traffic Control Officers:** The quantity to be paid for traffic control officers will be at the Contract unit price per hour (4 hour minimum) for the actual number of officers certified to be on the project site, including any law enforcement vehicles and all other direct and indirect costs. Payment will be made only for those traffic control officers specified in the Plans and authorized by the Engineer.

**102-11.3 Special Detours:** When a special detour is shown in the Plans, the work of constructing, maintaining, and subsequently removing such detour facilities will be paid for under Special Detour, lump sum. However, traffic control devices, warning devices, barriers, signing, pavement markings, and restoration to final configuration will be paid for under their respective pay items.

**102-11.4 Commercial Material for Driveway Maintenance:** The quantity to be paid for will be the certified volume, in cubic yards, of all materials authorized by the Engineer, acceptably placed and maintained for driveway maintenance. The volume, which is authorized to be reused, and which is acceptably salvaged, placed, and maintained in other designated driveways will be included again for payment. Commercial Material used for Temporary Openings will not be included for separate payment.

**102-11.5 Work Zone Signs:** The number of temporary post-mounted signs (temporary regulatory, warning and guide) certified as installed/used on the project will be paid for at the Contract unit price for work zone signs. When multiple signs are located on single or multiple posts, each sign panel will be paid individually. Signs greater than 20 square feet and detailed in the Plans will be paid for under Maintenance of Traffic, lump sum.

Temporary portable signs (excluding mesh signs) and vehicular mounted signs will be included for payment under work zone signs, only if used in accordance with the Standard Plans.

The number of temporary barrier mounted signs (temporary regulatory, warning and guide) certified as installed/used on the project will be paid for at the Contract unit price for barrier mounted work zone signs.

Work zone signs may be installed fourteen days prior to the start of Contract Time with the approval of the Engineer and at no additional cost to the Department.

**102-11.6. Business Signs:** The number of business signs certified as installed/used on the project will be paid for at the Contract unit price for business signs.

**102-11.7 Channelizing Devices:** The number of drums, vertical panels, and Type I, Type II, or direction indicator barricades, certified as installed/used on the project meeting the requirements of Standard Plans, Index 102-600 and have been properly maintained will be paid for at the Contract unit prices for channelizing device.

Payment for drums, vertical panels, and Type I, Type II, and direction indicator barricades will be paid per each per day.

Payment for vehicular LCDs will be paid as the length in feet installed divided by the device spacing for barricades, vertical panels, and drums and certified as installed/used on the project meeting the requirements of Standard Plans, Index 102-600 and have been properly maintained will be paid for at the Contract unit price for channelizing device.

Payment for pedestrian LCDs, certified as installed/used on the project and properly maintained, will be paid per linear foot per day. Placement of pedestrian LCDs at locations not shown in the Plans, or not authorized by the Engineer, will be at the Contractor's expense. Payment for pedestrian LCD mounted signs will be made under Work Zone Signs, per each per day.

Payment will not be made for channelizing devices unsatisfactorily maintained, as determined by the Engineer. Payment will be made for each channelizing device that is used to delineate trailer mounted devices. Payment will be made for channelizing devices delineating portable changeable message signs during the period beginning 14 working days before Contract Time begins as authorized by the Engineer.

**102-11.8 Temporary Barrier:** The quantity to be paid for will be the length, in feet, of freestanding units or anchored units certified as installed/used on the project. The quantity to be paid for relocating barrier will be based on the relocated installation type. No separate payment will be made for the asphalt pad. For freestanding units transitioned to a crash cushion, the cost of anchoring the transition units will be included in the cost of the temporary crash cushion in accordance with 102-11.11.

**102-11.9 Barrier Delineators:** No separate payment will be made for barrier delineators installed on top of temporary barrier and vehicular LCDs. Include the cost for barrier delineators in the cost of the barrier or vehicular LCD.

**102-11.10 Temporary Glare Screen:** The certified quantity to be paid for will be determined by the number of sections times the nominal length of each section.

**102-11.11 Temporary Crash Cushions:** No separate payment will be made for the concrete or asphalt pad.

**102-11.11.1 Redirective:** The quantity to be paid for will be the number of temporary crash cushions (redirective) certified as installed/used and maintained on the project, including anchoring of temporary barrier necessary for transition to the crash cushion and delineation.

**102-11.11.2 Gating:** The quantity to be paid for will be the number of temporary crash cushions (gating) certified as installed/used and maintained on the project, including anchoring of temporary barrier necessary for transition to the crash cushion and delineation.

**102-11.12 Temporary Guardrail:** The quantity to be paid for will be the length, in feet, of temporary guardrail constructed and certified as installed/used on the project. The length of a run of guardrail will be determined as a multiple of the nominal panel lengths.

**102-11.13 Arrow Board:** The quantity to be paid at the contract unit price will be for the number of arrow boards certified as installed/used on the project on any calendar day or portion thereof within the Contract Time.

**102-11.14 Portable Changeable Message Sign:** The quantity to be paid at the Contract unit price will be for the number of PCMSs or truck mounted changeable message signs certified as installed/used on the project on any calendar day or portion thereof within the Contract Time. Payment will be made for each portable changeable message sign that is used during the period beginning fourteen working days before Contract Time begins as authorized by the Engineer.

**102-11.15 Portable Regulatory Signs:** The quantity to be paid for will be the number of portable regulatory signs certified as installed/used on the project on any calendar day or portion thereof within the Contract Time, will be paid for the Contract unit price for portable regulatory sign.

**102-11.16 Radar Speed Display Unit:** The quantity to be paid for will be the number of radar speed display units certified as installed/used on the project on any calendar day or portion thereof within the Contract Time, will be paid for the Contract unit price for radar speed display unit.

**102-11.17 Temporary Signalization and Maintenance:** For existing intersections, the certified quantity to be paid for will be the number of signalized intersections per day for the full

duration of the Contract. For temporary intersections, the certified quantity to be paid for will be the number of signalized intersections per day for the duration of the temporary intersection. No separate payment will be made for temporary signalization and maintenance at new intersections.

**102-11.18 Temporary Traffic Detection and Maintenance:** For existing intersections, the certified quantity to be paid for will be the number of signalized intersections per day beginning the day Contract Time begins and ending the day the permanent detection is operational and the final lane configuration is in place. For temporary and new intersections, the certified quantity to be paid for will be the number of signalized intersections per day beginning the day the temporary detection is functional and ending the day: the permanent detection is operational and the final lane configuration is in place for a new intersection; or, when the detection is removed for a temporary intersection.

**102-11.19 Work Zone Pavement Markings:** Painted pavement markings will be paid as specified in 710-10. The quantity of removable tape to be paid for solid, 10'-30' skip, 3'-9' dotted, 6'-10' dotted, and 2'-4' dotted lines will be the length, in gross miles, authorized and acceptably applied under this Section and certified as installed/used on the project. The quantity of removable tape to be paid for transverse lines will be the length, in linear feet, authorized and acceptably applied under this Section and certified as installed/used on the project. The quantity of removable tape to be paid for pavement messages, symbols, and arrows will be per each, authorized and acceptably applied under this Section and certified as installed/used on the project. The quantity of temporary RPMs to be paid will be the number of RPMs authorized and acceptably applied.

**102-11.20 Temporary Raised Rumble Strips:** The quantity to be paid for will be the number of calendar days, or portions thereof, that temporary raised rumble strips are certified as installed/used on the project within the Contract Time. The number of strips used must meet the requirements of Standard Plans, Index 102-603. No adjustment will be made to the per day measurement for the number of strips or sets used, or for the number of times the sets are relocated.

**102-11.21 Temporary Lane Separator:** The quantity to be paid for will be the field measure, in feet, of temporary lane separator certified as installed/used on the project, including drainage gaps, completed and accepted. The cost of any pavement repairs due to removal is included in the cost of Maintenance of Traffic, lump sum.

**102-11.22 Temporary Signals for Lane Closures on Two-Lane, Two-Way Roadways:** The quantity to be paid for will be the number of temporary signals per day installed/used at the locations shown in the Plans. Temporary signals installed/used at the Contractor's option as an alternative to flaggers will be included in Maintenance of Traffic, lump sum.

**102-11.23 Temporary Highway Lighting:** When temporary highway lighting is required by the Plans, the work of constructing, maintaining, and removing the temporary highway lighting, including all materials and any necessary design work, will be paid for under temporary highway lighting, lump sum.

**102-11.24 Pedestrian or Bicycle Special Detours:** When a pedestrian or bicycle special detour is shown in the Plans, the work of constructing, maintaining, and subsequently removing such detour facilities will be paid for under pedestrian or bicycle special detour, lump sum. However, traffic control devices, warning devices, barriers, signing, pavement markings, and restoration to final configuration will be paid for under their respective pay items.

**102-11.25 Type III Barricades:** The number of type III barricades certified as installed/used on the project will be paid for at the Contract unit price for type III barricades.

**102-11.26 Limited Access Temporary Openings:** Include all construction, maintenance, removal, and restoration costs of temporary openings in Maintenance of Traffic, lump sum. No separate payment will be made for commercial material, gates, or fence.

## **102-12 Submittals.**

**102-12.1 Submittal Instructions:** Prepare a certification of quantities, using the Department's current approved form, for certified MOT payment items for each project in the Contract. Submit the certification of quantities to the Engineer. The Department will not pay for any disputed items until the Engineer approves the certification of quantities.

**102-12.2 Contractor's Certification of Quantities:** Request payment by submitting a certification of quantities no later than Twelve O'clock noon Monday after the estimate cut-off date or as directed by the Engineer, based on the amount of work done or completed. Ensure the certification consists of the following:

1. Contract Number, FPID Number, Certification Number, Certification Date and the period that the certification represents.

2. The basis for arriving at the amount of the progress certification, less payments previously made and less an amount previously retained or withheld. The basis will include a detail breakdown provided on the certification of items of payment in accordance with 102-13. After the initial setup of the MOT items and counts, the interval for recording the counts will be made weekly on the certification sheet unless there is a change. This change will be documented on the day of occurrence. Some items may necessitate a daily interval of recording the counts.

## **102-13 Basis of Payment.**

**102-13.1 Maintenance of Traffic (General Work):** When an item of work is included in the proposal, price and payment will be full compensation for all work and costs specified under this Section except as may be specifically covered for payment under other items.

**102-13.2 Traffic Control Officers:** Price and payment will be full compensation for the services of the traffic control officers.

**102-13.3 Special Detours:** Price and payment will be full compensation for providing all detour facilities shown in the Plans and all costs incurred in carrying out all requirements of this Section for general MOT within the limits of the detour, as shown in the Plans.

**102-13.4 Commercial Materials for Driveway Maintenance:** Price and payment will be full compensation for all work and materials specified for this item, including specifically all required shaping and maintaining of driveways.

**102-13.5 Work Zone Signs:** Price and payment will be full compensation for all work and materials for furnishing signs, supports and necessary hardware, installation, relocating, maintaining and removing signs.

**102-13.6. Business Signs:** Price and payment will be full compensation for all materials and labor required for furnishing, installing, relocating, maintaining, and removing the signs as well as the cost of installing any logos provided by business owners.

**102-13.7 Channelizing Devices:** Prices and payment will be full compensation for furnishing, installing, relocating, maintaining and removing the channelizing devices.

**102-13.8 Temporary Barrier:** Price and payment will be full compensation for furnishing, installing, maintaining, and removing the barrier and asphalt pad. When called for, temporary barrier (relocate) will be full compensation for relocating the barrier.

**102-13.9 Temporary Glare Screen:** Price and payment will be full compensation for furnishing, installing, maintaining, and removing the glare screen certified as installed/used on the project. When called for, glare screen (relocate) will be full compensation for relocating the glare screen.

**102-13.10 Temporary Crash Cushion (Redirective or Gating):** Price and payment will be full compensation for furnishing, installing, maintaining, and removing crash cushions and concrete or asphalt pads.

**102-13.11 Temporary Guardrail:** Price and payment will be full compensation for furnishing all materials required for a complete installation, including end anchorage assemblies and any end connections to other structures and for installing, maintaining and removing guardrail.

**102-13.12 Arrow Board:** Price and payment will be full compensation for furnishing, installing, operating, relocating, maintaining and removing arrow boards.

**102-13.13 Portable Changeable Message Sign:** Price and payment will be full compensation for furnishing, installing, operating, relocating, maintaining and removing portable changeable message signs.

**102-13.14 Portable Regulatory Signs:** Price and payment will be full compensation for furnishing, installing, relocating, operating, maintaining and removing a completely functioning system as described in these Specifications.

Payment will include all labor, materials, incidentals, repairs and any actions necessary to operate and maintain the unit at all times that work is being performed or traffic is being affected by construction and/or MOT operations.

**102-13.15 Radar Speed Display Unit:** Price and payment will be made only for a completely functioning system as described in these Specifications. Payment will include all labor, hardware, accessories, signs, and incidental items necessary for a complete system. Payment will include any measurements needed to ensure that the unit conforms to all Specification requirements.

Payment will include all labor, materials, incidentals, repairs and any actions necessary to operate and maintain the unit at all times that work is being performed or traffic is being affected by construction and MOT operations. Price and payment will be full compensation for furnishing, installing, operating, relocating, maintaining and removing radar speed display unit.

**102-13.16 Temporary Signalization and Maintenance:** Price and payment will constitute full compensation for furnishing, installing, operating, maintaining and removing temporary traffic control signals including all equipment and components necessary to provide an operable traffic signal. Payment will be withheld for each day at each intersection where the temporary signalization is not operational within 12 hours after notification.

**102-13.17 Temporary Traffic Detection and Maintenance:** Price and payment will constitute full compensation for furnishing, installing, operating, maintaining and removing temporary traffic detection including all equipment and components necessary to provide an acceptable signalized intersection. Take ownership of all equipment and components. Payment will be withheld for each day at each intersection where the temporary detection is not operational within 12 hours after notification.

**102-13.18 Work Zone Pavement Markings:** Price and payment will be full compensation for all work specified including, all cleaning and preparing of surfaces, furnishing of all materials, application, curing and protection of all items, protection of traffic, furnishing of

all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

Removable tape or durable paint may be substituted for standard paint at no additional cost to the Department.

Payment for temporary RPMs used to supplement line markings will be paid for under temporary raised pavement markers. Install these RPMs as detailed in the Standard Plans.

**102-13.19 Temporary Raised Rumble Strips:** Price and payment will be full compensation for all work and materials described in this Section, including all cleaning and preparing of surfaces, disposal of all debris, furnishing of all materials, application, curing, removal, reinstalling and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work.

**102-13.20 Temporary Lane Separator:** Price and payment will be full compensation for all work specified in this Section.

**102-13.21 Temporary Signals for Lane Closures on Two-Lane, Two-Way Roadways:** Price and payment will be full compensation for furnishing, installing, operating, maintaining and removing temporary traffic signal including all equipment and components necessary to provide an operable portable traffic signal.

**102-13.22 Temporary Highway Lighting:** Price and payment will be full compensation for providing all temporary highway lighting shown in the Plans.

**102-13.23 Pedestrian or Bicycle Special Detours:** Price and payment will be full compensation for providing all pedestrian or bicycle special detours shown in the Plans.

**102-13.24 Type III Barricades:** Prices and payment will be full compensation for furnishing, installing, relocating, maintaining and removing the type III barricades.

**102-13.25 Payment Items:** Payment will be made under:

- Item No. 102- 1- Maintenance of Traffic - lump sum.
- Item No. 102- 2- Special Detour - lump sum.
- Item No. 102- 3- Commercial Material for Driveway Maintenance - per cubic yard.
- Item No. 102- 4- Pedestrian or Bicycle Special Detour - lump sum.
- Item No. 102- 14- Traffic Control Officer - per hour.
- Item No. 102- 30- Temporary Highway Lighting - lump sum.
- Item No. 102- 60- Work Zone Sign - per each per day.
- Item No. 102- 61- Business Sign - each.
- Item No. 102- 62- Barrier Mounted Work Zone Sign – per each per day
- Item No. 102- 71- Temporary Barrier - per foot.
- Item No. 102- 75- Temporary Lane Separator - per foot
- Item No. 102- 73- Temporary Guardrail - per foot.
- Item No. 102- 74- Channelizing Devices
- Item No. 102- 76- Arrow Board - per each per day.
- Item No. 102- 78- Temporary Raised Pavement Markers - each.
- Item No. 102- 81- Temporary Crash Cushion, Gating - per location.
- Item No. 102- 89- Temporary Crash Cushion, Redirective - per location.
- Item No. 102- 94- Glare Screen - per foot.
- Item No. 102- 99- Portable Changeable Message Sign - per each per day.
- Item No. 102-104- Temporary Signalization and Maintenance - per intersection per day.

- Item No. 102-107- Temporary Traffic Detection and Maintenance - per intersection per day.
- Item No. 102-115- Type III Barricade - per each per day.
- Item No. 102-120- Temporary Signal for Lane Closures on Two-Lane, Two-Way Roadways – per each per day.
- Item No. 102-150- Portable Regulatory Sign - per each per day.
- Item No. 102-150- Radar Speed Display Unit - per each per day.
- Item No. 102-909- Temporary Raised Rumble Strips - per day.
- Item No. 102-913- Removable Tape.
- Item No. 710- Painted Pavement Markings.
- Item No. 711- Thermoplastic Pavement Markings.

**SECTION 103  
TEMPORARY WORK STRUCTURES**

**103-1 Description.**

**103-1.1 Scope of Work:** Construct temporary work structures used solely to support construction equipment. Temporary structures include but are not limited to work bridges, elevated platforms, floating platforms, and rail systems. Items such as mats, falsework or scaffolding are not included in this Section. If a temporary structure type other than the structure type shown in the plans is chosen, assume responsibility for obtaining all necessary permit revisions and the Engineer's approval. Conform to any limitations contained in the plans and permits. Do not place embankment outside the limits shown in the plans. The cost of the embankment, placing, compaction, and removal will be included in the lump sum price for Temporary Work Structure.

**103-1.2 Materials:** Construct the temporary work structure using materials sufficient to handle the anticipated loads. Assume responsibility for the design of the temporary structure.

**103-1.3 Navigation Requirements:** Submit drawings showing the location of the temporary work structures relative to the navigable waterway to the Coast Guard at least 60 days prior to beginning construction of the structure, or as required by conditions of the permit. Provide adequate lighting of the structure during the duration of construction as required by the Coast Guard or local authorities.

**103-2 Basis of Payment.**

**103-2.1 General:** The unit price for the temporary work structure will include all costs associated with the design, materials, labor, installation, removal and disposal of the structure.

**103-2.2 Partial Payments:** When the plans include a separate pay item for temporary work structure, 75% of the lump sum price will be paid upon completion of the temporary work structure, and 25% will be paid upon complete removal of the temporary work structure from the project site. When the project requires numerous structures or multiple setups (leap frog type) of the same system, the 75% will be split evenly between the various structures or setups. Partial payments for any project will be limited to 5% of the original Contract amount for that project. Any remaining amount will be paid upon completion of all work on the project.

When more than one project is included in the Contract, the above percentages will apply separately to each project which has a separate pay item for temporary work structures.

Payment will be made under:

Item No. 103- 1- Temporary Work Structures - lump sum.

**SECTION 104  
PREVENTION, CONTROL, AND ABATEMENT OF  
EROSION AND WATER POLLUTION**

**104-1 Description.**

Provide erosion control measures where work is accomplished in conjunction with the project, to prevent erosion, pollution of water, detrimental effects to public or private property adjacent to the project right-of-way and damage to work on the project.

**104-2 General.**

Coordinate the installation of temporary erosion control devices with the construction of the permanent erosion control devices to ensure economical, effective, and continuous control of erosion and water pollution throughout the life of the Contract.

**104-3 Control of Contractor’s Operations Which May Result in Water Pollution.**

Prevent contaminants, pollutants or hazardous substances, as defined in Section 376.301, Florida Statutes, from migrating from the construction site or from materials and equipment into any surface waters, wetlands, groundwater or property beyond the project limits. Conduct and schedule operations to avoid and minimize pollution or siltation from the project to surface waters, wetlands, groundwater, or property beyond the project limits.

Do not drive in, operate, or place construction equipment or materials in surface waters, wetlands, groundwater, or property beyond the project limits without permitted authority for permanent or temporary impacts. Water crossings or other wetlands impacts must be authorized by permit. Obstructing or impeding the water flow or movement of the water or wildlife must be authorized by permit.

Where pumps are used to remove highly turbid waters from enclosed construction areas such as cofferdams or forms, treat the water by one or more of the following methods prior to discharge from the project: pumping into grassed swales or appropriate upland vegetated areas or constructed sediment basins, or confined by an appropriate enclosure such as turbidity barriers when other methods are not practical. Do not discharge, water that does not meet State water quality standards or does not meet the criteria specified in any applicable permit.

Remove sediment accumulated during construction from all existing or newly constructed stormwater facilities prior to final acceptance. Ensure that all stormwater conveyances and stormwater facilities meet final grade requirements at final acceptance. Remove silt or regrade as necessary to comply with the lines and grades shown in the Plans.

Do not enter onto lands or waters outside the limits of construction as staked, except as authorized by the Engineer. Do not allow water that does not meet state water quality standards or does not meet the permitted criteria to exit the project limits.

Obtain the Engineer’s approval for the location and method of operation in borrow pits, material pits, and disposal areas furnished for waste material from the project (other than commercially operated sources) such that erosion during and after completion of the work will not result in detrimental siltation or water pollution.

**104-4 Materials for Temporary Erosion Control.**

The Engineer will not require testing of materials used in construction of temporary erosion control devices other than as provided for geotextile fabric in 985-3 unless such material

is to be incorporated into the completed project. When no testing is required, the Engineer will base acceptance on visual inspection.

The Contractor may use new or used materials for the construction of temporary silt fence, staked turbidity barriers, and floating turbidity barrier not to be incorporated into the completed project, subject to the approval of the Engineer.

**104-5 Preconstruction Requirements.**

Prior to the Preconstruction Conference, submit an Erosion and Sediment Control Plan meeting the requirements or special conditions of all permits authorizing project construction. If no permits are required or the approved permits do not contain special conditions or specifically address erosion and water pollution, the project’s Erosion and Sediment Control Plan will be governed by 7-1.1, 7-2.2, 7-8.1, 7-8.2, and Section 104.

When a DEP Generic Permit for Stormwater Discharge from Large and Small Construction Activities permit is issued, the Contractor’s Erosion and Sediment Control Plan shall be prepared to accompany the Department’s Stormwater Pollution Prevention Plan. Ensure the Erosion and Sediment Control Plan includes procedures to control off-site tracking of soil by vehicles and construction equipment and a procedure for cleanup and reporting of non-storm water discharges, such as contaminated groundwater or accidental spills. Do not begin any soil disturbing activities before receiving the Engineer’s written approval of the Erosion and Sediment Control Plan, including the required signed certification statements.

Failure to sign and submit any required documents or certification statements will be considered a default of the Contract. Any soil disturbing activities performed without the required signed documents or certification statements is considered a violation of the DEP Generic Permit for Stormwater Discharge from Large and Small Construction Activities.

Prepare a site-specific Erosion and Sediment Control Plan in accordance with the planned sequence of operations and present it in a format acceptable to the Department. The Erosion and Sediment Control Plan shall describe, but not be limited to, the following items or activities:

1. For each phase of construction operations or activities, supply the following information:

- a. Locations of all erosion control devices
- b. Types of all erosion control devices
- c. Estimated time erosion control devices will be in operation
- d. Monitoring schedules for maintenance of erosion control devices
- e. Methods of maintaining erosion control devices
- f. Dewatering plan
- g. Locations of all stored fuel or other containments, pollutants or hazardous waste
- h. Spill prevention and response measures and disposal and removal methods
- i. Submit any changes to the Erosion and Sediment Control Plan within seven calendar days

2. The name and telephone number of the person responsible for monitoring and maintaining the erosion control devices.

3. Submit for approval the Erosion and Sediment Control Plans meeting paragraphs 3a, 3b, or 3c below:

a. Projects permitted by the Southwest Florida Water Management District (SWFWMD), require the following:

Submit the Erosion and Sediment Control Plan to the Engineer for review and to the appropriate SWFWMD Office for review and approval. Include the SWFWMD permit number on all submitted data or correspondence.

The Contractor may schedule a meeting with the appropriate SWFWMD Office to discuss the Erosion and Sediment Control Plan in detail, to expedite the review and approval process. Advise the Engineer of the time and place of any meetings scheduled with SWFWMD.

Do not begin construction activities until the Erosion and Sediment Control Plan receives written approval from both SWFWMD and the Engineer.

b. Projects permitted by the South Florida Water Management District or the St. Johns River Water Management District, require the following:

Obtain the Engineer's approval of the Erosion and Sediment Control Plan.

Do not begin construction activities until the Erosion and Sediment Control Plan receives written approval from the Engineer.

c. Projects authorized by permitting agencies other than the Water Management Districts or projects for which no permits are required require the following:

The Engineer will review and approve the Contractor's Erosion and Sediment Erosion Control Plan.

Do not begin construction activities until the Erosion and Sediment Control Plan receives written approval from the Engineer.

## **104-6 Construction Requirements.**

**104-6.1 Limitation of Exposure of Erodible Earth:** Do not allow the surface area of erodible earth that clearing and grubbing operations, excavation and filling operations, or other earth disturbing activities to exceed 750,000 square feet without specific prior written approval by the Engineer. This limitation applies separately to clearing and grubbing operations and excavation and filling operations.

The Engineer may further limit the surface areas of unprotected erodible earth exposed by the construction operation and may direct the Contractor to provide additional erosion or pollution control measures to prevent contamination of any surface waters, wetlands, or groundwater or to prevent detrimental effects on property outside the project limits or damage to the project.

**104-6.2 Incorporation of Erosion and Sediment Control Devices:** Incorporate permanent erosion and sediment control devices into the project at the earliest practical time. Complete the installation of temporary erosion and sediment control devices prior to the commencement of any earthwork. Use temporary erosion and sediment control devices found in the State of Florida Erosion and Sediment Control Designer and Reviewer Manual (E&SC Manual) to control erosion and sediment generated by construction operations, to correct unforeseen conditions during construction, and to control erosion and sediment prior to the incorporation of permanent erosion and sediment control devices. An electronic version of the E&SC Manual can be found at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/FLerosionSedimentManual.shtm>.

**104-6.3 Scheduling of Successive Operations:** Schedule operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations, and the duration of exposure of uncompleted construction to the elements is as short as practicable.

Schedule and perform clearing and grubbing such that grading operations can be incorporated immediately thereafter. Schedule and perform grading operations so that permanent erosion control devices can follow immediately thereafter if conditions on the project permit.

**104-6.4 Details for Temporary Erosion and Sediment Control Devices:**

**104-6.4.1 General:** Use temporary erosion, sediment and water pollution control devices found in the E&SC Manual. These devices consist of, but are not limited to, temporary sod, rolled erosion control products, sediment containment systems, runoff control structures, sediment barriers, inlet protection systems, silt fences, turbidity barriers, and chemical treatment. For design details for some of these devices, refer to the E&SC Manual. Perform installation, inspection, maintenance, and removal of all temporary erosion and sediment control devices in accordance with applicable permits, manufacturer’s directions, and the Contract Documents.

**104-6.4.2 Temporary Sod:** The Engineer may designate certain areas of sod constructed in accordance with Section 570, as a temporary erosion control device. Do not use seed as a temporary erosion control device. The Engineer may waive the turf establishment requirements of Section 570 for areas of temporary sod that will not be a part of the permanent construction.

**104-6.4.3 Runoff Control Structures:** Construct runoff control structures in accordance with the details shown in the Contract Documents.

**104-6.4.4 Sediment Containment Systems:** Construct sediment containment systems in accordance with the details shown in the Contract Documents. Clean out sediment containment systems as necessary in accordance with the Contract Documents.

**104-6.4.5 Sediment Barriers:** Provide and install sediment barriers according to details shown in the Contract Documents or, as directed by the Engineer to protect against downstream accumulation of sediment. Sediment Barriers include, but are not limited to synthetic bales, silt fence, fiber logs and geosynthetic barriers. Reusable barriers that have had sediment deposits removed may be reinstalled on the project as approved by the Engineer.

**104-6.4.6 Silt Fence:**

**104-6.4.6.1 General:** Furnish, install, maintain, and remove silt fences, in accordance with the applicable permits, the manufacturer’s directions, and the Contract Documents.

**104-6.4.6.2 Materials and Installation:** Use a geotextile fabric made from woven or nonwoven fabric, meeting the physical requirements of Section 985 according to those applications for erosion control.

Choose the type and size of posts and wire mesh reinforcement (if required). Do not use products which have a separate layer of plastic mesh or netting. Provide a durable and effective silt fence that controls sediment in accordance with the Contract Documents.

Erect silt fence at upland locations and at temporary locations shown in the Contract Documents or where continuous construction activities change the natural contour and drainage runoff. Do not attach silt fence to existing trees unless approved by the Engineer.

**104-6.4.6.3 Inspection and Maintenance:** Inspect all silt fences in accordance with any applicable permit. If the project does not have a permit, inspect within 24 hours after each rain event and at least daily during prolonged rainfall. Immediately correct any deficiencies. In addition, make a daily review of the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Where deficiencies exist, repair or replace silt fences in accordance with the Contract Documents or as directed by the Engineer.

Remove sediment deposits when the deposit reaches approximately 1/2 the height of the silt fence or as directed by the Engineer. Shape any remaining sediment deposits to conform with the finished grade and prepare the area for turf in accordance with Section 570.

**104-6.4.7 Floating Turbidity Barriers and Staked Turbidity Barriers:**

Furnish, install, maintain, and remove floating turbidity barriers in accordance with the applicable permits, the manufacturer’s directions, and the Contract Documents. The Contractor may need to deploy turbidity barriers around isolated areas of concern (such as, seagrass beds, coral communities) both within as well as outside the project limits. The Engineer will identify such areas. Place the barriers prior to the commencement of any work that could impact the area of concern. Ensure that the type of barrier used and the deployment and maintenance of the barrier will minimize dispersion of turbid waters from the project. The Engineer may approve alternate methods or materials.

Install and maintain turbidity barriers to avoid or minimize the degradation of the water quality of the surrounding waters and minimize damage to areas where the floating barriers are installed.

**104-6.4.8 Inlet Protection System:** Furnish and install inlet protection systems as shown in the Contract Documents.

**104-6.4.9 Rolled Erosion Control Products (RECPs):**

**104-6.4.9.1 General:** Install RECPs in locations where temporary protection from erosion is needed. Two common applications are described below.

1. Use RECPs composed of natural or synthetic fiber mats, plastic sheeting, or netting as protection against erosion, when directed by the Engineer, during temporary pauses in construction caused by inclement weather or other circumstances. Remove the material when construction resumes.

2. Use RECPs as erosion control blankets, at locations shown in the Plans, to facilitate plant growth while permanent grassing is being established. For the purpose described, use non-toxic, biodegradable, natural or synthetic woven fiber mats. Install erosion control blankets capable of sustaining a maximum design velocity of 6.5 ft/sec as determined from tests performed by Utah State University, Texas Transportation Institute or an independent testing laboratory approved by the Department. Submit to the Engineer, certified test reports from the manufacturer showing that the erosion control blankets meet the requirements of this Specification. Certification must be attested, by a person having legal authority to bind the manufacturing company. Also, furnish two 4 by 8 inch samples for product identification. The manufacturers test records shall be made available to the Department upon request. Leave the material in place, as installed, to biodegrade.

**104-6.4.10 Chemical Treatment:** Provide chemical treatment in accordance with the Contract Documents. Chemical treatment may be used to clarify turbid or sediment laden water that does not meet state water quality standards or to supplement other erosion and

sediment control devices to aid in their performance. The contractor must provide the required toxicity testing information in accordance with the Contract Documents to the Engineer for review and acceptance prior to using any chemical treatment on the project site.

**104-6.5 Removal of Temporary Erosion Control Devices:** In general, remove or incorporate into the soil any temporary erosion control devices upon incorporation of the permanent erosion control devices into the project. The Engineer may direct that temporary devices be left in place.

#### **104-7 Maintenance of Erosion and Sediment Control Devices.**

**104-7.1 General:** Provide routine maintenance of permanent and temporary erosion and sediment control devices, at no expense to the Department, until the project is complete and accepted. If reconstruction or replacement of erosion and sediment control devices is necessary due to the Contractor's negligence or carelessness or, in the case of temporary erosion and sediment control devices, improper installation, lack of maintenance, excessive wear, design-life exceedance or failure by the Contractor to install permanent erosion control devices as scheduled, the Contractor shall repair or replace such erosion control devices at no expense to the Department. If reconstruction of permanent or temporary erosion and sediment control devices is necessary due to factors beyond the control of the Contractor, the Department will pay for replacement under the appropriate Contract pay item or items.

Inspect all erosion and sediment control devices at least once every seven calendar days and within 24 hours of the end of a storm event that is 0.50 inches or greater. Maintain all erosion and sediment control devices as required in the Stormwater Pollution Prevention Plan, the Contractor's Erosion and Sediment Control Plan, and if applicable, as specified in the State of Florida Department of Environmental Protection Generic Permit for Stormwater Discharge from Large and Small Construction Activities.

#### **104-8 Protection During Suspension of Contract Time.**

Initiate stabilization measures within seven calendar days upon suspension of construction activities. If it is necessary to suspend the construction operations for any appreciable length of time, shape the disturbed areas to facilitate stormwater runoff and construct earthen berms along the top edges of embankments to intercept stormwater runoff. Provide temporary slope drains in areas that are highly erodible to avoid pollution of surface waters, wetlands, groundwater, or property beyond the project limits. Locate slope drains at intervals of approximately 500 feet and stabilize by paving or covering with waterproof materials. Should such preventive measures fail, immediately take action as necessary to effectively prevent erosion and siltation. During suspension of operations, the Engineer may direct the Contractor to perform additional erosion and sediment control work as necessary.

#### **104-9 Method of Measurement.**

When separate items for temporary erosion control devices are included in the Contract, the quantities to be paid for will be:

1. the area, in square yards, of rolled erosion control products;
2. the length, in feet, of runoff control structures, measured along the surface of the work constructed;
3. the number of sediment containment systems constructed and accepted;
4. the number of sediment containment system cleanouts accomplished and accepted;

5. the length, in feet, of sediment barriers;
6. the length, in feet, of floating turbidity barrier;
7. the length, in feet, of staked turbidity barrier;
8. the number of inlet protection systems, for existing inlets;
9. the area, in square yards, of chemical treatment;
10. the number of floc logs or drums of product for chemical treatment;

Upon acceptance by the Engineer, the quantity of floating turbidity barriers, sediment barriers, staked turbidity barriers, and inlet protection devices will be paid for regardless of whether materials are new, used, or relocated from a previous installation on the project. Protection of newly constructed inlets and drainage systems is incidental to their installation. No separate payment will be made for temporary erosion control devices used to protect newly constructed drainage systems.

**104-10 Basis of Payment.**

Prices and payments will be full compensation for all work specified in this Section, including construction and routine maintenance of temporary erosion control devices.

Any additional costs resulting from compliance with the requirements of this Section, other than construction, routine maintenance, and removal of temporary erosion control devices, will be included in the Contract unit prices for the item or items to which such costs are related. Temporary sod used as a temporary erosion control device in accordance with 104-6.4.2 will be paid for under Section 570.

Separate payment will not be made for the cost of constructing temporary earth berms along the edges of the roadways to prevent erosion during grading and subsequent operations. The Contractor shall include these costs in the Contract prices for grading items.

In case of repeated failure on the part of the Contractor to control erosion, pollution, or siltation, the Engineer reserves the right to employ outside assistance or to use the Department’s own forces to provide the necessary corrective measures. Any such costs incurred, including engineering costs, will be charged to the Contractor and appropriate deductions made from the monthly progress estimate.

Payment will be made under:

- Item No. 104- 1- Artificial Coverings/ Rolled Erosion Control Products - per square yard.
- Item No. 104- 6- Slope Drains (Temporary)/ Runoff Control Structures - per foot.
- Item No. 104- 7- Sediment Basins/ Containment Systems - each.
- Item No. 104- 9- Sediment Basin/ Containment system Cleanouts - each.
- Item No. 104- 10- Sediment Barriers - per foot
- Item No. 104- 11- Floating Turbidity Barrier - per foot.
- Item No. 104- 12- Staked Turbidity Barrier - per foot.
- Item No. 104- 18- Inlet Protection System - each.
- Item No. 104- 19- Chemical Treatment - per square yard.
- Item No. 104- 20- Chemical Treatment (floc logs, drums of product) - each.

**SECTION 105  
CONTRACTOR QUALITY CONTROL GENERAL REQUIREMENTS**

**105-1 General.**

**105-1.1 Quality Control Documentation:**

**105-1.1.1 Submission of Materials Certification and Reporting Test Results:**

Submit certifications prior to placement of materials. Report test results at completion of the test and meet the requirements of the applicable Specifications.

**105-1.1.2 Databases:** Obtain access to the Department's databases prior to testing and material placement. Database access information is available through the Department's website. Enter all required and specified documentation and test results into the Department's databases.

**105-1.1.3 Worksheets:** Make available to the Department, when requested, worksheets used for collecting test information. Ensure the worksheets at a minimum contain the following:

1. Project Identification Number,
2. Time and Date,
3. Laboratory Identification and Name,
4. Training Identification Numbers (TIN) and initials,
5. Record details as specified within the test method.

**105-1.2 Inspections to Assure Compliance with Acceptance Criteria:**

**105-1.2.1 General:** The Department is not obligated to make an inspection of materials at the source of supply, manufacture, or fabrication. Provide the Engineer with unrestricted entry at all times to such parts of the facilities that concern the manufacture, fabrication, or production of the ordered materials. Bear all costs incurred in determining whether the material meets the requirements of these Specifications.

**105-1.2.2 Quality Control (QC) Inspection:** Provide all necessary inspection to assure effective QC of the operations related to materials acceptance. This includes but is not limited to sampling and testing, production, storage, delivery, construction and placement. Ensure that the equipment used in the production and testing of the materials provides accurate and precise measurements in accordance with the applicable Specifications. Maintain a record of all inspections, including but not limited to, date of inspection, results of inspection, and any subsequent corrective actions taken. Make available to the Department the inspection records, when requested.

**105-1.2.3 Notification of Placing Order:** Order materials sufficiently in advance of their incorporation in the work to allow time for sampling, testing and inspection. Notify the Engineer prior to placing orders for materials.

Submit to the Engineer a fabrication schedule for all items requiring commercial inspection at least 30 days before beginning fabrication. These items include steel bridge components, moveable bridge components, pedestrian bridges, castings, forgings, structures erected either partially or completely over the travelled roadway or mounted on bridges as overhead traffic signs (some of these may be further classified as cantilevered, overhead trusses, or monotubes) or any other item identified as an item requiring commercial inspection in the Contract Documents.

**105-2 Additional Requirements for Lump Sum Projects.**

Prepare and submit to the Engineer a project-specific list of material items and quantities to be used on the project as a Job Guide Schedule in the same format as the current Sampling, Testing, and Reporting Guide 21 calendar days prior to commencement of construction. Submit up-to-date quantities for the items on the Job Guide Schedule to the Engineer with each monthly progress estimate. The Department may not authorize payment of any progress estimate not accompanied by updated Job Guide Schedule quantities. Maintain the Job Guide Schedule throughout the project including the quantity placed since the previous submittal, and total to date quantity and any additional materials placed. Do not commence work activities that require testing until the Job Guide Schedule has been reviewed and accepted by the Engineer. At final acceptance, submit a final Job Guide Schedule that includes all materials used on the project in the same format as the monthly reports.

**105-3 Quality Control Program.**

Certain operations require personnel with specific qualifications. Certain materials require production under an approved Quality Control (QC) Plan to ensure that these materials meet the requirements of the Contract Documents. Applicable materials include hot mix asphalt, portland cement concrete (structural), earthwork, cementitious materials, timber, steel and miscellaneous metals, galvanized metal products, prestressed and/or precast concrete products, drainage products, and fiber reinforced polymer products. For all applicable materials included in the Contract, submit a QC Plan prepared in accordance with the requirements of this Section to the Engineer. Do not incorporate any of these materials into the project prior to the Engineer’s approval of the QC Plan.

Steel and Miscellaneous Metal products, including aluminum, are defined as the metal components of bridges, including pedestrian and moveable bridges, overhead and cantilevered sign supports, ladders and platforms, bearings, end wall grates, roadway gratings, drainage items, expansion joints, roadway decking, shear connectors, handrails, galvanized products, fencing, guardrail, light poles, high mast light poles, standard mast arm assemblies and Monotube assemblies, stay in-place forms, casing pipe, strain poles, fasteners, connectors and other hardware.

**105-4 Producer Quality Control Program.**

**105-4.1 General:** When accreditation or certification is required, make supporting documents from the two previous inspections performed by the accrediting or certifying agency available to the Department upon request.

Obtain Department approval prior to beginning production. Meet and maintain the approved Producer Quality Control Program requirements at all times. Production of these products without the Department’s prior acceptance of the Producer Quality Control Program may result in rejection of the products. Continued approval will be subject to satisfactory results from Department evaluations, including the Independent Assurance program. In cases of non-compliance with the accepted Producer Quality Control Program, identify all affected material and do not incorporate or supply to the Department projects. The following conditions may result in suspension of a Producer Quality Control Program:

1. Failure to timely supply information required.
2. Repeated failure of material to meet Standard Specification

requirements.

3. Failure to take immediate corrective action relative to deficiencies in the performance of the Producer Quality Control Program.

4. Certifying materials that are not produced under an accepted Producer Quality Control Program for use on Department projects.

5. Failure to correct any deficiencies related to any requirement of the Producer Quality Control Program, having received notice from the Department, within the amount of time defined in the notice.

**105-4.2 Producer Quality Control Program Requirements:**

**105-4.2.1 Hot Mix Asphalt, Portland Cement Concrete (Structural), Earthwork, Cementitious Materials, Timber, Steel and Miscellaneous Metals, Galvanized Metal Products, Prestressed and/or Precast Concrete Products, Drainage Products, and Fiber Reinforced Polymer Products Quality Control Program:** Have an accepted Producer Quality Control Program, developed in accordance with this Section, during the production of materials to be used on Department projects.

**105-4.2.2 Prestressed Concrete Quality Control Program:** Have a current certification from a Department approved precast prestressed concrete plant certification agency and a Department accepted Producer Quality Control Plan, meeting the requirements of this Section. The list of Department approved certification agencies is available on the website of the State Materials Office (SMO).

**105-4.2.3 Steel and Miscellaneous Metals Quality Control Program:** Have an accepted Producer Quality Control Plan, developed in accordance with this Section and a current American Institute for Steel Construction (AISC) certification, provided that AISC certification program is available for the category of the fabrication products.

**105-4.3 Submittal:** Depending on the type of products, producers shall submit their proposed Producer Quality Control Programs to the SMO or to the District Materials Office, as described below:

**105-4.3.1 State Materials Office (SMO):** Producers of cementitious materials, steel and miscellaneous metals, galvanized metal products, aggregates, timber, flexible pipe, and fiber reinforced polymer (FRP) products must submit their proposed Producer Quality Control Program to the SMO for review and acceptance.

**105-4.3.2 District Materials Office:** Producers of hot mix asphalt, portland cement concrete (structural), earthwork, and precast/prestressed concrete products and must submit their proposed Producer Quality Control Program to the local District Materials Office for acceptance. Producers located outside the State must contact the SMO for address information of the District Materials Office responsible for the review of the proposed Quality Control Program.

**105-4.4 Compliance with the Materials Manual:**

Producers of Flexible Pipe shall meet the requirements of Section 6.1, Volume II of the Department’s Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section61V2.shtm>.

Producers of Precast Concrete Pipe shall meet the requirements of Section 6.2, Volume II of the Department’s Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section62V2.shtm>.

Producers of Precast Concrete Drainage Structures shall meet the requirements of Section 6.3, Volume II of the Department’s Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section63V2.shtm>.

Producers of Precast Prestressed Concrete Products shall meet the requirements of Sections 8.1 and 8.3, Volume II of the Department’s Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section81V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section83V2.shtm>.

Producers of Precast Prestressed Concrete Products using Self Consolidating Concrete shall meet the requirements of Section 8.4, Volume II of the Department’s Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section84V2.shtm>.

Producers of Precast/Prestressed Concrete Products using Flowing Concrete shall meet the requirements of Section 8.6, Volume II of the Department’s Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section86V2.shtm>.

Producers of Incidental Precast/Prestressed Concrete Products shall meet the requirements of Section 8.2, Volume II of the Department’s Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section82V2.shtm>.

Producers of Portland Cement Concrete shall meet the requirements of Section 9.2, Volume II of the Department’s Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section92V2.shtm>.

Producers of Paving Concrete produced by Central Mix Plants shall meet the requirements of Section 9.3, Volume II of the Department’s Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section93V2.shtm>.

Producers of Structural Steel and Miscellaneous Metal Components shall meet the requirements of Sections 11.1, 11.2, 11.3, 11.4, 11.5 and 11.6 of the Department’s Materials Manual, which may be viewed at the following URLs:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section111V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section112V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section113V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section114V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section115V2.shtm>.

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section116V2.shtm>.

Producers of Fiber Reinforced Polymer Composites shall meet the requirements of Section 12-1, Volume II of the Department’s Materials Manual, which may be viewed at the following URL:

<https://www.fdot.gov/programmanagement/Implemented/URLinSpecs/Section121V2.shtm>.

**105-4.5 Producer Quality Control (QC) Plan Review and Acceptance:** The Department will respond to the producer within 21 calendar days of receipt of the proposed Producer Quality Control Program. The Department may perform evaluation activities to verify compliance with submitted documents prior to acceptance.

If the Producer Quality Control Program must be revised for any reason, including non-compliance, submit the revision to the Department. The Department will respond

to the producer within seven calendar days of receipt of the revised Producer Quality Control Program.

**105-4.6 Producer’s Quality Control (QC) Plan:** Submit detailed policies, methods and procedures to ensure the specified quality of all applicable materials and related production operations. Include other items in addition to these guidelines as necessary.

**105-4.6.1 Personnel:**

**105-4.6.1.1 Qualifications:** Submit the Training Identification Numbers (TINs) or any other information which will be traceable to the certification agency’s training location and dates for all technicians performing sampling, testing and inspection for both field and laboratory tests. Submit the names of the Construction Training and Qualification Program (CTQP) certifications and other pertinent certifications held and the expiration dates for each certification for each technician. Include employed and subcontracted technicians.

**105-4.6.1.2 Level of Responsibility:** Identify the primary contact for the Department. Identify roles and responsibilities of various personnel involved in the QC process.

**105-4.6.2 Raw Materials:**

**105-4.6.2.1 Source:** Identify the sources of raw materials. Submit locations and plant or mine numbers when applicable.

**105-4.6.2.2 Certification:** Submit methods of verifying compliance of certification with the Specifications.

**105-4.6.2.3 Disposition of Failing Materials:** Describe the system for controlling non-conforming materials, including procedures for identification, isolation and disposition.

**105-4.6.3 Storage Facilities for Raw Materials:** Describe measures and methods, including bedding details, for preventing segregation, contamination and degradation.

Describe methods of identifying individual materials. Where applicable, submit a site plan showing the locations of various materials.

**105-4.6.4 Production Equipment:** Describe calibration frequencies, maintenance schedule and procedures for production equipment.

**105-4.6.5 Plant Requirements:**

**105-4.6.5.1 Plant Identification:** For those facilities producing materials listed in 105-3, submit the mailing address, physical address including county and X,Y (latitude and longitude) coordinates of the plant, telephone and fax numbers, email address, primary contact at the plant, responsible person in charge, facility number provided by the Department, owner information including parent company, vendor number, designed production capacity, and other information as required.

**105-4.6.5.2 Process Control System:** Describe the methods and measures established to ensure Contract compliance for the produced materials that are supplemental to the QC sampling and testing program described in the Contract Documents. These methods and measures will include, but are not limited to, inspection schedule, additional sampling and testing, maintenance schedule, etc.

**105-4.6.5.3 Loading and Shipping Control:** Describe the methods and measures for preventing segregation, contamination and degradation during loading and shipping operations. Describe the methods established for materials to be in compliance with the Specifications at the point of use.

**105-4.6.5.4 Types of Products Generated:** Describe the products the plant is approved to produce under Department guidelines.

#### **105-4.7 Other Requirements:**

**105-4.7.1 Submittal of Certification:** Submit certifications issued by the plant/Contractor for the applicable products approved by the Department.

**105-4.7.2 Statement of Compliance:** Include a statement of compliance with all quality requirements set forth by the Department in the Contract Documents and Department manuals.

**105-4.7.3 Documentation Storage:** Identify location of document storage to enable Department review. Include QC charts, qualification and accreditation records, inspection reports, and other pertinent supporting documents.

**105-4.8 Final Manufactured Product - Plant Operations:** Describe inspection schedule and methods for identifying defects and non-compliance with the Specifications. Describe corrective actions and methods to resolve them.

**105-4.8.1 Storage:** When storage of the produced materials is required and it is not defined in the Contract Documents, describe the methods and duration for storage. Include measures and methods for preventing segregation, contamination and degradation during storage.

**105-4.8.2 Disposition of Failing Materials:** When not described in the Specifications, describe the methods and measures for identifying and controlling the failing materials. Include preventive and corrective measures. Describe disposition of failing materials.

**105-4.9 Testing Laboratories:** Identify the laboratories performing testing. Ensure that the testing laboratories comply with the Laboratory Qualification Program requirements of this Section or other applicable requirements.

**105-4.10 Department Inspection Access:** Include a statement in the Quality Control Plan allowing the Department inspectors access to the production facility to perform the inspections of the production process and the products produced for the Department.

#### **105-5 Contractor Quality Control (QC) Plan.**

**105-5.1 General:** Submit the Contractor QC Plan in the Department's database seven days prior to beginning work on any QC material as defined in this Section. The QC Plan may be submitted as a whole or in portions for the work related to the Contract.

Update the QC Plan at least five working days prior to the implementation of any changes.

If at any time the Work is not in compliance with the Contract Documents, the Engineer may suspend operations in accordance with 8-6.1.

**105-5.2 Personnel Qualification:** Submit the Training Identification Numbers for all technicians performing sampling, testing and inspection for field tests. Include employed and subcontracted technicians.

**105-5.3 Production Facilities:** Identify the producers of materials listed in 105-4.4 for the project. Include the Department's facility ID number as part of the identification. All producers must have accepted Producer's Quality Control Program and be listed on the Department's Production Facility Listing.

**105-5.3.1 Structural Concrete Mix Designs:** Identify the approved structural concrete mix designs for each structural concrete production facility for review and approval by the Engineer. Do not begin work on the material without the Engineer's approval. The Engineer will review and respond within five calendar days of submittal.

**105-5.4 Testing Laboratories:** Identify the laboratories performing testing. Ensure that the testing laboratories comply with the Laboratory Qualification Program requirements of this Section.

### **105-6 Contractor Certification of Compliance.**

Provide the Engineer with a notarized monthly certification of compliance with the Contract Documents, to accompany each progress estimate, on a form provided by the Engineer. The Department may not authorize payment of any progress estimate not accompanied by an executed certification document.

Final payment in accordance with 9-8 will not be made until a final notarized certification summarizing all QC exceptions has been submitted.

### **105-7 Lab Qualification Program.**

Testing laboratories participating in the Department's Acceptance Program must have current Department qualification when testing materials that are used on Department projects. In addition, they must have one of the following:

1. Current AASHTO (AAP) accreditation.
2. Inspected on a regular basis per ASTM D3740 for earthwork, ASTM D3666 for asphalt and ASTM C1077 for concrete for test methods used in the Acceptance Program, with all deficiencies corrected, and under the supervision of a Specialty Engineer.
3. Current Construction Materials Engineering Council (CMEC) program accreditation or other independent inspection program accreditation acceptable to the Engineer and equivalent to (1) or (2) above.

After meeting the criteria described above, submit a Laboratory Qualification Application to the Department. The application is available from the Department's website: <https://www.fdot.gov/materials/quality/programs/laboratoryqualification/index.shtm>. Obtain the Department's qualification prior to beginning testing. The Department may inspect the laboratory for compliance with the accreditation requirements prior to issuing qualification.

Meet and maintain the qualification requirements at all times. Testing without Department's qualification may result in a rejection of the test results. Continued qualifications are subject to satisfactory results from Department evaluations, including Independent Assurance evaluations. In case of suspension or disqualification, prior to resumption of testing, resolve the issues to the Department's satisfaction and obtain reinstatement of qualification. The following conditions may result in suspension of a laboratory's qualified status:

1. Failure to timely supply required information.
2. Loss of accredited status.
3. Failure to correct deficiencies in a timely manner.
4. Unsatisfactory performance.
5. Changing the laboratory's physical location without notification to the accrediting agency and the Engineer.
6. Delays in reporting the test data in the Department's database.
7. Incomplete or inaccurate reporting.
8. Using unqualified technicians performing testing.

Should any qualified laboratory falsify records, the laboratory qualification will be subject to revocation by the Engineer. Falsification of project-related documentation will be subject to further investigation and penalty under State and Federal laws.

It is prohibited for any contract laboratory or staff to perform Contractor QC testing and any other Acceptance Program testing on the same contract.

**105-8 Personnel Qualifications.**

**105-8.1 General:** Provide qualified personnel for sampling, testing and inspection of materials and construction activities. Ensure that qualifications are maintained during the course of sampling, testing and inspection.

Construction operations that require a qualified technician must not begin until the Department verifies that the technician is on the CTQP list of qualified technicians. The CTQP lists are subject to satisfactory results from periodic Independent Assurance evaluations.

**105-8.2 Quality Control (QC) Manager:** Designate a QC Manager who has full authority to act as the Contractor’s agent to institute any and all actions necessary to administer, implement, monitor, and as necessary, adjust quality control processes to ensure compliance with the Contract Documents. The QC Manager must speak and understand English. The QC Manager must be on-site at the project on a daily basis or always available upon four hours’ notice. Ensure that the QC Manager is qualified as such through the Construction Training and Qualification Program. The QC Manager and the Superintendent must not be the same individual.

Under the direction of the QC Manager, ensure that the QC test data is entered into the Department’s database on a daily basis. Use Department approved programs to generate the plots for the Earthwork Records System (ERS). Maintain all QC related reports and documentation for a period of three years from final acceptance of the project. Make copies available for review by the Department upon request.

**105-8.3 Temporary Traffic Control (Maintenance of Traffic) Personnel:** Worksite Traffic Supervisors, flaggers, and other personnel responsible for work zone related transportation management and traffic control must obtain training and certification in accordance with the Department’s Temporary Traffic Control (Maintenance of Traffic) Training Handbook located at the following URL address:  
<https://www.fdot.gov/roadway/TTC/Default.shtm>.

**105-8.4 Earthwork Quality Control (QC) Personnel:**

**105-8.4.1 Earthwork Level 1:** Ensure the technician who samples the soil and earthwork materials from the roadway project, takes earthwork moisture and density readings, and records those data into the ERS section of the Department’s database, holds a CTQP Earthwork Construction Inspection Level 1 qualification.

**105-8.4.2 Earthwork Level 2:** Ensure the technician responsible for determining the disposition of soil and earthwork materials on the roadway, and for interpreting and meeting Contract Document requirements holds a CTQP Earthwork Construction Inspection Level 2 qualification.

**105-8.5 Asphalt Quality Control (QC) Personnel:**

**105-8.5.1 Plant Technicians:** For asphalt plant operations, provide a QC technician, qualified as a CTQP Asphalt Plant Level 2 Technician, available at the asphalt plant at all times when producing mix for the Department. Perform all asphalt plant related testing with a CTQP Asphalt Plant Level 1 Technician. As an exception, measurements of temperature may be performed by someone under the supervision of a CTQP Plant Level 2 technician.

**105-8.5.2 Paving Technicians:** For paving operations (with the exception of miscellaneous or temporary asphalt), keep a qualified CTQP Asphalt Paving Level 2 Technician on the roadway at all times when placing asphalt mix for the Department, and perform all testing with a CTQP Asphalt Paving Level 1 Technician. As an exception, measurements of cross-slope,

temperature, and yield (spread rate) can be performed by someone under the supervision of a CTQP Paving Level 2 Technician at the roadway.

**105-8.5.3 Mix Designer:** Ensure all mix designs are developed by individuals who are CTQP qualified as an Asphalt Hot Mix Designer.

**105-8.5.4 Documentation:** Document all QC procedures, inspection, and all test results and make them available for review by the Engineer throughout the life of the Contract. Identify in the asphalt producer's QC Plan the QC Managers and Asphalt Plant Level 2 technicians responsible for the decision to resume production after a quality control failure.

**105-8.6 Concrete QC Personnel:**

**105-8.6.1 Concrete Field Technician - Level 1:** Ensure technicians performing plastic property testing on concrete for materials acceptance are qualified CTQP Concrete Field Technicians Level 1. Plastic property testing will include but not be limited to slump, temperature, air content, water-to-cementitious materials ratio calculation, and making and curing concrete cylinders. Duties will include initial sampling and testing to confirm specification compliance prior to beginning concrete placements, ensuring timely placement of initial cure and providing for the transport of compressive strength samples to the designated laboratories. Ensure that personnel performing plastic property testing on self-consolidating concrete (SCC) possess an ACI Self-Consolidating Concrete Testing Technician Certification.

**105-8.6.2 Concrete Field Inspector - Level 2:** Ensure field inspectors responsible for the quality of concrete being placed on the following structure types are qualified CTQP Concrete Field Inspectors Level 2:

1. Moveable bridges
2. Bridges over a water opening of 1,000 feet or more
3. Bridges with a span of 190 feet or more
4. Cable supported or cable stayed bridges
5. Post-tensioned bridges
6. Steel girder or steel truss bridges
7. Multi-level roadways

With the exception of concrete traffic railing and bridge approach slab placements, a Level 2 Inspector must be present on the jobsite during all concrete placements. Prior to the placement of concrete, the inspector will inspect the element to be cast to ensure compliance with Contract Documents. A Level 2 Inspector's duties may include ensuring that concrete testing, inspection, and curing in the field are performed in accordance with the Contract Documents. The QC Inspector will inform the Verification Inspector of anticipated concrete placements and LOT sizes.

**105-8.6.3 Concrete Laboratory Technician – Level 1:** Ensure technicians testing cylinders and recording concrete strength for material acceptance are qualified CTQP Concrete Laboratory Technicians Level 1. Duties include final curing, compressive strength testing, and the recording/reporting of all test data.

**105-8.7 Structural Concrete Production Facility Quality Control (QC) Personnel:**

Ensure that each portland cement structural concrete production facility (plant), has designated personnel including plant manager of QC, concrete mix designer, concrete batch plant operator, and testing technicians to provide QC inspections and testing.

Upon Department approval, the functions of the above positions may be performed by the same person when it can be demonstrated that the plant's operation and quality of concrete will not be detrimentally affected and personnel have the qualifications required herein.

**105-8.7.1 Plant Manager of QC:** Ensure that the plant manager of QC has at least three years of concrete related experience and the following training certifications:

1. CTQP Concrete Laboratory Technician - Level 1 certificate.
2. CTQP Concrete Field Technician - Level 1 certificate.
3. Concrete Batch Plant Operator certification in accordance with 105-

8.7.4.

As alternatives to these certifications, the Department will accept, one of the following:

- a. Prestressed Concrete Institute (PCI) QC Personnel Certification Level III.
- b. Precast Concrete Pipe, Box Culverts, Drainage Structures or Incidental Precast Concrete Plants Level II QC Inspector Certifications.
- c. National Ready Mixed Concrete Association (NRMCA) Certified Concrete Technologist Level 2.

**105-8.7.2 Concrete Mix Designer:** Ensure that the concrete mix designer has the CTQP Concrete Laboratory Technician Level 2 certification. As an alternative, the Department will accept any of the following qualifications:

1. PCI QC Personnel Level III Certification, for concrete mix designs of prestressed concrete products.
2. National Ready Mix Concrete Association (NRMCA) Certified Concrete Technologist Level 3.
3. Any of the Level II QC certifications in accordance with 105-8.9.2.2.

**105-8.7.3 Qualified Testing Technicians:** Ensure that the testing technicians have the following certifications:

1. ACI Concrete Field Testing Technician Grade I, for personnel performing concrete plastic property tests and ACI Self-Consolidating Concrete Testing Technician if testing self-consolidating concrete (SCC).
2. ACI Concrete Strength Testing Technician, for personnel performing tests on hardened properties of concrete.

**105-8.7.4 Concrete Batch Plant Operator:** Ensure that the concrete batch plant operator has a CTQP Concrete Batch Plant Operator Certification. As an alternative, the Department will accept the following certifications:

- a. Precast Concrete Structures Association (PCSA) Batch Plant Operator,
- b. NRMCA Certified Concrete Technologist Level 3, or
- c. NRMCA Plant Manager Certification.

For dry cast concrete pipe and dry cast drainage structures, the Department will accept American Concrete Pipe Association (ACPA) Quality School Certification.

**105-8.8 Prestressed Concrete Plant Quality Control (QC) Personnel:** Obtain personnel certifications from Department accredited training providers. The list of Department approved courses and their accredited providers is available on the SMO website at the following URL: <https://www.fdot.gov/materials/administration/resources/training/structural/concrete-prestressed.shtm>.

Ensure each prestressed concrete plant has an onsite production manager, an onsite plant QC manager, a plant engineer, and adequate onsite QC inspectors/technicians to provide complete QC inspections and testing.

Ensure the plant manager for QC has at least five years of related experience and the following certifications:

1. ACI Concrete Field Testing Technician Grade I certification.
2. PCI QC Personnel Certification Level III.
3. Certificate of completion of Section 450 Specification examination.

Ensure that the QC inspector/technician has the following certifications:

1. ACI Concrete Field Testing Technician Grade I certification.
2. Certificate of completion of Section 450 Specification examination.

**105-8.8.1 Additional Requirements for Quality Control (QC) Personnel of Prestressed Manufacturing Facilities:**

**105-8.8.1.1 Testing Personnel:** Ensure that testing technicians meet the requirement of 105-8.7.3.

**105-8.8.1.2 Batch Plant Operator:** Ensure that the batch plant operator meets the requirement of 105-8.7.4.

**105-8.9 Pipe and Precast Concrete Products Manufacturing Facilities Quality Control (QC) Personnel:**

**105-8.9.1 General:** Obtain personnel certifications from Department accredited training providers. The list of Department approved courses and their accredited providers is available on the SMO website at the following URL:

<https://www.fdot.gov/materials/administration/resources/training/structural/index.shtm>.

**105-8.9.2 Precast Concrete Drainage Structures, Precast Concrete Box Culvert, Precast Concrete Pipe, and Incidental Precast Concrete Manufacturing Facilities Quality Control (QC) Personnel:**

**105-8.9.2.1 Level I Quality Control Inspectors:** Ensure that the Level I Inspectors have the following certifications:

**105-8.9.2.1.1 Precast Concrete Drainage Technician Level I:** PCI Quality Control Technician Level I certification. As an alternative, a current Precast Concrete Quality Control Technician Level I certification in the respective work area will be accepted.

**105-8.9.2.1.2 Incidental Precast Concrete Technician Level I:** PCI Quality Control Technician Level I certification. As an alternative, a current Precast Concrete Quality Control Technician Level I certification in the respective work area will be accepted.

**105-8.9.2.1.3 Precast Concrete Pipe Technician Level I:** Precast Concrete Pipe Technician Level I certification.

**105-8.9.2.2 Level II Quality Control Inspectors:** Ensure that Level II Inspectors have the following certifications:

**105-8.9.2.2.1 Precast Concrete Drainage Technician Level II:**  
1. Precast Concrete Drainage Technician Level I, in accordance with 105-8.9.2.1.1.

2. PCI Quality Control Technician Level II certification. As an alternative, a current Precast Concrete Quality Control Technician Level II certification in the respective work area will be accepted.

3. CTQP Concrete Field Technician Level 1, if the plant produces structural concrete in accordance with Section 346.

**105-8.9.2.2.2 Incidental Precast Concrete Technician Level II:**

accordance with 105-8.9.2.1.2.

an alternative, a current Precast Concrete Quality Control Technician Level II in the respective work area will be accepted.

1. Incidental Precast Concrete Technician Level I, in  
 2. PCI Quality Control Technician Level II certification. As  
 3. CTQP Concrete Field Technician Level 1.  
 4. Level II technicians who will perform quality control of  
 incidental prestressed products must have a current certificate of completion of Section 450  
 Specification examination.

**105-8.9.2.2.3 Precast Concrete Pipe Technician Level II:**

1. Precast Concrete Pipe Technician Level I, in accordance  
 with 105-8.9.2.1.3.  
 2. Precast Concrete Pipe Technician Certification Level II.

**105-8.9.2.3 Plant Quality Control Manager:** Ensure that the QC manager has a minimum of two years construction related experience in the specific work area and has the following certifications:

**105-8.9.2.3.1 Precast Concrete Drainage Facilities:**

Precast Concrete Drainage Technician Level II in  
 accordance with 105-8.9.2.2.1.

**105-8.9.2.3.2 Incidental Precast Concrete Facilities:**

1. Incidental Precast Concrete Technician Level II in  
 accordance with 105-8.9.2.2.2.  
 2. Section 450 Specification Certification if the plant  
 produces incidental prestressed products.

**105-8.9.2.3.3 Precast Concrete Pipe Facilities:**

Precast Concrete Pipe Technician Level II in accordance  
 with 105-8.9.2.2.3.

**105-8.9.2.4 Additional Requirements for Quality Control (QC) Personnel of Precast Concrete Drainage Structures and Box Culverts, Precast Concrete Pipe, and Incidental Precast Concrete Manufacturing Facilities:**

**105-8.9.2.4.1 Testing Personnel:** Ensure testing technicians meet the requirement of 105-8.7.3.

**105-8.9.2.4.2 Batch Plant Operator:** Ensure the batch plant operator meets the requirement of 105-8.7.4.

**105-8.10 Supervisory Personnel – Post-Tensioned and Movable Bridge Structures:**

**105-8.10.1 General:** Provide supervisory personnel meeting the qualification requirements only for the post-tensioned and movable bridge types detailed in this Article. Submit qualifications to the Engineer at the pre-construction conference. Do not begin construction until the qualifications of supervisory personnel have been approved by the Engineer.

**105-8.10.2 Proof of License or Certification:** Submit a copy of the Professional Engineer license current and in force issued by the state in which registration is held. The license must be for the field of engineering that the construction work involves such as Civil, Electrical or Mechanical. Under certain circumstances Florida registration may be required.

Submit a copy of the license issued by the State of Florida for tradesmen that require a license indicating that the license is in force and is current. Submit a copy of the

certification issued by the International Society of Automation for each Certified Control Systems Technician.

**105-8.10.3 Experience Record:** Submit the following information for supervisory personnel to substantiate their experience record. The supervisor (project engineer, superintendent/manager or foreman) seeking approval must provide a notarized certification statement attesting to the completeness and accuracy of the information submitted. Submit the following experience information for each individual seeking approval as a supervisor:

Project owner's name and telephone number of an owner's representative, project identification number, state, city, county, highway number and feature intersected.

Detailed descriptions of each bridge construction experience and the level of supervisory authority during that experience. Report the duration in weeks, as well as begin and end dates, for each experience period.

The name, address and telephone number of an individual that can verify that the experience being reported is accurate. This individual should have been an immediate supervisor unless the supervisor cannot be contacted in which case another individual with direct knowledge of the experience is acceptable.

**105-8.10.4 Concrete Post-Tensioned Segmental Box Girder Construction:** Ensure the individuals filling the following positions meet the minimum requirements as follows:

**105-8.10.4.1 Project Engineer-New Construction:** Ensure the project engineer is a registered Professional Engineer with five years of bridge construction experience. Ensure a minimum of three years of experience is in segmental box girder construction engineering and includes a minimum of one year in segmental casting yard operations and related surveying, one year in segment erection and related surveying, including post-tensioning and grouting of longitudinal tendons and a minimum of one year as the project engineer in responsible charge of segmental box girder construction engineering. Ensure this individual is present at the site of construction, at all times while segmental box girder construction or segment erection is in progress.

**105-8.10.4.2 Project Engineer-Repair and Rehabilitation:** Ensure the project engineer is a registered Professional Engineer with five years of bridge construction experience. Ensure a minimum of three years of experience is in segmental box girder construction engineering and includes one year of post-tensioning and grouting of longitudinal tendons and a minimum of one year as the project engineer in responsible charge of segmental box girder rehabilitation engineering or segmental box girder new construction engineering.

**105-8.10.4.3 Project Superintendent/Manager-New Construction:** Ensure the project superintendent/manager has a minimum of ten years of bridge construction experience or is a registered Professional Engineer with five years of bridge construction experience. Ensure that a minimum of three years of experience is in segmental box girder construction operations and includes a minimum of one year in the casting yard operations and related surveying, one year in segment erection and related surveying including post-tensioning and grouting of longitudinal tendons and a minimum of one year as the project superintendent/manager in responsible charge of segmental box girder construction operations. Ensure this individual is present at the site of construction, at all times while segmental box girder construction or segment erection is in progress.

**105-8.10.4.4 Project Superintendent/Manager-Repair and Rehabilitation:** Ensure the project superintendent/manager has a minimum of five years of bridge construction experience or is a registered Professional Engineer with three years of bridge

construction experience. Ensure that a minimum of two years of experience is in segmental box girder construction operations and includes a minimum of one year of experience performing post-tensioning and grouting of longitudinal tendons and a minimum of one year as the project superintendent/manager in responsible charge of segmental box girder rehabilitation operations or segmental box girder new construction operations.

**105-8.10.4.5 Foreman-New Construction:** Ensure that the foreman has a minimum of five years of bridge construction experience with two years of experience in segmental box girder operations and a minimum of one year as the foreman in responsible charge of segmental box girder new construction operations. Ensure this individual is present at the site of construction, at all times while segmental box girder construction or segment erection is in progress.

**105-8.10.4.6 Foreman-Repair and Rehabilitation:** Ensure the foreman has a minimum of five years of bridge construction experience with two years of experience in segmental box girder operations and a minimum of one year as the foreman in responsible charge of segmental box girder rehabilitation operations or segmental box girder new construction operations.

**105-8.10.4.7 Geometry Control Engineer/Manager:** Ensure that the geometry control engineer/manager for construction of cast-in-place box segments is a registered Professional Engineer with one year of experience, a non-registered Engineer with three years of experience or a registered Professional Land Surveyor with three years of experience in geometry control for casting and erection of cast-in-place box segments. Credit for experience in cast-in-place box girder geometry control will be given for experience in precast box girder geometry control but not vice versa.

Ensure that the geometry control engineer/manager for precast box segments is a registered Professional Engineer with one year of experience or non-registered with three years of experience in casting yard geometry control of concrete box segments.

The geometry control engineer/manager must be responsible for and experienced at implementing the method for establishing and maintaining geometry control for segment casting yard operations and segment erection operations and must be experienced with the use of computer programs for monitoring and adjusting theoretical segment casting curves and geometry. This individual must be experienced at establishing procedures for assuring accurate segment form setup, post-tensioning duct and rebar alignment and effective concrete placement and curing operations as well as for verifying that casting and erection field survey data has been properly gathered and recorded. Ensure this individual is present at the site of construction, at all times while cast-in-place segmental box girder construction is in progress or until casting yard operations and segment erection is complete.

**105-8.10.4.8 Surveyor:** Ensure that the surveyor in charge of geometry control surveying for box segment casting and/or box segment erection has a minimum of one year of bridge construction surveying experience. Ensure this individual is present at the site of construction, at all times while segmental box girder construction or segment erection is in progress.

**105-8.10.5 Movable Bridge Construction:** Ensure the individual filling the following positions meet the minimum requirements as follows:

**105-8.10.5.1 Electrical Journeyman:** Ensure the electrical journeyman holds, an active journeyman electrician's license and has at least five years' experience in industrial electrical work, or is a certified control systems technician. A certified control systems

technician will not be permitted to perform electrical power work including, but not limited to, conduit and wire-way installation or power conductor connection. Ensure the electrical journeyman has successfully completed the installation of one similar movable bridge electrical system during the last three years.

**105-8.10.5.2 Control Systems Engineer and Mechanical Systems**

**Engineer:** Ensure the control systems engineer and mechanical systems engineer are both registered Professional Engineers with a minimum of 10 years supervisory experience each in movable bridge construction. Ensure the engineers have working knowledge of the movable bridge leaf motion control techniques, mechanical equipment and arrangements specified for this project. Ensure that each engineer has been in responsible control of the design and implementation of at least three movable bridge electrical control and machinery systems within the past 10 years of which, at least one of the three bridges was within the last three years. Ensure that a minimum of one of the three bridge designs incorporated the same type of leaf motion control and machinery systems specified for this project.

**105-8.10.6 Concrete Post-Tensioned Other Than Segmental Box Girder**

**Construction:** Ensure the individual filling the following positions meet the minimum requirements as follows:

**105-8.10.6.1 Project Engineer:** Ensure the project engineer is a registered Professional Engineer with five years of bridge construction experience. Ensure that a minimum of three years of experience is in concrete post-tensioned construction. Ensure that the three years of experience includes experience in girder erection, safe use of cranes, stabilization of girders; design of false work for temporary girder support, post-tensioning and grouting operations, and a minimum of one year as the project engineer in responsible charge of post-tensioning related engineering responsibilities.

**105-8.10.6.2 Project Superintendent/Manager:** Ensure the project superintendent/manager has a minimum of ten years of bridge construction experience or is a registered Professional Engineer with five years of bridge construction experience and has a minimum of three years of supervisory experience in girder erection, safe use of cranes, stabilization of girders; design of falsework for temporary girder support post-tensioning, grouting operations and a minimum of one year as the project superintendent/manager in responsible charge of post-tensioning related operations.

**105-8.10.6.3 Foreman:** Ensure the foremen has a minimum of five years of bridge construction experience with two years of experience in post-tensioning related operations and a minimum of one year as the foreman in responsible charge of post-tensioning related operations.

**105-8.10.7 Post-Tensioning (PT) and Filler Injection Personnel**

**Qualifications:** Perform all stressing and filler injection operations in the presence of the Engineer and with personnel meeting the qualifications of this article. Coordinate and schedule all PT and filler injection activities to facilitate inspection by the Engineer.

**105-8.10.7.1 Post-Tensioning:** Perform all PT field operations under the direct supervision of a Level 2 CTQP Qualified PT Technician who must be present at the site of the post-tensioning work during the entire duration of the operation. For the superstructures of bridges having concrete post-tensioned box or I girder construction, provide at least two CTQP Qualified PT Technicians, Level 1 or 2, on the work crew. The supervisor of the work crew, who must be a Level 2 CTQP Qualified PT Technician, may also be a work crew member, in which case, the supervisor shall count as one of the two CTQP qualified work crew members. For PT

operations other than the superstructures of post-tensioned box or I girder construction, perform all PT operations under the direct supervision of a Level 2 CTQP Qualified PT Technician who must be present at the site of the PT work during the entire duration of the operation. Work crew members are not required to be CTQP qualified.

**105-8.10.7.2 Grouting:** Perform all grouting field operations under the direct supervision of a Level 2 CTQP Qualified Grouting Technician who must be present at the site of the grouting work during the entire duration of the operation. For the superstructures of bridges having concrete post-tensioned box or I girder construction, provide at least two CTQP Qualified Grouting Technicians, Level 1 or 2, on the work crew. The supervisor of the work crew, who must be a Level 2 CTQP Qualified Grouting Technician, may also be a work crew member, in which case, the supervisor shall count as one of two CTQP qualified work crew members. For grouting operations other than the superstructures of post-tensioned box or I girder construction, perform all grouting operations under the direct supervision of a Level 2 CTQP Qualified Grouting Technician who must be present at the site of the grouting work during the entire duration of the operation. Work crew members are not required to be CTQP qualified.

Perform all vacuum grouting operations under the direct supervision of a crew foreman who has been trained and has experience in the use of vacuum grouting equipment and procedures. Submit the crew foreman's training and experience records to the Engineer for approval prior to performing any vacuum grouting operation.

**105-8.10.7.3 Flexible Filler Injection:** Perform all filler injection operations under the direct supervision of a filler injection foreman who has American Segmental Bridge Institute (ASBI) certification in the flexible filler process. Provide at least two CTQP Qualified Grouting Technicians with ASBI certification in the flexible filler process, one of whom must be a Level 2 CTQP Qualified Grouting Technician. Both technicians must be present at the site of the flexible filler injection work during the entire duration of the operation.

Provide a filler injection quality control (QC) inspector who has ASBI certification in the flexible filler process. The filler injection QC inspector must be present at the site of the flexible filler injection work during the entire duration of the operation.

Verifiable experience performing injection of similar flexible filler on at least two projects is acceptable in lieu of ASBI certification in the flexible filler process.

Perform all flexible filler repair operations under the direct supervision of a crew foreman who has been trained and has verifiable experience in the use of vacuum flexible filler repair equipment and procedures. Submit the crew foreman's training and experience records to the Engineer prior to performing any flexible filler operation.

**105-8.10.8 Failure to Comply with Bridge Qualification Requirements:** Make an immediate effort to reestablish compliance. If an immediate effort is not put forth as determined by the Engineer, payment for the bridge construction operations requiring supervisors to be qualified under this Specification will be withheld up to 60 days. Cease all bridge construction and related activities (casting yard, etc.) if compliance is not met within 60 days, regardless of how much effort is put forth. Resume bridge construction operations only after written approval from the Engineer stating that compliance is reestablished.

**105-8.11 Signal Installation Inspector:** Provide an inspector trained and certified by the International Municipal Signal Association (IMSA) as a traffic signal inspector to perform all signal installation inspections. Use only Department approved signal inspection report forms during the signal inspection activities. Ensure all equipment, materials, and hardware is in compliance with Department Specifications and verify that all equipment requiring certification

is listed on the Department’s Approved Product List (APL). Submit the completed signal inspection report forms, certified by the IMSA traffic signal inspector to the Engineer.

The Department’s approved inspection report forms are available at the following URL: <http://www.fdot.gov/traffic/>.

**105-8.12 Structural Steel and Miscellaneous Metals Fabrication Facility Quality**

**Control Personnel:** Ensure each fabrication facility has an onsite production manager, an onsite facility manager for QC, a plant engineer, and onsite QC inspectors/technicians to provide complete QC inspections and testing.

Ensure that the facility manager for QC and QC inspectors/technicians meet the certification requirements set forth in the latest version of AASHTO/NSBA Steel Bridge Collaboration S 4.1, Steel Bridge Fabrication QC/QA Guide Specification, including the years of experience required in Table 105-1 below. The facility manager for QC must meet the requirements of Table 105-1 for every structural steel member type produced by a plant with QC being managed by the facility manager for QC. The facility manager for QC will report directly to the plant manager or plant engineer and must not be the plant production manager nor report to or be the subordinate of the plant production manager. QC inspectors/technicians must be the employees of, and must report directly to the facility manager for QC.

Table 105-1 Experience Requirements for QC Inspectors/Technicians And Facility Manager for Quality Control		
Structural Steel Member Type	Minimum Years of Experience Required	
	QC Inspector/Technician	Facility Manager for QC
Rolled beam bridges	1 year	3 years
Welded plate girders (I sections, box sections, etc.)	2 years	4 years
Complex structures, such as trusses, arches, cable stayed bridges, and moveable bridges	3 years	5 years
Fracture critical (FC) members	3 years	5 years

**SECTION 107  
LITTER REMOVAL AND MOWING**

**107-1 Description.**

Provide pickup, removal and disposal of litter within the project limits from the outside edge of travel way to the right of way line. Include the median on divided highways, from the inside edge of travel way to the inside edge of travel way. Litter includes but is not limited to, bottles, cans, paper, tires, tire pieces, lumber, vehicle parts, metal junk, and brush debris.

Mow turf or vegetation within the project limits. Turf consists of grasses planted in accordance with Section 570. Vegetation consists of planted and natural grasses, weeds, and other natural vegetation that have been previously mowed.

**107-2 Operation.**

**107-2.1 Frequency:** Begin litter removal and mowing when directed by the Engineer and continue every 30 days, unless otherwise directed by the Engineer. Continue litter removal and mowing until final acceptance in accordance with 5-11. Mow all areas to obtain a uniform height of 6 inches.

After final acceptance, perform litter removal and mowing until new turf is established in accordance with 570-4 at no cost to the Department. Maintain turf and vegetation height between 6 inches and 12 inches. Do not include seed stalk or wildflowers when measuring height.

Perform litter removal prior to and in conjunction with mowing; however, the Engineer may direct litter pickups in addition to those performed in conjunction with mowing.

Do not mow new turf until a healthy root system is established. In designated wildflower areas, avoid cutting wildflowers when in bloom and when re-seeding.

**107-2.2 General:** Mow shoulders and medians concurrently so that not more than one mile will be left partially mowed at the conclusion of the working day. Mow turf and vegetation on slopes or around appurtenances concurrent with the mowing operation.

In areas saturated with standing water, mow or cut to the surface of the water using hand labor or other specialized equipment when standard equipment will cause damage.

Do not remove turf or other vegetation cuttings from the right-of-way, or rake or pick up the cuttings unless the cuttings are in the traveled ways, bike lanes, or sidewalk; are obstructing drainage structures; or are the result of cleaning the equipment.

**107-2.3 Limitations:** Maintain traffic in accordance with Section 102. When mowing within four feet of a travel lane, operate the equipment in the same direction of traffic, unless the adjacent lane is closed to traffic due to construction operations.

Perform all work during daylight hours.

**107-2.4 Disposal of Litter and Debris:** During each litter removal cycle, bag and remove all litter or piles at the end of each working day. Dispose of litter in accordance with applicable local and state laws. Do not store or stockpile litter within the project limits.

**107-3 Method of Measurement.**

The quantity to be paid will be the project area shown in the Contract Documents, in acres, for each litter removal or mowing cycle completed and accepted. No adjustments will be made to the project area quantity.

**107-4 Basis of Payment.**

Price and payment will be full compensation for all work specified in this section.

No separate payment will be made for litter removal and mowing after final acceptance.

Payment will be made under:

Item No. 107 - 1- Litter Removal - per acre.

Item No. 107 - 2- Mowing - per acre

## SECTION 108 MONITOR EXISTING STRUCTURES

### 108-1 Description.

Provide settlement, vibration, and groundwater monitoring in accordance with the requirements of this Section. The work required under this Section does not modify the requirements or responsibilities for preservation of existing property from damage in accordance with 7-11.1.

Evaluate the need for, design of, and provide any necessary precautionary features to protect existing structures from damage. Employ construction methods that will not produce damaging vibrations, soil movement, soil loss, or instability of existing structures.

### 108-2 Construction.

#### 108-2.1 Inspection and Settlement Monitoring:

**108-2.1.1 Miscellaneous Structures:** When constructing foundations for miscellaneous structures such as sign, signal, lighting, or intelligent transportation system structures, inspect and document the condition of the existing structures shown in the Plans, and survey and monitor for settlement the existing structures shown in the Plans.

**108-2.1.2 Structures other than Miscellaneous:** When excavating or constructing retaining walls and foundations for bridges, buildings, and structures other than miscellaneous structures, inspect and document the condition of the following existing structures, and survey and monitor for settlement the following existing structures:

1. as shown in the Plans.
2. within a distance of five shaft or auger cast pile diameters, or the estimated depth of drilled shaft or auger cast pile excavation, whichever is greater, measured from the center of these foundation elements.
3. within a distance of three times the depth of any other excavations.
4. within 200 feet of sheet pile installation and extraction operations.
5. within 100 feet of steel soldier pile installation and extraction operations.
6. for projects with pile driving operations, inspect and document the condition of all structures within a distance, in feet, of pile driving operations equal to 0.25 times the square root of the impact hammer energy, in foot-pounds. Survey and monitor for settlement all structures within a distance, in feet, of pile driving operations equal to 0.5 times the square root of the impact hammer energy, in foot-pounds.

**108-2.1.3 Roadway Compaction Operations:** When performing embankment and asphalt compaction, inspect and document the condition of the following existing structures, and survey and monitor for settlement the following existing structures:

1. as shown in the Plans.
2. within 75 feet of vibratory compaction (in any vibratory mode) operations.

**108-2.1.4 Inspection and Documentation Requirements:** Inspect and document the condition of the existing structures and all existing cracks with descriptions and pictures using a qualified Specialty Engineer. Submit two reports, signed and sealed by the Specialty Engineer, documenting the condition of the structures. Submit one report before beginning the construction operations that may affect the existing structures such as but not limited to foundation construction, excavations, vibratory compaction, dewatering and retaining wall

construction. Submit the second report documenting the condition of the structures after the construction operations are complete. Include in the reports the Specialty Engineer's assessment of any damage present, and in the event of damage, the Specialty Engineer's assessment of whether the observed damage is the result of the construction operations. Submit both reports to the Engineer. Inspecting and documenting the condition of bridges, sign, signal, lighting, and ITS structures owned by the Department is not required except when shown in the Contract Documents.

The Department will make the necessary arrangements to provide right-of-way entry to the existing structures.

**108-2.1.5 Settlement Surveying and Monitoring Requirements:** Obtain the Engineer's approval for the number and location of monitoring points. Survey and monitor the settlement of structures, providing +/-0.005 foot accuracy, recording elevations to 0.001 foot:

1. before beginning construction
2. daily, during the driving of any casings, piling, or sheeting,
3. daily, during compaction
4. daily, during foundation drilling
5. weekly, for two weeks after stopping pile driving
6. during excavation
7. during blasting
8. or, as directed by the Engineer

Upon either detecting movement of 0.010 feet or damage to the structure, immediately stop the construction operations affecting the structure, backfill any open excavations, notify the Engineer and submit a corrective action plan for acceptance by the Engineer. Submit settlement monitoring records to the Engineer on a weekly basis.

**108-2.2 Vibration Monitoring:** When shown in the Contract Documents, employ a Specialty Engineer to provide a system which will continuously monitor and record ground vibration levels near the structures shown in the Plans during the operation of any equipment causing vibrations or during blasting operations. Provide vibration monitoring equipment capable of detecting velocities of 0.01 inches per second or less. Obtain the Engineer's approval of the number and locations of the monitoring points and install the system per the Specialty Engineer's recommendations. Submit the vibration records to the Engineer within 24 hours of performing the monitoring activity.

Upon either detecting vibration levels reaching 0.5 inches per second or damage to the structure, immediately stop the source of vibrations, backfill any open excavations, notify the Engineer and submit a corrective action plan for acceptance by the Engineer.

**108-2.3 Groundwater Monitoring:** When shown in the Contract Documents, install a piezometer at the right-of-way line and near any existing structure that may be affected by dewatering operations, or as directed by the Engineer. Monitor the piezometer and record the groundwater elevation level each day that dewatering activities are performed and for one week after activities have ceased, or on a schedule approved by the Engineer. Notify the Engineer of any groundwater lowering near the structure of 12 inches or more.

### **108-3 Method of Measurement.**

The quantities to be paid for will be lump sum, completed and accepted. No separate payment will be made for the design, furnishing, construction, and removal of precautionary features, such as but not limited to sheeting, shoring, or bracing, installed for protection of existing structures.

**108-4 Basis of Payment.**

Price and payment will be full compensation for all work and materials specified in this Section.

Payment will be made under:

- Item No. 108- 1      Monitor Existing Structures - Inspection and Settlement Monitoring - lump sum.
- Item No. 108- 2      Monitor Existing Structures - Vibration Monitoring - lump sum.
- Item No. 108- 3      Monitor Existing Structures - Groundwater Monitoring - lump sum.

## CLEARING CONSTRUCTION SITE

### SECTION 110 CLEARING AND GRUBBING

#### **110-1 Description.**

Clear and grub within the areas shown in the Plans. Remove and dispose of all trees, stumps, roots and other such protruding objects, buildings, structures, appurtenances, existing flexible asphalt pavement, and other facilities necessary to prepare the area for the proposed construction. Remove and dispose of all product and debris not required to be salvaged or not required to complete the construction.

Perform miscellaneous work necessary for the complete preparation of the overall project site as specified in 110-10.

#### **110-2 Standard Clearing and Grubbing.**

**110-2.1 Work Included:** Completely remove and dispose of all buildings, timber, brush, trees, stumps, roots, rubbish, debris, existing flexible pavement and base, drainage structures, culverts, and pipes. Remove all other obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas.

Perform standard clearing and grubbing within the following areas:

1. All areas where excavation is to be done, including borrow pits, lateral ditches, right-of-way ditches, etc.
2. All areas where roadway embankments will be constructed, unless constructing over an existing road. If constructing over an existing road, remove asphalt pavement and base in accordance with 120-4.2 and the Plans.
3. All areas where structures will be constructed, including pipe culverts and other pipe lines.

**110-2.2 Depths of Removal of Roots, Stumps, and Other Debris:** In all areas where excavation is to be performed, or roadway embankments are to be constructed, remove roots and other debris to a depth of 12 inches below the ground surface. Remove roots and other debris from all excavated material to be used in the construction of roadway embankment or roadway base. Plow the surface to a depth of at least 6 inches, and remove all roots thereby exposed to a depth of at least 12 inches. Completely remove and dispose of all stumps within the roadway right-of-way.

Remove all roots, etc., protruding through or appearing on the surface of the completed excavation within the roadway area and for structures, to a depth of at least 12 inches below the finished excavation surface.

Remove or cut off all stumps, roots, etc., below the surface of the completed excavation in borrow pits, material pits, and lateral ditches.

In borrow and material pits, do not perform any clearing or grubbing within 3 feet inside the right-of-way line.

Within all other areas where standard clearing and grubbing is to be performed, remove roots and other debris projecting through or appearing on the surface of the original ground to a depth of 12 inches below the surface, but do not plow or harrow these areas.

**110-2.3 Boulders:** Remove any boulders encountered in the roadway excavation (other than as permitted under the provisions of 120-7.2) or found on the surface of the ground. When

approved by the Engineer place boulders in neat piles inside the right of way. The Contractor may stockpile boulders encountered in Department-furnished borrow areas, which are not suitable for use in the embankment construction, within the borrow area.

**110-2.4 Asbestos Containing Materials (ACM) Not Identified Prior to the Work:**

When encountering or exposing any condition indicating the presence of asbestos, cease operations immediately in the vicinity and notify the Engineer, in accordance with 110-6.5.

**110-3 Selective Clearing and Grubbing.**

**110-3.1 General:** Remove and dispose of vegetation, obstructions, etc., as shown in the Plans. Provide acceptable fill material, and grade and compact holes or voids created by the removal of the stumps. Perform all selective clearing and grubbing in accordance with ANSI A300.

No staging, storing, stockpiling, parking or dumping will be allowed in selective clearing and grubbing areas. Only mechanical equipment related to selective clearing and grubbing activities will be allowed in selective clearing and grubbing areas. Protect trees to remain from trunk, branch and root damage.

**110-3.2 Protection of Plant Preservation Areas:** Areas to remain natural may be designated in the Plans. No clearing and grubbing, staging, storage, stockpiling, parking or dumping is allowed in these areas. Do not bring equipment into these areas.

**110-3.3 Tree Protection Barrier:** Construct a tree protection barrier in accordance with Standard Plans Index 110-100 and the Plans. Maintain barrier for duration of the Contract.

**110-3.4 Tree Root and Branch Pruning:** When pruning cuts or root pruning to existing trees are shown in the Plans, work is to be supervised on site by an International Society of Arboriculture (ISA) Certified Arborist and performed in accordance with ANSI A300.

**110-3.5 Tree Removal:** Remove trees as shown in the Plans.

**110-4 Protection of Property Remaining in Place.**

Protect property to remain in place in accordance with 7-11.

**110-5 Removal of Buildings.**

**110-5.1 Parts to be Removed:** Completely remove all parts of the buildings, including utilities, plumbing, foundations, floors, basements, steps, connecting concrete sidewalks or other pavement, septic tanks, and any other appurtenances, by any practical manner which is not detrimental to other property and improvements.

Remove utilities to the point of connection to the utility authority's cut-in. After removing the sewer connections to the point of cut-in, construct a concrete plug at the cut-in point, as directed by the Engineer, except where the utility owners may elect to perform their own plugging. Contact the appropriate utility companies prior to removal of any part of the building to ensure disconnection of services.

Submit demolition schedule 15 working days before beginning any demolition or renovation of a building.

**110-5.2 Removal by Others:** Where buildings within the area to be cleared and grubbed are so specified to be removed by others, remove and dispose of any foundations, curtain walls, concrete floors, basements or other foundation parts which might be left in place after such removal of buildings by others.

**110-6 Removal of Existing Bridges.**

**110-6.1 General:** The work under this Article includes bridges, as defined in 1-3.

Remove and dispose of the materials from existing bridges. Remove

1. those bridges and approach slabs, or portions of bridges, shown in the Plans to be removed,

2. those bridges and approach slabs, or portions of bridges, found within the limits of the area to be cleared and grubbed, and directed by the Engineer to be removed,

3. those bridges and approach slabs, or portion of bridges, which are necessary to be removed in order to complete the work, and

4. other appurtenances or obstructions which may be designated in the Contract Documents to be included as an item of payment for the work under this Article.

Submit schedule information and demolition plan for approval 15 working days before beginning any demolition or renovation of any structures.

**110-6.2 Method of Removal:**

**110-6.2.1 General:** Remove the structures in such a way so as to leave no obstructions to any proposed new bridge or to any waterways. Pull, cut off, or break off pilings to the requirements of the permit or other Contract Documents, or if not specified, not less than 2 feet below the finish ground line. In the event that the Plans indicate channel excavation to be done by others, consider the finish ground line as the limits of such excavation. For materials which are to remain the property of the Department or are to be salvaged for use in temporary bridges, avoid damage to such materials, and entirely remove all bolts, nails, etc. from timbers to be so salvaged. Mark structural steel members for identification as directed.

**110-6.2.2 Removal of Steel Members with Hazardous Coatings:** Submit to the Engineer for approval the “Contractor’s Lead in Construction Compliance Program”, QP2 certification from the Society for Protective Coatings (SSPC) from the firm actually removing and disposing of these steel members before any members are disturbed.

Vacuum power tool clean any coated steel member to bare metal as defined by SSPC-SP11 a minimum of 4 inches either side of any area to be heated (e.g. torch cutting, sawing, grinding, etc.) in accordance with 29 CFR 1926.354. Abrasive blasting is prohibited.

**110-6.3 Partial Removal of Bridges:** On concrete bridges to be partially removed and widened, remove concrete by manually or mechanically operated pavement breakers, by concrete saws, by chipping hammers, or by hydro-demolition methods. Do not use explosives. Where concrete is to be removed to neat lines, use concrete saws or hydro-demolition methods capable of providing a reasonably uniform cleavage face. If the equipment used will not provide a uniform cut without surface spalling, first score the outlines of the work with small trenches or grooves. For all demolition methods, submit for review and approval of the Engineer, a demolition plan that describes the method of removal, equipment to be used, types of rebar splices or couplers, and method of straightening or cutting rebar. In addition, for hydro-demolition, describe the method for control of water or slurry runoff and measures for safe containment of concrete fragments that are thrown out by the hydro-demolition machine.

**110-6.4 Authority of U.S. Coast Guard:** For bridges in navigable waters, when constructing the project under authority of a U.S. Coast Guard permit, the U.S. Coast Guard may inspect and approve the work to remove any existing bridges involved therein, prior to acceptance by the Department.

**110-6.5 Asbestos Containing Materials (ACM) Not Identified Prior to the Work:**

When encountering or exposing any condition indicating the presence of asbestos, cease operations immediately in the vicinity and notify the Engineer.

Make every effort to minimize the disturbance of the ACM. Immediately provide provisions for the health and safety of all jobsite personnel and the public that may be exposed to any ACM. Provisions shall meet all applicable Federal, State, and Local Rules and Regulations regarding potentially hazardous conditions due to ACM.

The Engineer will notify the District Contamination Impact Coordinator (DCIC) who will engage the services of the Department’s Contamination Assessment/Remediation Contractor (CAR). Provide access to the potential contamination area. Preliminary investigation by the CAR Contractor will determine the course of action necessary for site security and the steps necessary to resolve the contamination issue.

The CAR Contractor will perform an asbestos survey to delineate the asbestos areas, and identify any staging or holding areas that will be needed for assessment or abatement of the asbestos material.

The CAR Contractor will maintain jurisdiction over activities within areas contaminated with ACM including staging and holding areas. The CAR Contractor will be responsible for the health and safety of workers within these delineated areas. Provide continuous access to these areas for the CAR Contractor and representatives of regulatory or enforcement agencies having jurisdiction.

Coordinate with the CAR Contractor and Engineer to develop a work plan with projected completion dates for the final resolution of the contamination, in coordination with any regulatory agencies as appropriate. Use the work plan and schedule as a basis for planning the completion of all work efforts. The Engineer may grant Contract Time extensions according to the provisions of 8-7.3.2.

Cooperate with the CAR Contractor to expedite integration of the CAR Contractor’s operations into the construction project. Adjustments to quantities or to Contract unit prices will be made according to work additions or reductions on the part of the Prime Contractor in accordance with 4-3.

The Engineer will inform the Prime Contractor when operations may resume in the affected area.

**110-7 Removal of Existing Concrete.**

Remove and dispose of existing Portland cement concrete pavement, sidewalk, slope pavement, ditch pavement, curb, and curb and gutter, etc., where shown in the Plans.

Remove all gravity walls, noise/sound walls, retaining walls, MSE walls, perimeter walls, and roadway concrete barriers, where shown in the Plans. All ancillary elements of these concrete features being removed including, but not limited to, base, leveling pads, copings, reinforcing steel or straps, footings, edgedrains, etc, are incidental and included in the cost of the removal.

**110-8 Ownership of Materials.**

Except as may be otherwise specified in the Contract Documents, take ownership of all buildings, structures, appurtenances, and other materials removed and dispose of them in accordance with 110-9.

**110-9 Disposal of Materials.**

**110-9.1 General:** Either stack materials designated to remain the property of the Department in neat piles within the right-of-way, load onto the Department’s vehicles, or deliver to location designated in the Plans.

Dispose of timber, stumps, brush, roots, rubbish, and other material resulting from clearing and grubbing in areas and by methods meeting the applicable requirements of all Federal, State and Local Rules and Regulations. Do not block waterways by the disposal of debris.

With the approval of the Engineer, wood chips may be evenly distributed to a depth of no more than one inch in designated areas in the Department’s right-of-way.

**110-9.2 Burning Debris:** Where burning of such materials is permitted, perform all such burning in accordance with the applicable Federal, State and Local rules and regulations. Perform all burning at locations where trees and shrubs adjacent to the cleared area will not be harmed.

**110-9.3 Timber and Crops:** The Contractor may sell any merchantable timber, fruit trees, and crops that are cleared under the operations of clearing and grubbing for his own benefit, subject to the provisions of 7-1.2, which may require that the timber, fruit trees, or crops be burned at or near the site of their removal, as directed by the Engineer. The Contractor is liable for any claims which may arise pursuant to the provisions of this Subarticle.

**110-9.4 Disposal of Treated Wood:** Treated wood must be handled and disposed of properly during removal. Treated wood should not be cut or otherwise mechanically altered in a manner that would generate dust or particles without proper respiratory and dermal protection. The treated wood must be disposed of in at least a lined solid waste facility or through recycling/reuse. Treated wood shall not be disposed by burning or placement in a construction and demolition (C&D) debris landfill.

**110-9.5 Hazardous Materials/Waste:** Handle, transport, and dispose of hazardous materials/waste in accordance with all Federal, State, and Local Rules and Regulations including, but not limited to, the following:

1. SSPC Guide 7
2. Federal Water Pollution Control Act, and
3. Resource Conservation and Recover Act (RCRA).

Accept responsibility for the collection, sampling, classification, packaging, labeling, accumulation time, storage, manifesting, transportation, treatment and disposal of hazardous materials/waste, both solid and liquid. Separate all solid and liquid waste and collect all liquids used at hygiene stations and handle as hazardous materials/waste. Obtain written approval from the Engineer for all hazardous materials/waste stabilization methods before implementation.

Obtain an EPA/FDEP Hazardous Waste Identification Number (EPA/FDEP ID Number) before transporting and/or disposal of any hazardous materials/waste.

List the Department as the generator for hazardous materials/waste resulting from removal or demolition of Department materials.

Submit the following for the Engineers’ approval before transporting, treatment or disposal of any hazardous materials/waste:

1. Name, address and qualifications of the transporter,
2. Name, address and qualifications of the treatment facility,
3. Proposed treatment and/or disposal of all Hazardous Materials/Waste.

4. EPA/FDEP Hazardous Waste Identification Number Application Form.
5. Manifest forms.

Transport all hazardous materials/waste in accordance with applicable Federal, State, and Local Rules and Regulations including, but not limited to, the 40 CFR 263 Standards. Submit all final Hazardous Materials/Waste manifest/bills of lading and certificates of disposal to the Engineer within 21 days of each shipment.

**110-9.5.1 Steel Members with Hazardous Coating:** Dispose of steel members with hazardous coating in one of the following manners:

1. Deliver the steel members and other hazardous waste to a licensed recycling or treatment facility capable of processing steel members with hazardous coating.
2. Deliver the steel members with hazardous coating to a site designated by the Engineer for use as an offshore artificial reef. Deliver any other hazardous materials/waste to a licensed hazardous materials/waste recycling treatment facility.

Dismantle and/or cut steel members to meet the required dimensions of the recycling facility, treatment facility or offshore artificial reef agency.

All compensation for the cost of removal and disposal of hazardous materials/waste will be included in the Cost of Removal of Existing Structures.

**110-9.5.2 Certification of Compliance:** Submit certification of Compliance from the firm actually removing and disposing of the hazardous materials/waste stipulating, the hazardous materials/waste has been handled, transported and disposed of in accordance with this Specification. The Certification of Compliance shall be attested to by a person having legal authority to bind the company.

Maintain all records required by this Specification and ensure these records are available to the Department upon request.

## **110-10 Miscellaneous Operations.**

**110-10.1 Water Wells Required to be Plugged:** Fill or plug all water wells within the right-of-way, including areas of borrow pits and lateral ditches, that are not to remain in service, in accordance with applicable Federal, State, and Local Rules and Regulations.

Cut off the casing of cased wells at least 12 inches below the ground line or 12 inches below the elevation of the finished excavation surface, whichever is lower. Water wells, as referred to herein, are defined either as artesian or non-artesian, as follows:

1. An artesian well is an artificial hole in the ground from which water supplies may be obtained and which penetrates any water-bearing rock, the water in which is raised to the surface by natural flow or which rises to an elevation above the top of the water-bearing bed. Artesian wells are further defined to include all holes drilled as a source of water that penetrate any water-bearing beds that are a part of the artesian water system of Florida, as determined by representatives of the applicable Water Management District.

2. A non-artesian (water-table) well is a well in which the source of water is an unconfined aquifer. The water in a non-artesian well does not rise above the source bed.

**110-10.2 Leveling Terrain:** Within the areas between the limits of construction and the outer limits of clearing and grubbing, fill all holes and other depressions, and cut down all mounds and ridges. Make the area of a sufficient uniform contour so that the Department's subsequent mowing and cutting operations are not hindered by irregularity of terrain. Perform this work regardless of whether the irregularities were the result of construction operations or existed originally.

**110-10.3 Mailboxes:** When the Contract Documents require furnishing and installing mailboxes, permit each owner to remove the existing mailbox. Work with the Local Postmaster to develop a method of temporary mail service for the period between removal and installation of the new mailboxes. Install the mailboxes in accordance with the Standard Plans.

**110-11 Method of Measurement.**

**110-11.1 Clearing and Grubbing:** The quantity to be paid for will be the lump sum quantity.

**110-11.2 Selective Clearing and Grubbing:** The quantity to be paid will be the plan quantity area in acres designated for Selective Clearing and Grubbing. The quantity to be paid for Tree Protection Barrier will be the linear foot measurement as shown in the Plans. Tree Root, Branch Pruning, and Tree Removal will be paid per each tree. Tree Removal per each will not be used where Clearing and Grubbing or Selective Clearing and Grubbing per acre is used.

**110-11.3 Removal of Existing Bridges:** The quantity to be paid for will be the lump sum quantity or quantities for the specific structures, or portions of structures to be removed.

**110-11.4 Removal of Existing Concrete:**

The quantity to be paid for will be the number of square yards of existing concrete elements, acceptably removed and disposed of, as specified. The quantity will be determined by actual measurement along the surface of the element before its removal. Measurements for appurtenances which have irregular surface configurations, such as curb and gutter, steps, and ditch pavement, will be the area as projected to an approximate horizontal plane. Where the removal of pavement areas is necessary only for the construction of box culverts, pipe culverts, storm sewers, inlets, manholes, etc., these areas will not be included in the measurements.

Area measurements for walls will be based on exposed vertical face measurements times the horizontal length of the wall.

**110-11.5 Plugging Water Wells:** The quantity to be paid for will be the number of water wells plugged, for each type of well (artesian or non-artesian).

**110-11.6 Mailboxes:** The quantity to be paid for will be the number of mailboxes acceptably furnished and installed.

**110-11.7 Delivery of Salvageable Material to the Department** The quantity to be paid for will be the Lump Sum quantity for delivery of salvageable materials to the Department, as indicated in the Plans.

**110-11.8 General:** In each case, except as provided below, where no item of separate payment for such work is included in the proposal, all costs of such work will be included in the various scheduled items in the Contract, or under specific items as specified herein below or elsewhere in the Contract.

**110-12 Basis of Payment.**

**110-12.1 Clearing and Grubbing:**

**110-12.1.1 Lump Sum Payment:** Price and payment will be full compensation for all clearing and grubbing required for the roadway right-of-way and for lateral ditches, channel changes, or other outfall areas, and any other clearing and grubbing indicated, or required for the construction of the entire project, including all necessary hauling, furnishing equipment, equipment operation, furnishing any areas required for disposal of debris, leveling of terrain and the landscaping work of trimming, etc.

Where construction easements are specified in the Plans and the limits of clearing and grubbing for such easements are dependent upon the final construction

requirements, no adjustment will be made in the lump sum price and payment, either over or under, for variations from the limits of the easement defined in the Plans.

**110-12.1.2 When No Direct Payment is Provided:** When no item for clearing and grubbing is included in the proposal, the Contractor shall include the cost of any work of clearing and grubbing which is necessary for the proper construction of the project in the Contract price for the structure or other item of work for which such clearing and grubbing is required. The Contractor shall include the cost of all clearing and grubbing which might be necessary in pits or areas from which base material is obtained in the Contract price for the base in which such material is used. The clearing and grubbing of areas for obtaining stabilizing materials, where required only for the purpose of obtaining materials for stabilizing, will not be paid for separately.

**110-12.2 Selective Clearing and Grubbing:** Price and payment will be full compensation for all selective clearing and grubbing, including all necessary hauling, furnishing equipment, Certified Arborist, equipment operation, furnishing any areas required for disposal of debris, leveling of terrain, root pruning and tree protection.

**110-12.3 Removal of Existing Bridges:** Price and payment will be full compensation for all work of removal and disposal of the designated bridges.

When direct payment for the removal of existing bridges is not provided in the proposal, the Contractor shall include the cost of removing all bridges in the Contract price for clearing and grubbing or, if no item of clearing and grubbing is included, in the compensation for the other items covering the new bridge being constructed.

**110-12.4 Removal of Existing Concrete:** Price and payment will be full compensation for performing and completing all the work of removal and satisfactory disposal.

When no separate item for this work is included, the Contractor shall include the costs of this work in the Contract price for the item of clearing and grubbing or for the pipe or other structure for which the concrete removal is required.

**110-12.5 Plugging Water Wells:** Price and payment will be full compensation for each type of well acceptably plugged.

If a water well requiring plugging is encountered and the Contract contains no price for plugging wells of that specific type, the plugging of such well will be paid for as unforeseeable work.

**110-12.6 Mailboxes:** Price and payment will be full compensation for all work and materials required, including supports and numbers.

**110-12.7 Delivery of Salvageable Material to the Department:** Price and payment will be full compensation for all work required for delivery of the materials to the Department.

**110-12.8 Payment Items:** Payment will be made under:

- Item No. 110- 1- Clearing and Grubbing - lump sum.
- Item No. 110- 2- Selective Clearing and Grubbing Area - acre.
- Item No. 110- 3- Removal of Existing Bridges - lump sum.
- Item No. 110- 4- Removal of Existing Concrete - per square yard.
- Item No. 110- 5- Plugging Water Wells (Artesian) - each.
- Item No. 110- 6- Plugging Water Wells (Non-Artesian) - each.
- Item No. 110- 7- Mailbox (Furnish and Install) - each.
- Item No. 110- 21 Tree Protection Barrier - per linear foot.
- Item No. 110- 22 Tree Root and Branch Pruning - per each tree.
- Item No. 110- 23 Tree Removal - per each tree.

Item No. 110- 86- Delivery of Salvageable Material to FDOT - lump sum.

## SECTION 125 EXCAVATION FOR STRUCTURES AND PIPE

### 125-1 Description.

Excavate for box culverts, pipes, retaining walls, headwalls for pipes and drains, catch basins, drop inlets, manholes, and similar structures. Construct and remove cofferdams, sheeting, bracing, etc.; pump or otherwise dewater foundations; remove and dispose of any existing structures or portions of structures not covered by other items in the Contract, including foundations, abutments, piers, wings, and all other materials, obstructions, etc., found necessary to clear the site for the proposed work; backfill, dispose of surplus material, and perform final cleaning, as may be necessary for the proper execution of the work. This Section does not include excavation for bases or pavements, curbs, curb and gutter, valley gutter, ditch pavement, or rubble gutter.

**125-1.1 Trench Excavation Safety System and Shoring, Special (Trench Excavation):** When performing trench excavation in excess of 5 feet in depth, comply with the Occupational Safety and Health Administration's (OSHA) trench safety standards, 29 CFR 1926, Subpart P, and all subsequent revisions or updates adopted by the Department of Labor and Employment Security. Ensure that trench boxes are wide enough to accommodate compaction and density testing.

Submission of bid and subsequent execution of the Contract will serve as certification that all trench excavation in excess of 5 feet in depth will be in compliance with Section 553.62, Florida Statutes.

Consider all available geotechnical information when designing the trench excavation safety system.

Consider these and any more stringent trench safety standards as minimum Contract requirements.

### 125-2 Classification.

Consider all materials excavated as unclassified and as excavation regardless of the material encountered.

### 125-3 Cofferdams.

#### 125-3.1 Construction:

**125-3.1.1 Methods:** Construct all foundations by open excavation, and shore, brace, or protect the foundation openings with cofferdams. Provide cofferdams or cribs for foundation construction below the bottom of the footings. Provide sufficient clearance in the cofferdam interiors to permit construction of forms and inspection of their exteriors, and for pumping equipment.

**125-3.1.2 Protection of Concrete:** Construct cofferdams to protect green concrete against damage from a sudden rising of the water and to prevent damage by erosion. Do not leave timber or bracing in cofferdams or cribs that extend into the substructure masonry except where permitted in writing by the Engineer.

**125-3.1.3 Placing in the Dry:** For placing footings in the dry, the Engineer may require cofferdam sheeting to be driven to an elevation 6 feet below the elevation of the bottom of the footings and require sufficient pumping equipment to dewater and maintain the cofferdam in a comparatively dry condition.

**125-3.1.4 Working Drawings:** For substructure work, submit drawings showing the proposed method of cofferdam construction and other details left to choice or not fully shown in the Plans. Obtain the Engineer's approval of the type and clearance of cofferdams, insofar as such details affect the character of the finished work. For other details of design that do not affect the character of the finished work, assume responsibility for the successful construction of the work. Retain a Professional Engineer, registered in the State of Florida, to prepare the above construction drawing, and keep a signed and sealed copy on hand at the site at all times.

**125-3.2 Removal:** Unless otherwise provided, remove cofferdams or cribs, with all sheeting and bracing, after completion of the substructure without disturbing or marring the finished masonry.

#### **125-4 Excavation.**

**125-4.1 Requirements for all Excavation:** Perform all excavation to foundation materials, satisfactory to the Engineer, regardless of the elevation shown in the Plans. Remove rock, boulders or other hard lumpy or unyielding material to a depth of 12 inches below the bottom of pipes and box culverts elevations. Remove muck or other soft material to the depth indicated in the Plans or as directed by the Engineer.

##### **125-4.2 Earth Excavation:**

**125-4.2.1 Foundation Material other than the Rock:** When masonry is to rest on an excavated surface other than rock, take special care to avoid disturbing the bottom of the excavation, and do not remove the final foundation material to grade until just before placing the masonry. In case the foundation material is soft or mucky, the Engineer may require excavation to a greater depth and to backfill to grade with approved material.

**125-4.2.2 Foundation Piles:** Where foundation piles are used, complete the excavation of each pit before driving the piles. After the driving is completed, remove all loose and displaced material, leaving a smooth, solid, and level bed to receive the masonry.

**125-4.2.3 Removal of Obstructions:** Remove boulders, logs, or any unforeseen obstacles encountered in excavating. Compensation will be in accordance with the requirements of 4-3.

**125-4.3 Rock Excavation:** Clean all rock and other hard foundation material, remove all loose material, and cut all rock to a firm surface. Either level, step vertically and horizontally, or serrate the rock, as may be directed by the Engineer. Clean out all seams, and fill them with concrete or mortar.

**125-4.4 Pipe Trench Excavation:** Excavate trenches for pipes to the elevation of the bottom of the pipe and to a width sufficient to provide adequate working room. Remove soil not meeting the classification specified as suitable backfill material in 125-8.3.2.2, to a depth of 4 inches below the bottom of the pipe elevation. Where the soils permit, ensure that the trench sides are vertical up to at least the mid-point of the pipe.

For pipe lines placed above the natural ground line, place and compact the embankment, prior to excavation of the trench, to an elevation at least 2 feet above the top of the pipe and to a width equal to four pipe diameters, and then excavate the trench to the required grade.

For pipe trenches utilizing trench boxes, ensure that the trench box used is of sufficient width to permit thorough tamping of bedding material under and around the pipes as specified in 125-8.1.6.

Do not disturb the installed pipe and its embedment when moving trench boxes. Move the trench box carefully to avoid excavated wall displacement or damage. As the trench

box is moved, fill any voids left by the trench box and continuously place and compact the backfill material adjacent to and all along the side of the trench box walls to fill any voids created by the trench box.

**125-5 Preservation of Channel.**

**125-5.1 General:** Unless shown in the Plans, do not excavate outside of caissons, cribs, cofferdams, or sheet piling, and do not disturb the natural stream bed adjacent to the structure. If excavating or dredging at the site of the structure before sinking caissons, cribs, or cofferdams, complete the foundation and backfill all such excavations to the original ground line or other required elevation, with material satisfactory to the Engineer.

**125-5.2 Removal of Excavated Materials:** Do not allow materials that are deposited adjacent to the stream area to infiltrate the water areas. Leave the stream in its original condition.

**125-6 Disposal of Surplus.**

Use suitable excavated materials for backfilling over or around the structure. Dispose of unsuitable materials. Meet the disposal requirements pertaining to water pollution contained in Section 104 and in 7-1.1.

**125-7 Pumping.**

Pump from the interior of any foundation enclosure in such manner as to preclude the possibility of any portion of the concrete materials being carried away. Do not pump while placing concrete, or for a period of at least 24 hours thereafter, unless using a suitable pump separated from the concrete work by a watertight wall.

**125-8 Backfilling.**

**125-8.1 General Requirements for Structures and Pipe:**

**125-8.1.1 General:** Backfill in the dry whenever normal dewatering equipment and methods can accomplish the needed dewatering. A LOT is defined as one lift of backfill material placement, not to exceed 500 feet in length or a single run of pipe connecting two successive structures, whichever is less. Backfill for structures and pipe compacted in one operation will be considered as one LOT within the cover zone. Backfill around structures compacted separately from the pipe will be considered as separate LOTs. Backfill on each side of the pipe for the first lift will be considered a separate LOT. Backfill on opposite sides of the pipe for the remaining lifts will be considered separate LOTs, unless the same compactive effort is applied. Same compactive effort is defined as the same type of equipment (make and model) making the same number of passes on both sides of the pipe. For multiple phase backfill, a LOT shall not extend beyond the limits of the phase.

When placing backfill within trench box each lift of backfill is considered a LOT. Placement of backfill within trench box limits will be considered a complete operation before trench box is moved for next backfill operation. When the trench box is moved for next backfill operation this will start new LOTs for each lift. Follow the density testing frequency in 125-9.3.1.

**125-8.1.2 Equipment and Methods:** Provide normal dewatering equipment including, but not limited to, surface pumps, sump pumps, wellpoints and header pipe and trenching/digging machinery. Provide normal dewatering methods including, but not limited to, constructing shallow surface drainage trenches/ditches, using sand blankets, perforated pipe drains, sumps and siphons.

**125-8.1.3 Backfill Materials:** Backfill to the original ground line or subgrade surface of openings made for structures, with a sufficient allowance for settlement. The Engineer may require that the material used for this backfill be obtained from a source entirely apart from the structure. Use only material accepted by the Engineer. Maintain a clearance of at least 1 foot of clean select soil between recycled concrete aggregate (RCA) and aluminum or metalized drainage pipe.

Do not allow heavy construction equipment to cross over culvert or storm sewer pipes until placing and compacting backfill material to the finished earthwork grade or to an elevation at least 4 feet above the crown of the pipe.

**125-8.1.4 Use of A-7 Material:** In the backfilling of trenches, A-7 material may be used from a point 12 inches above the top of the pipe up to the elevation shown in the Standard Plans as the elevation for undercutting of A-7 material.

**125-8.1.5 Time of Placing Backfill:** Do not place backfill against any masonry or concrete abutment, wingwall, or culvert until the Engineer has given permission to do so, and in no case until the masonry or concrete has been in place seven days or until the specified 28 day compressive strength occurs.

**125-8.1.6 Placement and Compaction:** Place the material in horizontal layers not exceeding 6 inches compacted thickness, in depth above water level, behind abutments, wingwalls and end bents or end rest piers, under the haunches of the pipes and around box culverts and all structures including pipe culverts. When the backfill material is deposited in water, compact as specified in 125-8.2.5 and 125-8.3.4.

**125-8.1.6.1 Thick Lift Requirements:** The Contractor may elect to place material in thicker lifts of no more than 12 inches compacted thickness above the Soil Envelope if the embankment material is classified as Group 1 in the table below. If the embankment material is classified as Group 2 in the table below and the Contractor chooses to place material in thicker lifts of no more than 12 inches compacted thickness above the soil envelope then the Contractor must demonstrate with a successful test section that density can be achieved. Thick lift around structures is only allowed above the soil envelope of the connecting pipe. Notify the Engineer in writing prior to beginning construction of a test section. Construct a test section of the length of one LOT. Perform five quality control (QC) tests at random locations within the test section. All five tests must meet the density required by 125-9.2 and be verified by the Department. Identify the test section with the compaction effort and soil classification in the Earthwork Records System (ERS) section of the Department's database. In case of a change in compaction effort or soil classification, construct a new test section. When a QC test fails the requirements of 125-9.2 or when the QC tests cannot be verified, construct a new test section. The Contractor may elect to place material in 6 inches compacted thickness at any time.

Group	AASHTO Soil Class	Maximum Lift Thickness		Thick Lift Control Test Section Requirements	
		Within Cover Zone	Above Soil Envelope	Within Cover Zone	Above Soil Envelope
1	A-3	6 inches	12 inches	N/A	Not Needed
	A-2-4 (No. 200 Sieve $\leq$ 15%)				
2	A-1	6 inches without control test section	N/A	Maximum of 12 inches per 120-8.2.1.2	
	A-2-4 (No. 200 Sieve $>$ 15%)				
	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6				
	A-7 (Liquid Limit $<$ 50)				

**125-8.2 Additional Requirements for Structures Other than Pipe:**

**125-8.2.1 Density:** Where the backfill material is deposited in water, obtain a 12 inch layer of comparatively dry material, thoroughly compacted by tamping, before verifying the layer and density requirements. Meet the requirements of 125-9.2.

**125-8.2.2 Box Culverts:** For box culverts over which pavement is to be constructed, compact around the structure to an elevation not less than 12 inches above the top of the structure, using rapid-striking mechanical tampers.

**125-8.2.3 Other Limited Areas:** Compact in other limited areas using mechanical tampers or approved hand tampers, until the cover over the structure is at least 12 inches thick. When hand tampers are used, deposit the materials in layers not more than 4 inches thick using hand tampers suitable for this purpose with a face area of not more than 100 square inches. Take special precautions to prevent any wedging action against the masonry, and step or terrace the slope bounding the excavation for abutments and wingwalls if required by the Engineer.

**125-8.2.4 Culverts and Piers:** Backfill around culverts and piers on both sides simultaneously to approximately the same elevation.

**125-8.2.5 Compaction Under Wet Conditions:** Where wet conditions do not permit the use of mechanical tampers, compact using hand tampers. Use only A-3 material for the hand tamped portions of the backfill. When the backfill has reached an elevation and condition such as to make the use of the mechanical tampers practical, perform mechanical tamping in such manner and to such extent as to transfer the compaction force into the sections previously tamped by hand.

**125-8.3 Additional Requirements for Pipe Greater than 12 Inches Inside Diameter:**

**125-8.3.1 General:** Trenches for pipe may have up to four zones that must be backfilled.

**Lowest Zone:** The lowest zone is backfilled for deep undercuts up to within 4 inches of the bottom of the pipe.

**Bedding Zone:** The zone above the lowest zone is the bedding zone. Usually it will be the backfill which is the 4 inches of soil below the bottom of the pipe. When rock or other hard material has been removed to place the pipe, the bedding zone will be the 12 inches of soil below the bottom of the pipe.

**Cover Zone:** The next zone is backfill that is placed after the pipe has been laid and will be called the cover zone. This zone extends to 12 inches above the top of the pipe. The cover zone and the bedding zone are considered the Soil Envelope for the pipe.

**Top Zone:** The top zone extends from 12 inches above the top of the pipe to the base or final grade.

**125-8.3.2 Material:**

**125-8.3.2.1 Lowest Zone:** Backfill areas undercut below the bedding zone of a pipe with coarse sand, or other suitable granular material, obtained from the grading operations on the project, or a commercial material if no suitable material is available.

**125-8.3.2.2 Soil Envelope:** In both the bedding zone and the cover zone of the pipe, backfill with materials classified as A-1, A-2, or A-3. Material classified as A-4 may be used if the pipe is concrete pipe.

**125-8.3.2.3 Top Zone:** Backfill the area of the trench above the soil envelope of the pipe with materials allowed on Standard Plans, Index 120-001.

**125-8.3.3 Compaction:**

**125-8.3.3.1 Lowest Zone:** Compact the soil in the lowest zone to approximately match the density of the soil in which the trench was cut.

**125-8.3.3.2 Bedding Zone:** If the trench was not undercut below the bottom of the pipe, loosen the soil in the bottom of the trench immediately below the approximate middle third of the outside diameter of the pipe.

If the trench was undercut, place the bedding material and leave it in a loose condition below the middle third of the outside diameter of the pipe. Compact the outer portions to meet the density requirements of the acceptance criteria. Place the material in lifts no greater than 6 inches (compacted thickness).

**125-8.3.3.3 Cover Zone:** Before placing the cover zone material, lay pipe according to Section 430. Excavate for pipe bells before laying pipe. Place the material in 6 inch layers (compacted thickness), evenly deposited on both sides of the pipe, and compact with mechanical tampers suitable for this purpose. Hand tamp material below the pipe haunch that cannot be reached by mechanical tampers. Meet the requirements of in 125-9.2.

**125-8.3.3.4 Top Zone:** Place the material in layers not to exceed 12 inches in compacted thickness. Meet the requirements of the density acceptance criteria.

**125-8.3.4 Backfill Under Wet Conditions:** Where wet conditions are such that dewatering by normal pumping methods would not be effective, the procedure outlined below may be used when specifically authorized by the Engineer in writing. The Department will pay for any select material which is not available from the grading as Unforeseeable Work. The Department will not pay for select material that might be used by the Contractor for his own convenience instead of dewatering.

The Department will permit the use of granular material below the elevation at which mechanical tampers would be effective, but only material classified as A-3. Place and compact the material using timbers or hand tampers until the backfill reaches an elevation such that its moisture content will permit the use of mechanical tampers. When the backfill has reached such elevation, use normally acceptable backfill material. Compact the material using mechanical tampers in such manner and to such extent as to transfer the compacting force into the material previously tamped by hand.

The Department will permit the use of coarse aggregate below the elevation at which mechanical tampers would be effective. Use coarse aggregate as specified in

Section 901 for Aggregate Size Number 89, 8, 78, 7, 68, 6, or 57. Place the coarse aggregate such that it will be stable and firm. Fully wrap the aggregate with a layer of Type D-4 filter fabric, as specified in Section 985. Do not place coarse aggregate within 4 feet of the ends of the trench or ditch. Use normally accepted backfill material at the ends.

**125-9 Acceptance Program.**

**125-9.1 General Requirements:** Meet the requirements of 120-10, except replace the requirements of 120-10.1.6 with 125-9.1.1, 120-10.2 with 125-9.2, and 120-10.3 with 125-9.3.

**125-9.1.1 Reduced Testing Frequency:** Obtain the Engineer’s approval in writing for the option to reduce density testing frequency to one test every two LOTs or one every four LOTs for trench box operations if the following requirements are met:

a. Resolution testing was not required for six consecutive verified LOTs.

b. Resolution testing was required for any of the six consecutive verified LOTs, but QC test data was upheld.

Identify the substantiating tests in the ERS section of the Department’s database and notify the Engineer in writing prior to starting reduced frequency of testing. Generate random numbers for selecting test locations for the LOTs under consideration. When QC test frequency is reduced, obtain the Engineer’s approval in writing to place more than one LOT over an untested LOT. Do not apply reduced testing frequency for the first and last lift of pipe. Assure similar compaction efforts for the untested sections. If the Verification test fails, and QC test data is not upheld by Resolution testing the QC testing will revert to the original frequency.

**125-9.2 Acceptance Criteria:**

**125-9.2.1 Density:** Obtain a minimum QC density in any LOT of 100% of the Standard Proctor maximum density as determined by FM 1-T099 or the requirements of 125-8.3.3.1 when applicable. When the cover height below the bottom of base under asphalt pavement, below concrete pavement, or below unpaved ground, exceeds 15 inches, compact the pipe backfill in the cover zone to a density of at least 95% of the Standard Proctor maximum density as determined by FM 1-T099.

For density requirements around drainage structures, obtain a minimum QC density in any LOT of 100% of the Standard Proctor maximum density as determined by FM 1-T099 for a distance of one pipe diameter but not less than 3 feet from the outside face of the structure.

**125-9.2.2 Exceptions to Structures and Pipe Density Requirements:** Compact the backfill to a firmness approximately equal to that of the soil next to the pipe trench in locations outside the plane described by a one (vertical) to two (horizontal) slope downward from the roadway shoulder point or the gutter line in accordance with Standard Plans, Index 120-001 or 120-002. Apply 125-9.2.1 when compacting side-drain pipe backfill under driveways serving a property that is not a single residential lot.

**125-9.3 Additional Requirements:**

**125-9.3.1 Frequency:** Conduct Standard Proctor maximum density sampling and testing at a minimum frequency of one test per soil type. The summary of tests and frequency is shown in Table 125-2 below.

Table 125-2		
Test Name	Quality Control	Verification
Standard Proctor Maximum Density	One per soil type	One per soil type
Density	One per LOT	One per four consecutive LOTs and for wet conditions, the first lift not affected by water
Soil Classification and Organic Content	One per Standard Proctor Maximum density	One per Standard Proctor Maximum density

**125-10 Verification Comparison Criteria and Resolution Procedures.**

Meet the requirements of 120-10.4.

**125-11 Site Restoration.**

Wherever the existing site is disturbed solely for the purpose of constructing or removing box culverts, pipes, inlets, manholes, etc., completely replace and restore the site to the Engineer’s satisfaction, without additional compensation.

**125-12 Cleaning Up.**

Upon completion of the work, leave the structure and all adjacent areas in a neat and presentable condition, clear up all temporary structures, rubbish and surplus materials and leave the space under the structure unobstructed and in such shape that drift will not collect nor scour or be induced. Pile all material from existing structures that have been removed neatly on the bank, unless otherwise directed by the Engineer. Pull false work piling unless the Engineer permits it to be cut or broken off in which case it will be cut or broken off at least 2 feet below the finished grade or stream bed.

**125-13 Method of Measurement.**

When direct payment for excavation for structures is provided in the proposal, and such payment is on a unit basis, the basis of payment is the cubic yard volume of the material excavated below the original ground line or stream bed, but not including that shown in the Plans to be paid for either as regular excavation, subsoil excavation, lateral ditch excavation or channel excavation, or which is included in the item for grading, and except that no payment will be made for material removed in excavating for footings or foundations outside of an area which is bounded by vertical planes 12 inches outside of the limits of the footing and parallel thereto. For pipe trenches the width used to be in the calculation shall be the diameter of the pipe, plus 24 inches.

**125-14 Basis of Payment.**

**125-14.1 When No Direct Payment Provided:** When direct payment for excavation for structures is not provided for in the proposal, all work specified in this Section, other than as specified in 125-14.3 through 125-14.7, shall be included in the Contract price for the concrete or for other items covering the applicable structure.

**125-14.2 Direct Payment:** When direct payment for work under this Section is provided, the Contract price per cubic yard (measured as provided in 125-13), as shown in the proposal, shall be full compensation for all the work specified in this Section, except such work as is specifically stipulated to be paid for separately, in 125-14.3 through 125-14.7.

**125-14.3 Excavation Below Plan Grade:** When excavation of material below plan grade is called for in the Plans or authorized by the Engineer, and payment for Excavation for Structures is on a cubic yard basis, the material excavated below plan grade will be included in the measurement for this item.

Payment for the material used for the backfill will be made as specified in 125-14.7.

**125-14.4 Strengthening Foundations:** The work of strengthening the foundations (as provided in 125-4.2) shall be paid for as provided in 4-4, unless such work is covered by a bid item.

**125-14.5 Backfilling for Additional Support:** The work of providing additional support by backfilling with sand or other satisfactory material, where called for by the Engineer (as specified in 125-8), shall be paid for as provided in 4-4.

**125-14.6 Removal and Replacement of Existing Pavement:** For pavement, curb, etc., which is removed only in order to construct pipe culverts or storm sewers, as specified in 125-11, all costs of such removal and replacement shall be included in the costs of the pipe or other structure for which it is removed, unless otherwise provided for in the contract.

**125-14.7 Removal and Replacement of Material Unsuitable for Backfill:** When it cannot reasonably be anticipated from information contained in the Plans, that material excavated for the structure will be unsuitable for use as backfill, and such material proves to be unsuitable for this use, the work of disposing of such material away from the site will be paid for as Unforeseeable Work, and the work of bringing in substitute material for the backfill will be paid for as specified for the particular case shown below:

1. No additional payment will be made for backfill materials obtained from surplus material available from the normal excavation or grading operations.
2. When the necessary material is not available from the normal excavation or grading operations, and the Contract includes an item for borrow excavation, backfill material authorized to be obtained from designated borrow areas will be included in the volume of borrow excavation to be paid for.
3. When the necessary material is not available from the normal excavation or grading operations and no separate item for borrow excavation is included in the Contract, any backfill material obtained by increasing the volume of excavation within the roadway right of way will be measured and paid for as regular excavation subject to the provisions of 9-3.2.2.
4. When authorization is given for obtaining the material from outside the right of way and from other than designated borrow areas, such excavation will be paid for as unforeseeable work.
5. Where pipe bedding is provided, as specified in 125-8, by the use of select granular material, the quantity of such select material obtained either as commercial material or from material from the grading operations other than in the immediate vicinity of the pipe to be bedded, as authorized by the Engineer, will be paid for at the Contract price per cubic yard for select bedding material. No payment for this material will be made for material available from the excavation for the pipe culvert or from other material available from the grading operations at a location not sufficiently remote as to require loading on trucks.

**125-14.8 Pay Items:** Payment for the work under this Section, when provided for directly, shall be made under:

- |          |         |   |
|----------|---------|---|
| Item No. | 125- 1- | Excavation for Structures - per cubic yard. |
| Item No. | 125- 3- | Select Bedding Material - per cubic yard.   |

**SECTION 346  
STRUCTURAL PORTLAND CEMENT CONCRETE**

**346-1 Description.**

Use a Department-approved concrete mix design composed of a mixture of portland cement, aggregate, water, admixtures, and supplementary cementitious materials. Deliver the portland cement concrete to the site of placement in a freshly mixed, unhardened state.

Obtain concrete from a plant that is currently on the Department’s Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105. If the concrete production facility’s Quality Control (QC) Plan is suspended, the Contractor is solely responsible to obtain the services of another concrete production facility with an accepted QC Plan or await the reacceptance of the concrete production facility’s QC Plan prior to the placement of any further concrete on the project. There will be no changes in the Contract Time because of the suspension, as described. Bear all delay costs and other costs associated with the concrete production facility’s QC Plan acceptance or reacceptance.

**346-2 Materials.**

**346-2.1 General:** Meet the following requirements:

Coarse Aggregate.....	Section 901
Fine Aggregate*.....	Section 902
Portland Cement and Blended Cement.....	Section 921
Water.....	Section 923
Admixtures**.....	Section 924
Supplementary Cementitious Materials.....	Section 929

\*Use only silica sand except as provided in 902-5.2.3.

\*\*Use products listed on the Department’s Approved Product List (APL).

Do not use materials containing hard lumps, crusts, or frozen matter, or that is contaminated with materials exceeding the specified limits in the above listed Sections.

**346-2.2 Types of Cement:** Unless a specific type of cement is designated in the Contract Documents, use Type I, Type IL, Type IP, Type IS, Type II, Type II (MH) or Type III cement in all classes of concrete. Use Type IL or Type II (MH) for all mass concrete elements.

Use only the types of cements designated for each environmental classification in structural concrete as shown in Table 346-1. A mix design for a more aggressive environment may be used in a less aggressive environmental condition.

Table 346-1 Cement Use by Environmental Classification			
Component	Slightly Aggressive Environment	Moderately Aggressive Environment	Extremely Aggressive Environment <sup>(1)</sup>
Bridge Superstructures			
Precast Superstructure and Prestressed Elements	Type I or Type III	Type I, Type IL, Type II, Type III, Type IP, or Type IS	Type II (MH), Type IL, Type III <sup>(2)</sup> or Ternary Blend
Cast in Place	Type I	Type I, Type IL, Type II, Type IP, or Type IS	Type II (MH), Type IL, or Ternary Blend
Bridge Substructures, Drainage Structures, and other Structures			
All Elements	Type I or Type III	Type I, Type IL, Type II, Type IP, or Type IS	Type II (MH), Type IL, or Ternary Blend
Notes:			
(1) Cements used in a more aggressive environment may also be used in a less aggressive environment.			
(2) Type III cement may be used in an Extremely Aggressive Environment for precast superstructure and prestressed elements when the ambient temperature at the time of concrete placement is 60°F and below.			

**346-2.3 Supplementary Cementitious Materials:** Supplementary cementitious materials are required to produce binary or ternary concrete mixes in all classes of concrete specified in Table 346-3, except for the following when used in slightly aggressive environments: Class I, Class I (Pavement), and Class II.

The quantity of portland cement replaced with supplementary cementitious materials must be on an equal weight replacement basis of the total cementitious materials in accordance with Table 346-2.

**346-2.3.1 Highly Reactive Pozzolans:** Materials that have a very high degree of pozzolanic reactivity due to their very fine particle sizes, including silica fume, metakaolin and ultrafine fly ash.

**346-2.3.2 Binary Concrete Mixes:** Concrete mixes containing portland cement and one supplementary cementitious material.

**346-2.3.3 Ternary Concrete Mixes:** Concrete mixes containing portland cement and any two of supplementary cementitious materials, either fly ash, slag, or highly reactive pozzolans.

Table 346-2 Cementitious Materials Concrete Mix Proportions (%) (Environmental classification is extremely aggressive, unless otherwise noted)						
Application	Portland Cement	Fly Ash Type F	Slag	Highly Reactive Pozzolans <sup>(4)</sup>		
				Silica Fume	Metakaolin	Ultra-Fine Fly Ash
General Use	70-82	18-30				
	66-78	15-25		7-9		
	66-78	15-25			8-12	
	66-78	15-25				8-12
	30-40	10-20	50-60			
	30-50		50-70			
	36-43		50-55	7-9		
	33-42		50-55		8-12	
	33-42		50-55			8-12
Precast / Prestressed	70-85 <sup>(1)</sup>	15-30 <sup>(1)</sup>				
	70-82	18-30				
	66-78	15-25		7-9		
	66-78	15-25			8-12	
	66-78	15-25				8-12
	30-40	10-20	50-60			
	30-50		50-70			
	36-43		50-55	7-9		
	33-42		50-55		8-12	
33-42		50-55			8-12	
Drilled Shaft	63-67	33-37				
	38-42		58-62			
	30-40	10-20	50-60			
Mass Concrete	50-82 <sup>(2)</sup>	18-50 <sup>(2)</sup>				
	50-65 <sup>(3)</sup>	35-50 <sup>(3)</sup>				
	66-78	15-25		7-9		
	66-78	15-25			8-12	
	66-78	15-25				8-12
	30-40	10-20	50-60			
	30-50		50-70			
	36-43		50-55	7-9		
	33-42		50-55		8-12	
33-42		50-55			8-12	

Notes:  
 (1) Slightly Aggressive and Moderately Aggressive environments.  
 (2) For Concrete with Core Temperature  $T \leq 165^\circ\text{F}$ .  
 (3) For Concrete with Core Temperature  $T \geq 165^\circ\text{F}$ .  
 (4) Highly reactive pozzolans may be used below the specified ranges to enhance strength and workability.

**346-2.4 Coarse Aggregate Gradation:** Produce all concrete using Size No. 57, 67 or 78 coarse aggregate.

Use Size No. 8, and Size No. 89 alone, only when approved by the Engineer.  
Use Size No. 4 or larger blended with smaller size coarse aggregate as two components.

**346-2.4.1 Optimized Aggregate Gradation:** Improve the aggregate packing density at the Contractor's option, by adding an intermediate-size coarse aggregate. Meet the requirements of Section 9.2, Volume II of the Materials Manual, on the methods used to produce combined aggregate gradation of fine, intermediate, and coarse aggregate sizes for the concrete mixes.

**346-2.5 Admixtures:** Ensure admixtures are used in accordance with the manufacturer's recommendations and meeting the requirements of Section 9.2, Volume II of the Materials Manual.

### **346-3 Classification of Concrete.**

**346-3.1 General:** The classifications of concrete are designated as Class I, Class I (Pavement), Class II, Class II (Bridge Deck), Class III, Class III (Seal), Class IV, Class IV (Drilled Shaft), Class V, Class V (Special), Class VI, and Class VII. The 28-day specified minimum compressive strength, maximum water to cementitious materials ratio and target slump of each class are detailed in Table 346-3. The required air content for all classes of concrete is less than or equal to 6.0%.

For purposes of this Specification the concrete is further classified as follows:

1. Conventional Concrete: The target slump is described in Table 346-3 with a tolerance of  $\pm 1.5$  inches.
2. Increased Slump Concrete: The maximum target slump is 7 inches with a tolerance of  $\pm 1.5$  inches when a Type F, G, I or II admixture is used.
3. Slip-form Concrete: The target slump is 1.5 inches with a tolerance of  $\pm 1.5$  inches.
4. Flowing Concrete: Use flowing concrete only in the manufacturing of precast and prestressed products. Request Engineer's authorization to use flowing concrete for cast-in-place applications. The target slump is 9 inches with a tolerance of  $\pm 1.5$  inches. Meet the requirements of Section 8.6 Volume II of the Materials Manual.
5. Self-Consolidating Concrete (SCC): Use SCC only in the manufacturing of precast and prestressed products. The minimum target slump flow is 22.5 inches with a tolerance of  $\pm 2.5$  inches. Meet the requirements of Section 8.4 Volume II of the Materials Manual.

**346-3.2 Concrete Class Substitutions:** The Engineer may allow the substitution of a higher class concrete in lieu of the specified class concrete when the substituted concrete mixes are included as part of the QC Plan, or for precast concrete, the Precast Concrete Producer QC Plan. The substituted higher class concrete must meet or exceed the requirements of the specified class concrete.

When the average 28-day compressive strength is less than the 28-day specified minimum compressive strength of the higher class mix design, notify the Engineer. Acceptance is based on the requirements in Table 346-3 for the specified class concrete.

**346-3.3 Master Proportion Table:** Proportion the materials used to produce the various classes of concrete in accordance with Table 346-3.

The calculation of the water to cementitious materials ratio (w/cm) is based on the total cementitious materials including portland cement and any supplementary cementitious materials used in the mix.

Class of Concrete	28-day Specified Minimum Compressive Strength (f'c) (psi)	Maximum Water to Cementitious Materials Ratio (pounds per pounds)	Target Slump Value (inches)
I <sup>(1)</sup>	3,000	0.53	3 <sup>(2)</sup>
I (Pavement)	3,000	0.50	1.5 or 3 <sup>(3)</sup>
II <sup>(1)</sup>	3,400	0.53	3 <sup>(2)</sup>
II (Bridge Deck)	4,500	0.44	3 <sup>(2)</sup>
III <sup>(4)</sup>	5,000	0.44	3 <sup>(2)</sup>
III (Seal)	3,000	0.53	8
IV	5,500	0.41 <sup>(4)</sup>	3 <sup>(2)</sup>
IV (Drilled Shaft)	4,000	0.41	8.5
V (Special)	6,000	0.37 <sup>(4)</sup>	3 <sup>(2)</sup>
V	6,500	0.37 <sup>(4)</sup>	3 <sup>(2)</sup>
VI	8,500	0.37 <sup>(4)</sup>	3 <sup>(2)</sup>
VII	10,000	0.37 <sup>(4)</sup>	3 <sup>(2)</sup>

Notes:  
 (1) For precast three-sided culverts, box culverts, endwalls, inlets, manholes and junction boxes, the target slump value and air content will not apply. The maximum allowable slump is 6 inches, except as noted in (2). The Contractor is permitted to use concrete meeting the requirements of ASTM C478 (4,000 psi) in lieu of the specified Class I or Class II concrete for precast endwalls, inlets, manholes and junction boxes.  
 (2) Increased slump and slip form concrete as defined in 346-3.1.  
 (3) Meet the requirements of Section 350.  
 (4) When silica fume or metakaolin is required, the maximum water to cementitious material ratio will be 0.35. When ultrafine fly ash is used, the maximum water to cementitious material ratio will be 0.30.

### 346-3.4 Durability for Concrete Construction:

**346-3.4.1 Minimum Cementitious Materials Content:** Ensure that the produced concrete meets the minimum amount of cementitious materials content in Table 346-4.

Concrete Class	Environmental Classification		
	Extremely Aggressive	Moderately Aggressive	Slightly Aggressive
I, I (Pavement), II, and III (Seal)	470		
II (Bridge Deck), III <sup>(1)</sup> , IV, IV (Drilled Shaft), V, V(Special), VI and VII	600	550	510

Notes:  
 (1) When precast three-sided culverts, box culverts, endwalls, inlets, manholes or junction boxes require a Class III concrete, the minimum cementitious materials content may be reduced to 470 pounds per cubic yard.

**346-3.4.2 Chloride Content Limits:** Use the following maximum allowable chloride content limits for the concrete application and/or exposure environment shown:

Table 346-5 Chloride Content Limits for Concrete Construction		Maximum Allowable Chloride Content, (pounds per cubic yard of concrete)
Application/Exposure Environment		
Non-Reinforced Concrete		No Test Needed
Reinforced Concrete	Slightly Aggressive Environment	0.70
	Moderately or Extremely Aggressive Environment	0.40
Prestressed Concrete		0.40

Suspend concrete placement immediately for every mix design if chloride test results exceed the limits of Table 346-5 until corrective measures are made. Submit an Engineering Analysis Scope in accordance with 6-4 by a Specialty Engineer knowledgeable in the areas of corrosion and corrosion control, to determine if the material meets the intended service life of the structure on all concrete produced from the mix design failing chloride test results to the previous passing test results.

**346-3.4.3 Surface Resistivity Test:** Ensure that the Class II (Bridge Deck), Class IV, Class V, Class V (Special), Class VI, or Class VII concrete in extremely aggressive environments meets or exceeds a resistivity of 29 kOhm-cm at 28 days, when a highly reactive pozzolan is used.

#### 346-4 Special Types of Concrete.

**346-4.1 Drilled Shaft Concrete:** Notify the Engineer at least 48 hours before placing drilled shaft concrete. Obtain slump loss test results demonstrating that the drilled shaft concrete maintains a slump of at least 5 inches throughout the concrete elapsed time before drilled shaft concrete operations begin.

Perform the slump loss test at the anticipated ambient temperature for drilled shaft placements greater than 30 cubic yards and an elapsed time of greater than five hours.

Obtain slump loss test results from an approved laboratory or from a field demonstration. Slump loss test results for drilled shafts requiring 30 cubic yards of concrete or less and a maximum elapsed time of five hours or less may be done in a laboratory. Obtain all other slump loss test results in the field.

The concrete elapsed time is defined in Section 455. Obtain the Engineer's approval for use of slump loss test results including elapsed time before concrete placement begins.

Test each load of concrete for slump to ensure that it is within the limits of this Section. Initially cure acceptance cylinders for 48 hours before transporting them to the laboratory.

If the elapsed time during placement exceeds the slump loss test data, submit an Engineering Analysis Scope in accordance with 6-4 by a Specialty Engineer knowledgeable in concrete foundations, to determine if the shaft is structurally sound and free from voids. At the direction of the Engineer, excavate the drilled shaft for inspection. Obtain approval from the Engineer before placing any additional shafts.

**346-4.2 Mass Concrete:** When the Contract Documents designate any structure as mass concrete, use a Specialty Engineer to develop and administer a Mass Concrete Control Plan

(MCCP). Develop the MCCP in accordance with ACI Publications 207.1R Guide to Mass Concrete, 207.2R Report on Thermal and Volume Change Effects on Cracking of Mass Concrete, and 224R Control of Cracking in Concrete Structures. Ensure that the concrete core temperatures for any mass concrete element do not exceed the maximum allowable temperature of 180°F and that the differential temperatures between the element core and surface do not exceed the maximum allowable temperature differential of 35°F. Submit the MCCP to the Engineer for approval at least 14 calendar days prior to the first anticipated mass concrete placement. Ensure the MCCP includes and fully describes the following:

1. The Financial Project Identification Number (FPID).
2. Contact names and numbers.
3. Names and qualifications of all designees who will inspect the installation of and record the output of temperature measuring devices, and who will implement temperature control measures.
4. The number, type, and dimensions of each mass concrete element to be constructed.
5. A sequential ID number assigned to each element indicating bridge number, element type, element size, and element location.
6. The mix design number of the concrete used to construct each element.
7. Indicate which mass concrete elements will be monitored.
8. Casting procedures,
9. Insulating systems,
10. Type and placement of temperature measuring and recording devices, as well as any remote monitoring devices and software.
11. For each concrete mix design and concrete element, provide information included in Table 346-6, listing the maximum allowable concrete placement temperature for each ambient temperature range at time of placement, in 10°F increments from 40°F and 99°F.

Table 346-6 Maximum Allowable Concrete Placement Temperature Data Sheet		
Mix Design No.	Maximum Allowable Concrete Placement Temperature (°F)	
Ambient Temperature at Time of Placement	Footer Dimensions <sup>(1)</sup> W by L by H (ft)	Column Dimensions <sup>(1)</sup> D by H(ft)
40° - 49°F		
50° - 59°F		
60° - 69°F		
70° - 79°F		
80° - 89°F		
90° - 99°F		
Notes: (1) W = Width, L = Length, H = Height and D = Diameter		

12. Measures to prevent thermal shock.

13. Active cooling measures, if used.

Do not place concrete until the proposed MCCP has is approved, and fully complies with its requirements. Any modifications must be submitted as addenda to the original

MCCP and must be approved in writing by the Engineer. Ensure that, prior to the first concrete placement of each concrete element the Specialty Engineer or approved designee personally inspects the installation of the temperature measuring devices and verifies that the temperature data acquisition equipment is properly functioning. The temperature data acquisition equipment must record temperature readings at least once per hour, beginning at the completion of concrete placement and continuing until the core temperature is within 50°F of the ambient temperature. The Specialty Engineer shall be available for immediate consultation during the monitoring period of any mass concrete element. Monitor temperature readings at least once every six hours. Within three working days of the completion of temperature recording for each concrete element, submit an electronic spreadsheet file, editable report to the Engineer that includes the element identification, date and time of any changes to the temperature control measures, all original temperature readings and curing notes. Also submit data logger summaries and graphs, and results of the visual inspection of each element.

If the first element of a group of elements with the same dimensions is placed in accordance with the approved MCCP, without exceeding either the maximum temperature or maximum temperature differential of the concrete, reduced monitoring of the remaining elements may be allowed with written approval from the Engineer. Request approval from the Engineer at least 14 calendar days prior to the anticipated date of reduced monitoring. If approved, temperature monitoring is required only for the initial element of a group of concrete elements meeting all of the following requirements:

1. All elements have the same dimensions.
2. All elements have the same concrete mix design.
3. All elements have the same insulation R value and active cooling measures (if used).
4. Ambient temperatures during concrete placement for all elements are within minus 10°F of the ambient temperature during placement of the initial element.
5. Use the same temperature control measures used for the initial monitored element and keep in place for at least the same length of time as for the initial element. The Contractor and Engineer each have the option to have the temperature monitored to ensure the core temperature is within 50°F of ambient temperature prior to termination of temperature control measures.

Install temperature measuring and recording devices for all mass concrete elements. Position the temperature sensors 2.00± 0.25 inches inside the concrete surface for surface temperature measurements and at the expected location of the maximum temperature for core temperature measurements. Place the ambient temperature sensor in a location that protects it from direct exposure to rain, sun, or sources of radiated heat, such as concrete or asphalt pavement surfaces. Temperatures shall be continuously recorded starting at the end of concrete placement and continuing until the core has cooled to within 50°F of the ambient temperature. Resume monitoring of the temperatures for all elements if directed by the Engineer.

Instrumentation and temperature monitoring are not required for drilled shafts supporting sign, signal, lighting or intelligent transportation (ITS) structures that meet all of the following requirements:

1. The diameter is six feet or less.
2. The total cementitious materials content of the concrete mix design is less than or equal to 750 pounds per cubic yard.

Temperature monitoring may be omitted at the Contractor's option, for any mass concrete substructure element meeting all of the following requirements:

1. The minimum cross-sectional dimension of the element is six feet or less.
2. Insulation with an R-value of at least 2.5 must be provided for at least 72 hours following the completion of concrete placement.
3. The environmental classification of the concrete element is slightly aggressive or moderately aggressive.
4. The concrete mix design meets the mass concrete proportioning requirements of 346-2.3.
5. The total cementitious material content of the concrete mix design is less than or equal to 750 pounds per cubic yard.
6. Temperature of the concrete is 95°F or less at placement.

Implement immediate corrective action as directed by the Specialty Engineer when either the core temperature or the temperature differential of any mass concrete element exceeds its maximum allowable value. The approval of the MCCP shall be revoked. Do not place any mass concrete elements until a revised MCCP has been approved in writing by the Engineer. Submit an Engineering Analysis Scope in accordance with 6-4 for approval, which addresses the structural integrity and durability of any mass concrete element that is not cast in compliance with the approved MCCP or which exceeds the allowable core temperature or temperature differential. Submit all analyses and test results requested by the Engineer for any noncompliant mass concrete element to the satisfaction of the Engineer. The Department will make no compensation for additional costs or loss of time due to additional analyses, tests, or other impacts on production caused by the use of reduced monitoring or the Contractor's option.

### **346-5 Sampling and Testing Methods.**

Perform concrete sampling and testing in accordance with the following methods:

Table 346-7 Concrete Sampling and Testing Methods	
Description	Method
Slump of Hydraulic Cement Concrete	ASTM C143
Air Content of Freshly Mixed Concrete by the Pressure Method <sup>(1)</sup>	ASTM C231
Air Content of Freshly Mixed Concrete by the Volumetric Method <sup>(1)</sup>	ASTM C173
Making and Curing Test Specimens in the Field <sup>(2)</sup>	ASTM C31
Compressive Strength of Cylindrical Concrete Specimens	ASTM C39
Obtaining and Testing Drilled Core and Sawed Beams of Concrete	ASTM C42
Initial Sampling of Concrete from Revolving Drum Truck Mixers or Agitators	FM 5-501
Low Levels of Chloride in Concrete and Raw Materials	FM 5-516
Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete	ASTM C138
Temperature of Freshly Mixed Portland Cement Concrete	ASTM C1064
Sampling Freshly Mixed Concrete <sup>(3)</sup>	ASTM C172
Static Segregation of Self-Consolidating Concrete using Column Techniques	ASTM C1610
Slump Flow of Self-Consolidating Concrete	ASTM C1611
Relative Viscosity of Self-Consolidating Concrete	ASTM C1611
Visual Stability Index of Self-Consolidating Concrete	ASTM C1611
Passing Ability of Self-Consolidating Concrete by J-Ring	ASTM C1621
Rapid Assessment of Static Segregation Resistance of Self-Consolidating Concrete Using Penetration Test	ASTM C1712
Aggregate Distribution of Hardened Self-Consolidating Concrete	FM 5-617
Hardened Visual Stability Index of Self-Consolidating Concrete	AASHTO R 81
Fabricating Test Specimens with Self-Consolidating Concrete	ASTM C1758
Concrete Resistivity as an Electrical Indicator of its Permeability	AASHTO T 358
<p>(1) The Department will use the same type of meter for Verification testing as used for QC testing. When using pressure type meters, use an aggregate correction factor determined by the concrete producer for each mix design to be tested. Record and certify test results for correction factors for each type of aggregate at the concrete production facility.</p> <p>(2) Provide curing facilities that have the capacity to store all QC, Verification, and Resolution cylinders simultaneously for the initial curing. Cylinders will be delivered to the testing laboratory in their molds. The laboratory will remove the specimens from the molds and begin final curing.</p> <p>(3) Take the test sample from the middle portion of the batch in lieu of collecting and compositing samples from two or more portions, as described in ASTM C172.</p>	

### 346-6 Quality Control.

**346-6.1 General:** Perform QC activities to ensure materials, methods, techniques, personnel, procedures and processes utilized during production meet the specified requirements. For precast/prestressed concrete operations, ensure that the QC testing is performed by the producer.

Accept the responsibility for QC inspections on all phases of work. Ensure all materials and workmanship incorporated into the project meet the requirements of the Contract Documents.

**346-6.2 Concrete Mix Design:** Provide concrete that has been produced in accordance with a Department approved mix design, in a uniform mass free from balls and lumps.

For slump target values in excess of 6 inches, including flowing concrete and SCC, utilize a grate over the conveyance equipment to capture any lumps or balls that may be present in the mix. The grate must cover the entire opening of the conveyance equipment and

have an opening that is a maximum of 2-1/2 inches in any one direction. Remove the lumps and balls from the grate and discard them. Discharge the concrete in a manner satisfactory to the Engineer. Perform demonstration batches to ensure complete and thorough placements in complex elements, when requested by the Engineer.

Do not place concretes of different compositions such that the plastic concretes may combine, except where the Plans require concrete with a surface resistivity value of 29 kOhm-cm or below and one with higher than 29 kOhm-cm values in a continuous placement. Produce these concretes using separate mix designs. For example, designate the mix with calcium nitrite as the original mix and the mix without calcium nitrite as the redesigned mix. Ensure that both mixes contain the same cement, fly ash or slag, coarse and fine aggregates and admixtures. Submit both mixes for approval as separate mix designs, both meeting all requirements of this Section. Ensure that the redesigned mix exhibits plastic and hardened qualities which are additionally approved by the Engineer as suitable for placement with the original mix. The Engineer will approve the redesigned mix for commingling with the original mix and for a specific project application only. Alternately, place a construction joint at the location of the change in concretes as approved by the Engineer.

**346-6.3 Delivery Certification:** Ensure that an electronic delivery ticket is furnished with each batch of concrete before unloading at the placement site. The delivery ticket may be proprietary software or in the form of an electronic spreadsheet, but shall be printed. Ensure that the materials and quantities incorporated into the batch of concrete are printed on the delivery ticket. Include the following information on the delivery ticket:

1. Arrival time at jobsite,
2. Time that concrete mix has been completely discharged,
3. Number of revolutions upon arrival at the jobsite,
4. Total gallons of water added at the jobsite,
5. Additional mixing revolutions when water is added,
6. Total number of revolutions.

Items (3) through (6) do not apply to non-agitating concrete transporting vehicles.

Ensure the batcher responsible for production of the batch of concrete signs the delivery ticket, certifying the batch of concrete was produced in accordance with the Contract Documents.

Sign the delivery ticket certifying that the design mix maximum specified water to cementitious materials ratio was not exceeded due to any jobsite adjustments to the batch of concrete, and that the batch of concrete was delivered and placed in accordance with the Contract Documents.

**346-6.4 Plastic Property Tolerances:** Reject concrete with slump or air content that does not fall within the specified tolerances, except as noted below, and immediately notify the concrete production facility that an adjustment of the concrete mixture is required. If a load does not fall within the tolerances, test each subsequent load and the first adjusted load. If failing concrete is not rejected or adjustments are not implemented, the Engineer may reject the concrete and terminate further production until the corrections are implemented.

At the Contractor's risk, water may be added at the placement site immediately after completion of the initial slump test, either to correct a low slump or to increase the concrete workability, provided the addition of water does not exceed the water to cementitious materials ratio as defined by the mix design.

After adding water, perform an additional slump test to confirm the concrete is within the slump tolerance range. If the slump is outside the tolerance range, reject the load. If an adjustment is made at the concrete production facility, perform a slump test on the next load to ensure the concrete is within the slump tolerance range. Do not place concrete represented by slump test results outside of the tolerance range. Include water missing from the water storage tanks upon arrival at the project site in the jobsite water added.

Do not allow concrete to remain in a transporting vehicle to reduce slump.

**346-7 Mixing and Delivering Concrete.**

**346-7.1 General Requirements:** Operate all concrete mixers at speeds and volumes per the manufacturer’s design or recommendation as stipulated on the mixer rating plate.

**346-7.2 Transit Truck Mixing:** Produce a completely uniform mixed concrete in a truck mixer for 70 to 100 revolutions at the mixing speed designated by the truck manufacturer.

Prior to starting the discharge of the concrete at the jobsite, when water is added, record the added quantity and mix the concrete 30 additional drum mixing revolutions. Do not make more than two mix adjustments. Seek approval from the Engineer prior to using a central mixer and depositing the batch into a truck mixer.

**346-7.2.1 Transit Time:** Ensure compliance with Table 346-8 between the initial introduction of water into the mix and completely discharging all the concrete from the truck. Reject concrete exceeding the maximum transit time. The Engineer may approve an extension of the transit time which will be identified on the approved mix design.

Table 346-8	
Maximum Allowable Transit Time	
Non-Agitator Trucks	Agitator Trucks
45 minutes	60 minutes
75 minutes <sup>(1)</sup>	90 minutes <sup>(1)</sup>

Note:  
 (1) When a water-reducing and retarding admixture (Type D, Type G, or Type II) is used.

**346-7.2.2 Placement Time:** All the concrete in a load must be in its final placement position a maximum of 15 minutes after the transit time has expired unless a time extension is approved by the Engineer.

For Class IV (Drilled Shaft) mixes, placement time may be extended provided the slump loss time of the first concrete placed is not exceeded throughout the elapsed time.

The Engineer may perform Independent Verification (IV) testing to verify the plastic and hardened properties of the concrete when a time extension is granted.

**346-7.3 On-site Batching and Mixing:** Use a mixer of sufficient capacity to prevent delays that may be detrimental to the quality of the work. Ensure that the accuracy of batching equipment is in accordance with requirements of this Section.

**346-7.4 Concreting in Cold Weather:** Do not mix or place concrete when the air temperature is below 40°F. Protect the fresh concrete from freezing in accordance with Section 400. The requirements of concreting in cold weather are not applicable to precast concrete mixing and placement operations occurring in a temperature controlled environment.

**346-7.5 Concreting in Hot Weather:** Hot weather concreting is defined as the production, placing and curing of concrete when the concrete temperature at placing exceeds 85°F but is 100°F or less.

Unless the specified hot weather concreting measures are in effect, reject concrete exceeding 85°F at the time of placement. Regardless of special measures taken, reject concrete exceeding 100°F. Predict the concrete temperatures at placement time and implement hot weather measures to avoid production shutdown.

**346-7.6 Sample Location:** Obtain acceptance samples from the point of final placement.

Where concrete buckets are used to discharge concrete directly to the point of final placement or into the hopper of a tremie pipe, samples will be obtained from the discharge of the bucket. When the concrete is discharged directly from the mixer into the bucket and the bucket is discharged within 20 minutes, samples may be obtained from the discharge of the mixer.

Where conveyor belts, troughs, pumps, or chutes are used to transport concrete directly to the point of final placement or into the hopper of a tremie pipe, samples will be obtained from the discharge end of the entire conveyor belt, trough, pump, or chute system.

Where concrete is placed in a drilled shaft or other element using a tremie pipe and a concrete pump, samples will be obtained from the discharge of the pump line at the location of the tremie hopper.

For all other placement methods, prior to each placement, obtain Department approval for sampling at the discharge of the mixer in lieu of sampling at the point of final placement. Submit the sampling correlation procedure to the Engineer for approval prior to the placement of the concrete. Once the comparative sampling correlation is approved by the Engineer, apply this correlation to the plastic properties tolerances for samples obtained from the discharge of mixer.

Where a concrete pump is used to deposit concrete directly into a drilled shaft which is a wet excavation without the use of a tremie, or other applications as approved by the Engineer, ensure the discharge end of the pump line remains immersed in the concrete at all times after starting concrete placement.

### **346-8 Plastic Concrete Sampling and Testing.**

QC tests include air content, temperature, slump, and preparing compressive strength cylinders for testing at later dates. In addition, calculate the water to cementitious materials ratio in accordance with FM 5-501 for compliance to the approved mix design.

Ensure that each truck has a rating plate and a valid mixer identification card issued by the Department. Ensure that the revolution counter on the mixer is working properly, and calibration of the water dispenser has been performed within the last twelve months. Reject any concrete batches that are delivered in trucks that do not have mixer identification cards. Remove the mixer identification card when a truck mixer is discovered to be in noncompliance and the mixer deficiencies cannot be repaired immediately. When the mixer identification card is removed for noncompliance, make note of the deficiency or deficiencies found, and forward the card to the District Materials and Research Engineer who has Producer QC Plan acceptance authority.

Perform plastic concrete tests on the initial delivery from each plant of each concrete design mix each day. Ensure QC technicians meeting the requirements of Section 105 are present and performing tests throughout the placement operation. Ensure a technician is present and performing tests throughout the placement operation at each placement site. If a project has

multiple concrete placements at the same time, identify the technicians in the QC Plan to ensure minimum sampling and testing frequencies are met. Ensure that the equipment used for delivery, placement and finishing meets the requirements of this Specification.

When a truck designated for QC testing arrives at the discharge site, a subsequent truck may also discharge once a representative sample has been collected from the QC truck and while awaiting the results of QC testing. Reject non-complying loads at the jobsite. Ensure that corrections are made on subsequent loads. Immediately cease concrete discharge of all trucks if the QC truck has failing test. Perform plastic properties tests of concrete on all trucks prior to the first corrected truck and the corrected truck. When more than one truck is discharging into a pump simultaneously, only the truck designated for QC testing may discharge into the pump to obtain a representative sample of concrete from the QC truck only.

Furnish sufficient concrete of each design mix as required by the Engineer for verification (VT) testing. When the Engineer's VT test results do not compare with the QC plastic properties test results, within the limits defined by the Independent Assurance (IA) checklist comparison criteria, located in Materials Manual Chapter 5, disposition of the concrete will be at the option of the Contractor.

On concrete placements consisting of only one load of concrete, perform initial sampling and testing in accordance with this Section. The acceptance sample and plastic properties tests may be taken from the initial portion of the load.

If any of the QC plastic properties tests fail, reject the remainder of that load, and any other loads that have begun discharging, terminate the LOT and notify the Engineer. Make cylinders representing that LOT from the same sample of concrete.

Following termination of a LOT, obtain samples from a new load, and perform plastic properties tests until the water to cementitious materials ratio, air content, temperature and slump comply with the Specification requirements. Initiate a new LOT once the testing indicates compliance with Specification requirements.

Suspend production when any five loads in two days of production of the same design mix are outside the specified tolerances. Increase the frequency of QC testing to one per load to bring the concrete within allowable tolerances. After production resumes, obtain the Engineer's approval before returning to the normal frequency of QC testing.

If concrete placement stops for more than 90 minutes, perform initial plastic properties testing on the next batch and continue the LOT. Cylinders cast for that LOT will represent the entire LOT.

When the Department performs Independent Verification (IV), the Contractor may perform the same tests on the concrete at the same time. The Department will compare results based on the Independent Assurance (IA) Checklist tolerances.

### **346-9 Acceptance Sampling and Testing.**

**346-9.1 General:** Perform plastic properties tests in accordance with 346-8 and cast a set of three QC cylinders, for all structural concrete incorporated into the project. Take these acceptance samples randomly as determined by a random number generator acceptable to the Department. The Department will independently perform VT plastic properties tests and cast a set of VT cylinders. The VT cylinders will be the same size cylinder selected by the Contractor, from a separate sample from the same load of concrete as the Contractor's QC sample.

For each set of QC cylinders verified by the Department, cast two additional cylinders from the same sample, and identify them as the quality control resolution (QR) test cylinders. The Department will also cast two additional verification resolution (VR) test

cylinders from each VT sample. All cylinders will be clearly identified as outlined in the Sample/Lot Numbering System instructions located on the State Materials Office website. Deliver the QC samples, including the QR cylinders to the final curing facility in accordance with ASTM C31. Concurrently, the Department will deliver the VT samples, including the VR cylinders, to their final curing facility.

Test the QC laboratory cured samples for compressive strength at the age of 28 days, in a laboratory meeting and maintaining at all times the qualification requirements listed in Section 105.

Ensure the QC testing laboratory input the compressive strength test results into the Department’s Materials Acceptance and Certification (MAC) system within 24 hours after testing. Notify the Engineer when results cannot be inputted into MAC.

The Department will compare the VT sample compressive strength test results with the corresponding QC sample test results.

**346-9.2 Sampling Frequency:** As a minimum, sample and test concrete of each mix design for water to cementitious materials ratio, air content, temperature, slump and compressive strength once per LOT as defined by Table 346-9. The Engineer will randomly verify one of every four consecutive LOTs of each mix design based on a random number generator. The Department may perform Independent Verification (IV) testing to verify compliance with specification requirements. All QC activities, calculations, and inspections will be randomly confirmed by the Department.

Table 346-9 Sampling Frequency	
Class Concrete <sup>(1)</sup>	LOT Size
I	one day’s production
I (Pavement)	2,000 square yards, or one day’s production, whichever is less
II, II (Bridge Deck), III, IV, V (Special), V, VI, VII	50 cubic yards, or one day’s production, whichever is less
IV (Drilled Shaft)	50 cubic yards, or one day’s production, whichever is less <sup>(2)</sup>
III (Seal)	Each Seal placement
<p>(1) For any class of concrete used for roadway concrete barrier, the lot size is defined as 100 cubic yards, or one day’s production, whichever is less.</p> <p>(2) Start a new LOT when there is a gap of more than two hours between the end of one drilled shaft placement and the beginning of the next drilled shaft placement.</p>	

**346-9.2.1 Reduced Frequency for Acceptance Tests:** The LOT size may represent 100 cubic yards when produced with the same mix design at the same concrete production facility for the same prime Contractor and subcontractor on a given Contract. As an exception, the requirements for the precast/prestressed production facility will only include the same mix design at the same concrete production facility.

Submit strength test results indicating that the two following criteria are met:

1. The average of the acceptance compressive strengths is equal to or greater than the specified minimum compressive strength ( $f'_c$ ) plus 2.33 standard deviations minus:

- a. 500 psi, if  $f'_c$  is 5,000 psi or less.
- b.  $0.10 f'_c$ , if  $f'_c$  is greater than 5,000 psi.

2. Every average of three consecutive strength test equals or exceeds the  $f'_c$  plus 1.34 standard deviations.

Base calculations on a minimum of ten consecutive strength test results for a Class IV or higher; or a minimum of five consecutive strength results for a Class III or lower.

The average of the consecutive compressive strength test results, based on the class of concrete, can be established using historical data from a previous Department project. The tests from the previous Department project must be within the last calendar year or may also be established by a succession of samples on the current project. Only one sample can be taken from each LOT. Test data must be from a laboratory meeting the requirements of Section 105. Obtain Department approval before beginning reduced frequency LOTs.

If at any time a strength test is not verified or the average strength of the previous ten or five consecutive samples based on the class of concrete from the same mix design and the same production facility does not conform to the above conditions, return to the frequency represented by the LOT as defined in Table 346-9. Notify the Engineer that the initial frequency is reinstated. In order to reinstate reduced frequency, submit a new set of strength test results.

**346-9.3 Strength Test Definition:** The strength test of a LOT is defined as the average compressive strengths tests of three cylinders cast from the same sample of concrete.

**346-9.4 Acceptance of Concrete:** The Engineer will accept the concrete of a given LOT when the compressive strength test results are verified and meets the minimum specified compressive strength in Table 346-3. Ensure that the hardened concrete strength test results are obtained in accordance with 346-9.3.

The process of concrete compressive strength verification and acceptance consists of the following steps:

1. Verification of QC and VT data.
2. Resolution of QC and VT data if needed.
3. Structural Adequacy determination.

Do not discard a cylinder strength test result based on low strength (strength below the specified minimum strength as per the provisions of this Section).

When one of the three QC cylinders from a LOT is lost, missing, damaged or destroyed, determination of compressive strength will be made by averaging the remaining two cylinders. If more than one QC cylinder from a LOT is lost, missing, damaged or destroyed, the Contractor will core the structure at no additional expense to the Department to determine the compressive strength. Prior to coring, obtain Engineer's approval for coring the structure and its proposed coring location. Acceptance of LOT may be based on VT data at the discretion of the Engineer.

For each QC and each QR cylinder that is lost, missing, damaged or destroyed, payment for that LOT will be reduced by \$750.00 per 1,000 psi of the specified design strength [Example: loss of two Class IV (Drill Shaft) QC cylinders that has no VT data will require the element to be cored and a pay reduction will be assessed  $(4,000 \text{ psi} / 1,000 \text{ psi}) \times \$750 \times 2 = \$6,000$ ]. This reduction will be in addition to any pay adjustment for low strength.

**346-9.4.1 Small Quantities of Concrete:** When a project has a total plan quantity of less than 50 cubic yards, that concrete will be accepted based on the satisfactory compressive strength of the QC cylinders. Submit certification to the Engineer that the concrete was batched and placed in accordance with the Contract Documents. Submit a QC Plan for the concrete placement operation in accordance with Section 105. The Engineer may perform IV testing as identified in 346-9 and evaluate the concrete in accordance with 346-9.7.

**346-9.5 Verification:** The results of properly conducted test by QC and VT laboratories on specimens prepared from the same sample of concrete are not to differ by more than 14%.

$$\text{Difference (\%)} = \text{ABS} \left( \frac{\text{QC} - \text{VT}}{\text{QC}} \right) 100$$

Where:

Difference (%) is the absolute percentage difference between QC and VT average compressive strength.

The procedure consists of verifying if the QC and VT compressive strengths data meet the established comparison criteria:

1. When the difference between the average compressive strength of QC and the average compressive strength of VT is less than or equal to 14%, the QC test results are upheld and verified. The Engineer will accept at full pay only LOTs of concrete represented by plastic property results which meet the requirements of the approved mix design and strength test results which equal or exceed the respective specified minimum strength.

2. When the difference between the average compressive strength of QC and the average compressive strength of VT data exceeds 14%, the compressive strength results are not verified and the Engineer will initiate the resolution procedure.

Maintain the QR and VR cylinders for a minimum of 30 days following the testing date of the specified strength.

**346-9.6 Resolution:** The Engineer will perform the resolution process to identify the reliability of the compressive strength results when the difference between the average compressive strength of QC and the average compressive strength of VT data exceeds 14% as described in 346-9.5(2).

The Engineer will correlate the 28-day strength (VR<sub>28</sub> and QR<sub>28</sub>) for the VR and QR cylinders and will compare:

1. The VT sample results with the VR<sub>28</sub> cylinders results.
2. The QC sample results with the QR<sub>28</sub> cylinders results.

Comparison results must not be greater than 17.5%. Core samples of the hardened concrete may be required.

$$V_D (\%) = \text{ABS} \left( \frac{\text{VT} - \text{VR}_{28}}{\text{VT}} \right) 100$$

$$Q_D (\%) = \text{ABS} \left( \frac{\text{QC} - \text{QR}_{28}}{\text{QC}} \right) 100$$

Where:

V<sub>D</sub> (%) is the absolute percentage difference between VT and VR<sub>28</sub>.

Q<sub>D</sub> (%) is the absolute percentage difference between QC and QR<sub>28</sub>.

The resolution procedure will use the above equations. The Engineer will determine through the resolution procedure whether the QC strength test results or the VT strength test are deemed to be the most accurate, LOTs will then be considered to be verified.

The Engineer will inform the QC and VT laboratories within three calendar days of the acceptance compressive strength test to transport their QR and VR cylinders to the resolution laboratory. The QC and VT laboratories will transport their own hold cylinders to the resolution testing laboratory within three calendar days after the Engineer notifies the Contractor that a resolution procedure is required. In addition, the Engineer will ensure that the QR and VR cylinders are tested within 14 calendar days of the acceptance strength tests.

The Engineer will determine the most accurate strength test result to represent the four or fewer consecutive LOTs as follows:

1. When both results meet the established comparison criteria, both are deemed accurate and the QC strength will represent the LOTs. The Department will pay for cost of the resolution testing.

2. When only the QC result is within the established comparison criteria, the QC strength is deemed as most accurate and will represent the LOTs. The Department will pay for the cost of the resolution testing.

3. When only the VT result is within the established comparison criteria, the VT strength is deemed as most accurate and will represent the LOTs. The Department will assess a \$1,000 pay reduction for the cost of the Resolution Investigation.

4. When both results are outside the established comparison criteria, the Engineer, with input from the DMO, will determine if any Department IA evaluations are required and which test results are most accurate. The Department will pay for the cost of the resolution testing.

When the Engineer cannot determine which strength test results are the most accurate, the concrete represented by the four consecutive LOTs will be evaluated based on the QC data.

The results of the resolution procedure will be forwarded to the Contractor within five working days after completion of the investigation.

**346-9.7 Structural Adequacy:** The Engineer will evaluate the structural adequacy for verified concrete that does not meet the minimum specified compressive strength of Table 346-3.

For standard molded and cured strength cylinders, the compressive strength of concrete is satisfactory provided that the two following criteria are met:

1. The average compressive strength does not fall below the specified minimum compressive strength by more than:

- a. 500 psi if the specified minimum compressive strength is equal to or less than 5,000 psi.

- b. 10% of the specified minimum compressive strength if the specified minimum compressive strength is greater than 5,000 psi.

2. The average compressive strength with the previous two LOTs is equal to or exceeds the specified minimum compressive strength. This condition only applies if there are two or more previous LOTs to calculate the average.

The Engineer will consider the concrete for a given LOT as structurally adequate and coring will not be allowed when a concrete compressive strength test result falls below the specified minimum strength but has met the above conditions.

### **346-10 Investigation of Low Compressive Strength Concrete.**

When a verified concrete compressive strength test result falls below the specified minimum strength, and does not meet the structural adequacy described in 346-9.7, perform one of the following options:

1. Submit an Engineering Analysis Scope in accordance with 6-4 to establish structural and durability adequacy. When the scope is approved by the Engineer, submit an Engineering Analysis Report (EAR) in accordance with 6-4 that includes a full structural analysis. If the results of the structural analysis indicate adequate strength to serve its intended purpose with adequate durability, and is approved by the Engineer, the Contractor may leave the concrete in place subject to the requirements of 346-11, otherwise, remove and replace the LOT of concrete in question at no additional expense to the Department.

2. At the Engineer’s discretion, obtain drilled core samples as specified in this Section to determine the in-place strength of the LOT of concrete in question, at no additional expense to the Department. The Engineer will determine whether to allow coring of the in-place concrete or require an engineering analysis based on the compressive strength of the test cylinders.

**346-10.1 Coring for Determination of Structural Adequacy:** Core strength test results obtained from the structure will be accepted by both the Contractor and the Department as the in-place strength of the LOT of concrete in question. The core strength test results will be used in lieu of the cylinder strength test results for determination of structural adequacy. The Department will calculate the strength value to be the average of the compressive strengths of the three individual cores. This will be accepted as the actual measured value.

Obtain and test the cores in accordance with ASTM C42. The Engineer will select the size and location of the drilled cores so that the structure is not impaired and does not sustain permanent damage after repairing the core holes. Obtain the Engineer’s written approval before taking any concrete core sample. Notify the Engineer 48 hours prior to taking core samples.

Sample three undamaged cores taken from the same approximate location where the questionable concrete is represented by the low strength concrete test cylinders. Repair core holes after samples are taken with a product in compliance with Section 930 or 934 and meeting the approval of the Engineer. Report the test results to the Engineer within two calendar days of testing the core samples.

The Engineer, with input from the DMO, will consider the concrete as structurally adequate, in the area represented by core tests at the actual test age, if the average compressive strength of cores does not fall below the specified minimum compressive strength ( $f'c$ ) by more than:

- a. 500 psi when the  $f'c$  is equal to or less than 5,000 psi.
- b. 10% of the  $f'c$  when the  $f'c$  is greater than 5,000 psi.

The Engineer may also require the Contractor to perform additional testing as necessary to determine structural adequacy of the concrete.

**346-11 Pay Adjustments for Low Compressive Strength Concrete.**

**346-11.1 General:** For any LOT of concrete failing to meet the  $f'c$  as defined in 346-3, 346-9, and satisfactorily meeting all other requirements of the Contract Documents, including structural adequacy, the Engineer will individually reduce the price of each low strength LOT in accordance with this Section.

**346-11.2 Basis for Pay Adjustments:** The Engineer will determine payment reductions based on the 28 day compressive strength, represented by either acceptance compressive strength or correlated cores strength test results based on the following criteria:

- 1. When the acceptance compressive strength test result falls below the specified minimum compressive strength, but no more than the limits established in 346-9.7 below the

specified minimum strength, do not core hardened concrete for determining pay adjustments. Use the acceptance compressive strength test results.

2. When the acceptance compressive strength test result falls below the specified minimum compressive strength by more than the limits established in 346-9.7, the structure may be cored for determination of structural adequacy as directed by the Engineer. Use the result of the 28 day correlated core compressive strength or the acceptance compressive strength test, whichever is less.

A price adjustment will be applied to the certified invoice price the Contractor paid for the concrete or the precast product.

The Engineer will relate the strength at the actual test age to the 28 day strength for the design mix represented by the cores using appropriate strength time correlation equations.

In precast concrete operations, excluding prestressed concrete, ensure that the producer submits acceptable core sample test results to the Engineer. The producer may elect to use the products in accordance with this Section. Otherwise, replace the concrete in question at no additional cost to the Department. For prestressed concrete, core sample testing is not allowed for pay adjustment. The results of the cylinder strength tests will be used to determine material acceptance and pay adjustment.

**346-11.3 Calculating Pay Adjustments:** The Engineer will determine payment reductions for low strength concrete accepted by the Department. The 28-day strength is represented by either cylinders or correlated cores strength test results in accordance with 346-11.2.

Reduction in Pay is equal to the reduction in percentage of concrete compressive strength below the specified minimum strength:

$$\text{Reduction in Pay (\%)} = \left( \frac{f'_{c-28 \text{ day Strength}}}{f'_c} \right) 100$$

For the elements that payments are based on the per foot basis, the Engineer will adjust the price reduction from cubic yards basis to per foot basis, determine the total linear feet of the elements that are affected by low strength concrete samples and apply the adjusted price reduction accordingly.

**346-12 Pay Reduction for Plastic Properties.**

A rejected load in accordance with 346-6.4 is defined as the entire quantity of concrete contained within a single ready mix truck or other single delivery vehicle regardless of what percentage of the load was placed. If concrete fails a plastic properties test and is thereby a rejected load but its placement continues after completion of a plastic properties test having a failing result, payment for the concrete will be reduced.

The pay reduction for cast-in-place concrete will be twice the certified invoice price per cubic yard of the quantity of concrete in the rejected load.

The pay reduction for placing a rejected load of concrete into a precast product will be applied to that percentage of the precast product that is composed of the concrete in the rejected load. The percentage will be converted to a reduction factor which is a numerical value greater than zero but not greater than one. The precast product payment reduction will be twice the Contractor's billed price from the producer for the precast product multiplied by the reduction factor.

If the Engineer authorizes placement of the concrete, even though plastic properties require rejection, there will be no pay reduction based on plastic properties failures; however, any other pay reductions will apply.

**SECTION 347  
PORTLAND CEMENT CONCRETE - CLASS NS**

**347-1 Description.**

The requirements of this Section are applicable to concrete designated as nonstructural portland cement concrete, (Class NS) hereinafter referred to as concrete. Use concrete composed of a mixture of portland cement, aggregates, water; and where specified chemical admixtures, or supplementary cementitious materials. Deliver concrete to placement site in a freshly mixed, unhardened state. Ensure the concrete is placed and cured in a manner to ensure that the strength and durability of the concrete is maintained.

**347-2 Materials.**

**347-2.1 General:** Certify that all materials used in concrete are from Department approved sources, and free from detrimental matter.

Meet the following requirements:

- Portland Cement.....Section 921
- Coarse Aggregate\* .....Section 901
- Fine Aggregate\* .....Section 902
- Water.....Section 923
- Chemical Admixtures .....Section 924
- Supplementary Cementitious Materials..Section 929

\* Recycled Asphalt Pavement (RAP) may replace up to 20% of the total aggregate in the design mix. Use RAP from a Department approved stockpile.

**347-3 Production, Mixing and Delivery.**

**347-3.1 Concrete Production Requirements:** Obtain concrete from a plant that is currently on the Department’s Nonstructural Concrete Production Facility Listing. Producers seeking inclusion on the list must contact the local District Materials Office for approval.

When Volumetric Mixers are used, deliver concrete in accordance with the Volumetric Mixer Standards of the Volumetric Mixer Manufacturers Bureau (VMMB) VMMB 100-01.

Substitution of structural concrete in lieu of non-structural concrete may be used if approved by the Engineer. If structural concrete is used in lieu of non-structural concrete, obtain the concrete from a production facility meeting the requirements of Section 346.

Acceptance is based on the requirements of Section 347.

The Engineer may disqualify any concrete production facility for non-compliance with Specification requirements.

**347-3.2 Delivery:** The maximum allowable mixing, agitation, and placement time of concrete is 120 minutes.

**347-3.3 Small Quantities of Concrete:** With approval of the Engineer, small quantities of concrete, less than 3 cubic yards placed in one day and less than 0.5 cubic yards placed in a single placement may be accepted using a pre-bagged mixture.

**347-4 Certification and Acceptance.**

**347-4.1 General:** Furnish a delivery ticket with each batch of concrete before discharging concrete at the placement site. Ensure the delivery ticket includes material quantities

incorporated into the batch, sources of materials, batch adjustments, batch size, time loaded, time discharged, and the allowable jobsite water addition.

Ensure the batcher responsible for producing the concrete signs the delivery ticket, certifying that the batch was produced in accordance with the Contract Documents.

Record water added at the jobsite. Sign the delivery ticket certifying that the concrete was placed in accordance with the Contract Documents.

Acceptance by the Department will be by certification on the delivery ticket signed by the batcher and the Contractor. Certify that the concrete meets a minimum compressive strength of 2,500 psi at 28 days. The Engineer may verify the strength of the concrete.

**347-4.2 Remedial Action:** Delineate, remove to the full depth and width, and replace, at no cost to the Department, concrete that has:

1. Any cracking greater than 1/4 inch in vertical displacement.
2. Any spalling or flaking off of the surface layer that exposes the rough, pitted aggregate surface in excess of 10 square inches.
3. Any intersecting cracks visible in the hardened concrete (regardless of size) in sidewalk, ditch pavement, slope pavement, traffic separator, or curb and gutter.
4. Any uncontrolled cracks that appear during the life of the Contract unacceptable to the Engineer.

**SECTION 515**  
**METAL PEDESTRIAN/BICYCLE RAILINGS, GUIDERAILS, AND HANDRAILS**

**515-1 Description.**

Furnish and install metal pedestrian/bicycle railings, including bullet rails, guiderails and handrails in accordance with the Plans and Standard Plans.

Obtain rail components from producers currently on the Department’s Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105.

**515-2 Materials.**

Meet the following requirements:

- Concrete .....Section 346
- Anchor Bolts, Rods, Nuts and Washers\* .....Section 962
- Adhesive Anchors\*\* .....Section 937
- Aluminum .....Section 965
- Bearing Pads ..... 932-2.5
- Epoxy Mortar\*\* .....Section 926
- Steel.....Section 962

\*Do not use expansion anchors.

\*\*Use products listed on the Department’s Approved Product List (APL).

**515-3 Construction Requirements.**

**515-3.1 General:** Space posts to clear obstacles without exceeding maximum post spacing and maintain a uniform spacing with reasonable consistency. Place splices in approximately the same place within a railing section.

Railings must be free of burrs and sharp edges and all plug welds ground smooth.

**515-3.2 Welds:** Nondestructive testing of welds is not required, unless otherwise shown in the Plans.

**515-3.2.1 Aluminum Railing:** Welds must be in accordance with Section 965. Filler material for seal welds, plug welds and bend splices may be ER4303.

**515-3.2.2 Steel Railing:** Meet the requirements of Section 962, except weld connections must be in accordance with AWS D1.1, Structural Welding Code, using E70XX weld material, unless otherwise shown in the Plans.

**515-3.3 Coatings:**

**515-3.3.1 Aluminum Railing:** Coating is not required, unless otherwise shown in the Plans. Finished product must have a smooth uniform appearance.

When a colored coating is required, use a fluoropolymer based powder coating system complying with American Architectural Manufacturers Association (AAMA) Specification No. 2605.

**515-3.3.2 Steel Railing:** Components must be hot-dip galvanized after fabrication in accordance with Section 962, unless otherwise shown in the Plans. When a colored coating is required, meet the requirements of 649-4.

#### **515-4 Shop Drawings.**

Submit shop drawings and obtain approval prior to fabrication in accordance with Section 5. Show project specific geometry (line and grade), post type and locations, expansion joint and splice locations.

Include other project specific details such as tapered end transitions, continuity or transition details post and panel infill type, and anchor bolt general details.

#### **515-5 Installation.**

**515-5.1 General:** Place a 1/8 inch thick bearing pad with dimensions matching the base plate between the base plate and concrete surface.

**515-5.2 Bullet Railings:** Install rail posts perpendicular to the profile grade longitudinally and plumb transversely.

**515-5.3 Pedestrian /Bicycle Railings and Guiderails:** For locations other than bridges, fabricate and install posts plumb. On bridges, fabricate and install posts perpendicular to the profile grade line longitudinally and plumb transversely. Use aluminum shim plates to make necessary adjustments. Bond stacked shim plates with adhesive bonding material and field trim shim plates to match the foundation contours. Beveled shim plates may be used in lieu of trimmed flat shim plates.

If shims greater than 1/2 inch total thickness are required, provide longer anchor bolts. Bolts must be long enough to secure washers and nuts and meet the minimum embedment length.

Post tolerance from plumb is plus or minus one inch, measured at 42 inches above the foundation. Rails must form a smooth continuous line without hills or dips greater than 1/2 inch between any three posts or side sway greater than 1/2 inch between post assemblies.

#### **515-5.4 Anchoring:**

**515-5.4.1 General:** Secure nuts to a snug tight condition. Tack weld nuts to stem or distort bolt threads to prevent nut loosening and removal. Coat damaged galvanizing on bolt stems, nuts, and tack welds in accordance with Section 562.

**515-5.4.2 Adhesive Anchors:** Install anchors in accordance with Section 416.

**515-5.4.3 C-I-P and Thru-Bolt Anchors:** Use galvanized hex head anchor bolts. When thru-bolting is used, coat cut reinforcing steel inside the drilled hole with a zinc galvanizing compound in accordance with Section 562 prior to installing bolts.

**515-5.4.4 Embedded Guiderail Posts:** Core holes into the foundation concrete, then clean holes, in accordance with the manufacturer's instructions. At a minimum, use oil free compressed air to remove loose particles, brush the inside surface to free loose particles, then use compressed air again to remove any remaining particles. Use a Type AB, or F epoxy compound to secure guiderail posts into the cored holes.

#### **515-6 Method of Measurement.**

The quantity of railing to be paid for will be the plan quantity, in linear feet, installed and accepted. The quantity will be measured along the centerline of the top rail.

#### **515-7 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section, including all materials, hardware, labor, and incidentals required to complete the installation.

For relocation of existing railing, price and payment will be full compensation for the

removal and reinstallation, including all materials, hardware, labor, and incidentals required to complete the installation.

Payment will be made under the following:

- Item No. 515- 1- Pipe Handrail-Guiderail - per linear foot.
- Item No. 515- 2- Pedestrian/Bicycle Railing - per linear foot.
- Item No. 515- 3- Handrail - Retrofit to Existing Railing - per linear foot.
- Item No. 515- 4- Aluminum Bullet Railings - per linear foot.

**SECTION 520  
CONCRETE GUTTER, CURB ELEMENTS,  
AND TRAFFIC SEPARATOR**

**520-1 Description.**

Construct portland cement concrete curb. Curb will include concrete curb and gutter, concrete traffic separator, valley gutter, special concrete gutter, curb for sidewalk curb ramps and driveways, and any other types of concrete curb not specified in other Sections.

**520-2 Materials.**

**520-2.1 Concrete:** Use concrete meeting the requirements of Section 347.

**520-2.2 Reinforcement:** For all steel reinforcement required by the Plans, meet the requirements of Section 415.

**520-2.3 Joint Materials:** Meet the requirements of Section 932.

**520-2.4 Toll Header Curb Concrete:** Use concrete meeting the requirements of Section 346, Class II.

**520-3 Forms.**

**520-3.1 Form Materials:** Construct forms for this work of either wood or metal. Provide forms that are straight, free from warp or bends, and of sufficient strength, when staked, to resist the pressure of the concrete without deviation from line and grade. For all items constructed on a radius, use flexible forms.

**520-3.2 Depth of Forms:** Ensure that forms have a depth equal to the plan dimensions for the depth of concrete being deposited against them.

**520-3.3 Machine Placement:** The Contractor may place these items by machine methods with the approval of the Engineer provided that the Contractor consistently produces an acceptable finished product, true to line, grade, and cross section.

**520-4 Excavation.**

Excavate to the required depth, and compact the foundation material upon which these items are to be placed as specified in 120-9.

**520-5 Placing Concrete.**

Place the concrete in the forms, and tamp and spade it to prevent honeycombing, and until the top of the structure can be floated smooth and the edges rounded to the radius shown in the Plans.

**520-6 Joints.**

**520-6.1 Contraction Joints:** Except for machine placed items, the Contractor may form joints by using dummy joints (either formed or sawed) or by using sheet metal templates. If using sheet metal templates, ensure that they are of the dimensions, and are set to the lines, shown in the Plans. Hold templates firmly while placing the concrete. Leave templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place.

Saw contraction joints, for machine placed items, unless the Engineer approves an alternate method. Saw the joints as soon as the concrete has hardened to the degree that excessive raveling will not occur and before uncontrolled shrinkage cracking begins.

Space contraction joints at intervals of 10 feet except where closure requires a lesser interval, but do not allow any section to be less than 4 feet in length.

**520-6.2 Expansion Joints:** Construct expansion joints at all inlets, at all radius points, and at other locations indicated in the Plans. Locate them at intervals of 500 feet between other expansion joints or ends of a run. Ensure that the joint is 1/2 inch in width.

**520-7 Finishing.**

**520-7.1 Repair of Minor Defects:** Remove the forms within 24 hours after placing the concrete, and then fill minor defects with mortar composed of one part portland cement and two parts fine aggregate. The Engineer will not allow plastering on the face of the curb. Remove and replace any rejected curb, curb and gutter, or valley gutter without additional compensation.

**520-7.2 Final Finish:** Finish all exposed surfaces while the concrete is still green. In general, the Engineer will only require a brush finish. For any surface areas, however, which are too rough or where other surface defects make additional finishing necessary, the Engineer may require the Contractor to rub the curb to a smooth surface with a soft brick or wood block, using water liberally. Also, if necessary to provide a suitable surface, the Engineer may require the Contractor to rub further, using thin grout or mortar.

**520-7.3 Imprinted Concrete:** Install imprinted concrete as shown in the Plans.

**520-8 Curing.**

**520-8.1 General:** Continuously cure the concrete for a period of at least 72 hours. Commence curing after completely finishing and as soon as the concrete has hardened sufficiently to permit application of the curing material without marring the surface. Immediately replace any curing material removed or damaged during the 72 hour period.

After removing the forms, cure the surfaces exposed by placing a berm of moist earth against them or by any of the methods described below, for the remainder of the 72 hour curing period.

**520-8.2 Wet Burlap Method:** Place burlap, as specified in 925-1, over the entire exposed surface of the concrete, with sufficient extension beyond each side to ensure complete coverage. Overlap adjacent strips a minimum of 6 inches. Hold the burlap securely in place such that it will be in continuous contact with the concrete at all times, and do not allow any earth between the burlap surfaces at laps or between the burlap and the concrete. Saturate the burlap with water before placing it, and keep it thoroughly wet throughout the curing period.

**520-8.3 Membrane Curing Compound Method:** Apply clear membrane curing compound or white pigmented curing compound, as specified in 925-2, by a hand sprayer meeting the requirements of 350-3.10, in a single coat continuous film at a uniform coverage of at least one gallon per 200 square feet. Immediately recoat any cracks, checks, or other defects appearing in the coating. Thoroughly agitate the curing compound in the drum prior to application, and during application as necessary to prevent settlement of the pigment.

**520-8.4 Polyethylene Sheeting Method:** Place polyethylene sheeting, as specified in 925-3, over the entire exposed surface of the concrete, with sufficient extension beyond each side to ensure complete coverage. Overlap adjacent strips a minimum of 6 inches. Hold the sheeting securely in place and in continuous contact with the concrete at all times.

**520-9 Backfilling and Compaction.**

After the concrete has set sufficiently, but not later than three days after pouring, refill the spaces in front and back of the curb to the required elevation with suitable material. Place and thoroughly compact the material in layers not thicker than 6 inches.

**520-10 Surface Requirements.**

Test the gutter section of curb and gutter with a 10 foot straightedge laid parallel to the centerline of the roadway and while the concrete is still plastic. Perform straightedging along the edge of the gutter adjacent to the pavement or along other lines on the gutter cross-section, as directed by the Engineer. Immediately correct irregularities in excess of 1/4 inch.

**520-11 Method of Measurement.**

For curb or curb and gutter, the quantity to be paid will be the plan quantity, in feet, measured along the face of the completed and accepted curb or curb and gutter. Curb for sidewalk curb ramps or driveways will be paid at the Contract unit price for the adjacent curb type.

For valley gutter or shoulder gutter, the quantity to be paid will be the plan quantity, in feet, measured along the gutter line of the completed and accepted valley gutter or shoulder gutter.

For concrete traffic separator of constant width, meeting the requirements of Standard Plans, Index 520-020, the quantity to be paid will be the plan quantity, in feet, measured along the center of its width, completed and accepted, including the length of the nose.

For concrete traffic separator of nonstandard or varying width, the quantity to be paid will be the plan quantity, in square yards, completed and accepted.

For curb of any type next to concrete pavement, the curb-pavement joint quantity to be paid will be the plan quantity, in feet, measured along the face of the completed and accepted curb.

**520-12 Basis of Payment.**

**520-12.1 Concrete Gutter, Curb Elements, and Traffic Separator:** Price and payment will be full compensation for all work specified in this Section, including reinforcement steel, dowels, asphalt pavement and base under traffic separator, joint materials and asphalt curb pad.

**520-12.2 Excavation:** Excavation for new installations will be paid for as roadway excavation in accordance with 120-13.2.

**520-12.3 Payment Items:** Payment will be made under:

- Item No. 520- 1- Concrete Curb and Gutter - per foot.
- Item No. 520- 2- Concrete Curb - per foot.
- Item No. 520- 3- Concrete Valley Gutter - per foot.
- Item No. 520- 4- Curb-Concrete Pavement Joint - per foot.
- Item No. 520- 5- Concrete Traffic Separator - per foot.
- Item No. 520- 6- Concrete Shoulder Gutter - per foot.
- Item No. 520- 70- Concrete Traffic Separator - per square yard.

## SECTION 522 CONCRETE SIDEWALK AND DRIVEWAYS

### **522-1 Description.**

Construct concrete sidewalks and driveways in accordance with the Plans and the Standard Plans. Sidewalk will include curb ramps, landings, transition slopes, sidewalk curb, and edge beams.

### **522-2 Materials.**

Meet the requirements specified in 520-2 and the embankment utilization requirements of Standard Plans Index 120-001.

### **522-3 Forms.**

Provide forms as specified in 520-3.

### **522-4 Foundation.**

Shape and compact the foundation materials with suitable equipment to a firm, even surface, true to grade and cross-slope. Compact cut-and-fill areas within 1 foot beyond each side of the sidewalk or driveway, when right-of-way conditions allow. Meet the testing frequency and maximum lift thickness requirements of Section 120. Record density test results in the Earthwork Records System (ERS) section of the Department's database for the foundation material below the bottom of concrete for a minimum depth of 2 feet for fill areas, and 1 foot for cut areas, to a density not less than 95% of the maximum density as determined by FM 1-T099. Compact the material in the remaining fill areas to match the adjacent area density.

### **522-5 Joints.**

Install expansion and contraction joints in accordance with the Plans and the Standard Plans.

### **522-6 Placing Concrete.**

Place the concrete as specified in 520-5.

### **522-7 Finishing.**

**522-7.1 Screeding:** Strike-off the concrete by means of a wood or metal screed, used perpendicular to the forms, to obtain the required grade and remove surplus water and laitance.

**522-7.2 Surface Requirements:** Imprint concrete as detailed in the Plans, otherwise provide a broom finish. Ensure that the surface variations are not more than 1/4 inch under a 10-foot straightedge or more than 1/8 inch on a 5-foot transverse section. Finish the outer edges of the concrete with an edging tool having a radius of 1/2 inch.

**522-7.3 Sidewalk Cross Slope Requirements:** Construct sidewalk with cross slope as shown in the Plans and Standard Plans. Sidewalks must have some cross slope, but no more than 2.0%, in either the positive or negative direction after construction.

### **522-8 Curing.**

Cure the concrete as specified in 520-8.

**522-9 Opening Sidewalk to Pedestrian Traffic.**

Install detectable warnings, when shown in the Plans, in accordance with Section 527 on completed sections of sidewalk before opening to pedestrian traffic.

**522-10 Method of Measurement.**

The quantity to be paid will be plan quantity, in square yards, completed and accepted.

**522-11 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section. Excavation for new installations will be paid for under the items for the grading work on the project.

Payment will be made under:

Item No. 522-

Concrete Sidewalks and Driveways - per square yard.

**SECTION 570  
PERFORMANCE TURF**

**570-1 Description.**

Establish a growing, healthy turf over all areas designated in the Plans. Use sod in areas designated in the Plans to be sodded. Use seed, hydroseed, bonded fiber matrix, or sod in all other areas. Maintain performance turf areas until final acceptance of all Contract work in accordance with Section 5-11 and the establishment requirements of 570-4 have been met.

**570-2 Materials.**

Meet the following requirements:

- Turf Materials .....Section 981
- Fertilizer .....Section 982
- Water .....Section 983

**570-3 Construction Methods.**

**570-3.1 General:** Remove all construction debris in performance turf areas. Install performance turf at the earliest practical time for erosion control and establishment.

Shape the areas to be planted to the plan typical sections and lines and grade shown in the Plans.

Except in areas where the Contract Documents requires specific types of turf to match adjoining private property, any species of turf designated in Section 981 may be used. All of the permanent performance turf material shall be in place prior to final acceptance.

The Department will only pay for replanting as necessary due to factors determined by the Engineer to be beyond control of the Contractor.

Install all performance turf on shoulder areas prior to the placement of the friction course on adjacent pavement.

**570-3.2 Seeding:** At the Contractor’s option, wildflower seed may be included in the performance turf seeding operation or performed separately from the performance turf seeding. Seed must produce visible seedlings within 45 days of planting.

Use of compost meeting the requirements of Section 987 as mulch is acceptable unless otherwise specified.

**570-3.3 Sod:** Place the sod on the prepared surface, with edges in close contact. Do not use sod which has been cut for more than 48 hours.

Place the sod to the edge of all landscape areas as shown in the Plans and the Standard Plans.

Place rolled sod parallel with the roadway and cut any exposed netting even with the sod edge.

Monitor placed sod for growth of exotic or invasive pest plants and noxious weeds. If exotic or invasive pest plants and/or noxious weeds manifest themselves within 30 days of placement of the sod during the months April through October, within 60 days of placement of the sod during the months of November through March treat affected areas by means acceptable to the Department at no expense to the Department. If pest plants and/or noxious weeds manifest themselves after the time frames described above from date of placement of sod, the Engineer, at his sole option, will determine if treatment is required and

whether or not the Contractor will be compensated for such treatment. If compensation is provided, payment will be made as Unforeseeable Work as described in 4-4.

Remove and replace any sod as directed by the Engineer.

**570-3.4 Hydroseeding:** Use equipment specifically designed for mixing the mulch, seed, fertilizer, tackifier and dye, and applying the slurry uniformly over the areas to be hydroseeded.

Use mulch that does not contain reprocessed wood or paper fibers. Ensure that 50% of the fibers will be retained on a twenty-five mesh screen.

Mix fertilizer as required into the hydroseeding slurry.

Ensure that the dye does not contain growth or germination inhibiting chemicals.

When polyacrylamide is used as part of hydroseeding mix, only anionic polymer formulation with free acrylamide monomer residual content of less than 0.05% is allowed. Cationic polyacrylamide shall not be used in any concentration. Do not spray polyacrylamide containing mixtures onto pavement. These may include tackifiers, flocculants or moisture-holding compounds.

**570-3.5 Bonded Fiber Matrix (BFM):** Meet the minimum physical and performance criteria of this Specification for use of BFM in hydroseeding operations or temporary non-vegetative erosion and sediment control methods.

Provide evidence of product performance testing, manufacturer's certification of training and material samples to the Engineer at least 7 calendar days prior to installation.

Provide documentation to the Engineer of manufacturer's testing at an independent laboratory, demonstrating superior performance of BFM as measured by reduced water runoff, reduced soil loss and faster seed germination in comparison to erosion control blankets.

Use only BFMs that contain all components pre-packaged by the manufacturer to assure material performance. Deliver materials in UV and weather resistant factory labeled packaging. Store and handle products in strict compliance with the manufacturer's directions.

When polyacrylamide is used as part of hydroseeding mix, only anionic polymer formulation with free acrylamide monomer residual content of less than 0.05% is allowed. Cationic polyacrylamide shall not be used in any concentration. Do not spray polyacrylamide containing mixtures onto pavement. These may include tackifiers, flocculants or moisture-holding compounds.

Meet the following requirements after application of the formed matrix:

Ensure that the tackifier does not dissolve or disperse upon re-wetting.

Ensure that the matrix has no gaps between the product and the soil and that it provides 100% coverage of all disturbed soil areas after application.

Ensure that the matrix has no germination or growth inhibiting properties and does not form a water-repelling crust.

Ensure that the matrix is comprised of materials which are 100% biodegradable and 100% beneficial to plant growth.

Mix and apply the BFM in strict compliance with the manufacturer's recommendations.

Apply the BFM to geotechnically stable slopes at the manufacturer's recommended rates.

Degradation of BFM will occur naturally as a result of chemical and biological hydrolysis, UV exposure and temperature fluctuations. Re-application, as determined by the

Engineer, will be required if BFM-treated soils are disturbed or water quality or turbidity tests show the need for an additional application.

**570-3.6 Watering:** Water all performance turf areas as necessary to produce a healthy and vigorous stand of turf. Ensure that the water used for turf irrigation meets the requirements of Section 983.

**570-3.7 Fertilizing:** Fertilize as necessary to promote turf growth and establishment based on soil testing. Refer to Section 982 for fertilizer rates.

For bid purposes, base estimated quantities on an initial application of 265 lb/acre and one subsequent application of 135 lb/acre of 16-0-8.

**570-3.8 Shoulder Treatment:** Provide soil for shoulder treatment in accordance with Standard Plans, Index 570-010. Soil needed for these purposes will be included in the corresponding Pay Item.

#### **570-4 Turf Establishment.**

Perform all work necessary, including watering and fertilizing, to sustain an established turf, free of noxious weeds, at no additional expense to the Department. Provide the filling, leveling, and repairing of any washed or eroded areas, as necessary.

Established turf is defined as follows:

1. An established root system (leaf blades break before seedlings or sod can be pulled from the soil by hand).
2. No bare spots larger than one square foot.
3. No continuous sod seams running perpendicular to the face of the slope.
4. No bare areas comprising more than 1% of any given 1,000 square foot area.
5. No deformation of the performance turf areas caused by mowing or other Contractor equipment.
6. No exposed sod netting.
7. No competing vegetation, exotic or invasive pest plants or noxious weeds.

Monitor turf areas and remove all competing vegetation, exotic or invasive pest plants, and noxious weeds (as listed by the Florida Exotic Pest Plant Council, Category I “List of Invasive Species”, Current Edition, <https://www.fleppc.org>). Remove such vegetation regularly by manual, mechanical, or chemical control means, as necessary. When selecting herbicides, pay particular attention to ensure use of chemicals that will not harm desired turf or wildflower species. Use herbicides in accordance with 7-1.7.

If at the time that all other work on the project is completed, but all turf areas have not met the requirements for established turf set forth in 570-4, continuously maintain all turf areas until the requirements for established turf set forth in 570-4 have been met.

During establishment and until the performance turf is established in accordance with this Section, continue the inspection, maintenance, and documentation of erosion and sedimentation control items in accordance with Section 104. Remove and dispose of all erosion and sedimentation control items after the performance turf has been established.

Notify the Engineer, with a minimum of seven calendar days advance notice, to conduct inspections of the performance turf at approximate 90-day intervals during the establishment period to determine establishment. Results of such inspections will be made available to the Contractor within seven calendar days of the date of inspection. Determination of an established turf will be based on the entire project and not in sections.

Upon the determination by the Engineer that the requirements of 570-4 have been met and an established turf has been achieved and all erosion and sedimentation control items have

been removed, the Engineer will release the Contractor from any further responsibility provided for in this Specification.

The Contractor's establishment obligations of this specification will not apply to deficiencies due to the following factors, if found by the Engineer to be beyond the control of the Contractor, his subcontractors, vendors or suppliers:

1. Determination that the deficiency was due to the failure of other features of the Contract.

2. Determination that the deficiency was the responsibility of a third party performing work not included in the Contract or its actions.

The Department will only pay for replanting as necessary due to factors determined by the Department to be beyond the control of the Contractor.

#### **570-5 Responsible Party.**

For the purposes of this Specification, the Contractor shall be the responsible party throughout construction and establishment periods.

Upon final acceptance of the Contract in accordance with 5-11, the Contractor's responsibility for maintenance of all the work or facilities within the project limits of the Contract will terminate in accordance with 5-11; with the sole exception that the facilities damaged due to lack of established turf and the obligations set forth in this Specification-for performance turf shall continue thereafter to be responsibility of the Contractor as otherwise provided in this Section.

#### **570-6 Statewide Disputes Review Board.**

The Statewide Disputes Review Board in effect for this Contract will resolve any and all disputes that may arise involving administration and enforcement of this Specification related to the remedial work performed during the warranty period. The Responsible Party and the Department acknowledge that use of the Statewide Disputes Review Board is required, and the determinations of the Statewide Disputes Review Board for disputes arising out of this Specification will be binding on both the Responsible Party and the Department, with no right of appeal by either party. Meet the requirements of 8-3.

#### **570-7 Failure to Perform.**

Should the Contractor fail to timely submit any dispute to the Statewide Disputes Review Board, refuse to submit any dispute to the Statewide Disputes Review Board, fail to provide an established turf in accordance with 570-4 within six months of final acceptance of the Contract in accordance with 5-11, or fail to compensate the Department for any remedial work performed by the Department in establishing a turf and other remedial work associated with lack of an established turf, including but not limited to, repair of shoulder or other areas due to erosion and removal of sediments deposited in roadside ditches and streams, as determined by the Statewide Disputes Review Board to be the Contractor's responsibility, the Department shall suspend, revoke or deny the Contractor's certificate of qualification under the terms of Section 337.16(d)(2), Florida Statutes, until the Contractor provides an established turf or makes full and complete payment for the remedial work performed by the Department. In no case shall the period of suspension, revocation, or denial of the Contractor's certificate of qualification be less than six months. Should the Contractor choose to challenge the Department's notification of intent for suspension, revocation or denial of qualification and the Department's action is upheld,

the Contractor shall have its qualification suspended for a minimum of six months or until the remedial action is satisfactorily performed, whichever is longer.

**570-8 Method of Measurement.**

The quantities to be paid for will be plan quantity in square yards based on the area shown in the Plans, completed and accepted.

**570-9 Basis of Payment.**

Prices and payments will be full compensation for all work and materials specified in this Section.

Payment will be made under:

Item No. 570- 1- Performance Turf - per square yard.

**DIVISION III**

**Materials**

**AGGREGATES**

**SECTION 901  
COARSE AGGREGATE**

**901-1 General.**

**901-1.1 Composition:** Coarse aggregate shall consist of naturally occurring materials such as gravel, or resulting from the crushing of parent rock, to include natural rock, slags, expanded clays and shales (lightweight aggregates) and other approved inert materials with similar characteristics, having hard, strong, durable particles, conforming to the specific requirements of this Section.

Materials substantially retained on the No. 4 sieve, shall be classified as coarse aggregate.

Approval of mineral aggregate sources shall be in accordance with 6-2.3.

**901-1.2 Deleterious Substances:** All coarse aggregates shall be reasonably free of clay lumps, soft and friable particles, salt, alkali, organic matter, adherent coatings, and other substances not defined which may possess undesirable characteristics. The weight of deleterious substances shall not exceed the following percentages:

Coal and lignite (AASHTO T 113).....	1.00
Soft and friable particles (AASHTO T 112)*.....	2.00
Clay lumps (AASHTO T 112)* .....	2.00
Plant root matter (visual inspection in AASHTO T 27)****.....	0.005
Wood and wood matter (visual inspection in AASHTO T 27)**** .....	0.005
Cinders and clinkers.....	0.50
Free shell** .....	1.00
Total Material passing the No. 200 sieve (FM 1-T011) At Source with Los Angeles Abrasion less than or equal to 30 .....	2.50
At Source with Los Angeles Abrasion greater than 30.....	1.75
At Point of Use.....	3.75
Fine-Grained Organic Matter (AASHTO 194).....	0.03
Chert (less than 2.40 specific gravity SSD) (AASHTO T 113)*** .....	3.00

\* The maximum percent by weight of soft and friable particles and clay lumps together shall not exceed 3.00.

\*\* Aggregates to be used in asphalt concrete may contain up to 5% free shell. Free shell is defined as that portion of the coarse aggregate retained on the No. 4 sieve consisting of loose, whole, or broken shell, or the external skeletal remains of other marine life, having a

ratio of the maximum length of the particle to the shell wall thickness exceeding five to one. Coral, molds, or casts of other shells, and crushed clam and oyster shell indigenous to the formation will not be considered as free shell.

\*\*\* This limitation applies only to coarse aggregates in which chert appears as an impurity. It is not applicable to aggregates which are predominantly chert.

\*\*\*\* Plant root matter, and wood and wood matter shall be considered deleterious when any piece exceeds two inches in length or 1/2 inch in width.

The weights of deleterious substances for reclaimed Portland cement concrete aggregate shall not exceed the following percentages:

Bituminous Concrete .....	1.00
Bricks .....	1.00
Wood and other organic substances (by weight)***** .....	0.1
Reinforcing Steel and Welded Wire Reinforcement .....	0.1
Plaster and gypsum board .....	0.1
Joint Fillers.....	0.1

\*\*\*\*\* Supersedes requirement for other coarse aggregate

**901-1.3 Physical Properties:** Coarse aggregates shall meet the following physical property requirements, except as noted herein:

Los Angeles Abrasion (FM 1-T096).....	maximum loss 45%
Soundness (Sodium Sulfate) AASHTO T 104 .....	
.....	maximum loss 12%*
Flat or elongated pieces** .....	maximum 10%

\* For source approval - aggregates exceeding soundness loss limitations will be rejected unless performance history shows that the material will not be detrimental for portland cement concrete or other intended usages.

\*\* A flat or elongated particle is defined as one having a ratio between the maximum and the minimum dimensions of a circumscribing prism exceeding five to one.

**901-1.4 Gradation:** Coarse aggregates shall conform to the gradation requirements of Table 901-1, when the stone size is specified. However, Table 901-1 is waived for those aggregates intended for usage in bituminous mixtures, provided the material is graded on sieves specified in production requirements contained in 6-2.3, and meets uniformity and bituminous design requirements.

Table 901-1 Standard Sizes of Coarse Aggregate								
Amounts Finer than Each Laboratory Sieve (Square Openings), weight percent								
Size No.	Nominal Size Square Openings	4 inches	3-1/2 inches	3 inches	2-1/2 inches	2 inches	1-1/2 inches	1 inch
1	3-1/2 to 1-1/2 inches	100	90 to 100	-	25 to 60	-	0 to 15	-
2	2-1/2 inches to 1-1/2 inches	-	-	100	90 to 100	35 to 70	0 to 15	-
24	2-1/2 inches to 3/4 inch	-	-	100	90 to 100	-	25 to 60	-
3	2 inches to 1 inch	-	-	-	100	90 to 100	35 to 70	0 to 15
357	2 inches to No. 4	-	-	-	100	95 to 100	-	35 to 70
4	1-1/2 inches to 3/4 inch	-	-	-	-	100	90 to 100	20 to 55
467	1-1/2 inches to No. 4	-	-	-	-	100	95 to 100	-
5	1 inch to 1/2 inch	-	-	-	-	-	100	90 to 100
56	1 inch to 3/8 inch	-	-	-	-	-	100	90 to 100
57	1 inch to No. 4	-	-	-	-	-	100	95 to 100
6	3/4 inch to 3/8 inch	-	-	-	-	-	-	100
67	3/4 inch to No. 4	-	-	-	-	-	-	100
68	3/4 inch to No. 8	-	-	-	-	-	-	-
7	1/2 inch to No. 4	-	-	-	-	-	-	-
78	1/2 inch to No. 8	-	-	-	-	-	-	-
8	3/8 inch to No. 8	-	-	-	-	-	-	-
89	3/8 inch to No. 16	-	-	-	-	-	-	-
9	No. 4 to No. 16	-	-	-	-	-	-	-
10	No. 4 to 0	-	-	-	-	-	-	-

Table 901-1 (Continued)								
Standard Sizes of Coarse Aggregate								
Amounts Finer than Each Laboratory Sieve (Square Openings), weight percent								
Size No.	Nominal Size Square Openings	3/4 inch	1/2 inch	3/8 inch	No. 4	No. 8	No. 16	No. 50
1	3-1/2 inches to 1-1/2 inches	0 to 5						
2	2-1/2 inches to 1-1/2 inches	0 to 5						
24	2-1/2 inches to 3/4 inch	0 to 10	0 to 5					
3	2 inches to 1 inch	-	0 to 5					
357	2 inches to No. 4	-	10 to 30	-	0 to 5			
4	1-1/2 inches to 3/4 inch	0 to 15	-	0 to 5				
467	1-1/2 inches to No. 4	35 to 70	-	10 to 30	0 to 5			
5	1 inch to 1/2 inch	20 to 55	0 to 10	0 to 5				
56	1 inch to 3/8 inch	40 to 85	10 to 40	0 to 15	0 to 5			
57	1 inch to No. 4	-	25 to 60	-	0 to 10	0 to 5		
6	3/4 inch to 3/8 inch	90 to 100	20 to 55	0 to 15	0 to 5			
67	3/4 inch to No. 4	90 to 100	-	20 to 55	0 to 10	0 to 5		
68	3/4 inch to No. 8	90 to 100	-	30 to 65	5 to 25	0 to 10	0 to 5	
7	1/2 inch to No. 4	100	90 to 100	40 to 70	0 to 15	0 to 5		
78	1/2 inch to No. 8	100	90 to 100	40 to 75	5 to 25	0 to 10	0 to 5	
8	3/8 inch to No. 8	-	100	85 to 100	10 to 30	0 to 10	0 to 5	
89	3/8 inch to No. 16	-	100	90 to 100	20 to 55	0 to 30	0 to 10	0 to 5
9	No. 4 to No. 16	-	-	100	85 to 100	10 to 40	0 to 10	0 to 5
10	No. 4 to 0	-	-	100	85 to 100	-	-	-

The gradations in Table 901-1 represent the extreme limits for the various sizes indicated which will be used in determining the suitability for use of coarse aggregate from all sources of supply. For any grade from any one source, the gradation shall be held reasonably uniform and not subject to the extreme percentages of gradation specified above.

**901-2 Natural Stones.**

Coarse aggregate may be processed from gravels, granites, limestones, dolomite, sandstones, or other naturally occurring hard, sound, durable materials meeting the requirements of this Section.

**901-2.1 Gravels:** Gravel shall be composed of naturally occurring quartz, free from deleterious coatings of any kind. The minimum dry-rodDED weight AASHTO T 19 shall be 95 pounds per cubic foot.

Crushed gravel shall consist of a minimum of 85%, by weight, of the material retained on the No. 4 sieve, having at least three fractured faces.

**901-2.2 Granites:** Coarse aggregate produced from the crushing of granites shall be sound and durable. For granites to be used in bituminous mixtures and surface treatments, the Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 50 (FM 1-T096). Maximum amount of mica schist permitted is 5% (FM 5-584).

**901-2.3 Limestones, Dolomite and Sandstone:** Coarse aggregates may be produced from limestone, dolomite, sandstones, and other naturally occurring hard, durable materials meeting the requirements of this Section. When used as a friction course, crushed limestone shall have a minimum acid insoluble content of 12% (FM 5-510). Other materials must meet the approval requirements for friction course determined by Rule 14-103.005(1), Florida Administrative Code (FAC).

Pre-Cenozoic limestones and dolomite shall not be used as crushed stone aggregates either coarse or fine for asphalt concrete friction courses, or any other asphalt concrete mixture or surface treatment serving as the final wearing course. This specifically includes materials from the Ketone Dolomite (Cambrian) Newala Limestone (Mississippian) geologic formations in Northern Alabama and Georgia.

As an exception to the above, up to 20% fine aggregate from these materials may be used in asphalt concrete mixtures other than friction courses which serve as the final wearing course.

**901-2.4 Cemented Coquina Rock:** For cemented coquina rock to be used in bituminous mixtures, the Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 50 (FM 1-T 096) provided that the amount of material finer than No. 200 generated during the Los Angeles Abrasion test is less than 18%.

**901-3 Manufactured Stones.**

**901-3.1 Slags:** Coarse aggregate may be produced from molten nonmetallic by-products consisting essentially of silicates and aluminosilicates of calcium and other bases, such as air-cooled blast-furnace slag or phosphate slag, provided it is reasonably uniform in density and quality, and reasonably free from deleterious substances as specified in 901-1.2. In addition, it must meet the following specific requirements:

- Sulphur content ..... not more than 1.5%
- Dry rodDED weight AASHTO T 19..... minimum 70 lb/ft<sup>3</sup>
- Glassy Particles..... not more than 10%
- Slag shall not be used as an aggregate for Portland cement concrete.

For air-cooled blast furnace slag, the Los Angeles Abrasion requirement of 901-1.3 is modified to permit a maximum loss up to 50 (FM 1-T096) provided that the amount of material finer than No. 200 sieve generated during the Los Angeles Abrasion test is less than 18%.

**901-4 Lightweight Aggregates.**

**901-4.1 Lightweight Coarse Aggregate for Bituminous Construction:** Lightweight coarse aggregate may be produced from naturally occurring materials such as pumice, scoria and tuff or from expanded clay, shale or slate fired in a rotary kiln. It shall be reasonably uniform in quality and density, and free of deleterious substances as specified in 901-1.2, except that the term cinders and clinkers shall apply to those particles clearly foreign to the extended aggregate in question.

In addition, it must meet the following specific requirements:

- Material passing the No. 200 Sieve  
.....maximum 3.00%, (FM 1-T011)
- Dry loose weight (AASHTO T 19)\* ..... 33-55 lb/ft<sup>3</sup>
- Los Angeles Abrasion (FM 1-T096). maximum 35%
- Ferric Oxide (ASTM C641)..... maximum 1.5 mg

\* Source shall maintain dry-loose unit weight within plus or minus 6% of Quality Control average. Point of use dry-loose unit weight shall be within plus or minus 10% of Source Quality Control average.

**901-4.2 Lightweight Coarse Aggregate for Structural Concrete:** The requirements of 901-4.1 are modified as follows:

- Aggregates shall not be produced from pumice and scoria.
- Los Angeles Abrasion (FM 1-T096, Section 12) shall be 45%, maximum.
- Gradation shall meet the requirements of AASHTO M 195 for 3/4 inch, 1/2 inch and 3/8 inch.

**901-5 Recycled Concrete Aggregate (RCA).**

RCA shall be crushed and processed to provide a clean, hard, durable aggregate having a uniform gradation free from adherent coatings.

RCA can be used as coarse aggregate in pipe backfill under wet conditions, underdrain aggregate, or concrete meeting the requirements of Section 347. RCA can only be used in bituminous mixtures if the RCA originated from a concrete mix which was produced and placed in accordance with Section 346. RCA shall be asbestos free.

The Contractor's (Producer's) crushing operation shall produce an aggregate meeting the applicable gradation requirements. The physical property requirements of 901-1.3 for soundness shall not apply and the maximum loss as determined by the Los Angeles Abrasion (FM 1-T096) is changed to 50.

The sources of reclaimed portland cement concrete will be treated as a mine and subject to the requirements of Section 6 and Section 105.

**901-6 Exceptions, Additions and Restrictions.**

Pertinent specification modifications, based on material usage, will be found in other Sections of the specifications.

**SECTION 902  
FINE AGGREGATE**

**902-1 General.**

**902-1.1 Composition:** Fine aggregate shall consist of natural silica sand, screenings, local materials, or subject to approval, other inert materials with similar characteristics, or combination thereof, having hard, strong, durable particles, conforming to the specific requirements of this Section.

Approval of construction aggregate sources shall be in accordance with 6-2.3.

**902-1.2 Deleterious Substances:** All fine aggregate shall be reasonably free of lumps of clay, soft or flaky particles, salt, alkali, organic matter, loam or other extraneous substances. The weight of deleterious substances shall not exceed the following percentages:

Shale.....	1.0
Coal and lignite.....	1.0
Cinders and clinkers.....	0.5
Clay Lumps.....	1.0

**902-2 Silica Sand.**

**902-2.1 Composition:** Silica sand shall be composed only of naturally occurring hard, strong, durable, uncoated grains of quartz, reasonably graded from coarse to fine, meeting the following requirements, in percent total weight.

Table 902-1		
Sieve Opening Size	Percent Retained	Percent Passing
No. 4	0 to 5%	95 to 100%
No. 8	0 to 15%	85 to 100%
No. 16	3 to 35%	65 to 97%
No. 30	30 to 75%	25 to 70%
No. 50	65 to 95%	5 to 35%
No. 100	93 to 100%	0 to 7%
No. 200	minimum 96%	maximum 4%

Silica sand from any one source, having a variation in Fineness Modulus greater than 0.20 either way from the Fineness Modulus of target gradations established by the producer, may be rejected.

**902-2.2 Organic Impurities:** Silica sand shall be subject to the colorimetric test for organic impurities. If the color produced is darker than the standard solution, the aggregate shall be rejected unless it can be shown by appropriate tests that the impurities causing the color are not of a type that would be detrimental to portland cement concrete. Such tests shall be in accordance with AASHTO T 21 and AASHTO T 71. When tested for the effect of organic impurities on strength of mortar, the strength ratio at seven and 28 days, calculated in accordance with Section 11 of AASHTO T 71, shall not be less than 95%.

**902-3 Sands for Miscellaneous Uses.**

**902-3.1 Anchor Bolts and Pipe Joints:** Sand for setting anchor bolts, pipe joints or other similar uses shall meet the quality requirements of 902-2, except that gradation requirements are waived.

**902-3.2 Brick Masonry:** Sand for brick masonry shall meet the quality requirements of 902-2, except for gradation requirements. All the materials shall pass the No. 8 sieve, and be well graded from coarse to fine.

**902-3.3 Sand-Cement Riprap:** Sand for sand-cement riprap shall meet the quality requirements of 902-2, except for gradation requirements. The material shall meet the following gradation limits:

Table 902-2	
Sieve Size	Percent Passing
No. 4	minimum 97%
No. 100	maximum 20%
No. 200	maximum 5%

**902-4 Filter Material for Underdrains.**

Silica sand for use as filter material for Types I through IV underdrains shall meet the requirements of 902-2, except that the requirements of 902-1.2 and 902-2.2 shall not apply. The aggregate shall be reasonably free of organic matter and other deleterious materials. The gradation requirements of 902-2.1 shall apply except no more than 2% shall pass the No. 200 sieve.

Filter material for Type V underdrain shall meet the above requirements except that there shall be no more than 1% of silt, clay and organic matter, that the aggregate shall have a Uniformity Coefficient of 1.5 or greater, and that 10% diameter shall be No. 70 to 35 sieve. The Uniformity Coefficient shall be determined by the ratio D60 divided by D10, where D60 and D10 refer to the particle diameter corresponding to 60% and 10% of the material which is finer by dry weight.

**902-5 Screenings.**

**902-5.1 Composition:** Screenings shall be composed of hard, durable particles, either naturally occurring, such as gravel screenings, or resulting from the crushing or processing of the parent rock, to include natural rock, slags, expanded clays or shales (lightweight aggregates), or other approved inert materials with similar characteristics.

Aggregates classified as screening shall conform to the following gradation requirements:

Table 902-3	
Sieve Size	Percent Passing
3/8 in.	100%
No.4	75 to 100%

**902-5.2 Specific Requirements:**

**902-5.2.1 Screenings from Department Approved Sources of Coarse Aggregate:** Processed screenings from fully approved sources of coarse aggregate are subject to

gradation. Should coarse aggregate source approval status change, or unsatisfactory in-service history develop, additional control requirements may be implemented.

Screenings for use in hot bituminous mixture may consist of screenings from the processing of reclaimed portland cement concrete pavement to produce coarse aggregate.

**902-5.2.2 Screenings from Other Sources:** Screenings, from sources other than Department Approved Sources of Coarse Aggregate, must meet the following additional general requirements:

Modified Los Angeles Abrasion: 95% statistical probability of meeting maximum loss of 23%.

Specific Gravity\*

Absorption\*

Soundness\*

Sulfur\*

Phosphate\*

Extraneous Substances\*

\*Specific specification requirements based on material usage found in appropriate Bituminous or Portland Cement Sections.

Based on specific material characteristics, processing techniques and in-service history on Department projects, specific source requirements may be assigned.

**902-5.2.3 Screenings for Use in Portland Cement Concrete:** Screenings produced from either the Miami Oolite, Miami Ft. Thompson, or Loxahatchee Ft. Thompson Formations may be substituted for silica sand for use in concretes, except for concrete pavements, approach slabs, bridge decks and precast superstructure segments. (However, screenings will be permitted in the concrete when the bridge deck or approach slab is to be covered with an asphalt concrete surface course.)

These screenings must meet the gradation requirements of AASHTO M 6, Section 6.1, as well as the maximum percent passing the No. 200 sieve, Fineness Modulus, and Organic requirements of 902-2 Silica Sand. In addition, the saturated, surface dry specific gravity shall be at least 2.48.

### 902-6 Local Materials.

Local materials shall be composed of hard, strong, durable particles, either naturally occurring, such as natural sands, or resulting from the crushing or processing of parent rock, to include natural sand and rock, slags, expanded clays or shales (lightweight aggregate), or other approved inert materials with similar characteristics.

Aggregates classified as local material shall conform to the following gradation requirements:

Table 902-4	
Sieve Size	Percent Passing
3/8 in.	100%
No. 10	85 to 100%
No. 200	maximum 15%

In addition to meeting the requirements of 902-1.2, the material shall not contain excessive quantities of other deleterious substances, such as roots, cans, debris, etc. If clay size material is present, it shall not exceed 7%, as determined by AASHTO T 88, and it shall be of a type which will not produce clay balls when used. The aggregate must be suitable for designated use, as determined by laboratory tests. If the deposit consists of stratified layers of varying characteristics and gradation, the producer shall employ such means as necessary to secure a uniform material.

Local materials will not be required to be produced under the requirements of 6-2.3, provided they can meet the above requirements.

**902-7 Lightweight Fine Aggregate for Internal Curing.**

Fine lightweight aggregate suitable for internal curing shall meet the requirements of ASTM C1761.

**902-8 Exceptions, Additions and Restrictions.**

Other specification modifications, based on material usage may be found in the appropriate sections of the Specifications.

MATERIALS FOR PORTLAND CEMENT CONCRETE  
(STRUCTURAL, PAVEMENT, AND MISCELLANEOUS)

**SECTION 921**  
**PORTLAND CEMENT AND BLENDED CEMENT**

**921-1 General.**

Cement shall conform to the requirements of AASHTO M 85 or AASHTO M 240, as applicable, except as provided in this Section.

**921-1.1 Type of Cement:** Cement may be Types I, II, II (MH), III, IV, V (as defined by AASHTO M 85), or IL, IP, IS (as defined by AASHTO M 240). Cement type shall be selected based on component and environmental conditions in accordance with Section 346. Different brands of cement, cement of the same brand from different facilities, or different types of cement shall be stored separately, identified, and shall not be mixed.

**921-1.2 Heat of Hydration:** The cement heat of hydration for Type II (MH) and Type IL shall be tested in accordance with ASTM C1702 and reported at three days.

**921-2 Definitions.**

The following definitions are applicable to the production and Quality Control (QC) of cement:

1. **Approved Laboratory:** A laboratory that is currently inspected by the Cement and Concrete Reference Laboratory (CCRL), is actively participating in the CCRL proficiency program and which has all deficiencies noted at the time of inspection corrected. The laboratory must also authorize CCRL to submit their inspection reports to the State Materials Office (SMO).

2. **Cement Producer:** A cement supplier, including but not limited to a plant, a terminal, or a transfer facility, that has been qualified by the SMO. The Cementitious Materials Production Facility Listing will be maintained by the SMO.

3. **Mill Test Report:** A certification from the cement supplier showing that the cement meets the requirements of Section 921.

The mill test report must include, at a minimum, the following information:

- a. The type of cement.
- b. The production period.
- c. Chemical and physical analysis of the cement.
- d. The silo identification where the cement is stored.
- e. The base cement phase composition, except for blended cements.
- f. Amount of limestone and/or inorganic processing additions used, expressed as a percentage of the cement mass, as applicable.
- g. The oxide composition of the limestone and/or inorganic processing additions, as applicable.
- h. The specific gravity of cement reported as an average of the last twelve-monthly tests, updated every six months.
- i. The heat of hydration at three days, as applicable.
- j. The approved laboratory that performed all tests.

An acceptable mill test report is available in the appendix of AASHTO M 85.

4. Purchaser: The term “purchaser” in the AASHTO requirements shall be taken as the Department.

**921-3 Quality Control Program.**

**921-3.1 General:** Develop a Producer QC Program as specified in Section 105.

Cement producers shall submit a proposed QC Plan to the SMO for acceptance. Complete the Cementitious Materials Producer QC Plan Checklist (Appendix B02) and submit it along with the QC Plan, in a separate file. The checklist can be found on the SMO website: <https://www.fdot.gov/materials/quality/programs/qualitycontrol/checklists/index.shtm>. In addition to the QC Plan, the producer must submit monthly mill test reports from an approved laboratory which certifies that the cement in current production or supply conforms to the requirements of this Section.

Cement producer with an accepted QC Plan will appear on the Cementitious Materials Production Facility Listing.

QC test data that does not comply with the specification will not be a reason for rejection of the material if the cement producer’s QC Plan indicated that material will be diverted and not used for Department work.

**921-3.2 Sampling and Testing:** An approved laboratory shall perform one QC test per day. Mill test reports representing no more than one month’s production shall be submitted to the SMO on a monthly basis, for foreign cement, refer to 921-5.

Representatives from the Department may take verification samples at the cement producer’s plant, terminal, distribution facility or the concrete production facility. Samples shall be obtained by one of the methods described in FM 5-503. Sample size shall be a minimum of one-gallon. At the concrete production facility, cement samples shall be jointly obtained by the Department inspector and the concrete producer’s representative.

Upon request of the Department, the producer shall provide split samples of the cement collected for QC testing. Split samples shall be delivered to the SMO and shall be identified as representing a designated LOT of cement.

Notification of failing verification sample test results will be distributed to the cement producer and concrete producer, if applicable. Split samples of the initial sample may be provided to the cement supplier and concrete producer upon request, as available.

**921-3.3 Limestone and Inorganic Processing Additions:** Producers intending to use limestone and/or inorganic processing additions as component materials in the production of cement shall describe the type, source, and the target amount, expressed as a percentage of cement mass. In addition, the producer shall display the information required in 921-2 on the mill test report. Samples of any pulverized limestone and/or inorganic processing additions shall be provided to the SMO for evaluation upon request.

**921-4 Shipping and Storage.**

Cement shall be delivered in bags or in bulk. Portland cement from a producer on the Cementitious Materials Production Facility Listing shall be shipped on the basis of mill test reports meeting the requirements of this Section. Ensure that each shipment is accompanied by a delivery ticket that is traceable to the mill test report and includes, at a minimum, the following information:

1. FDOT Facility Identifier
2. Type of cement
3. Date shipped

#### 4. Silo Identification

The storage building, bin or silo shall be weatherproofed.

#### **921-5 Foreign Cement Acceptance.**

Cement being imported from a foreign source shall conform to all requirements of this section and will be subject the following process:

1. The proposed QC Plan and the QC Plan Check list (Appendix B02) referenced in 921-3.1 shall be sent to the SMO and will include information regarding the QC, sampling, storage, and handling of the cement at the arrival terminal as well as the shipping control to and from the arrival terminal. In addition, the QC Plan from the foreign source shall be translated to English and will be included with the proposed QC Plan for the arrival terminal.

2. An initial one-gallon sample of the imported cement shall be sent to the SMO for chemical and physical verification testing.

3. When the first ship is being loaded from foreign source, a one-gallon verification sample will be obtained and shipped to the SMO for chemical and physical property testing.

The material will be accepted for use on Department projects provided that the QC Plan has been accepted, and the results of the initial and verification samples have been confirmed to meet the requirements of this Section.

Upon receiving the shipment of cement at the arrival terminal, the Department will be notified, and a Department representative may obtain another verification sample.

Mill test reports representing each shipment shall be sent to the SMO.

#### **921-6 Rejection of Material:**

The entire container which holds cement that does not meet the requirements of this Section or has been damaged, is partially set, lumpy or caked shall be rejected.

Bagged cement which varies more than 5% from the designated weight, or if the average weight of 50 sacks, taken at random, is less than the designated weight, the cement shall be rejected.

## SECTION 923 WATER FOR CONCRETE

### 923-1 General Requirements.

Water for use with cement shall be clear and free from oil, and injurious amounts of acid, alkali, chlorides, organic matter, and other deleterious substances. It shall not be salty or brackish. Water that contains quantities of substances which makes it discolored or smell unusual or objectionable, shall not be used unless approved by the Department. Water sources permitted include potable water supplies that are approved by a public health department, open bodies of water, well water, reclaimed water, and recycled water. Reclaimed water shall be as defined in Chapter 62-610, F.A.C. Open bodies of water are defined as naturally occurring rivers, lakes, and ponds. Recycled water includes wash water from mixer washout operations and stored in a lined settling pond. All other sources of water not listed above shall be considered recycled and reclaimed water.

### 923-2 Evaluation of Water for Concrete.

**923-2.1 General:** Water from potable water supplies approved by a public health department may be used without additional testing. The concrete producer shall submit test data of water samples from other sources. To determine chemical properties, the concrete producer shall use a laboratory accredited by the Construction Materials Engineering Council Accreditation Program including accreditation on referred chemical tests on Table 923-1 and 923-2.

**923-2.2 Initial Sampling and Testing Frequency:** Open bodies of water and well water shall be initially sampled once prior to use. Recycled and reclaimed water shall be tested once per week for four weeks initially, and thereafter once per month for four months prior to its use, provided that the results of the test samples comply with all the applicable limits. Failing test results will result in restarting initial sampling and testing.

**923-2.3 Production Sampling and Testing Frequency:** Open bodies of water and recycled water shall be tested monthly. Well water and reclaimed water shall be tested once every three months. If the last eight consecutive well water and reclaimed water samples meet the requirements, then the sample frequency may be reduced to one sample every six months, as approved by the Department. If a well water or reclaimed water sample fails once the frequency has been reduced, then the sampling frequency shall revert to once every three months.

### 923-3 Chemical Requirements.

**923-3.1 Testing:** All chemical analysis shall be performed in accordance with the test methods listed in Tables 923-1 and 923-2 or equivalent Standard Methods for the Examination of Water and Wastewater (SM). Inorganic Anions (Chlorides and Sulfates) may be determined simultaneously using SM 4110B Ion Chromatography or separately using SM 4500 Cl<sup>-</sup> and SM 4500 SO<sub>4</sub><sup>2-</sup> E in lieu of ASTM D512 and ASTM D516. The test method used shall be included in the concrete producer report.

**923-3.2 Recycled and Reclaimed Water:** Recycled and reclaimed water shall be tested before use and shall not exceed the limits in Table 923-1:

Table 923-1		
Chemical Test	Test Method	Maximum (%)
Total Solids	SM 2540 B	5.00
Total Chlorides as Cl <sup>-</sup>	ASTM D512	0.05
Total Sulfates as SO <sub>4</sub> <sup>2-</sup>	ASTM D516	0.30

**923-3.3 Open Bodies of Water and Well Water:** Open bodies of water and well water shall be tested before use and shall not exceed the limits of Table 923-2:

Table 923-2		
Chemical Test	Test Method	Maximum (%)
Alkalinity Calculated in terms of Calcium Carbonate	SM 2320 B	0.05
Total Organic Solids	SM 2540 E	0.05
Total Inorganic Solids	SM 2540 E	0.08
Total Chlorides as Cl <sup>-</sup>	ASTM D512	0.05

**923-4 Physical Requirements for Mortar.**

**923-4.1 General:** To determine physical properties, use a laboratory accredited by the Construction Materials Engineering Council Accreditation Program or inspected by the Cement and Concrete Reference Laboratory.

**923-4.2 Testing:** Mortar shall be tested in accordance with ASTM C109 with the following exception: the mortar shall not be tested for flow. The mortar, composed of the sampled water, shall have a compressive strength of not less than 90% when compared to a mortar prepared using distilled water and tested at seven days.

Water of a questionable quality, as determined by the Department, shall be subject to the acceptance criteria for time of set as required by ASTM C1602, Table 1.

## SECTION 924 ADMIXTURES FOR CONCRETE

### 924-1 General.

This Section covers admixtures for specific concrete applications. Admixtures shall comply with applicable ASTM specifications and the requirements of this Section. Admixtures that have been previously qualified for Department use are listed on the Department's Approved Product List (APL).

### 924-2 Acceptance of Admixtures.

**924-2.1 Approved Product List (APL):** All admixtures must be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their products shall submit an application in accordance with Section 6 and include product data sheets, certified independent test data showing the product meets the requirements of this Section, safety data sheet (SDS), and a certification of the average solids content and specific gravity.

Admixtures shall meet the following requirements:

- Air-Entraining - ASTM C260
- Type A Water-Reducing - ASTM C494
- Type C Accelerating - ASTM C494
- Type D Water-Reducing and Retarding - ASTM C494
- Type E Water-Reducing and Accelerating - ASTM C494
- Type F High Range Water Reducing - ASTM C494
- Type G High Range Water-Reducing and Retarding - ASTM C494
- Type I - Plasticizing - ASTM C1017
- Type II - Plasticizing and Retarding - ASTM C1017
- Type S Specific Performance - ASTM C494 and the performance

requirements of this Section.

Corrosion Inhibitors – ASTM G109 and the requirements of this Section.

The inclusion of any specific product on the APL, as specified in 6-1, indicates that the product has been given contingent approval, as evidenced by previous tests and apparent effectiveness under field conditions.

Unless otherwise specified, no further testing will be required for any product on the APL unless there is indication in actual field use of inadequate or unreliable results.

**924-2.2 Additional Requirements for Corrosion Inhibitors:** Calcium nitrite is a chemically reactive admixture used in concrete to inhibit the corrosion of embedded reinforcing steel and other metallic components. The calcium nitrite supplier shall submit to the Engineer test certificates from an independent laboratory indicating compliance with this Specification. The test certificate shall include corrosion inhibiting properties per ASTM G109 and results of physical tests included in this section. Calcium nitrite shall be supplied by the same manufacturing source throughout the project. If a single primary source of calcium nitrite cannot be maintained throughout the project, new test certificates shall be submitted. The Engineer will determine specification compliance of a new supplier's product, and evaluate the effectiveness of the new calcium nitrite product before approving the source.

The active ingredient shall be calcium nitrite  $\text{Ca}(\text{NO}_2)_2$ .

The calcium nitrite shall be furnished in solution containing not less than 29% calcium nitrite solids. The concentration of the calcium nitrite solution shall be verified by

spectrophotometric analysis or other comparable methods. The nitrite concentration shall be measured in accordance with Standard Methods for the Examination of Water and Waste Water, 18th Edition.

A volume of one gallon of calcium nitrite solution shall weigh within the range of 10.40 to 11.92 lb.

The calcium nitrite solution shall be added to the concrete mixture at a rate of 4.50 to 4.60 gal/yd<sup>3</sup> of concrete.

The addition of calcium nitrite to the concrete mix shall not adversely affect the properties of fresh and hardened concrete.

Calcium nitrite concrete shall meet the following physical requirements when mixed and tested in accordance with ASTM C494:

Table 924-1	
Water Content, % of control	95 to 100
Time of setting, allowable deviation from control, h:min:	
Initial: at least not more than	1:00 earlier nor 1:30 later
Final: at least not more than	1:00 earlier nor 1:30 later
Compressive Strength, min. % of control:	shall be 100 for all ages
Flexural strength, min. % of control:	shall be 100 for all ages
Length change, max Shrinkage (alternative requirements): % of control	135
Increase over control	0.010
Relative durability factor, min	80

The following table lists the corrosion inhibiting test result limits for calcium nitrite concrete tested in accordance with ASTM G109:

Table 924-2	
Maximum Allowable Test Results of Calcium Nitrite Concrete	
Measured average macrocell current any time during the test	10 μA
Average macrocell current at test completion	2 μA
Average visible corrosion measured as percent corroded area of control	85%

**924-2.3 Type S (Specific Performance):** Trial batches shall use concrete meeting the requirements of ASTM C494. Additional trial batches may be required. Dosage rate shall be the same for all testing.

**924-2.3.1 Workability Retention:** Workability retention admixtures are used to extend workability and slump life without retarding the setting time. The dosage rate used shall be capable of maintaining 80% of the initial measured slump after 60 minutes. Perform an initial slump test, hold the trial batch in the mixer for 60 minutes, remix for 30 seconds and perform a second slump test. Workability retention shall be calculated as the percent difference in the initial slump and the slump at 60 minutes.

**924-2.3.2 Shrinkage Reducing:** Shrinkage reducing admixtures are used to minimize the shrinkage of plastic and hardened concrete. The dosage rate used shall reduce shrinkage a minimum of 50% after dry curing for 28 days. Shrinkage shall be determined in accordance with ASTM C157, except omit curing period in ASTM C157(10.3). Air storage for

the 28-day curing period shall be in accordance with ASTM C157(11.1.2). Shrinkage reduction shall be calculated as the percent difference in the control mix length change and the test mix length change.

**924-2.3.3 Viscosity Modifying:** Viscosity modifying admixtures are used primarily in flowing and self-consolidating concrete to maximize the rheology of plastic concrete and reduce segregation. The dosage rate used shall reduce static segregation to a minimum of 10%. A flowing concrete control mix shall be established by adding a compatible high range water-reducing or plasticizing admixture to increase the slump to 10 inches, plus or minus 0.5 inches. To establish the test mix, the control mix shall be reproduced with the addition of the viscosity admixture. The static segregation for both mixes shall be determined in accordance with ASTM C1610. Static segregation shall be calculated as the percent difference of the control mix static segregation to the test mix static segregation.

**924-2.3.4 Rheology Modifying:** Rheology modifying admixtures are used to maximize the rheology of plastic concrete. The dosage rate used shall be based on the manufactures recommendation and may vary for a specific application.

### **924-3 Retesting.**

The approved admixtures are required to be tested for their uniformity and equivalence whenever there is an indication of erratic results. The tests shall be performed in accordance with the following procedure. The admixture shall be checked for comparison between infrared spectrophotometry, pH value, specific gravity, and solids content. Any marked variation from the original curve, pH value, specific gravity, or solids content will be considered sufficient evidence that the chemistry of the original material has been changed and, therefore, the use of this material will be rejected and the material will be removed from the APL.

**SECTION 925  
CURING MATERIALS FOR CONCRETE**

**925-1 Burlap.**

Burlap for curing concrete shall consist either of two layers, each weighing 10 to 18 ounces/10 square feet, or of four layers, each weighing 6 to 7 ounces/10 square feet. Burlap which has been used as a container for sugar shall not be used. Burlap that is being used for the first time shall be thoroughly washed in order to remove starches used in sizing the material. Burlap shall be furnished in strips of at least 3 feet wide and shall be at least 3 feet longer than the width of surface to be covered.

**925-2 Membrane-Forming Curing Compound.**

**925-2.1 General:** Membrane-forming curing compound shall conform to requirements of ASTM C309 and the following requirements:

Table 925-1		
Requirement	Test Method	Test Value
Water Loss@72 hours	ASTM C156	0.55 kg/m <sup>2</sup>
Deleterious Reaction with Concrete	ASTM C309	None
Reflectance	ASTM E1347	60% minimum*
Drying Time	ASTM C309	4 hours maximum
Non-Volatile Content	ASTM D1644 (Method A)	(informational)
Density, lbs/gal	ASTM D1475	(informational)

\*Type 2 (White) compounds only.

The membrane-forming curing compound shall be of a consistency suitable for spraying at temperatures prevalent at the time of application, and which forms a continuous, uniform film. It shall be free from precipitated matter caused by conditions of storage or temperature. Thoroughly agitate the curing compound in accordance with the manufacturer's recommendations prior to shipment from manufacturer's plant and prior to use at job site.

Curing compound delivered to the jobsite shall be in the manufacturer's original container and clearly labeled with the following information:

1. manufacturer's name
2. product name (trade name)
3. type
4. batch or LOT number
5. date of manufacture

**925-2.2 Product Acceptance:** Acceptance of membrane-forming curing compound shall be based on the product being listed on the Department's Approved Product List (APL).

**925-2.2.1 Approved Product List:** Manufacturers seeking evaluation of their product must submit an application in accordance with Section 6 and include product data sheets, material safety data sheets (SDS) and certified test reports from an independent laboratory showing the product meets the requirements of this Section. Testing in accordance with the

National Transportation Product Evaluation Program (NTPEP) Project Work Plan for the Laboratory Testing of Liquid Membrane-Forming Compounds for Curing Concrete shall be acceptable as independent laboratory data. Include an Infrared Spectrophotometry (IR) Scan and a certification stating the nominal minimum percentage of non-volatile material for the product formulation. Deviation of the non-volatile material below this certified value shall be considered a change in formulation and shall be grounds for removal from the APL.

**925-2.2.2 Certification:** Prior to use, the Contractor shall submit to the Engineer a certification from the manufacturer conforming to the requirements of Section 6 that the requirements of this Section are met.

**925-2.3 Product Life:** Store the curing compound in accordance with the manufacturer's recommendations. Curing compounds not used within one year of the date of manufacture shall not be incorporated into the work.

**925-3 Sheet Materials.**

**925-3.1 General:** Waterproof paper, polyethylene film and white burlap-polyethylene sheet, for curing concrete shall meet the requirements of ASTM C171, with the additional requirements for waterproof paper and for polyethylene film as shown below.

**925-3.2 Additional Requirements for Waterproof Paper:** The paper as prepared for use shall be in such dimensions that each unit as laid will extend at least 18 inches beyond the edges of the slab. If laid longitudinally, paper not manufactured in sizes which will provide this width shall be securely sewed or cemented together; the joints being sealed in such manner that they do not open up or separate during the curing period.

At the option of the Contractor, instead of the single longitudinal strip specified above, the blanket may be furnished in three strips; one strip being the neat width of the pavement, with two side strips.

**925-3.3 Additional Requirements for Polyethylene Sheeting:** The sheets, as prepared for use, shall be of such dimensions that each unit as laid will extend beyond the edges of the slab by at least twice the thickness dimension of the pavement edge, and the sheets shall overlap by at least 18 inches.

No sheet may be reused except after individual inspection and approval by the Engineer. Any sheets determined by the Engineer to be so damaged as to not afford the protection to the concrete in preventing moisture loss during the curing period will be rejected.

**925-4 Certification.**

For burlap or white burlap-polyethylene, the Contractor shall submit to the Engineer a certification conforming to the requirements of Section 6 from the manufacturer confirming that the requirements of this Section are met. Each certification shall cover only one type of burlap or white burlap-polyethylene sheeting.

## SECTION 926 EPOXY COMPOUNDS

### 926-1 Types of Compounds.

Epoxy resin-based compounds for application to portland cement concrete, bituminous cement concrete, metals and other type surfaces shall be applicable for the following types as designated. Products may only be used for applications recommended by the manufacturer.

Table 926-1	
Type	Description
AB*	An epoxy resin, for bonding fresh or hardened concrete to hardened concrete and constructing doweled splices in precast prestressed concrete piles.
E*	A fluid epoxy for crack injection in the repair of old structures.
F	An epoxy for repairing spalled areas on concrete bridge structures with these subtypes:
F-1*	A non-sagging gel type for vertical surfaces.
F-2**	A pourable type for repairs where forms are to be used.
H**	An epoxy for structural bonding where asphalt overlays are to be in contact with the hardened compound.
K*	An epoxy for underwater sealing of the bottom of the jacket of an integral pile jacket system.
M***	A coal tar epoxy coating for steel sheet piles and H piles (water immersion) and hot applied coal tar epoxy tape.
PSE*	A two-part epoxy system to match the cast faces of joints between precast segmental concrete superstructure and/or substructure segments.
Q*	An epoxy for use in post tensioning anchorage protection systems.
*Accepted by APL	
**Accepted by certified test report	
***Accepted by certification	

### 926-2 Epoxy Design Requirements.

**926-2.1 General:** All types of compounds, except for Type M, shall be thermosetting containing no volatile solvent, and be pure reactive material. All types of compounds except for Type M shall have simple mix ratios of one to one, two to one, or shall be supplied in pre-proportioned containers in which all the contents are to be mixed.

All types of compounds shall be labeled with the manufacturer's name, brand name, component type (resin, hardener or filler), mix ratio, mixing directions, date manufactured, shelf life, and the manufacturer's lot number. Potential hazards shall be stated on each package in accordance with the Federal Hazardous Products Labeling Act.

Certain terms used in this specification shall have these meanings:

low modulus - the stress-strain property for which ultimate tensile strength is attained at over 10% elongation.

high modulus - the stress-strain property for which ultimate tensile strength is attained at under 6% elongation.

non-sagging gel - grades of mixed compounds which will not perceptibly flow under their own weight on a vertical surface in the unhardened state.

pourable - grades of mixed compound sufficiently fluid that they (either neat or filled) can be cast into and will take the shape of a mold.

Fillers for mixing mortars and grouts shall be recommended by the manufacturer of the epoxy compound and supplied as packages accompanying the epoxy or premixed.

**926-2.2 Approved Product List (APL):** All epoxy materials shall be one of the products listed on the Department’s Approved Product List (APL) unless an alternative acceptance is identified in this Specification. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6 and identify the epoxy type. Include with the submittal product data sheets, safety data sheets (SDS), and certified test reports from an independent laboratory showing the product meets the requirements of this Section. Manufacturers may submit performance test reports from the National Transportation Product Evaluation Program (NTPEP) as acceptable independent laboratory data.

Upon request, submit product samples to the Department for confirmatory testing and Infrared (IR) analysis.

**926-3 Specific Requirements for Type AB Epoxy Compounds.**

**926-3.1 Mixing and Application:** Type AB epoxy compounds are used for bonding fresh or hardened concrete to harden concrete and constructing doweled splices in precast prestressed concrete piles.

**926-3.2 Performance Tests:** Meet the requirements of ASTM C881 Type IV and V, Class C, when tested at 73° ± 2° F.

**926-4 Specific Requirements for Type E Compounds.**

Epoxies for crack injection shall meet the requirements of ASTM C881 Type IV compound with these additional requirements:

Table 926-2	
Viscosity five minutes after mixing	300 to 600 cps at 77°F by ASTM D2556
Wet bond strength to concrete, minimum	250 psi at seven days by FM 5-518

**926-5 Specific Requirements for Type F Compounds.**

**926-5.1: Repairing Spalled Areas:** Epoxies for repairing spalled areas shall meet the requirements in this Section.

**926-5.2: Subtype F-1:** Subtype F-1 epoxy is used for repairing vertical and other surfaces and shall be a trowelable low modulus, non-sagging gel epoxy compound capable of bonding to wet surfaces with these properties:

Table 926-3	
Color	Shall match gray color No. 36622 of FED-STD-595
Consistency	Gel
Maximum sand loading	Recommended by the manufacturer
Elongation in tension minimum	10% by ASTM D638, seven-day cure
Wet bond to Steel and Concrete minimum	250 psi by Florida Test Method FM 5-518

**926-5.3: Subtype F-2:** Subtype F-2 epoxy is used for filling larger spalls where a form is required to build back to the original surface. Materials shall be a pourable low modulus type compound capable of bonding to wet surfaces with these properties:

Table 926-4	
Color	Shall match gray color No. 36622 of FED-STD-595-
Maximum sand loading	Recommended by the manufacturer
Elongation in tension, minimum	10% by ASTM D638, seven-day cure
Exotherm	110°F by ASTM D2471, 1 pint sample
Wet bond strength	250 psi at seven days by FM 5-518

Type F-2 epoxy compounds will be accepted by certified test report. Submit to the Engineer testing from the manufacturer of the product for each LOT of material to be incorporated in the project. The test results will indicate that the material is in conformance with the Specifications, and will include actual values from the required tests. Obtain approval from the Engineer before incorporating material into the project.

**926-6 Specific Requirements for Type H Compounds.**

Type H epoxies for structural bonding where bituminous pavement overlays will come in contact with the hardened compound shall meet the requirements for Types AB compounds above. Submit from the manufacturer test data showing that cutback and emulsified asphalts, asphalt cement, and bituminous mixes shall bond to but not soften or otherwise damage the epoxy after a curing period of four days.

Type H epoxy compounds will be accepted by certified test report. Submit to the Engineer testing from the manufacturer of the product for each LOT of material to be incorporated in the project. The test results will indicate that the material is in conformance with the Specifications and will include actual values from the required tests. Obtain approval from the Engineer before incorporating material into the project.

**926-7 Specific Requirements for Type K Compounds.**

Type K epoxies are used for sealing the bottom of integral pile jackets in the repair of concrete piles. These epoxies will be extended with the aggregate supplied by the manufacturer. The epoxy shall be factory pre-proportioned including factory supplied aggregate and meet the following requirements:

Table 926-5	
Compressive strength at seven days, minimum by ASTM C579B	4,500 psi
Bond Strength by FM 5-518	
to wet concrete, minimum	250 psi
to wet pile jacket, minimum	150 psi
Viscosity of mixed epoxy component at 77°F, five minutes by ASTM D2556	1,000-2,000 cps

The epoxy shall be capable of flowing through water in the void area of the jacket and hardening under water so as to provide a water tight seal of the depth indicated in the Plans or approved shop drawings and to maintain this seal during subsequent construction steps.

**926-8 Specific Requirements for Type M Compounds.**

Type M Coal Tar epoxy coatings for steel sheet and H piles used in bridges, fender systems and other structures subject to immersion in water shall comply with the requirements of SSPC Paint 16 with Type 1 pitch. Application of the epoxy coating shall meet the requirements of Section 560 for a coal tar epoxy coating.

Hot applied coal tar epoxy tape used to protect tie back rods on sheet pile walls and bulkheads shall comply with the requirements of American Water Works Association standard C203. Application shall be according to the manufacturers published recommendations.

Submit to the Engineer a manufacturer certification, confirming that the coal tar epoxy meets the requirements of this Section. The certification shall conform to the requirements of Section 6. Do not incorporate these materials into the project until the Engineer has accepted and approved the certification for the material. Submit such certification for each LOT of material delivered to the project. In each certification, identify the serial or LOT numbers of the containers certified.

**926-9 Specific Requirements for Type PSE Epoxy Compounds.**

Precast Segmental Epoxy (PSE) compounds are used for match-cast joints between precast concrete segments. Normal set PSE shall remain workable for a short open time (about one hour) and meet the requirements of ASTM C881, Type VI Grade 3. Slow set PSE shall remain workable over an extended open time (about eight hours), meet the requirements of ASTM C881, Type VII Grade 3, and have a compressive yield strength of 6,000 psi at 14 days.

PSE compounds shall be factory pre-proportioned and formulated to provide application temperature ranges which are suitable for the erection of match cast segments with substrate temperatures between 40°F and 105°F with a minimum of at least two, but preferably three, formulations dividing the range into approximately equal subranges which overlap by at least 5°F.

**926-10 Specific Requirements for Type Q Compounds.**

Type Q epoxy compounds are used to protect the anchorages of post-tensioning tendons or bars and other uses indicated in the Plans. The material shall produce a low exothermic reaction and have flow and fill characteristics suitable for machine base plate applications. The material shall be factory pre-proportioned including factory supplied aggregate. Mix with the full aggregate loading unless the use of less aggregate is approved by the Engineer.

The epoxy grout plus aggregate mix shall meet or exceed the specified physical properties stated herein as determined by the following standard ASTM test methods.

Table 926-6		
Property	Test Value	Test Method
Compressive Strength at 7-day Cure at 77°F	> 10,000 psi	ASTM C579B
Tensile Strength at 7 days, Cure at 77°F	> 2,100 psi	ASTM C307
Flexural Strength at 7days Cure at 77°F	> 3,600 psi	ASTM C580
Modulus of Elasticity 7 days Cure at 77°F	< 2,100,000 psi	ASTM C580
Coefficient of Thermal Expansion at 74° to 210°F	< 20 x 10 <sup>-6</sup> in/in/°F	ASTM C531
Peak Exotherm, Specimen 12 x 12 x 3 in.	< 150°F	ASTM D2471
Slant Shear at 7 days (Bond Strength to Concrete)	> 3000 psi	FM 5-587
Thermal Compatibility	90% of control	FM 5-609
Linear Shrinkage at 7 days	0.025%	ASTM C531
Flowability and Bearing Area	90% Contact area	ASTM C1339
Gel Time, Specimen 12 x 12 x 3 in.	< 4:00 (hr.)	ASTM D2471

## SECTION 929 SUPPLEMENTARY CEMENTITIOUS MATERIALS

### 929-1 General.

Supplementary cementitious materials (SCMs) shall conform to the requirements of this Section. SCMs shall be used in concrete mix designs in accordance with Section 346.

Fly ash, slag cement, and ultra-fine fly ash shall not be used in conjunction with Type IP or Type IS cements.

Repulable bags may be accepted by the Engineer, provided a successful demonstration by the producer has indicated complete degradation of the repulable bags during the mixing operation and before the mix is discharged.

The Engineer may require additional testing beyond the requirements of this Section prior to the acceptance of any SCM sources.

#### 929-1.1 Definitions.

The following definitions are applicable to the production and quality control (QC) of SCMs:

1. Approved Laboratory: A laboratory that is currently inspected by the Cement and Concrete Reference Laboratory (CCRL), is actively participating in the CCRL proficiency program and has corrected all deficiencies noted at the time of inspection. The laboratory must authorize the CCRL to send a copy of the final inspection report and proficiency sample results to the State Materials Office (SMO).

2. SCM Producer: Indicates an SCM supplier, including but not limited to a plant, a terminal, or a transfer facility, that has been qualified by the SMO. The Cementitious Materials Production Facility Listing will be maintained by the SMO.

3. Test Report: A certification from the SCM producer showing that the SCM meets the requirements of this Section. The test report must include, at a minimum, the following information:

- a. The Type of SCM.
- b. The production period.
- c. Chemical and physical analysis of the SCM.
- d. The silo numbers where the SCM is stored.
- e. The specific gravity of the SCM.
- f. The approved laboratory that performed all tests.

4. Purchaser: The term “purchaser” in the ASTM requirements shall be taken as the Department.

### 929-2 Quality Control Program.

**929-2.1 General:** Develop a Producer QC Program as specified in Section 105.

SCM producers shall submit a proposed QC Plan to the SMO for acceptance.

Complete the Cementitious Materials Producer QC Plan Checklist (Appendix B02) and submit it along with the QC Plan, in a separate file. The checklist can be found on the SMO website:

<https://www.fdot.gov/materials/quality/programs/qualitycontrol/checklists/index.shtm>. In

addition to the QC Plan, the SCM producer must submit monthly test reports from an approved laboratory which certifies that the SCM in current production or supply conforms to the requirements of this Section.

SCM producers with an accepted QC Plan will appear on the Cementitious Materials Production Facility Listing.

QC test data that does not comply with the Specification will not be reason for rejection of the material if the SCM producer's QC Plan indicates that material will be diverted and not used for Department projects.

**929-2.2 Sampling and Testing:** Representatives from the Department may take verification samples at the SCM producer's plant, terminal, distribution facility or the concrete production facility. Samples shall be obtained by one of the methods described in FM 5-503. Sample sizes shall be a minimum of one gallon by volume. At the concrete production facility, cementitious samples shall be jointly obtained by the Department inspector and the concrete producer's representative.

Upon request of the Department, the SCM producer shall provide split samples of the cementitious material collected for QC testing. Split samples shall be delivered to the SMO and shall be identified as representing a designated LOT of the SCM.

Notification of failing verification sample test results will be distributed to the SCM producer and concrete producers (if applicable). Split samples of the initial sample may be provided to the SCM producer and concrete producer upon request.

### **929-3 Fly Ash.**

**929-3.1 General:** Sampling and testing of fly ash shall follow the requirements of ASTM C311. Fly ash shall not include the residue resulting from the burning of municipal waste or any other refuse with coal, or the burning of industrial or municipal waste in incinerators.

**929-3.2 Fly Ash (Class F):** Fly ash derived from the combustion of ground or powdered coal shall meet the requirements of ASTM C618 Class F fly ash.

**929-3.3 Fly Ash (Class C):** Fly ash derived from the combustion of ground or powdered coal shall meet the requirements of ASTM C618 Class C fly ash.

**929-3.4 Acceptance Testing of Fly Ash:** Acceptance of fly ash from sources operating under an accepted QC Plan shall be based on the monthly test reports meeting the chemical and physical requirements of ASTM C618 Class F or Class C and this Section. When the loss on ignition exceeds 5.0%, the Supplementary Optional Physical Requirements shall be mandatory. Fly ash meeting the requirements of ASTM C618 Class F may be used with no further testing.

Petroleum coke, bark ash, or Class C fly ash may be used if the concrete test results provide an improvement or comparable compressive strength, sulfate resistance, corrosion protective properties and other durability requirements, when compared to concrete containing Class F fly ash.

**929-3.4.1 Concrete/Mortar Testing:** Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three comparison batches with petroleum coke, bark ash, or Class C fly ash, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:

1. Use a previously approved FDOT Class IV (5,500 psi) mix design.
2. Size No. 57 Coarse Aggregate from an approved FDOT source.
3. 18 to 22% fly ash replacement.
4. Water/cementitious materials ratio of 0.41.

The following testing shall be performed on each concrete mix, as appropriate.

Table 929-1 Concrete Testing Requirements		
Test Description	Standard Test Method	Test Age
Surface Resistivity	AASHTO T 358	28 days
Compressive Strength	ASTM C39	28 days
Chloride Diffusion	ASTM C1556 or NT Build 443	6 months, 12 months <sup>(1)</sup>
Length Change	ASTM C157	28 days <sup>(2)</sup>
<p>(1) Upon completion of all 28 day and 6-month testing, the SCM producer may present the data to the SMO for acceptance. The 12 month data shall be provided to the SMO upon completion.</p> <p>(2) Follow the Air Storage procedure.</p>		

Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6 and 12 months of testing.

#### 929-4 Slag Cement.

Slag cement (ground granulated blast furnace slag, GGBFS) is the quenched, ground by-product of the iron ore refinement process conducted in blast furnaces. It is primarily an amorphous material of calcium aluminosilicate constituents.

**929-4.1 General:** Slag cement and reference cement used for determination of slag activity tests shall meet the requirements of ASTM C989. Sampling and testing procedures shall follow the requirements of ASTM C989.

**929-4.2 Acceptance Testing of Slag Cement:** Acceptance of slag cement from sources operating under an accepted QC Plan shall be based on the monthly test reports meeting the chemical and physical requirements of ASTM C989 and this Section. The test report shall include:

1. For slag granules, provide X-ray Fluorescence (XRF) elemental analysis of the granules, presented in oxide form. Include CaO, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, MgO, Mn<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, and sulfur (as sulfide).

2. For slag cement, provide XRF elemental analysis, presented in oxide form. Include CaO, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, MgO, Mn<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, sulfur as sulfide (S), sulfate sulfur (SO<sub>3</sub>), and total sulfur as sulfate (SO<sub>3</sub>).

3. The results of all testing listed under Test Methods section of ASTM C989.

4. Indicate the amount of any additions introduced during grinding of the slag granules and report compliance with Section 6 of ASTM C989.

a. Amount of limestone added and its CaCO<sub>3</sub> content.

b. Amount of other inorganic processing addition.

5. For calcium sulfate additions, indicate:

a. Amount of calcium sulfate added.

b. Form of calcium sulfate.

c. SO<sub>3</sub> content.

d. Method used to determine the amount of calcium sulfate that was added.

**929-4.2.1 Assessment of Sulfate Resistance:** Following guidance in ACI 233R-17 Guide to the Use of Slag Cement in Concrete and Mortar, slag cements with Al<sub>2</sub>O<sub>3</sub> contents

greater than 11% should be interground with calcium sulfate to avoid an undersulfated cementitious system. Provide ASTM C1012 data with a 50:50 portland cement-slag cement blend, using a Type II (MH) portland cement on the Department's Production Facility Listing, with an alkali content of no more than 0.6%, when any of the following conditions occur:

1. The  $Al_2O_3$  content of the slag cement is equal to or greater than 12%.
2. The slag cement is a blend of slag granules from more than one source

that are interground during production of the slag cement and for which one or more of the following are true:

- a. The  $Al_2O_3$  contents of both slag sources are equal to or greater than 12%.
- b. The average  $Al_2O_3$  content of the blend is equal to or greater than 12%.
- c. One of the slag sources has an  $Al_2O_3$  content that is equal to or greater than 14%.

The Department will consider the ASTM C1012 data acceptable when the results indicate no more than 0.10% expansion at 12 months.

The Department may grant provisional acceptance if the expansion does not exceed 0.05% at 6 months.

For any slag cements with  $Al_2O_3$  content equal to or greater than 12%, perform a retest of ASTM C1012 if the monthly test report indicates that any of the following conditions have occurred:

1. The  $Al_2O_3$  content increases by greater than or equal to 1.0% of the content measured during qualification of the sulfate resistance.
2. The sulfate sulfur ( $SO_3$ ) content decreases by 0.25% less than that measured during qualification of the sulfate resistance.
3. The Blaine fineness increases by 50  $m^2/kg$  greater than that measured during qualification of the sulfate resistance.

The Department may grant provisional acceptance of the slag cement source if ASTM C1012 data is required for any of the above retesting conditions.

## 929-5 Calcined Clay.

**929-5.1 General:** Sampling and testing of calcined clay shall follow the requirements of ASTM C311. Calcined clay shall meet the requirements of ASTM C618 Class N.

**929-5.2 Acceptance Testing of Calcined Clay:** Acceptance of calcined clay from sources operating under an accepted QC Plan shall be based on the monthly test reports meeting the chemical and physical requirements of ASTM C618 Class N and this Section.

Calcined clay may be used in concrete if the test results provide an improvement or comparable compressive strength, sulfate resistance, corrosion protective properties, and other durability requirements of concrete, when compared to ASTM C618 Class F fly ash concrete.

**929-5.2.1 Concrete/Mortar Testing:** Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three comparison batches with the calcined clay, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:

1. Use a previously approved FDOT Class IV (5,500 psi) mix design.
2. Size No. 57 Coarse Aggregate from an approved FDOT source.
3. Control batches: Replace 18 to 22% of the portland cement with

Class F fly ash.

4. Comparison batches: Replace a portion of portland cement with a quantity of calcined clay sufficient to produce properties comparable to those for the control batches.

5. Water/cementitious materials ratio of 0.41

Testing shall be performed in accordance with Table 929-1.

Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6, 12, and 18 months of testing.

**929-6 Ground Glass.**

**929-6.1 General:** Sampling and testing of ground glass shall follow the requirements of ASTM C311. Ground glass shall meet the requirements of ASTM C1866. Sampling and testing procedures shall follow the requirements of ASTM C1866.

**929-6.2 Acceptance Testing of Ground Glass:** Acceptance of ground glass from sources operating under an accepted QC Plan shall be based on the monthly test reports meeting the chemical and physical requirements of ASTM C1866 and this Section.

Ground glass may be used in concrete if the test results provide an improvement or comparable compressive strength, sulfate resistance, corrosion protective properties, and other durability requirements of concrete, when compared to ASTM C618 Class F fly ash concrete.

**929-6.2.1 Concrete/Mortar Testing:** Six concrete mixes shall be prepared by an accredited laboratory, three control batches using an approved Class F fly ash and three comparison batches with the ground glass, while all other constituents remain the same except for small adjustments to get the mix to yield. Follow the below criteria for each mix:

1. Use a previously approved FDOT Class IV (5,500 psi) mix design.
2. Size No. 57 Coarse Aggregate from an approved FDOT source.
3. Control batches: Replace 18 to 22% of the portland cement with Class F

fly ash.

4. Comparison batches: Replace a portion of portland cement with a quantity of ground glass sufficient to produce properties comparable to those for the control batches.

5. Water/cementitious materials ratio of 0.41.

Testing shall be performed in accordance with Table 929-1.

Sulfate Resistance testing shall be performed on a mortar mix in accordance with ASTM C1012 and results reported after 6, 12, and 18 months of testing.

**929-7 Highly Reactive Pozzolans.**

**929-7.1 Silica Fume:**

**929-7.1.1 General:** Silica Fume shall meet the requirements of ASTM C1240 using the referenced test methods and frequencies.

**929-7.1.2 Acceptance Testing of Silica Fume:** Acceptance of silica fume from sources operating under an accepted QC Plan shall be based on monthly test reports that the material meets the requirements of ASTM C1240 and this Section.

**929-7.2 Metakaolin:**

**929-7.2.1 General:** Metakaolin shall meet the requirements of ASTM C618 Class N with the following modifications:

1. The sum of  $\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$  shall be at least 85%.
2. The loss on ignition shall be less than 3.0%.
3. The available alkali's, as equivalent  $\text{Na}_2\text{O}$ , shall not exceed 1.0%.

4. The strength activity Index, at 7 days, shall be at least 85%.

**929-7.2.2 Acceptance Testing of Metakaolin:** Acceptance of metakaolin from sources operating under an accepted QC Plan shall be based on the monthly test reports meeting the chemical and physical requirements of ASTM C618 Class N, as modified herein, and this Section.

**929-7.3 Ultra Fine Fly Ash:**

**929-7.3.1 General:** Sampling and testing of the ultra fine fly ash shall follow the requirements of ASTM C311. Ultra fine fly ash derived from the combustion of ground or powdered coal shall meet the requirements of ASTM C618 as a Class F fly ash with the following modifications:

1. The pozzolanic activity index, at 7 days, shall be at least 85% of the control and the pozzolanic activity index, at 28 days, shall be at least 95% of the control.
2. The amount of material retained when wet-sieved on a 45-µm sieve shall be less than 6.0%.
3. The moisture content shall be less than 1.0%.
4. The loss on ignition shall be less than 2.0%.

**929-7.3.2 Acceptance Testing of Ultra Fine Fly Ash:** Acceptance of fly ash from sources operating under an accepted QC Plan shall be based on the monthly test reports meeting the chemical and physical requirements of ASTM C618 Class F fly ash and this Section. When the loss on ignition exceeds 2.0%, the Uniformity Requirements in the Supplementary Optional Physical Requirements shall be mandatory.

**929-8 Shipping and Storage.**

SCMs may be delivered in bags or in bulk. SCMs from an SCM producer on the Cementitious Materials Production Facility Listing shall be shipped on the basis of test reports meeting the requirements of this Section. Ensure that each shipment is accompanied by a delivery ticket that is traceable to the test report and includes, at a minimum, the following information:

1. FDOT Facility Identifier
2. Type of material (e.g. Class F fly ash or Grade 120 slag)
3. Date shipped
4. Silo Identification

The storage building, bin or silo shall be weatherproofed.

**929-9 Foreign Supplementary Cementitious Material Acceptance.**

SCMs being imported from a foreign source shall conform to all requirements of this Section and will be subject the following process:

1. The proposed QC Plan shall be sent to the SMO and will include information regarding the QC, sampling, storage, and handling of the material at the arrival terminal as well as the shipping control to and from the arrival terminal. In addition, the QC Plan from the foreign source shall be translated to English and will be included with the proposed QC Plan for the arrival terminal.
2. An initial one gallon by volume sample of the imported SCM shall be sent to the SMO for chemical and physical testing.
3. When the first ship is being loaded from the foreign source, a one gallon by volume verification sample will be obtained and shipped to the SMO for chemical and physical property testing.

The material will be accepted for use on Department projects provided that the QC Plan has been accepted, and the results of the initial and verification samples have been confirmed to meet the requirements of this Section.

Upon receiving the shipment of cement at the arrival terminal, the Department will be notified, and a Department representative may obtain another verification sample.

Test reports representing each shipment shall be sent to the SMO.

ACCESSORY MATERIALS FOR  
CONCRETE PAVEMENT AND CONCRETE STRUCTURES

**SECTION 931**  
**METAL ACCESSORY MATERIALS FOR CONCRETE**  
**PAVEMENT AND CONCRETE STRUCTURES**

**931-1 Reinforcement Steel (for Pavement and Structures).**

**931-1.1 Steel Bars:**

**931-1.1.1 Carbon Steel Bars:** Carbon steel bars for concrete reinforcement shall conform to the requirements of ASTM A615 Grades 60 or 80.

**931-1.1.2 Stainless Steel Bars:** Stainless steel bars for concrete reinforcement shall conform to the requirements of ASTM A955, Grades 60 or 75; or ASTM A276, UNS S31653 or S31803.

**931-1.1.3 Low-Carbon Chromium Steel Bars:** Low-carbon chromium steel bars for concrete reinforcement shall conform to the requirements of ASTM A1035 Grade 100.

**931-1.1.4 Special Requirements:** The following special requirements shall apply:

1. Unless otherwise specified or shown in the Plans all reinforcing bars No. 3 and larger shall be deformed bars.
2. Twisted bars shall not be used.
3. Wherever in the Specifications the word “purchaser” appears it shall be taken to mean the Department.

**931-1.1.5 Acceptance of Steel Bars:** Acceptance of reinforcing steel shall be based on the manufacturer being on the National Transportation Product Evaluation Program (NTPEP) list of compliant producers, samples taken by the Department, and manufacturer’s certified mill analysis. The test results shall meet the specification limits of the ASTM or AASHTO designation for the size, grade and any additional requirements. The manufacturer’s certified mill analysis for each heat, size, and grade per shipment of reinforcing steel shall be provided to the Engineer prior to use.

The Engineer will select samples representing each LOT of reinforcing steel. A sample is defined as the reinforcing steel and the certified mill analysis corresponding to the sample. A LOT is defined as the weight of all bars, regardless of size, grade or pay item in consecutive shipments of 100 tons or less. Samples shall be cut from bundled steel that is shipped to the jobsite.

Projects with less than two tons of bars do not require Department sampling.

**931-1.2 Wire Reinforcement:**

**931-1.2.1 Carbon Steel Wire Reinforcement:** Plain and deformed carbon steel wire reinforcement shall meet the requirements of ASTM A1064. Deformed carbon steel wire shall be Grade 75.

**931-1.2.2 Stainless Steel Wire Reinforcement:** Plain and deformed stainless steel wire reinforcement shall meet the requirements of ASTM A276, UNS S30400.

**931-1.2.3 Acceptance of Wire Reinforcement:** Acceptance of wire reinforcement shall be based on the manufacturer’s certified mill analysis certifying that the test results meet the specification limits of the ASTM designation for the sizes and any additional

requirements. Prior to use, submit to the Engineer the manufacturer's certified mill analysis for each heat and size per shipment.

**931-1.3 Carbon Steel Welded Wire Reinforcement:**

**931-1.3.1 Carbon Steel Welded Wire Reinforcement:** Welded wire reinforcing steel shall meet the requirements of ASTM A1064.

**931-1.3.2 Acceptance of Carbon Steel Welded Wire Reinforcement:**

Acceptance of welded wire reinforcement shall be based on the manufacturer's certified mill analysis certifying that the test results meet the specification limits of the ASTM designation for the sizes and any additional requirements. Prior to use, submit to the Engineer the manufacturer's certified mill analysis for each heat and size per shipment.

**931-1.4 Couplers for Steel Bars:**

**931-1.4.1 Approved Product List (APL):** The couplers used shall be a product included on the Department's APL.

Manufacturers seeking approval of their product shall demonstrate the performance of their product in accordance with the requirements in 931-1.4.2 through 931-1.4.4 as applicable and 931-1.4.5.

**931-1.4.2 Couplers for Carbon Steel Bars:** Couplers for use with carbon steel bars shall be fabricated from an alloy that is electrochemically compatible with bars that meet the requirements of 931-1.1.1.

**931-1.4.3 Couplers for Stainless Steel Bars:** Couplers for use with stainless steel bars shall be fabricated from an alloy that is electrochemically compatible with bars that meet the requirements of 931-1.1.2.

**931-1.4.4 Couplers for Low-Carbon Chromium Steel Bars:** Couplers for use with low-carbon chromium steel bars shall be fabricated from an alloy that is electrochemically compatible with bars that meet the requirements of 931-1.1.3.

**931-1.4.5 Special Requirements:** Couplers shall develop at least 125% of the specified yield strength of the bar being spliced.

**931-2 Metal Materials for Joints in Concrete Pavement.**

**931-2.1 Sheet Metal Bottom Strips:** For concrete pavement using the special select soil base option, the sheet metal strip for protecting the bottom and side edges of transverse expansion joints shall be composed of galvanized sheet metal of 0.0157 inches minimum thickness and shall conform to the requirements of ASTM A653.

The sheets shall be furnished in accordance with the dimensions shown in the Plans. They may be in one continuous piece, or spliced. When splicing is used the metal shall be lapped not less than 3 inches and securely fastened, by welding or otherwise, in such manner as to leave the spelter undamaged and produce a smooth sliding surface in contact with the pavement slab. The splices shall be spaced not less than 10 feet apart and not less than 5 feet from either end. The complete sheet shall not vary from a straight line by more than 1 inch from end to end.

The Contractor shall submit to the Engineer a certified mill analysis from the manufacturer of the sheet metal bottom strips including test results for thickness, dimension, grade, length, size, and spacing. Each certified mill analysis shall cover only one type of metal material for joints.

**931-2.2 Bars and Chairs for Longitudinal Joints:** Transverse reinforcing steel across the joint shall be deformed steel bars conforming to the requirements of 931-1.1 except that the bars may be any grade shown in ASTM A615.

These bars, and the chairs to hold them in place, shall be of the type and spacing as indicated in the Plans.

**931-2.3 Dowel Bars:** Dowel bars shall be plain steel bars conforming to the requirements of ASTM A615 for any grade of steel shown. They shall be of the length, size and spacing as shown in the Plans. When coated dowel bars are specified, coat with epoxy meeting the requirements of ASTM A775 by a producer with Epoxy Coating Certification from the Concrete Reinforcing Steel Institute, or one coat of zinc-rich primer meeting the requirements of SSPC Paint 20.

The Contractor shall submit to the Engineer a certified test report from the manufacturer of the dowel bars confirming that the requirements of this Section are met. The certified test report shall conform to the requirements of Section 6 and include metallurgical mill analysis, grade, length and size. Each certification shall cover only one LOT for dowel bars.

**931-2.4 Chairs and Metal Expansion Caps:** The chairs and metal expansion caps shall be of an approved type as shown in the Plans.

Dowel bars for expansion joints shall have a metal cap on one end so placed to provide ample space for movement of the slab. Continuous sleeves covering one half of the length of the bar will not be permitted. Other fasteners may be approved. Dowel bars shall be coated with an approved material to break the bond.

### **931-3 Metal Dowel Bar Assemblies for Joints in Concrete Pavement.**

**931-3.1 Approved Product List (APL):** The dowel bar assembly used shall be a product included on the Department's APL.

Manufacturers or distributors seeking approval of their material in accordance with this specification shall demonstrate the performance of their products in accordance with the requirements in 931-3.2 thru 931-3.6.

**931-3.2 Rigidity:** The dowel bars shall be supported by an approved welded assembly possessing sufficient rigidity to hold the dowel bars in position to such accuracy that error or deviation from its required position in any bar in the entire installation after the pavement has been finished shall be no greater than 1/2 inch.

The assembly shall have continuous parallel spacer bars and two continuous parallel bearing members of no less than 1/4 inch diameter wire. One spacer bar shall be located at or near each end of the dowel. Alternate ends of dowels shall be welded to a spacer bar in such a manner as to maintain the dowels parallel to each other and permit sliding movement in the joint.

The free ends of each dowel shall be retained securely in place by means of wire loops or metal tubes welded to the other spacer bar. An expansion cap shall be installed on one end of each bar if the dowels are being used in an expansion joint.

Suitable struts or ties shall be provided to hold the assembly in correct position during installation.

The assembly shall have an upright support welded to the spacer bar and continuous bearing member at the end of each dowel and a continuous bearing member.

If the upright support consists of a single vertical wire, the support shall be no less than 5/16 inch diameter wire. Otherwise, the support shall be no less than 1/4 inches in diameter.

**931-3.3 Sand Plates:** Sand plates, if required, shall be made from no less than 3/8 inch sheet steel. Each plate shall have no less than 0.1 square feet of bearing area. The plates shall be furnished in sufficient number to provide uniform support for the complete assembly. They may

be furnished separate from the assembly units or attached thereto by welding, suitable clips, or other approved means.

**931-3.4 Welds:** The welds of the assembly shall be made securely. A broken weld will be cause for rejection of the length of section of the assembly where it occurs.

**931-3.5 Assembly Placement:** When the dowel bar assembly is in place, it shall act as a rigid unit with each component part securely held in position relative to the other member of the assembly.

The entire assembly shall be held securely in place during placing, consolidating, and finishing the concrete by means of metal pins. Pins used on granular subbase or cold mixed bituminous stabilized subbase shall penetrate at least 12 inches below the dowel bar assembly. The pins shall be of no less than 1/4 inch diameter wire and shall be provided with a hook or arm welded to the pin in such a manner that it shall secure the assembly in place.

Nail securing systems may be used as an anchoring device on hot bituminous stabilized subbase. The nail shall be no less than 1/8 inch in diameter, no less than 2 inches in length and the nail head or attached washer shall be not less than 1/2 inch outside diameter. The nail shall be driven through both ends of a metal strap after it has been placed around one of the lower transverse bars on the dowel bar assembly.

At least eight pins or nails shall be used for each 12 foot section (a lane width) of assembly. Sand plates, if required, shall be drilled to receive the pins.

The Contractor shall provide the equipment and personnel necessary to verify dowel bar location after the concrete is placed and has received the initial screeding.

**931-3.6 Materials:** The wire for the welded assembly shall be in accordance with all applicable requirements of ASTM A1064.

After fabrication of dowel bar assemblies, apply coating in accordance with the requirements of 931-2.3.

**931-4 Wire for Site Cage Machines:**

The wires for site cage machines shall meet the requirements of ASTM A1064 or ASTM A706.

**SECTION 932  
NONMETALLIC ACCESSORY MATERIALS  
FOR CONCRETE PAVEMENT AND CONCRETE STRUCTURES**

**932-1 Joint Materials.**

**932-1.1 Preformed Joint Filler for Pavement and Structures:** Preformed joint filler shall meet the requirements of AASHTO M 153, ASTM D8139, AASHTO M 213, or cellulose fiber types meeting all the requirements of AASHTO M 213 (except for the asphalt content) is acceptable provided they contain minimums of 0.2% zinc borate as a preservative and 1.5% waterproofing wax. For AASHTO M 153, unless a particular type is specified, either Type I, Type II or Type III may be used.

Preformed joint fillers shall have a thickness equal to the width of the joint required, and shall be furnished in lengths equal to the widths of the slabs in which they are to be installed, except that strips which are of a length not less than the distance between longitudinal joints, or between longitudinal joint and edge, may be used if laced or clipped together in a manner approved by the Engineer. The depth and shape of the joint filler shall conform to the dimensions shown in the Plans. For doweled joints, proper provision shall be made for the installation of the dowels.

**932-1.1.1 Certification:** The Contractor shall submit to the Engineer a certification confirming that the preformed joint filler meets the requirements of this Section. The certification shall conform to the requirements of Section 6.

**932-1.2 Joint Sealer for Pavement and Structures:**

**932-1.2.1 General:** This Specification covers joint sealer intended for use in sealing joints in asphaltic concrete pavement and portland cement concrete pavement. These materials may also be used to seal joints in portland cement concrete bridges and other structures.

**932-1.2.2 Material:** The joint sealant shall be composed of a mixture of materials, typically but not limited to bituminous based, that will melt when heated for application and then solidify to form a resilient and adhesive compound capable of sealing joints in portland cement concrete and asphaltic concrete against the infiltration of moisture and foreign materials throughout normal pavement conditions and at ambient temperatures. The manufacturer shall have the option of formulating the material according to their Specifications. However, the requirements delineated in this Specification shall apply regardless of the type of formulation used. The material shall cure sufficiently to not flow from the joint or be picked up by vehicle tires after 3 hours at 77°F. The material shall be capable of a uniform application consistency suitable for filling joints without the inclusion of large air holes or discontinuities and without damage to the material.

Materials for pavement joints shall be tested according to ASTM D5329.

**932-1.2.2.1 Physical Requirements of Joint Sealants for Portland Cement Concrete Only:**

Table 932-1	
Parameter	Limits
Pour Point	At least 20°F lower than the safe heating temperature as stated by the manufacturer.
Cone-Penetration, Non-immersed at 77°F, 150 g, 5 s	Less than or equal to 90 mm
Flow at 140°F, 5 h	Less than or equal to 5.0 mm
Bond, Non-immersed, 0°F for 5 cycles*	No cracking, separation, or opening that at any point is over 1/4 inch deep, in the sealant or between the sealant and the substrate.
*The depth of a crack, separation or opening shall be measured perpendicular to the side of the sealant showing the defect. At least two test samples in a group of three representing a given sample of sealant shall meet this requirement.	

**932-1.2.2.2 Physical Requirements of Joint Sealants for Portland Cement Concrete and/or Asphaltic Concrete:**

Table 932-2	
Parameters	Limits
Pour Point	At least 20° lower than the safe heating temperature as stated by the manufacturer.
Cone-Penetration, Non-immersed at 77°F, 150 g, 5 s	Less than or equal to 90 mm
Flow at 140°F, 5 h	Less than or equal to 3.0 mm
Bond, Non-immersed, -20°F for 3 cycles, 50% extension*	No cracking, separation, or opening that at any point is over 1/4 inch deep, in the sealant or between the sealant and the substrate.
Resilience at 77°F	Recovery greater than or equal to 60%
Asphaltic Concrete Compatibility at 140°F	No failure in adhesion, formation of an oily exudates at the interface between the sealant and the asphaltic concrete, or softening or other deleterious effects on the asphaltic concrete or sealant.
*The depth of a crack, separation or opening shall be measured perpendicular to the side of the sealant showing the defect. At least two test samples in a group of three representing a given sample of sealant shall meet this requirement.	

**932-1.2.3 Approved Product List (APL):** The joint sealant materials used shall be one of the products listed on the Department’s APL. Manufacturers seeking evaluation of their products shall submit product datasheets, performance test reports from an independent laboratory showing the product meets the requirements of this section, and a APL application in accordance with Section 6. Information on the APL application must identify the sealant type.

**932-1.2.4 Shipment:** The material shall be delivered in containers plainly marked with the manufacturer’s name or trademark product name, LOT number and date of expiration.

**932-1.2.5 Bond Breaker Rod:** The bond breaker rod shall be a closed cell, expanded polyethylene foam rod of the size and dimensions shown in the Plans. It shall be compatible with the joint sealant and no bond or reaction shall occur between the rod and the sealant.

All bond breaker rods installed shall be covered by a sealant at the end of each work day.

Bond breaker tape approved by the sealant manufacturer may be used in lieu of bond breaker rod when sealing random cracks.

**932-1.3 Low Modulus Silicone Sealant Materials:**

**932-1.3.1 Low Modulus Silicone Sealants:** Silicone sealant shall be furnished in a one part or pre-measured two-part formulation meeting the requirements specified herein.

Acetic acid cure sealants are not acceptable. A primer as specified in 932-1.4 for bonding sealant to concrete shall be used if required by the manufacturer. When a manufacturer’s product is tested and approved by the Department using a primer, primer will be required for project installation.

Do not use Low Modulus Silicone Sealants Types A, B or C for bridge expansion joints.

Silicones shall be identified in the following manner:

Type A - A low modulus, non-sag (non-self-leveling) silicone formulation, used in sealing horizontal and vertical joints in cement concrete pavements and bridges (i.e., concrete-concrete joints). Tooling is required.

Type B - A very low modulus, self-leveling silicone formulation, used in sealing horizontal joints (including joints on moderate slopes) in cement concrete pavements and bridges (i.e., concrete-concrete joints). Tooling is not normally required.

Type C - An ultra-low modulus, self-leveling silicone formulation, used in sealing horizontal joints (including joints on moderate slopes) in cement concrete pavements and bridges (i.e., concrete-concrete joints). It can also be used to seal the joints between cement concrete pavements and asphalt concrete shoulders (including asphalt-asphalt joints). Tooling is not normally required.

Type D - An ultra-low modulus, self-leveling silicone formulation, cold-applied, rapid-cure, used to seal expansion joints that experience both thermal and/or vertical movements. The material must cure by chemical reaction and not by evaporation of solvent or fluxing of harder particles. Tooling shall not be required. Use in accordance with Standard Plans, Index 458-110 for bridge deck expansion joints with backer rods or as shown in the Plans for other joints with or without backer rods.

**932-1.3.2 Physical Requirements:**

Table 932-3					
Silicone Sealant Type	Test Method	Type A	Type B	Type C	Type D
Flow	ASTM D5893	No Flow			
Slump (maximum)	ASTM D2202	0.3 inches			
Extrusion rate (minimum)	ASTM C1183, Procedure A	20 ml/min	20 ml/min	20 ml/min	20 ml/min
Tack-free time at 77 ± 3°F and 45 to 55% Relative Humidity	ASTM C679	90 minutes maximum	180 minutes, maximum	180 minutes, maximum	20 – 60 minutes
Specific gravity	ASTM D792, Method A	1.1 to 1.515	1.10 to 1.40	1.1 to 1.5	1.26 to 1.34
Durometer hardness, Shore A (Cured seven days at 77 ± 3°F and 50 ± 5% Relative Humidity)	ASTM D2240	10-25			

Table 932-3					
Silicone Sealant Type	Test Method	Type A	Type B	Type C	Type D
Durometer hardness, Shore 00 (Cured 21 days at 77 ± 3°F and 50 ± 5% Relative Humidity)	ASTM D2240		40-80	20-80	
Tensile stress (maximum) at 150% elongation	ASTM D412 (Die C)	45 psi	40 psi	15 psi	
Elongation (Cured seven days at 77 ± 3°F and 50 ± 5% Relative Humidity)	ASTM D412 (Die C)	800% minimum			600% minimum
Elongation (Cured 21 days at 77 ± 3°F and 50 ± 5% Relative Humidity)	ASTM D412 (Die C)		800% minimum	800% minimum	
Ozone and Ultraviolet Resistance	ASTM C793	No chalking, cracking or bond loss after 5,000 hours, minimum.			
Bond to cement mortar briquets (primed if required) (Cured seven days at 77 ± 3°F and 50 ± 5% Relative Humidity)	AASHTO T 132	50 psi minimum			
Bond to cement mortar briquets (Cured 21 days at 77 ± 3°F and 50 ± 5% Relative Humidity)	AASHTO T 132		40 psi minimum	35 psi minimum	
Movement Capability	ASTM C719	No adhesive or cohesive failure and adhesion, 10 cycles at -50 to +100%			No adhesive or cohesive failure and adhesion, 10 cycles at +100/-50 %

Portland Cement Mortar: Briquets shall be molded and cured 28 days minimum in accordance with AASHTO T 132. Saw cut cured briquets in half, clean, and dry at 230°, plus or minus 5°F. Bond the two halves together with a thin section of sealant. After cure of sealant, briquets shall be tested in accordance with AASHTO T 132.

**932-1.3.3 Field Cure:** Six-inch samples of the sealant shall be taken by the Engineer from the joint at the end of a two week curing period and tested for durometer hardness (by FM ANSI/ASTM D2240), except that the requirements of a 1 inch sample width shall not apply. A minimum hardness of 7.0 is required as evidence of adequate cure.

**932-1.3.4 Approved Product List:** The low modulus silicone sealant used shall be one of the products listed on the APL. Manufacturers seeking evaluation of their products shall submit product datasheets, performance test reports from an independent laboratory

showing the product meets the requirements of this Section, an infrared identification curve (2.5 to 15  $\mu\text{m}$ ) and an APL application in accordance with Section 6. Information on the APL application must identify the sealant type.

**932-1.3.5 Shipment:** The material shall be delivered in containers plainly marked with the manufacturer's name or trademark product name, LOT number and date of expiration.

**932-1.3.6 Primer:** When required by the manufacturer's product, a primer shall be used.

The manufacturer shall perform quality control tests on each LOT of sealant primer material furnished to each project and submit a certified report that each LOT of primer material furnished to a project meets the company's specifications for that product and the primer is suitable for its intended use.

Sealant primer material shall be delivered in containers plainly marked with the manufacturer's name or trademark and product name, LOT number and date of expiration.

**932-1.3.7 Backer Rod and Tape Bond Breakers:** Backer rods and tape shall be compatible with the joint sealant and approved by the sealant manufacturer. No bond or reaction shall occur between the rod and the sealant.

**932-1.3.8 Installation:** Installation, material selection, joint dimensions, bond breaker suitability (by type and project) shall be in agreement with the requirements of Standard Plans, Indexes 350-001 and 458-110. Any modifications or exceptions to these requirements shall be shown in the Plans.

For new construction projects or general use where the joints to be sealed have uniform width, a closed cell, expanded polyethylene foam backer rod bond breaker shall be required. For rehabilitation projects and similar joint seals where the joints to be sealed have irregular width, an open cell, expanded polyethylene foam backer rod bond breaker with an impervious skin shall be required.

The backer rod shall be compatible with the joint sealant. No bond or reaction shall occur between the rod and the sealant.

Tape bond breaker approved by the sealant manufacturer may be used in lieu of backer rod bond breaker when sealing joints and/or random cracks, as required.

Type D Silicone sealant shall be placed when the ambient temperature is rising and is between 55°F and 85°F and the temperature is expected to rise for the next three hours minimum to provide to adequate joint opening and compression of the sealant during curing.

All installed bond breakers shall be covered by sealant at the end of each work day.

A tolerance in cross-sectional height at midpoint of minus 1/16 inches to plus 3/16 inches will be allowed to the nominal values shown for each joint width on the plan sheet. The Engineer shall check one joint for each 1,000 feet of roadway by cutting out specimens. If the cross section of the cut specimen is out of the allowable range, additional specimens shall be taken as follows:

One joint every 100 feet of pavement, not to exceed 500 feet.

If the average of the specimens is out of tolerance, the Contractor shall remove and replace the entire 500 foot section at no additional expense to the Department.

Installation tolerance shall be verified at 1,000 foot intervals.

**932-1.4 Pre-cured Silicone Sealant:**

**932-1.4.1 General:** Pre-cured silicone sealants are intended for sealing vertical joints on concrete surfaces. Type V1 sealant is intended for contraction joints or joints with movements less than 1/4 inches. Type V2 sealant is intended for expansion joints not exceeding 200% of the nominal joint opening. Type V2 sealant may be substituted for Type V1 sealant. The joint sealant must be listed on the APL.

**932-1.4.2 Physical Requirements:** Sealant material shall be a nominal 1/16 inches thick, available in standard widths from 1 inch to 6 inches, colored to match the finish surface coating of the concrete, and meet the following minimum testing requirements:

Table 932-4			
Test Property Description	Test Method	Type V1	Type V2
Minimum Movement, Cohesion/Adhesion	ASTM C1523	100%	200%
Dry/Room Temperature Loss of Adhesion/Cohesion	ASTM C1523	None	None
Water Immersion Loss of Adhesion/Cohesion	ASTM C1523	None	None
Frozen Loss of Adhesion/Cohesion	ASTM C1523	None	None
Heat Loss of Adhesion/Cohesion	ASTM C1523	None	None
Artificial Weathering Loss of Adhesion/Cohesion	ASTM C1523	None	None
Tear Propagation	ASTM C1523	NT or PT (No Tear or Partial/Knotty Tear)	NT or PT (No Tear or Partial/Knotty Tear)
Ultimate Elongation	ASTM D412	250%	500%

**932-1.4.3 Approved Product List:** The pre-cured silicone sealant used shall be one of the products listed on the APL. Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. Applications must include test results, an infrared identification curve (2.5 to 15  $\mu\text{m}$ ), and a product data sheet with the recommended adhesive and installation requirements.

**932-1.5 Compression Seals and Adhesive Lubricant**

**932-1.5.1 Preformed Elastomeric Compression Seals:** Preformed Elastomeric Compression Seals shall meet the requirements of ASTM D2628 except that immersion oil IRM 903 may be substituted for Oil No. 3 in the Oil Swell test procedure.

**932-1.5.2 Compression Seal Adhesive Lubricant:** Compression seal adhesive lubricant shall meet the requirements of ASTM D4070. The material shall be fluid from 5°F to 120°F (-15°C to 49°C).

**932-1.5.3 Certification:** The manufacturer shall submit a certified test report for each lot of material furnished to each project along with a statement certifying that the material conforms to this specification and identifying the project number and manufacturer’s lot number.

**932-1.5.4 Verification Samples:** Provide verification samples in accordance with Section 6.

**932-2 Structure Bearing Pads.**

**932-2.1 General:** Furnish elastomeric structure bearing pads as shown in the Contract Documents. Elastomeric bearings as defined herein shall include plain pads (elastomer only) and laminated bearings with steel or fabric laminates. Flash tolerance, finish and appearance of bearings shall meet the requirements of the latest edition of the Rubber Handbook as published by the Rubber Manufacturer’s Association, Inc. RMA-F3-T.063 for molded bearings, and RMA-F2 for extruded bearings.

**932-2.2 Materials:** Use elastomer that is Grade 2 or higher, as defined in the AASHTO LRFD Bridge Design Specifications, crystallization resistant, 100% virgin polychloroprene (neoprene). Use only new materials; reclaimed material is not allowed in the finished product. No wax, anti-ozonants, or other foreign material may accumulate or be applied to the surfaces of the bearing. The steel layers of the laminated pads shall utilize 10 gauge steel sheet (0.1345 inches thick). The steel utilized for the steel layers and for external load bearing plates (if specified) shall meet the requirements of ASTM A36 or ASTM A1011 Grade 36 Type I steel sheet. External load bearing plates shall be finished or machined flat to within 0.01 inches. The bottom surfaces of external load plates (masonry plates) designed to rest on bearing pads shall not exceed an out of flatness value of 0.0625 inches. External load bearing plates shall be protected from rust until all exposed surfaces can be field painted. Any rust inhibitor shall be removed from all surfaces prior to welding.

**932-2.3 Sampling:** A sampling LOT shall consist of a maximum of 100 bearing pads of a single type of bearing (plain, steel laminates, fabric laminates), of the same design, materials, thickness, and manufacturer, referred to here as “like pads”, delivered to the project site or to an offsite storage facility within the State of Florida in reasonable proximity to the project site as determined by the Engineer. Organize stockpiled pads into groups of like pads by LOT so that they can be readily identified and sampled by the Engineer.

**932-2.3.1 Ancillary Structure Pads:** Sampling is not required and acceptance is by certification.

**932-2.3.2 Bridge Structure Pads:** When the total number of like pads, as defined in 932-2, consists of a LOT of 10 or less, sampling is not required and acceptance is by certification. Submit to the Engineer a certification conforming to the requirements of Section 6 stating that the structure bearing pads meet the requirements of this Section.

For LOT sizes of like pads that exceed 10, two bridge bearing pads per LOT will be selected by the Engineer, one for testing and one for verification in the event of a failing test result. LOTs will be sampled only after all like pads in the LOT are at the project site or in an offsite storage facility. Samples shall consist of complete pads as detailed in the Plans. Furnish additional complete bridge bearing pads to replace those selected for testing. Bridge bearing pads shall be available for sampling a minimum of three weeks prior to their installation. Submit the sample bridge bearing pads to a Department approved independent laboratory for testing. Shipping and testing will be at the Contractor’s expense.

**932-2.4 Dimensional Tolerances:** Fabricate elastomeric bearings within the dimensional tolerances specified below or as designated in the Plans. If any of the dimensions are outside the limits specified, the bearing pad shall be rejected.

Table 932-5		
Measurement		Tolerance (inches)
1. Overall vertical dimensions	Design thickness $\leq 1.25$ inches	-0, +0.125
	Design thickness $> 1.25$ inches	-0, +0.25
2. Overall horizontal dimensions	measurements $\leq 36$ inches	-0, +0.25
	measurements $> 36$ inches	-0, +0.50
3. Thickness of individual layers of elastomer (laminated bearings only) at any point within the bearing		$\pm 0.125$
4. Variation from a plane parallel to the theoretical surface (as determined by measurements at the edge of the bearings)	Top (slope relative to bottom)	$\leq 0.005$ radians
	Sides	0.25
5. Position of exposed connection members		$\pm 0.125$
6. Edge cover of embedded laminates of connection members		-0, +0.125
7. Position and size of holes, slots, or inserts		$\pm 0.125$
Note: If the variation in thickness of individual layers of elastomer is greater than that allowed in the tolerance for Measurement (3) ( $\pm 0.125$ in.), use the following equation to determine compliance: $7.5\theta + v/hr < 0.35$ provided $\theta \leq 0.02$ where $\theta$ (radians) and $v$ (in) are absolute values of steel laminate rotation and vertical displacement. If the specified layer elastomeric layer thickness is $h_r$ , the bearing length is $L$ , and $H_1$ and $H_2$ are the measured maximum and minimum thicknesses at the edges of the layer, then $v =  h_r - 1/2(H_1 + H_2) $ and $\theta =  (H_1 - H_2)/2L $ for interior layers and $\theta =  (H_1 - H_2)/L $ for top and bottom layers provided that the minimum elastomer layer thickness $H_2 \geq 0.2$ in.		

**932-2.5 Ancillary Structures - Plain, Fiber Reinforced, or Fabric Laminated Bearing Pads:**

**932-2.5.1 Plain Pads:** Plain pads shall be either molded, extruded, or vulcanized in large sheets and cut to size. Cutting shall not heat the material and shall produce a smooth finish conforming to ANSI B46.1, 6.3  $\mu\text{m}$  (0.248 mils). Plain pads shall be molded or extruded to the finished thickness. Plying pads of lesser thickness together shall not be permitted. External load plates, when used, shall be protected from rusting and shall be hot bonded by vulcanization during the primary molding process. The finished pads shall withstand a minimum uniform compressive load of 1200 psi when tested in accordance with FM 5-598.

**932-2.5.2 Fiber Reinforced or Fabric Laminated Pads:** Fiber reinforced pads shall be constructed with a homogeneous blend of elastomer and random-oriented high strength synthetic fiber cords. Bearing pads may be molded and vulcanized in large sheets and cut to size. Cutting shall be performed so as to prevent heating and must produce a smooth finish conforming to ANSI B46.1.

Fabric laminated bearings shall be constructed of multiple layers of fabric and elastomer. The fabric shall be composed of 8 ounce cotton duck and the pads manufactured in accordance with Military Specification MIL-C-882. Ensure the fabric is free of folds or ripples and parallel to the top and bottom surfaces.

Fiber reinforced and fabric pads shall withstand a minimum uniform compressive load of 2,400 psi when tested in accordance with FM 5-598.

**932-2.5.3 Certification:** The Contractor shall submit to the Engineer a certification conforming to the requirements of Section 6 stating that the ancillary structure pads meet the requirements of this Section and the physical and heat resistance properties of Section 6 of FM 5-598. For bearing pads to be used under metal railings, submit certification indicating

compliance with either, ASTM D2000 M1 BC (suffix grade 1 - basic requirements, type B, class C) or the physical and heat resistance properties of FM 5-598.

**932-2.6 Bridge Structures - Elastomeric Bearing Pads:** Bearings with steel laminates shall be cast as a unit in a mold and bonded and vulcanized under heat and pressure. Bearings with steel laminates which are designed to act as a single unit with a given shape factor must be manufactured as a single unit. The mold shall have a standard shop practice mold finish. The internal steel laminates shall be blast cleaned to a cleanliness that conforms to SSPC-SP6 at the time of bonding. Plates shall be free of sharp edges and burrs and shall have a minimum edge cover of 0.25 inches. External load plates (sole plates) shall be hot bonded to the bearing during vulcanization.

Edges of the embedded steel laminates, including the laminate restraining devices and around holes and slots shall be covered with not less than 3/16 inches of elastomer or the minimum edge cover specified in the Plans. All exposed laminations or imperfections that result in less than the specified elastomer cover of any surface of the steel laminations shall be repaired by the manufacturer at the point of manufacture. The repair shall consist of sealing the imperfections flush on the finished pads with a bonded vulcanized patch material compatible with the elastomeric bearing pad. Repairs employing caulking type material or repairing the bearings in the field will not be permitted.

**932-2.6.1 Testing:** Test bridge bearing pads in accordance with FM 5-598. Laminated bridge bearings must meet a minimum compressive load of 2,400 psi and non-laminated (plain) pads must meet a minimum compressive load of 1,200 psi. If any properties are identified as noncompliant with the criteria specified, the bearing shall be rejected and the verification sample tested. If the verification sample test results are also noncompliant, the LOT shall be rejected. A list of approved testing laboratories can be found on the Department's website. The URL for obtaining this information, if available, is: <https://mac.fdot.gov/reports>.

**932-2.6.2 Marking:** Each elastomeric bearing pad shall be permanently marked. The marking shall consist of the order number, LOT number, pad identification number, elastomer type, and shear modulus or hardness (when shear modulus is not specified). Where possible, the marking shall be on a face of the bridge bearing pad that will be visible after erection of the structure.

**932-2.6.3 Certified Test Results:** For bridge bearing pads, the Contractor shall submit to the Engineer complete certified test results from the independent laboratory for all tests specified, properly identified by LOT and project number.

**932-2.6.4 Certification:** The Contractor shall submit to the Engineer a certification conforming to the requirements of Section 6 stating that the bearing pads, (plain, fiber reinforced or elastomeric) meet the requirements of this Section. The certification shall designate the bearings in each LOT and state that each of the bearings in the LOT was manufactured in a reasonably continuous manner from the same batch of elastomer and cured under the same conditions.

### **932-3 Fiber Reinforced Polymer (FRP) Reinforcing Bars.**

**932-3.1 General:** Obtain FRP reinforcing bars from producers currently on the Department's Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105.

Use only solid, round, thermoset basalt fiber reinforced polymer (BFRP), glass fiber reinforced polymer (GFRP) or carbon fiber reinforced polymer (CFRP) reinforcing bars. Single or multi-wire CFRP strands are permitted as spirals for reinforcing in concrete piling

where specified in the Contract Documents. Bars shall be manufactured using pultrusion, variations of pultrusion, or other suitable processes noted in the producer’s Quality Control Plan, subject to the approval of the State Materials Office (SMO). For BFRP and CFRP bars only vinyl ester or epoxy resin systems are permitted. For GFRP, use only bars manufactured using vinyl ester resin systems and glass fibers classified as E-CR or R that meet the requirements of ASTM D578.

**932-3.2 Bar Sizes and Loads:** The sizes and loads of FRP reinforcing bars shall meet the requirements in Table 932-6. The measured cross-sectional area, including any bond enhancing surface treatments, shall be determined according to Table 932-7.

Table 932-6 Sizes and Tensile Loads of FRP Reinforcing Bars							
Bar Size Designation	Nominal Bar Diameter (in)	Nominal Cross Sectional Area (in <sup>2</sup> )	Measured Cross-Sectional Area (in <sup>2</sup> )		Minimum Guaranteed Tensile Load (kips)		
			Minimum	Maximum	BFRP and GFRP Bars	CFRP (Type II) Single & 7-Wire Strands	CFRP (Type I) Bars
2.1-CFRP	0.21	0.028	0.026	0.042	-	7.1	-
2	0.250	0.049	0.046	0.085	6.1	-	10.3
2.8-CFRP	0.280	0.051	0.048	0.085	-	13.1	-
3	0.375	0.11	0.104	0.161	13.2	-	20.9
3.8-CFRP	0.380	0.09	0.087	0.134	-	23.7	-
4	0.500	0.20	0.185	0.263	21.6	-	33.3
5	0.625	0.31	0.288	0.388	29.1	-	49.1
6	0.750	0.44	0.415	0.539	40.9	-	70.7
6.3-CFRP	0.630	0.19	0.184	0.242	-	49.8	-
7	0.875	0.60	0.565	0.713	54.1	-	-
7.7-CFRP	0.770	0.29	0.274	0.355	-	74.8	-
8	1.000	0.79	0.738	0.913	66.8	-	-
9	1.128	1.00	0.934	1.137	82.0	-	-
10	1.270	1.27	1.154	1.385	98.2	-	-

**932-3.3 Material Requirements:** Producers shall submit to the State Materials Office (SMO), a test report of the physical and mechanical property requirements in Table 932-7 and Table 932-8 as applicable for the types and sizes of FRP reinforcing produced. Qualification testing shall be conducted by an independent laboratory approved by the Department for performing the FRP test methods.

Three production LOTS shall be randomly sampled at the production facility by a designee of the SMO. The minimum number of specimens per production LOT shall be as indicated in Table 932-7 and Table 932-8. The coefficient of variation (COV) for each test result

shall be less than 6%. Outliers shall be subject to further investigation per ASTM E178. If the COV exceeds 6%, the number of test specimens per production LOT may be doubled, a maximum of two times, to meet the COV requirement. Otherwise, the results shall be rejected. A production LOT is defined as a LOT of FRP reinforcing produced from start to finish with the same constituent materials used in the same proportions without changing any production parameter, such as cure temperature or line speed.

Table 932-7 Physical and Mechanical Property Requirements for Straight FRP Reinforcing Bars			
Property	Test Method	Requirement	Specimens per LOT
Fiber Mass Fraction	ASTM D2584 or ASTM D3171	≥70%	5 <sup>n</sup>
Short-Term Moisture Absorption	ASTM D570, Procedure 7.1; 24 hours immersion at 122°F	≤0.25%	5 <sup>m</sup>
Long-Term Moisture Absorption	ASTM D570, Procedure 7.4; immersion to full saturation at 122°F	≤1.0%	5 <sup>m</sup>
Glass Transition Temperature (T <sub>g</sub> )	ASTM D7028 (DMA) or ASTM E1356 (DSC; T <sub>m</sub> )/ASTM D3418 (DSC; T <sub>mg</sub> )	≥230°F  ≥212°F	3 <sup>m</sup>
Total Enthalpy of Polymerization (Resin)	ASTM E2160	Identify the resin system used for each bar size and report the average value of three replicates for each system	--
Degree of Cure	ASTM E2160	≥95% of Total polymerization enthalpy	3 <sup>n</sup>
Measured Cross-Sectional Area	ASTM D7205	Within the range listed in Table 932-6	10 <sup>n</sup>
Guaranteed Tensile Load <sup>a</sup>		≥ Value listed in Table 932-6	
Tensile Modulus		≥ 6,500 ksi for BFRP and GFRP ≥18,000 ksi for CFRP (Type I) Bars ≥ 22,400 ksi for CFRP (Type II) Strands	
Alkali Resistance with Load	ASTM D7705; Procedure B, set sustained load to 30% of value in Table 932-6; 3 months test duration, followed by tensile strength per ASTM D7205	≥ 70% Tensile strength retention for BFRP & GFRP ≥ 95% Tensile Strength for Retention	5 <sup>m</sup>
Transverse Shear Strength	ASTM D7617	>22 ksi	5 <sup>n</sup>
Horizontal Shear Strength <sup>p</sup>	ASTM D4475	>5.5 ksi	5 <sup>n</sup>
Bond Strength to Concrete, Block Pull-Out	ACI 440.3R, Method B.3 or ASTM D7913	>1.1 ksi for Bars >0.9 for Strands	5 <sup>m</sup>

a – Guaranteed tensile load shall be equal to the average test result from all three lots minus three standard deviations. n – Tests shall be conducted for all bar sizes produced.  
m – Tests shall be conducted for the smallest, median, and largest bar size produced.  
p – Only required for BFRP bars.

**932-3.3.1 Additional Requirements for Bent FRP Bars:** For all bars produced by bending straight solid FRP bars before the resin is fully cured, the minimum inside bend radius shall be at least three times the nominal diameters for bar sizes 2 through 8; and four times the nominal diameters for sizes 9 and 10.

The straight portion of a bent FRP reinforcing bar shall be extracted with sufficient length for tensile testing according to Table 932-8. When the bent shape does not allow for the tensile testing of one of its straight portions, test specimens produced at the same time during the same production LOT shall be used.

Table 932-8 Physical and Mechanical Property Requirements for Bent FRP Reinforcing Bars			
Property	Test Method	Requirement	Specimens per LOT
Fiber Mass Fraction – Bent Portion <sup>b</sup>	ASTM D2584 or ASTM D3171	≥70%	5 <sup>m</sup>
Short-Term Moisture Absorption – Bent Portion <sup>b</sup>	ASTM D570, Procedure 7.1; 24 hours immersion at 122°F	≤0.25%	5 <sup>m</sup>
Long-Term Moisture Absorption – Bent Portion <sup>b</sup>	ASTM D570, Procedure 7.4; immersion to full saturation at 122°F	≤1.0%	5 <sup>m</sup>
Glass Transition Temperature – Bent Portion <sup>b</sup>	ASTM E1356 (DSC; $T_m$ ) /ASTM D3418 (DSC; $T_{mg}$ )	≥212°F	3 <sup>m</sup>
Degree of Cure – Bent Portion <sup>b</sup>	ASTM E2160	≥95% of Total polymerization enthalpy	3 <sup>m</sup>
Measured Cross-Sectional Area – Straight Portion	ASTM D7205	Within the range listed in Table 932-6	5 <sup>m</sup>
Guaranteed Tensile Load <sup>a</sup> – Straight Portion		≥ Value listed in Table 932-6	
Tensile Modulus – Straight Portion		≥6,500 ksi for BFRP and GFRP ≥18,000 ksi for CFRP (Type I) Bar > 22,400 ksi for CFRP (Type II) Strand	
Alkali Resistance without Load – Straight Portion	ASTM D7705; 3 months test duration, followed by tensile strength per ASTM D7205	≥ 80% Tensile strength retention	5 <sup>m</sup>

Table 932-8 Physical and Mechanical Property Requirements for Bent FRP Reinforcing Bars			
Property	Test Method	Requirement	Specimens per LOT
Strength of 90° Bends	ACI 440.3, Method B.5 or ASTM D7914	> 60% Guaranteed tensile load listed in Table 932-6	5 <sup>m</sup>
Transverse Shear Strength – Straight Portion	ASTM D7617	>22 ksi	5 <sup>m</sup>
Horizontal Shear Strength <sup>p</sup>	ASTM D4475	>5.5 ksi	5 <sup>m</sup>
a – Guaranteed tensile load shall be equal to the average test result from all three lots minus three standard deviations. b – Bent portion specimens shall be extracted from a central location within a 90° bend. m – Tests shall be conducted for the smallest, median, and largest bent bar size produced. p – Only required for BFRP bars.			

**932-3.4 Material Acceptance:** Submit to the Engineer a certificate of analysis for each production LOT from the producer of the FRP reinforcing bars, confirming compliance with the requirements of this Section.

**932-3.4.1 Sampling:** The Engineer will select a minimum of six straight bars with minimum lengths of 7 feet each and a minimum of five bent bars for spiral bends/revolutions from each shipment, representing a random production LOT, per bar size of FRP reinforcing for testing in accordance with Table 932-9. Testing shall be conducted, at the Contractor’s expense, by a Department approved independent laboratory. Each test shall be replicated a minimum of three times per sample. Submit the test results to the Engineer for review and approval prior to installation. Testing will not be required for bars to be used solely as reinforcement for sheet pile bulkheads, but LOT samples will still be selected and retained by the Engineer until final acceptance of the work.

Table 932-9 Testing Requirements for Project Material Acceptance of FRP Reinforcing Bars				
Property	Test Method	Requirement	Test Required for Straight Bar	Test Required for Bent Bar
Fiber Mass Fraction	ASTM D2584 or ASTM D3171	$\geq 70\%$	Yes	Yes – bent portion <sup>b</sup>
Short-Term Moisture Absorption	ASTM D570, Procedure 7.1; 24 hours immersion at 122°F	$\leq 0.25\%$	Yes	Yes – bent portion <sup>b</sup>
Glass Transition Temperature	ASTM D7028 (DMA) or ASTM E1356 (DSC; $T_m$ )/ ASTM D3418 (DSC; $T_{mg}$ )	$\geq 230^\circ\text{F}$  $\geq 212^\circ\text{F}$	Yes	Yes – bent portion <sup>b</sup>
Degree of Cure	ASTM E2160	$\geq 95\%$ of Total polymerization enthalpy	Yes	Yes – bent portion <sup>b</sup>
Measured Cross-sectional Area	ASTM D7205	Within the range listed in Table 932-6	Yes	Yes – straight portion
Guaranteed Tensile Load <sup>a</sup>		$\geq$ Value listed in Table 932-6	Yes	No
Tensile Modulus		$\geq 6,500$ ksi for BFRP and GFRP $\geq 18,000$ ksi for CFRP (Type I) Bars $\geq 22,400$ ksi for CFRP (Type II) Bars	Yes	No

a – Guaranteed tensile load shall be equal to the average test result from all three lots minus three standard deviations.  
b – Bent portion specimens shall be extracted from a central location within a 90° bend.

**932-4 FRP Spirals for Concrete Piling.**

FRP Spirals for reinforcing in concrete piling shall be CFRP conforming to the requirements of Section 933 or 932-3 for CFRP (Type II).

**SECTION 937  
POST-INSTALLED ANCHOR SYSTEMS FOR  
STRUCTURAL APPLICATIONS IN CONCRETE ELEMENTS**

**937-1 General.**

Post-installed anchor systems intended for structural applications in concrete elements consist of adhesive-bonded anchor systems.

**937-2 Approved Product List (APL).**

Manufacturers of post-installed anchor systems may apply for inclusion of individual products on the Department’s Approved Product List (APL). The application shall be made in accordance with Section 6 and shall include certified test reports from an independent testing laboratory which shows the material system meets all the requirements of this Section.

**937-3 Certification.**

The Contractor shall provide the Engineer with certification from the manufacturer of the anchor system, confirming that the requirements of this Section are met. The certification shall conform to the requirements of Section 6. Each certification shall cover only one LOT of anchoring materials.

**937-4 Adhesive Bonding Material Systems.**

**937-4.1 General:** Adhesive bonding material systems for structural applications shall consist of pre-packaged, 2-part chemical components. The material systems shall be specifically intended for use in structural applications for bonding anchors and dowels to hardened concrete. Applications are limited to anchors and dowels installed in positions ranging from vertically downward to horizontal.

Do not use material from containers which are damaged or have been previously opened. Use only full packages of components. Combining of adhesive bonding components from bulk supplies is not permitted.

Material systems shall be pre-packaged to automatically proportion and mix the materials for use. Manual proportioning of the components will not be permitted.

**937-4.2 Minimum Performance Requirements (FM 5-568):** When tested in accordance with FM 5-568, the adhesive bonding material system, for general use, shall meet the following requirements:

Table 937-1 Uniform Bond Stress		
	Type HV	Type HSHV
Confined Tension	2,290 psi	3,060 psi
Damp-Hole Installation	1,680 psi	1,830 psi
Elevated Temperature	2,290 psi	3,060 psi
Horizontal Orientation	2,060 psi	2,060 psi
Short Term Cure	1,710 psi	1,710 psi
Specified Bond Strength	1,080 psi	1,830 psi

Maximum Coefficient of Variation for Uniform Bond Stress: 20%.

Long Term Load (Creep):

1. The rate of displacement shall decrease during the 42 day application of load.

2. At 42 days, the total displacement due to creep (with load still applied) shall be less than 0.03 inches and during the last 14 days of the 42 day load duration, the total displacement due to creep shall be less than 0.003 inches.

3. After removal of the 42 day load, the uniform bond Stress from a subsequent Confined Tension Test shall not be less than 1,826 psi.

**937-4.3 Product Identification (Fingerprint) Properties (FM 5-569):** References for comparison including infrared absorption, density or average weight, gel time or setting time, and bond strength shall be determined in accordance with FM 5-569.

**937-4.4 Packaging and Marking:** The adhesive bonding material system shall be delivered to the project site in original unopened containers with the manufacturer's label identifying the product. Each package shall be clearly marked with the following information:

- Manufacturer's name and address
- Product Name
- Date of Manufacture
- Expiration Date
- LOT Identification Number
- Storage and Handling Requirements

Each package shall include the manufacturer's instructions for anchor and dowel installation. The instructions shall include the following information:

- Diameters of drilled holes for applicable anchor and dowel sizes.
- Cleaning procedure for drilled holes, including a description of permitted and prohibited equipment and techniques.
- Allowable temperature ranges for storage, installation and curing.
- Identification of acceptable mixing/dispensing nozzles.
- Fabrication requirements for anchors and dowels.
- Description of tools permitted or required for installation.
- Method of identifying properly proportioned and mixed adhesive materials.
- Time and temperature schedule for initial set and full-strength cure.
- Special requirements for special installation conditions such as damp holes, or horizontal or near horizontal orientation of the anchor or dowel.

**SECTION 948  
OPTIONAL DRAINAGE PRODUCTS AND  
REPAIR SYSTEMS**

**948-1 Polyvinyl-Chloride (PVC) Pipe, or Acrylonitrile-Butadiene-Styrene (ABS) Plastics Pipe.**

**948-1.1 For Bridge Drains:** PVC pipe shall conform to the requirements of ASTM D1785, for Type I, Grade 1, Schedule 80 PVC pipe with a minimum polymer cell classification of 12454 per ASTM D1784 and a minimum of 1.5% by weight of titanium dioxide for UV protection.

**948-1.2 Pressure Pipe:** Pressure pipe for direct burial under pavement shall conform to the requirements of ASTM D1785, for Type I, Grade I, Schedule 40, for sizes up to and including 2-1/2 inches, and Schedule 80 for sizes up to 4 inches. Pressure pipe 4 inches in diameter and larger shall conform to the requirements of AWWA C900-75, DR18, and ASTM D1785, Type I, Grade I or other types as may be specifically called for in the Plans or Special Provisions.

**948-1.3 Pipe Marking:** All PVC pipe shall be marked as required by Article 8 of ASTM D1785, and acceptance of the pipe may be based on this data.

**948-1.4 Nonpressure Pipe:** PVC pipe and ABS pipe intended for direct-burial or concrete encasement, shall meet the following requirements:

1. PVC Pipe: ASTM D3034, SDR-35, or ASTM F949, profile wall without perforations.
2. ABS Pipe: ASTM D2680.

The manufacturer of the PVC or ABS pipe shall submit to the Engineer the mill analysis covering chemical and physical test results.

**948-1.5 Underdrain:** PVC pipe for use as underdrain shall conform to the requirements of ASTM F758 or ASTM F949. Also, PVC underdrain manufactured from PVC pipe meeting ASTM D3034, perforated in accordance with the perforation requirements given in AASHTO M 36 or AASHTO M 196 will be permitted.

**948-1.6 Edgedrain:** PVC pipe for use as edgedrain shall conform to the requirements of ASTM F758, ASTM F949 or ASTM D3034 pipe shall be perforated in accordance with the perforation requirements given in AASHTO M 36 or AASHTO M 196. Additional perforations will be required as indicated in Standard Plans, Index 446-001 for pipes designated under ASTM F758 and ASTM D3034. PVC pipe intended for direct burial in asphalt shall meet the following requirements:

1. ASTM D3034, SDR-35, or ASTM F949
2. NEMA TC-2 (pipe material and compounds) and NEMA TC-3 (pipe fittings) for PVC (90°C electrical conduit pipe) NEMA ECP-40 and NEMA ECP-80. Underwriter Laboratory Specifications referenced under NEMA specifications for electrical conductivity are not required.
3. Pipe shall withstand asphalt placement temperatures specified without permanent deformation.
4. Perforations shall be in accordance with AASHTO M 36 or AASHTO M 196.

**948-1.7 PVC Pipe (12 Inches to 48 Inches):** PVC pipe for side drain, cross drain, storm drain and other specified applications shall conform to AASHTO M 278 for smooth wall PVC pipe or ASTM F949 and AASHTO M 304 for PVC ribbed pipe with plant certification from the

National Transportation Product Evaluation Program (NTPEP). Resin shall contain a minimum of 1.5% by weight of titanium dioxide for UV protection. Post-consumer and post-industrial recycled resins are not allowed. Mitered end sections are not to be constructed of PVC.

PVC pipe shall be installed within two years from the date of manufacture.

Obtain pipe from a production facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion shall meet the requirements of Section 105.

**948-1.7.1 Material Acceptance:** Prior to use, submit to the Engineer a material certification from the manufacturer confirming that the requirements of this Section are met. The certification shall conform to the requirements of Section 6.

Project sampling shall be performed in accordance with 430-9.

**948-2 Corrugated Polyethylene Tubing and Pipe.**

**948-2.1 General:** For underdrain, corrugated polyethylene tubing and fittings shall meet the requirements of AASHTO M 252. For edgedrain, corrugated polyethylene tubing and fittings shall meet the requirements of AASHTO M 252, except as modified in 948-2.2. For storm drain side drain, french drain and cross drain corrugated polyethylene pipe shall meet the requirements of AASHTO M 294 and 948-2.3.

The tubing or pipe shall not be left exposed to sunlight for periods exceeding the manufacturer's recommendation.

**948-2.2 Edgedrain (4 Inches to 10 Inches):** The requirements for edgedrain as specified in AASHTO M 252 are modified as follows:

1. Coiling of tubing 6 inches in diameter or greater is not permitted. Tubing shall have a minimum pipe stiffness of 46 psi at 5% deflection.

**948-2.3 Corrugated High Density Polyethylene (HDPE) Pipe (12 Inches to 60 Inches):**

**948-2.3.1 General:** Class I (50-year design service life) corrugated HDPE pipe used for side drain, storm and cross drain or french drain shall meet the requirements of AASHTO M 294(V) with plant certification from the NTPEP. Corrugations shall be annular. Pipe resin shall conform to ASTM D3350 with a minimum cell classification 435400C and between 2% to 4% carbon black. Post-consumer and post-industrial recycled resins are not allowed. Mitered end sections are not to be constructed of polyethylene.

Obtain pipe from a production facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion shall meet the requirements of Section 105.

**948-2.3.2 Additional Requirements for Class II (100-Year Design Service Life), Type S HDPE Pipe:** Class II HDPE pipe shall meet the requirements in Table 948-1 in addition to those in 948-2.3. Perforations will not be allowed. Manufacturers may only use ground Class II HDPE pipe for reworked plastic.

Table 948-1 Stress Crack Resistance of Pipes			
Pipe Location	Test Method	Test Conditions	Requirement
Pipe Liner	FM 5-572, Procedure A	10% Igepal solution at 122°F and 600 psi applied stress, 5 replicates	Average failure time of the pipe liner shall be ≥18.0 hours, no single value shall be less than 13.0 hours.
Pipe Corrugation <sup>(1)</sup> , (molded plaque)	ASTM F2136	10% Igepal solution at 122°F and 600 psi applied stress, 5 replicates	Average failure time shall be ≥24.0 hours, no single value shall be less than 17.0 hours.
Junction	FM 5-572, Procedure B and FM 5-573	Full Test <sup>(2)(3)</sup> Test at 3 temperature/stress combinations: 176°F at 650 psi 176°F at 450 psi 158°F at 650 psi; 5 replicates at each test condition	Determine failure time at 500 psi at 73.4°F ≥ 100 years (95% lower confidence) using 15 failure time values <sup>(4)</sup> The tests for each condition can be terminated at duration equal to or greater than the following criteria: 110.0 hr at 176°F 650 psi 430.0 hr at 176°F 450 psi 500.0 hr at 158°F 650 psi
		Single Test <sup>(5)</sup> : Test temperature 176°F and applied stress of 650 psi.; 5 replicates	The average failure time must be equal to or greater than 110.0 hr
Longitudinal Profiles <sup>(6)</sup>	FM 5-572, Procedure C, and FM 5-573	Full Test <sup>(2)(3)</sup> : Test at 3 temperature/stress combinations: 176°F at 650 psi 176°F at 450 psi 158°F at 650 psi; 5 replicates at each test condition	Determine failure time at 500psi at 73.4°F ≥ 100 years (95% lower confidence) using 15 failure time values <sup>(4)</sup> . The tests for each condition can be terminated at duration equal to or greater than the following criteria: 110.0 hr at 176°F 650 psi 430.0 hr at 176°F 450 psi 500.0 hr at 158°F 650 psi
		Single Test <sup>(5)</sup> : Test temperature 176°F and applied stress of 650 psi.; 5 replicates	The average failure time must be equal to or greater than 110.0 hr (no value shall be less than 55.0 hours)

Table 948-1 Stress Crack Resistance of Pipes			
Oxidation Resistance of Pipes			
Pipe Location	Test Method	Test Conditions	Requirement
Liner and/or Crown <sup>(7)</sup>	OIT Test (ASTM D3895)	2 replicates (to determine initial OIT value) on the as manufactured (not incubated) pipe.	25.0 minutes, minimum
Liner and/or Crown <sup>(7)</sup>	Incubation test FM 5-574 and OIT test (ASTM D3895)	Three samples for incubation of 265 days at 176°F <sup>(8)</sup> and applied stress of 250 psi. One OIT test per each sample	Average of 3.0 minutes <sup>(9)</sup> (no values shall be less than 2.0 minutes)
Liner and/or Crown <sup>(7)</sup>	MI test (ASTM D1238 at 190°C/2.16Kg)	2 replicates on the as manufactured (not incubated) pipe.	< 0.4 g/10 minutes
Liner and/or Crown <sup>(7)</sup>	Incubation test FM 5-574 and MI test (ASTM D1238 at 190°C/2.16Kg)	2 replicates on the three aged sampled after incubation of 265 days at 176°F <sup>(8)</sup> and applied stress of 250 psi	MI Retained Value <sup>(9)(10)</sup> shall be greater than 80% and less than 120%.

Note: FM = Florida Method of Test.

- (1) Required only when the resin used in the corrugation is different than that of the liner.
- (2) A higher test temperature (194°F) may be used if supporting test data acceptable to the State Materials Engineer is submitted and approved in writing.
- (3) Full test shall be performed on alternative pipe diameter of pipe based on wall profile design, raw material cell classification, and manufacturing process. Full test must be performed on maximum and minimum pipe diameters within a manufacturing process.
- (4) Computer program to predict the 100 year SCR with 95% lower confidence can be obtained from FDOT.
- (5) Single test for the junction and longitudinal profile may be used on alternating pipe sizes within a manufacturing process. Single point tests may not be used on maximum and minimum pipe sizes within a manufacturing process except by approval of the Engineer. Single point tests may be used for quality assurance testing purposes.
- (6) Longitudinal profiles include vent holes and molded lines.
- (7) OIT and MI tests on the crown are required when resin used in the corrugation is different than that of the liner.
- (8) The incubation temperature and duration can also be 196 days at 185°F.
- (9) The tests for incubated and “as-manufactured” pipe samples shall be performed by the same lab, same operator, the same testing device, and in the same day.
- (10) The MI retained value is determined using the average MI value of incubated sample divided by the average MI value of as-manufactured pipe sample.

**948-2.3.3 Material Acceptance:** Meet the requirements of 948-1.7.1.

**948-2.3.4 Laboratory Accreditation:** Manufacturers seeking evaluation of a product in accordance with Departmental procedures must submit test reports conducted by a laboratory qualified by the Geosynthetic Accreditation Institute-Laboratory Accreditation Program (GAI-LAP) or qualified by ISO 17025 accreditation agency using personnel with actual experience running the test methods for Class II HDPE pipe. Submit the test reports to the State Materials Office.

**948-2.4 Steel Reinforced Polyethylene Ribbed Pipe:**

**948-2.4.1 General:** Steel reinforced polyethylene ribbed pipe used for side drain, storm and cross drain, or french drain shall meet the requirements of AASHTO M 335 with plant certification from the NTPEP and the testing requirements for stress crack and oxidation

resistance in Table 948-1. Pipe resin shall conform to ASTM D3350 with a minimum cell classification 435400C and between 2% to 4% carbon black. Post-consumer and post-industrial recycled resins are not allowed. Mitered end sections are not to be constructed of steel reinforced polyethylene ribbed pipe.

Obtain pipe from a production facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion shall meet the requirements of Section 105.

**948-2.4.2 Material Acceptance:** Meet the requirements of 948-1.7.1.

**948-2.4.3 Laboratory Accreditation:** Meet the requirements of 948-2.3.4 except use personnel with actual experience running the test methods for steel reinforced polyethylene ribbed pipe.

**948-2.5 Steel Reinforced Polyethylene Corrugated Pipe:**

**948-2.5.1 General:** Class I (50-year design service life) steel reinforced polyethylene corrugated pipe used for side drain, storm and cross drain must meet the requirements of AASHTO MP 42 with plant certification from the National Transportation Product Evaluation Program (NTPEP), provided such certification for this category of pipe is available. Pipe resin must conform to ASTM D3350 with a minimum cell classification of 334452C or E and between 2% to 4% carbon black. Thermosetting polyurethane materials used for pipe joints must be polyester-based and meet the requirements of Table 948-2. Post-consumer and post-industrial recycled resins are not allowed. Perforations are not allowed. Mitered end sections are not to be constructed of steel reinforced polyethylene corrugated pipe.

Obtain pipe from a production facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion to the listing shall meet the requirements of Section 105.

Table 948-2 Polyurethane Component Requirements				
Test Methods		Test Conditions		Requirement
ASTM D2240 Durometer Hardness 1-inch Thick Specimens		Initial		≥60
		After 6 Months Exposure to Each Condition*		No more than 10% reduction from measured initial value
ASTM D695 Compressive Properties 0.1 inch per minute Load Rate		Initial		≥200 psi
		After 6 Months Exposure to Each Condition*		No more than 10% reduction from measured initial value
ASTM D1623 Yield Tensile Strength Type B Specimens 0.1 inch per minute Load Rate		Initial		≥300 psi
		After 6 Months Exposure to Each Condition*		No more than 30% reduction from measured initial value
*Exposure Conditions:				
Solution pH	Resistivity (Ohm-cm), Minimum	Chloride Content (ppm), Maximum	Temperatures (°C)	
5.5	1,000	300	60, 80, 90	
7	1,000	300	60, 80, 90	
12	1,000	300	60, 80, 90	

**948-2.5.2 Project Material Acceptance:** Prior to use, submit to the Engineer a material certification from the manufacturer confirming that the requirements of this Section are met. The certification shall conform to the requirements of Section 6.

**948-2.5.3 Laboratory Accreditation:** Manufacturers seeking evaluation of a product in accordance with Departmental procedures must submit test reports conducted by a laboratory qualified by the Geosynthetic Accreditation Institute-Laboratory Accreditation Program (GAI-LAP) or qualified by ISO 17025 accreditation agency using personnel with actual experience performing the test methods for steel reinforced polyethylene pipe. Submit the test reports to the State Materials Office.

**948-3 Fiberglass Reinforced Polymer Pipe.**

**948-3.1 For Bridge Drains:** Fiberglass pipe shall conform to the requirements of ASTM D3262, ASTM D2996 or ASTM D2310, for Type I, Grade 2, Class E, using polyvinyl ester as the only resin. The minimum hoop stress designation shall be A. The resin shall contain UV stabilizers or a two-part 100% solids polyurethane coating.

**948-4 Ductile Iron Pipe.**

**948-4.1 For Bridge Drains:** Ductile iron pipe shall conform to the requirements of AWWA C151.

**948-5 Hot Dip Galvanized Steel Pipe.**

**948-5.1 For Bridge Drains:** Hot dip galvanized steel pipe shall conform to the requirements of ASTM A53.

**948-6 Flexible Transition Couplings and Pipe.**

**948-6.1 For Bridge Drains:** Flexible transition couplers and pipe shall conform to the requirements of ASTM C1173.

**948-7 Profile Wall Polypropylene (PP) Pipe (12 Inches to 60 Inches).**

**948-7.1 Class I PP:** Class I (50-year design service life) PP pipe used for side drain, cross drain, storm drain, and french drain shall meet the requirements of AASHTO M 330 with plant certification from the NTPEP. Corrugations shall be annular. Polypropylene compound shall conform to the requirements of ASTM F2881. Post-consumer and post-industrial recycled resins are not allowed. Mitered end sections are not to be constructed of polypropylene.

Obtain pipe from a production facility that is listed on the Department's Production Facility Listing. Producers seeking inclusion shall meet the requirements of Section 105.

**948-7.2 Additional Requirements for Class II (100-Year Design Service Life) PP Pipe:** Meet the requirements in Table 948-3 in addition to those in 948-7.1. Manufacturers may only use ground Class II PP for reworked plastic.

Table 948-3 Stress Crack Resistance			
Pipe Location	Test Method	Test Conditions	Requirement
Pipe Liner	FM 5-572, Procedure A	10% Igepal solution at 50°C and 600 psi applied stress, 5 replicates	Average failure time of the pipe liner shall be ≥100 hours, no single value shall be less than 71 hours. <sup>(1)</sup>
Oxidation Resistance			
Pipe Location	Test Method	Test Conditions	Requirement
Pipe Liner and/or Crown <sup>(2)</sup>	OIT Test (ASTM D3895)	2 replicates (to determine initial OIT value) on the as manufactured (not incubated) pipe.	25.0 minutes, minimum
Pipe Liner and/or Crown <sup>(2)</sup>	Incubation test FM 5-574 and OIT test (ASTM D3895)	Three samples for incubation of 264 days at 85°C <sup>(3)</sup> . One OIT test per each sample	Average of 3.0 minutes <sup>(4)</sup> (no values shall be less than 2.0 minutes)
Pipe Liner and/or Crown <sup>(2)</sup>	MI test (ASTM D1238 at 230°C/2.16Kg)	2 replicates on the as manufactured (not incubated) pipe.	< 1.5 g/10 minutes
Pipe Liner and/or Crown <sup>(2)</sup>	Incubation test FM 5-574 and MI test (ASTM D1238 at 230°C/2.16Kg)	2 replicates on the three aged sampled after incubation of 264 days at 85°C <sup>(3)</sup>	MI Retained Value <sup>(4)(5)(6)</sup> shall be greater than 80% and less than 120%.

Note: FM = Florida Method of Test.

(1) If due to sample size this test cannot be completed on the liner then testing shall be conducted on a molded plaque sample. Samples can be removed if test time exceeds 100 hours without failure.

(2) OIT and MI tests on the crown are required when resin used in the corrugation is different than that of the liner.

(3) The incubation temperature and duration can also be 192 days at 90°C or 140 days at 95°C.

(4) The tests for incubated and “as-manufactured” pipe samples shall be performed by the same lab, same operator, the same testing device, and in the same day.

(5) Within each replicate set of tests, the discrepancy range shall be within 9%. If an out-of-range discrepancy occurs, repeat the two MI tests on the same pipe sample. If insufficient material is available, a repeat of one test is acceptable.

(6) The MI retained value is determined using the average MI value of incubated sample divided by the average MI value of as-manufactured pipe sample.

**948-7.3 Material Acceptance:** Meet the requirements of 948-1.7.1.

**948-7.4 Laboratory Accreditation:** Meet the requirements of 948-2.3.4 except use personnel with actual experience running the test methods for profile wall polypropylene pipe.

**948-8 Filter Fabric Sock for Use with Underdrain.**

For Type I underdrain specified in Standard Plans, Index 440-001, filter sock shall be an approved strong rough porous, polyester or other approved knitted fabric which completely covers and is secured to the perforated plastic tubing underdrain in such a way as to prevent infiltration of trench backfill material.

The knitted fabric sock shall be a continuous one-piece material that fits over the tubing like a sleeve. It shall be knitted of continuous 150 denier yarn and shall be free from any chemical treatment or coating that might significantly reduce porosity and permeability.

The knitted fabric sock shall comply with the following physical properties:

Table 948-4		
Weight, applied (oz/sq. yd.)	3.5 min	ASTM D3887
Grab tensile strength (lbs.)	50 min.*	ASTM D5034
Equivalent opening size (EOS No.)	25 min.**	Corps of Engineers CW-02215-77
Burst strength (psi)	100 min.**	ASTM D3887
*Tested wet.		
**Manufacturer's certification to meet test requirement.		

The knitted fabric sock shall be applied to the tubing in the shop so as to maintain a uniform applied weight. The tubing with knitted fabric sock shall be delivered to the job site in such manner as to facilitate handling and incorporation into the work without damage. The knitted fabric sock shall be stored in UV resistant bags until just prior to installation. Torn or punctured knitted fabric sock shall not be used.

#### **948-9 Repair Systems for Rehabilitation of Pipe and Other Drainage Structures.**

**948-9.1 General:** Repair systems shall have at least the minimum stiffness required for the intended application in accordance with the AASHTO LRFD Bridge Design Specifications.

**948-9.2 Folded Liner:** Folded liner shall be manufactured in an out of form state, usually collapsed circumferentially, and folded on the long axis. After installation in a host structure, the liner is formed by means of heat and pressure to fit the host structure. When installed, folded liner shall extend from one structure to the next in one continuous length with no intermediate joints.

**948-9.2.1 Polyethylene:** Folded polyethylene liner shall meet the requirements of ASTM 2718 or ASTM F714 with a minimum cell classification of 335420 and between 2% to 4% carbon black.

**948-9.2.2 PVC:** Folded PVC liner shall meet the requirements of ASTM F1504 (meet all the requirements for cell classification 12334 or 13223) or ASTM F1871 (meet all the requirements for cell classification 12111).

**948-9.2.3 Cured-In-Place:** Folded resin impregnated flexible tubing shall meet the requirements of ASTM F1216 and ASTM D5813.

**948-9.3 Prefabricated (Slip) Pipe Liner:** When used in slip lining applications, prefabricated liner shall be round, flexible or semi-rigid liner, manufactured in lengths that may be joined in a manhole or access pit before insertion in a host pipe.

##### **948-9.3.1 Polyethylene:**

1. Solid wall polyethylene pipe liner shall meet the requirements of ASTM F714 or AASHTO M 326 and shall have a minimum cell classification of 345464 and between 2% to 4% carbon black.

2. Profile wall polyethylene pipe liner shall meet the requirements of AASHTO M 294 and shall have a minimum cell classification of 435400 and between 2% to 4% carbon black.

3. Steel reinforced polyethylene pipe liner shall meet the requirements of AASHTO MP 20-13, ASTM F2562 or ASTM F2435 and shall have a minimum cell classification of 334452 and between 2% to 4% carbon black.

**948-9.3.2 PVC:**

1. Solid wall PVC pipe liner shall meet the requirements of ASTM D2729 and shall have a minimum cell classification of 12454.

2. Profile wall PVC pipe liner shall meet the requirements of ASTM F794, ASTM F949, or AASHTO M 304 and shall have a minimum cell classification of 12454.

**948-9-3.3 Fiberglass:** Prefabricated fiberglass pipe liner shall meet the requirements of ASTM D3262.

**948-9.4 Spiral-Wound Liner:** Spiral-wound liner shall consist of coils of profile strips or one piece profile strips that are wound directly into a host pipe helically

**948-9.4.1 Polyethylene:** Polyethylene spiral-wound liner shall meet the requirements of ASTM F1697 or ASTM F1735, except the resin shall conform to ASTM D3350 with a minimum cell classification of 335420 and between 2% to 4% carbon black.

**948-9.4.2 PVC:** PVC spiral-wound liner shall meet the requirements of ASTM F1697 or ASTM F1735 and shall have a minimum cell classification of 12454.

**948-9.4.3 Steel Reinforced:** Steel reinforced spiral-wound liner shall meet the requirements of ASTM F1697 or ASTM F1735, except the resin shall conform to ASTM D3350 with a minimum cell classification of 335420 and between 2% to 4% carbon black. The steel reinforcement shall be fully encapsulated to prevent exposure to corrosive elements.

**948-9.5 Segmental Panel Liner:** Segmental panel liner consists of custom fit flat or curved panels that are formed to the inside wall of a host structure.

**948-9.5.1 Polyethylene:** Polyethylene segmental panel liner shall meet the requirements of ASTM F1735, except the resin shall conform to ASTM D3350 with a minimum cell classification of 345464 and between 2% to 4% carbon black.

**948-9.5.2 PVC:** PVC segmental panel liner shall meet the requirements of ASTM F1735 and shall have a minimum cell classification of 12454.

**948-9.6 Point Repair Systems:** Point repair systems may be used to repair and rehabilitate an isolated portion of an existing structure and may consist of any materials covered by this specification. Materials that shall be used as primary components of point repair apparatus are:

1. Stainless steel, which shall meet the requirements of AASHTO M 167M, ASTM A167, or ASTM A240
2. Aluminum, which shall meet the requirements of AASHTO M 196
3. Rubber, which shall meet the requirements of ASTM C923.

**948-9.7 Spray Applied Repair Systems:** Spray applied repair systems consist of liquid, slurry, foam or gel that is sprayed over the interior surface or injected into specific locations of an existing structure or pipe to rehabilitate it, with or without fiber reinforcement. Spray applied repair system installers shall submit to the Department proof of experience for on-site supervision and previously completed contracts including the following:

1. Project name and location
2. Names of contracting parties
3. Owner's names
4. A brief description of the work
5. Dates of completion of spray applied liner work

Materials that may be used for spray applied lining are:

1. Hydrophilic urethane-based foams or gels which shall meet the requirements of ASTM F2414.
2. Epoxy resins and unsaturated styrene-based resins which shall meet the resin material requirements of ASTM F1216.
3. Cementitious materials, as recommended by the manufacturer, including: annular backfill, low density cellular concrete, shotcrete, gunite, centrifugally cast, and pre-packaged grout.
4. High-strength, low-porosity geopolymer materials, as recommended by the manufacturer.

**SECTION 962  
STRUCTURAL STEEL AND MISCELLANEOUS  
METAL ITEMS (OTHER THAN ALUMINUM)**

**962-1 Structural Steel.**

**962-1.1 Structural Steel Materials:** Unless otherwise specified in the Contract Documents, provide structural steel for bolted or welded construction in accordance with Structural Steel for Bridges, ASTM A709. If the grade is not shown elsewhere in the Contract Documents, provide the grade as directed by the Engineer. All grades, as specified in the Contract Documents, are to conform to ASTM A709, as shown in Table 962-1 below:

Table 962-1 – Structural Steel Materials			
ASTM A709 Grade	Product Form*	Yield Strength (ksi)	Tensile Strength (ksi)
36	P, S, B	36 min	58-80
50	P, S, B	50 min	65 min
50W	P, S, B	50 min	70 min
50S	S	50-65	65 min
HPS 50W	P, S, B	50 min	70 min
HPS 70W	P, B	70 min	85-110
HPS100W ( 2-1/2 in or less)	P, B	100 min	110-130
HPS100W (over 2-1/2 in)	P, B	90 min	100-130

\* P = plates, S = structural shapes, B = bars

**962-1.2 Testing:** For structural steel subjected to tensile stress used for main load-carrying members or components (as defined in Section 460), meet the ASTM A709 impact test requirements for non-fracture and fracture critical tension components as specified in the Contract Documents. Meet the requirements for Zone 1 (Minimum Service Temperature 0°F).

If not specified elsewhere in the Contract Documents, provide structural steel in accordance with ASTM A709 requirements for non-fracture and fracture critical tension components as directed by the Engineer.

**962-2 Steel Castings.**

**962-2.1 Carbon Steel Castings:** Provide carbon steel castings that conform to the requirements of ASTM A27. Unless otherwise specified in the Contract Documents, all castings are to be Grade 65-35 or Grade 70-36.

**962-2.2 Corrosion Resistant Steel Castings:** Provide corrosion resistant Iron-Chromium or Iron-Chromium-Nickel castings that conform to the requirements of ASTM A743. Unless otherwise specified in the Contract Documents, all castings are to be Grade CA 15M.

**962-3 Steel Forgings.**

Provide steel forgings from which pins, rollers, trunnions, shafts, gears, or other forged parts are fabricated that conform to ASTM A668. Unless otherwise specified in the Contract Documents, all forgings are to be Class C, D, F, or G.

**962-4 Iron Castings.**

**962-4.1 Gray Iron Castings:** Provide gray iron castings that conform to the requirements of AASHTO M 105. For frames, grates, rings, and covers for inlets, manholes, and other structures placed in areas of vehicular traffic, conform to the requirements of AASHTO M 306. Unless otherwise specified in the Contract Documents, provide gratings, manhole covers and frames to Class 35B and machinery parts to Class 30.

**962-4.2 Ductile Iron Castings:** Provide ductile iron castings that conform to the requirements of ASTM A536. Unless otherwise specified in the Contract Documents, provide castings to Grade 414-276-18. In addition to the specified test coupons, test specimens from parts integral with the castings, such as risers, are to be tested for castings with a mass more than 1,000 pounds to determine that the required quality is obtained in the castings in the finished condition.

**962-4.3 Malleable Iron Castings:** Provide malleable iron castings that conform to the requirements of ASTM A47. Unless otherwise specified in the Contract Documents, provide castings to Grade 24118.

**962-5 Bolts, Nuts and Washers Not Designated as High-Strength.**

Provide bolts that conform to the requirements of ASTM A307 or ASTM A449. Provide nuts that conform to the requirements of ASTM A563 and washers that conform to ASTM F436, unless specified as ordinary rough or machine bolts as approved by the Engineer. Washers provided to ASTM F844 and nuts to ASTM A194 may be used with the Engineer’s approval.

Use double nuts, when ordinary rough or machine bolts are specified in the Contract Documents.

**962-6 High-Strength Bolts, Nuts, Washers and Direct-Tension-Indicator (DTI) Devices.**

Use high strength bolts, nuts, washers and DTI devices meeting the following requirements:

Bolts: Grade A325 or Grade A490, Heavy Hex. Only use Grade A490 high strength bolts with the approval of the Engineer.

Nuts: ASTM A563, Heavy Hex. Select nuts in accordance with ASTM F3125 (Table 1). If grade C, D or C3 nuts are selected, provide with a minimum Rockwell hardness of 89 HRB or a minimum Brinell hardness of 180 HB. Use nuts meeting the requirements of ASTM A194 only when approved by the Engineer.

Washers: ASTM F436 and ASTM F3125 (Table 1). Use washers meeting the requirements of ASTM F844 only when approved by the Engineer.

Identifying Marks: in accordance with ASTM F3125 (Table 1) and ASTM A563.

DTI devices: meeting the requirements of ASTM F959. Furnish plain DTI devices for use with plain bolts if the finish coat of paint is applied after installation and testing of the DTI device and will cover the remaining gap. Otherwise, coat the DTI device in accordance with the manufacturer’s recommendations.

When the Contract Documents call for uncoated weathering steel in any component of the connected part, provide Type 3 bolts and washers, and nuts with weathering characteristics. If one side of the assembly is coated and the other exposed weathering steel, coat the fastener assembly on the coated side similarly (Such as the case for weathering steel tub girders coated on the inside only).

Ensure that fastener assemblies are properly lubricated in accordance with ASTM A563 Supplementary Requirements S1 and S2.

**962-7 Anchor Rods and Bridge Bearing Materials.**

Provide anchor rods, washers, masonry plates, bearings and other miscellaneous metal components that conform to the following requirements:

Provide anchor rods that conform to the requirements of ASTM F1554 unless the Engineer approves the use of anchor rods meeting the requirements of ASTM A307, with nuts that meet the requirements of ASTM A563, Hex Nuts, Heavy and with a finish consistent with the rod. Nuts meeting the requirements of ASTM A194 may be used only with the Engineer’s approval.

Use washers meeting the requirements of ASTM F436, with a finish consistent with the rod. Washers meeting the requirements of ASTM A844 may be used only with the Engineer’s approval.

**962-8 Miscellaneous Metal Items.**

Unless otherwise specified in the Contract Documents, provide the following specific materials.

**962-8.1 Pipe Railings:** Provide steel pipe conforming to the requirements of ASTM A53 for Standard Weight Pipe.

**962-8.2 Steel Sheet Piling:** Provide steel sheet piles conforming to the requirements of ASTM A328, ASTM A572 or ASTM A690.

**962-8.3 Steel Sign Supports and Accessories:** Provide steel members for sign supports that meet the material requirements specified in the Contract Documents.

**962-8.4 Structural Tubing:**

**962-8.4.1 Materials:** Provide steel structural tubing as one of the following: Cold-formed, welded or seamless conforming to the requirements of ASTM A500, Grade B or C, coated in accordance with the Contract Documents;

Hot-formed, welded or seamless tubing conforming to the requirements of ASTM A501, coated in accordance with the Contract Documents;

ASTM A847 when weathering characteristics are required; or

As indicated elsewhere in the Contract Documents.

**962-8.4.2 Testing:** Structural steel tubing subjected to tensile stresses used in main load carrying members or components (as defined in Section 460) shall meet the impact test requirements of ASTM A709 for non-fracture and fracture critical tension components for Zone 1. Minimum Average energy shall be 15 ft-lbf at 70°F (non-fracture critical); or 25 ft-lbf at 70°F (fracture critical).

**962-8.5 Steel for Concrete Reinforcement:** Requirements for concrete reinforcement are contained in Section 931.

**962-8.6 Steel Guardrail:** Requirements for steel guardrail are contained in Section 967.

**962-8.7 Field Splice Filler Materials:** Provide field splice filler materials in accordance with the Contract Documents. If unspecified and less than 3/16 inches thick provide ASTM A606 or ASTM A1011.

**962-8.8 Steel Pipe Piling:** Provide seamless, or longitudinal or helical welded pipe conforming to the requirements of API 5L Grade L320, X46 or higher, or ASTM A252 Grade 3. Provide longitudinal or helical welded pipe with only complete joint penetration (CJP) welds conforming to the requirements of API 5L or AWS D1.1.

**962-8.9 Steel Grates:** Provide Grade 50 steel per ASTM A242/A242 M, A572/A572 M or A588/A588 M for grates. Galvanize grates in accordance with 962-9 when “Alt. G” grates are specified in the Plans.

## **962-9 Galvanizing.**

**962-9.1 Plates, Structural Shapes, Bars, and Strip:** When galvanizing is specified in the Contract Documents for ferrous metal products, other than fasteners and hardware items, provide galvanizing in accordance with the requirements of ASTM A123, Specifications for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

**962-9.2 Fasteners and Hardware:** When zinc coating is required in the Contract Documents, fasteners and hardware items shall be galvanized in accordance with the requirements of ASTM A153, Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware, except for high strength fasteners as noted below:

1. Do not galvanize Grade A490 bolts.
2. Mechanically galvanize Grade A3125 Type 1 bolts in accordance with ASTM B695, Class 55.
3. For all anchor rods and hardware treat the coated rods, nuts and washers with chromate after coating in a water solution containing 0.2% sodium dichromate 3 ounces/10 gallons. Coat the bolt, nut and washer used in the fastener assembly by the same zinc process, and submit a test report on the zinc coating thickness.
4. For anchor rods fabricated from material having a yield strength greater than 80,000 psi, apply an electroplated zinc coating SC 3, Type II in accordance with ASTM B633.

**962-9.3 Qualifications of Galvanizer:** Use galvanizers listed on the Department's Production Facility Listing. Producers seeking inclusion shall meet the requirements of Section 105.

## **962-10 Certifications and Verification.**

**962-10.1 General:** Supply a certified mill analysis to the Engineer for all metal materials to be used in fabrication, including but not limited to plates, bars, shapes, and fasteners in accordance with their respective ASTM or AASHTO specification. Show or attach the full and complete designation of the project for which the materials are intended for use and specifically cross-identify each furnished piece to the order material.

Material meeting equivalent AASHTO and ASTM specifications may be supplied under either specification. Provide materials in accordance with the latest edition of the specifications shown below, as approved by the Engineer.

**962-10.2 Conformance:** The certified mill analysis will indicate that the material is in conformance with the applicable material specification and will include actual values from required tests. Check the certified mill analysis against the appropriate specification to ensure that materials conform to Contract Documents.

**962-10.3 Certified Mill Analysis Source:** The certified mill analysis must originate from the producer of the material and not from a supplier. Material from stock may only be accepted if it can be positively identified and the appropriate documentation is submitted.

**962-10.4 Verification Samples:** Provide verification samples in accordance with Section 6.

## **962-11 Heat Treatments.**

Provide procedures and perform heat treatments in accordance with Section 460.

**SECTION 965  
GENERAL PROVISIONS FOR ALUMINUM ITEMS  
(INCLUDING WELDING)**

**965-1 General.**

This Section covers the material and fabrication requirements for aluminum components. All aluminum light poles, J-arms, and railings supplied under this Specification shall be from producers currently on the Department's Production Facility Listing. Producers seeking inclusion on the Department's Production Facility Listing must meet the requirements of Section 105.

**965-2 Fabrication.**

Provide fabricated components in accordance with AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, the Design Plans, and this section. Verify the strength of each Lot by tensile test. Alternate testing will not be accepted. Provide certifications as specified in 965-4, upon request. Protect against damage and marring during transit and delivery.

**965-2.1 Light Poles:** Provide aluminum lighting poles in accordance with this section and Table 965-1. Weld arms and poles in the T4 condition, using the filler metal ER4043, ER4047, ER5183, ER5356, or ER5556 in accordance with AWS D1.2 Aluminum Structural welding Code. Weld to castings in accordance with 965-2.3. Heat treat the arm and pole, until aged to the T6 condition. Transverse welds are only allowed at the base. Equip poles with a vibration damper, when specified in the contract documents.

Provide exterior surface with a clean, uniform silvery appearance, free of dark streaks and discoloration. Finish the pole and arm with a satin rubbed finish.

**965-2.2 Overhead Sign Components:** Provide aluminum toll gantry J-arms in accordance with this section and Table 965-1. Weld tube to plate connections in the T4 or T6 condition, using the filler metal ER4043, ER4047, ER5183, ER5356, or ER5556 in accordance with AWS D1.2 Aluminum Structural welding Code. Heat treat tube and plate in the T4 condition until aged to the T6 condition.

Provide exterior surface with a clean, uniform silvery appearance, free of dark streaks and discoloration.

**965-2.3 Castings:** Provide aluminum castings in accordance with this section and Table 965-1. Weld aluminum castings to itself or aluminum tube to castings using the filler metal ER4043, in accordance with AWS D1.2 Aluminum Structural welding Code. Heat treat the castings, until aged to the T6 condition.

**965-2.4 Railing:** Provide aluminum railing in accordance with this section and Table 965-1. Weld aluminum railing using the filler metal ER4043, ER4047, ER5183, ER5356, or ER5556 in accordance with AWS D1.2 Aluminum Structural welding Code.

**965-2.5 Static Sign Assemblies:** Provide aluminum sheet, plate and structural shapes in accordance with this section and Table 965-1. Weld structural profiles to itself or aluminum components using ER4043, ER4047, ER5183, ER5356 or ER5556 in accordance with AWS D1.2 Aluminum Structural Welding Code. Heat treat the structural profiles, until aged to the T6 condition.

Table 965-1 Material Requirements for Aluminum Components				
Product	ASTM	Alloy/Temper	Reportable Properties	Supplementary Requirements
Pole, Arm, Extrusions	B221	6061-T6	Alloy, Temper, Thickness	Report Tensile Strength
		6063-T6		
Bars, Plates, Stiffeners, Backing Ring, Shims, Shapes	B221	6063-T6		
	B209	6061-T6		
Castings	B26	356-T6		
	B108			
Railing	B221	6351-T5		
	B241	6061-T6		
	B210			
	B429			
J-Arm Tube	B429	6061-T6		
	B221			
J-Arm Connection Plate	B209	6061-T6		
Sheet	B209	6061-T6 5154-H38 5052-H38		
Structural Shapes	B308	6061-T6		

**965-3 Paint for Poles, Pedestals, and Posts.**

Paint systems used on aluminum poles, pedestals, and posts shall meet the color requirements as specified in the Contract Documents. All paint systems shall possess physical properties and handling characteristics that are compatible with the application requirements of Section 646. Materials shall be specifically intended for use over aluminum. Paint systems shall exhibit no loss of adhesion or total color difference ( $\Delta E^*_{ab}$ ) greater than 8.0 units for five years after final acceptance as specified in 5-11. An aluminum pole, pedestal, post, or sign panel that exhibits a cumulative surface area of delamination in excess of 50 square inches will constitute an adhesion failure. Delamination shall be defined as any area of exposed metal surface subsequent to hand tool cleaning. A  $\Delta E^*_{ab}$  value exceeding 8.0 units per the International Commission on Illumination  $L^*a^*b^*$  1976 (CIELAB) space and color difference formula, measured in accordance with ASTM D2244, will constitute a color retention failure.

The Department will measure and enter in the Department’s database the CIELAB color chromaticity coordinates for the color of the top coat of sample coupons provided as required by 646-2.7 using a BYK-Gardner Handicolor colorimeter using D65 illuminant and 2-degree geometry settings. The Department-measured CIELAB chromaticity coordinates shall define the initial color and will be used for resolution of color retention failures and the resolution of color retention disputes.

**965-4 Certification.**

Produce a certificate of compliance for all aluminum castings. Produce other certificates of compliance at the request of the Engineer. Certificates of compliance shall identify that the material has been sampled and tested in accordance with the applicable ASTM and shall include the reportable properties and supplementary requirements of the applicable Sections listed above.

## EROSION CONTROL MATERIALS

### SECTION 981 TURF MATERIALS

#### 981-1 General.

The types of seed and sod will be specified in the Contract Documents. All seed and sod shall meet the requirements of the Florida Department of Agriculture and Consumer Services and all applicable state laws, and shall be approved by the Engineer before installation.

All seed, sod and mulch shall be free of noxious weeds and exotic pest plants, plant parts or seed listed in the current Category I “List of Invasive Species” from the Florida Exotic Pest Plant Council (FLEPPC, <https://www.fleppc.org>). Any plant officially listed as being noxious or undesirable by any Federal Agency, any agency of the State of Florida or any local jurisdiction in which the project is being constructed shall not be used. Any such noxious or invasive plant or plant part found to be delivered in seed, sod or mulch will be removed by the Contractor at his expense and in accordance with the law.

All materials shall meet plant quarantine and certification entry requirements of Florida Department of Agriculture & Consumer Services, Division of Plant Industry Rules.

#### 981-2 Seed.

The seed shall have been harvested from the previous year’s crop. All seed bags shall have a label attached stating the date of harvest, LOT number, percent purity, percent germination, noxious weed certification and date of test.

Each of the species or varieties of seed shall be furnished and delivered in separate labeled bags. During handling and storing, the seed shall be cared for in such a manner that it will be protected from damage by heat, moisture, rodents and other causes.

All permanent and temporary turf seed shall have been tested within a period of six months of the date of planting.

All permanent and temporary turf seed shall have a minimum percent of purity and germination as follows:

1. All Bahia seed shall have a minimum pure live seed content of 95% with a minimum germination of 80%.
2. Bermuda seed shall be of common variety with a minimum pure live seed content of 95% with a minimum germination of 85%.
3. Annual Type Ryegrass seed shall have a minimum pure live seed content of 95% with a minimum germination of 90%.

#### 981-3 Sod.

**981-3.1 Types:** Unless a particular type of sod is called for in the Contract Documents, sod may be either centipede, bahia, or bermuda at the Contractor’s option. It shall be well matted with roots. Where sodding will adjoin, or be in sufficiently close proximity to, private lawns, other types of sod may be used if desired by the affected property owners and approved by the Engineer.

**981-3.2 Dimensions:** The sod shall be taken up in commercial-size rectangles, or rolls, preferably 12 inches by 24 inches or larger, except where 6 inch strip sodding is called for, or as rolled sod at least 12 inches in width and length consistent with the equipment and methods used

to handle the rolls and place the sod. Sod shall be a minimum of 1-1/4 inches thick including a 3/4 inch thick layer of roots and topsoil. Reducing the width of rolled sod is not permitted after the sod has been taken up from the initial growing location. Any netting contained within the sod must be certified by the manufacturer to biodegrade within one year.

**981-3.3 Condition:** The sod shall be sufficiently thick to secure a dense stand of live turf. The sod shall be live, fresh and uninjured, at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be planted within 48 hours after being cut and kept moist from the time it is cut until it is planted. No sod which has been cut for more than 48 hours may be used unless specifically authorized by the Engineer. A letter of certification from the turf Contractor as to when the sod was cut, and what type, shall be provided to the Engineer upon delivery of the sod to the job site.

The source of the sod may be inspected and approved by the Engineer prior to being cut for use in the work.

**981-4 Mulch.**

The mulch material shall be compost meeting the requirements of Section 987, hardwood barks, shavings or chips; or inorganic mulch materials as approved by the Engineer; or hydraulically applied wood fiber mulch or bonded fiber matrix (BFM) for the establishment of turf material.

## SECTION 982 FERTILIZER

### 982-1 Fertilizers.

Fertilizers shall comply with the State fertilizer laws.

The numerical designations for fertilizer indicate the minimum percentages (respectively) of total nitrogen, available phosphoric acid, and water-soluble potash, contained in the fertilizer. At least 50% of the nitrogen shall be from a slow-release source.

### 982-2 Certification.

The Contractor shall submit to the Engineer a certified test report from the manufacturer of the commercial fertilizer confirming that the requirements of this Section are met. The certified test report shall conform to the requirements of Section 6 and include test results for total nitrogen, available phosphoric acid, water-soluble potash, and sulfur. Each certification shall cover one batch per type for dry type fertilizer.

### 982-3 Fertilizer Rates.

Soil laboratory fertilization recommendations are based on the amount (lbs) of nutrients (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O) to apply per given area (usually 1,000 square feet.). From this recommendation it is necessary to select an appropriate fertilizer grade and then determine how much of this fertilizer to apply to the area.

If a complete fertilizer (containing all three primary nutrients) is not available in the ratio of N-P-K necessary to match the ratio required in the fertilizer recommendation, mixed-grade or single-nutrient fertilizers should be used to satisfy each nutrient requirement.

To calculate fertilizer rates:

1. Measure the area to be fertilized in square feet.
2. Select fertilizers to be used based on the soil testing laboratory recommendations by matching the ratio of nutrients recommended to the fertilizer grades available.
3. Determine the amount of fertilizer to apply to a given area (1,000 square feet.) by dividing the recommended amount of nutrient by the percentage of the nutrient (on a decimal basis) in the fertilizer. Apply no more than 0.25 lbs P<sub>2</sub>O<sub>5</sub>/1000 square feet per application prior to planting.
4. Adjust the amount of fertilizer to the project area.

**SECTION 983  
WATER FOR GRASSING**

The water used in the grassing operations may be obtained from any approved source. The water shall be free of any substance which might be harmful to plant growth. Effluent water shall meet all Federal, State and local requirements.

**SECTION 985  
GEOSYNTHETIC MATERIALS**

**985-1 Description.**

Geosynthetic materials are used for nonstructural and structural applications and shall be either geotextiles (woven or non-woven) or geogrids (woven or extruded) that are used for drainage, erosion control, reinforcement, separation or stabilization.

**985-2 Materials.**

**985-2.1 General Requirements:** Unless restricted in the Plans or Specifications, the geosynthetic material shall be a woven, non woven or extruded material consisting of long-chain polymeric filaments or yarns such as polypropylene, polyethylene, polyester, polyamides or polyvinylidene chloride formed into a stable network such that the filaments or yarns retain their relative position to each other. The base plastic shall contain stabilizers and/or inhibitors to make the filaments resistant to deterioration due to ultra-violet light, heat exposure and potential chemically damaging environment. The edges of the material shall be selvaged or otherwise finished to prevent the outer yarn from pulling away from the material and shall be free of any treatment which may significantly alter its physical properties.

**985-2.2 Physical Requirements:** Each geosynthetic material shall be tested by an independent third party in accordance with the following methods as they apply to the specific application type. All testing and reported values, except apparent opening size (AOS), are to be minimum average roll values in the weakest principal direction unless indicated otherwise in this Section. Values for AOS are maximum average roll values.

Table 985-1 Geotextile Selection	
In-situ Soil Type or Drainage Application	Class for Type D1, D2, D3 Materials (see Table 985-2)
< 15% passing a No. 200 Sieve*	a
15% to 50% passing a No. 200 Sieve*	b
> 50% passing a No. 200 Sieve*	c
> 50% passing a No. 200 Sieve* with Plastic Index >7	d
MSE Joint Cover for Sand or Limerock Backfill	e
MSE Joint Cover for Coarse Aggregate Backfill	f

\*as per AASHTO T 88.

Table 985-2 Drainage Geotextiles Test Methods and Requirements for Types D-1, D-2 and D-3			
Property/Test Method	D-1	D-2	D-3
Minimum Permittivity (Sec - 1) per ASTM D4491	D-1a = 0.7 D-1b = 0.2 D-1c = 0.1 D-1d = 0.1 D-1e = 0.25 D-1f = 1.5	D-2a = 0.7 D-2b = 0.2 D-2c = 0.1 D-2d = 0.1 D-2e = 0.25 D-2f = 1.5	D-3a = 0.5 D-3b = 0.2 D-3c = 0.1 D-3d = 0.1 D-3e = 0.7
Maximum AOS (mm, US Sieve No.) per ASTM D4751	D-1a = 0.425 (40) D-1b = 0.250 (60) D-1c = 0.212 (70) D-1d = 0.300 (50) D-1e = 0.212 (70) D-1f = 0.600 (30)	D-2a = 0.425 (40) D-2b = 0.250 (60) D-2c = 0.212 (70) D-2d = 0.300 (50) D-2e = 0.212 (70) D-2f = 0.600 (30)	D-3a = 0.425 (40) D-3b = 0.250 (60) D-3c = 0.212 (70) D-3d = 0.300 (50) D-3e = 0.212 (70)
Minimum Grab Tensile Strength (lbs) per ASTM D4632	315	Woven Monofilament = 248 Other Woven Geotextiles = 315	Elongation <50% = 248 Elongation ≥50% = 158
Mass per Unit Area (oz/sy) per ASTM D5261	Provide Test Result	Provide Test Result	Provide Test Result
Minimum Puncture Strength (lbs) per ASTM D6241	618	Woven Monofilament = 495 Other Woven Geotextiles = 618	Elongation <50% = 495 Elongation ≥50% = 309
Minimum Trapezoidal Tear (lbs) per ASTM D4533	113	Woven Monofilament = 57 Other Woven Geotextiles: = 113	Woven Monofilament = 57 Other Geotextiles: Elongation <50% = 90 Elongation ≥50% = 57
Minimum UV Resistance per ASTM D4355 (% Retained Strength)	50% @500 hours	50% @500 hours	50% @500 hours
Limitations	Woven Monofilament Geotextiles only	Woven Geotextiles only. No Slit Film Geotextiles allowed.	No Slit Film Geotextiles allowed.

Table 985-3 Test Methods and Requirements for Drainage Geotextiles Types D-4 and D-5		
Property/Test Method	D-4	D-5
Minimum Permittivity (Sec <sup>-1</sup> ) per ASTM D4491	0.5	0.5
Maximum AOS (mm, US Sieve No.) per ASTM D4751	0.425 (40)	0.212 (70)
Minimum Grab Tensile Strength (lbs) per ASTM D4632	180	90
Mass per Unit Area (oz/sy) per ASTM D5261	Provide Test Result	Provide Test Result
Minimum Puncture Strength (lbs) per ASTM D6241	223	223
Minimum Trapezoidal Tear (lbs) per ASTM D4533	70	40
Minimum UV Resistance per ASTM D4355 (% Retained Strength)	50% @500 hours	50%@500 hours

Table 985-4 Test Methods and Requirements for Erosion Control Materials					
Property/Test Method	E-1	E-2	E-3	E-4	E-5
Permittivity (Sec <sup>-1</sup> ) per ASTM D4491	0.05	0.05			
Grab Tensile Strength (lbs) per ASTM D4632	90	90			
Minimum UV Resistance per ASTM D4355 (% Retained Strength)	80% @500 hours	80% @150 hours	80% @500 hours		
Tensile Strength **(lbs/ft) per ASTM D6818 or D5035			135x70	275x135	550x275
Filtration Efficiency (%) per ASTM D5141	75% and min. flow rate of 0.3 gal/sf/min				
Design Shear***			≥2.1 psf	≥3.6 psf	≥5.0 psf
**Tensile Strength is expressed in units of measure of lbs/ft, in machine direction and cross direction as MD x CD. ***Design Shear limits for Erosion mats must be determined by 30 minutes sustained flow in an unvegetated state as determined by tests performed by Utah State University, Texas Transportation Institute or an independent testing laboratory approved by the State Drainage Engineer.					

Table 985-5 Test Methods and Requirements for Structural Geosynthetics			
Property/Test Method	Structural Application Type	Test Methods for Woven Geotextiles	Test Methods for Woven or Extruded Geogrids
Permittivity (sec <sup>-1</sup> )	R - 1, 2, 3, 4, 5	ASTM D4491	
UV Stability (Min Retained Strength @500 hr)	R - 3	ASTM D4355	ASTM D4355
Puncture Strength (lbs)	R - 5	ASTM D6241	
Grab Strength (lbs)	R - 5	ASTM D4632	
Opening Size	R - 1, 2, 3, 4, 5	AOS (US Sieve No.) ASTM D4751	Aperture Size (in x in)
Tensile Strength (lbs/ft)		ASTM D4595	ASTM D6637
Machine Direction Ultimate, (T <sub>ult</sub> )			
2% Strain	R - 1, 3		
5% Strain	R - 2, 3, 4, 5		
10% Strain	R - 1, 2, 3, 4, 5		
Cross Direction Ultimate			
2% Strain	R - 1, 3,		
5% Strain	R - 2, 3, 4, 5		
10% Strain	R - 1, 2, 3, 4, 5		
Strain @ Ultimate Tensile Strength	R - 1, 2, 3, 4, 5		
Tear Strength (lbs)		ASTM D4533	
Machine Direction	R - 5		
Cross Direction	R - 5		
Soil-Geosynthetic Friction	R - 1, 2, 3	ASTM D5321	ASTM D5321/6706
Pullout Resistance	R - 3	ASTM D6706	ASTM D6706
Creep Resistance-T <sub>creep</sub> (lbs/ft)	R - 2, 3	ASTM D5262	ASTM D5262
Creep Reduction Factor (T <sub>ult</sub> /T <sub>creep</sub> )	R - 2, 3		
Installation Damage (RF <sub>ID</sub> )		AASHTO R 69	AASHTO R 69
Sand	R - 2, 3, 4		
Limestone	R - 2, 3, 4		
Durability (RF <sub>D</sub> )			
Chemical	R - 2, 3, 4	AASHTO R 69	AASHTO R 69
Biological	R - 2, 3, 4	AASHTO R 69	AASHTO R 69

Table 985-5 Test Methods and Requirements for Structural Geosynthetics			
Property/Test Method	Structural Application Type	Test Methods for Woven Geotextiles	Test Methods for Woven or Extruded Geogrids
Joint Strength (RF <sub>j</sub> )		GRI: GT7	GRI: GG4(a) & GG4(b)
Mechanical	R - 2, 3		
Sewn	R - 2, 3	ASTM D4884	

**985-2.3 Overlaps and Seams:** Overlaps shall be in accordance with the manufacturer’s recommendations unless specified otherwise in the Contract Documents for a particular application. To reduce overlaps, the geosynthetic material may be sewn together in accordance with the manufacturer’s recommendations. Sew the seams with thread meeting the chemical requirements and minimum seam strength requirements in Tables 985-2, 985-3 and 985-5.

**985-2.4 Packaging and Labeling:** Geosynthetics shall be packaged in a protective covering sufficient to protect the material from temperatures greater than 140 F, sunlight, dirt, and other debris during shipment and storage. The manufacturer’s name, product name, style number, roll dimensions and LOT numbers must be clearly labeled on all packaging.

**985-3 Product Acceptance and Certification.**

**985-3.1 Product Acceptance:** All geosynthetic materials shall be one of the products listed on the Department’s Approved Product List (APL).

Manufacturers seeking evaluation of structural and drainage products must submit an application in accordance with Section 6 and include test reports from the National Testing Product Evaluation Program (NTPEP) that document the material meets the requirements of this Section. Acceptance for structural geosynthetic materials requires the manufacturer’s facility to be on NTPEP’s list of compliant producers. These requests must also include the current NTPEP audit report.

Manufacturers seeking evaluation of erosion control products must submit an application in accordance with Section 6 and include independently certified test reports that the material meets the requirements of this Section.

Products will be listed on the APL according to geosynthetic application type. For products with limited APL approvals, installations and design alternatives must not rely on the limitation. Structural geosynthetics are listed with property values.

**985-3.2 Certification:** The Contractor shall submit to the Engineer a current certification from the manufacturer confirming that the material meets the requirements of this Section and is appropriate for the intended use. The Contractor shall also provide two 8 inch by 10 inch samples of the geosynthetic material for product identification. The manufacturer’s certification shall be attested to within the past one year by a person having legal authority to bind the manufacturing company.

The manufacturer shall maintain test records as required by this Specification and these records shall be made available to the Department upon request.

**985-4 Applications.**

**985-4.1 Nonstructural:**

**985-4.1.1 Drainage:** Select geotextile materials that meet the required permeability and AOS based on test results on the soil or fill adjacent to the geotextile for gradation. Materials for drainage applications must be tested in accordance with and meet the physical requirements in 985-2.2, Table 985-2.

Table 985-6 Drainage Applications		
Geotextile Type	Description	Standard Plans Index
D-1	Revetment (Special)	
	Rock, Rubble without bedding stone	
	Ditch Pavement (Rubble Riprap) without bedding stone	524-001
D-2	Revetment (Standard)	
	Articulating Block	
	Gabions	524-001
	Rock, Rubble, and Broken Concrete with bedding stone	
	Ditch Pavement (Rubble Riprap) with bedding stone	524-001
	Joint Cover for Mechanically Stabilized Retaining Wall with Coarse Aggregate Backfill	
	Joint Cover for Mechanically Stabilized Retaining Wall Supporting Spread Footing Foundations	
D-3	Underdrain	440-001
	French Drain	443-001
	Sheet Piling Filter	
	Filter Fabric Jacket (Culvert)	430-001
	Concrete Pavement Subdrainage	446-001
	Joint Cover for Mechanically Stabilized Retaining Wall with Sand or Limerock Backfill	
D-4	Slope Pavement	
	Ditch Pavement (Sand-Cement Riprap or Concrete)	524-001
D-5	Separation Geotextile	
	Cast-In-Place Retaining Wall	

**985-4.1.2 Erosion Control:** Materials may contain natural fibers added to acceptable plastic erosion mats for the sole purpose of facilitating turf growth. However, materials used for erosion control applications must be tested without any natural fiber components in accordance with and meet the physical requirements in 985-2.2, Table 985-4.

Table 985-7 Erosion Control Applications	
Type	Description
E-1	Staked Silt Fence
E-2	Wind Screen
E-3	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 1)
E-4	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 2)
E-5	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 3)

**985-4.2 Structural:**

**985-4.2.1 Reinforcement, Separation and Stabilization:** Materials for reinforcement, separation and stabilization applications must be tested in accordance with and meet the physical requirements in 985-2.2, Table 985-5. The ultimate tensile strength of all R-1 materials must be at least 4800 pounds per foot in both the machine and cross machine directions.

Table 985-8 Reinforcement, Separation and Stabilization Applications	
Type	Description
R-1	Geosynthetic Reinforced Soil (GRS-IBS)
R-2	Reinforcement of Foundations over Soft Soils
R-3	Reinforced Soil Slopes
R-4	Reinforced Embankment
R-5	Construction Expedient

## SECTION 987 SOIL LAYER MATERIALS

### 987-1 Description.

All material shall be suitable for plant growth. The organic matter content of the soil layer after mixing shall be a minimum of 2.5%, a maximum of 10%, in accordance with FM 1-T267 and have a pH value of 5.5 or greater and less than or equal to 7.0 as determined in accordance with FM 5-550. The organic matter content shall be created using any of the following materials.

### 987-2 Materials.

Soil layer materials may be obtained from either, or a combination of, the following sources:

1. Excavation within the limits of construction on the project. Such material may be stockpiled or windrowed on the project in areas approved by the Engineer.
2. Designated borrow pits for the project.
3. From other sources of organic soil materials provided by the Contractor.

**987-2.1 Organic Soil:** This may consist of muck, mucky peat and peat and shall have an organic matter content of 30% or more if the mineral fraction is more than 50% clay, or more than 20% organic matter if the mineral fraction has no clay.

**987-2.2 Blanket Material:** Meet the material classification shown in the Plans and Standard Plans, Index 120-001.

**987-2.3 Compost:** Meet the requirements of Florida Department of Environmental Protection Rule 62.709.550 Type Y (yard waste), Type YM (yard waste and manure), Type A (municipal solid waste compost) or Rule 62.640.850 Type AA (composted biosolids) and have unrestricted distribution.

**987-2.3.1 Compost for use as a Soil Amendment:** If the electrical conductivity (EC) value of the compost exceeds 4.0dS (mmhos/cm) based on the saturated paste extract method, the compost shall be leached with water prior to application.

**987-2.3.2 Compost for use as a Mulch:** The compost shall contain no foreign matter, such as glass, plastic or metal shards. The compost shall be slightly coarse to coarse in nature (over half of the solids shall be from particles 1/2 inches in size and no greater than 6 inches). Preference shall be given to compost or mulch made from uncontaminated woody waste materials.

**987-2.4 Landscape Soil:** Landscape soil must be sandy loam or loamy sand with properties of AASHTO classification A-2-4 or A-4. The soil must have an organic matter content of 5 to 10% using the loss on ignition (LOI) test in accordance with FM 1-T267 from a soil testing laboratory approved in accordance with 105-7. Soil must be free of litter and deleterious substance such as cans, debris, particles greater than 0.50 inches, and rinsate containing lime or toxic materials.

Soil must be free of noxious plants or propagules of plants listed in Florida Rule 5B-57.007, and invasive exotic plants listed under Category I Florida Exotic Plant Pest Council.

Where shown in the Plans or when approved by the Engineer, existing soil may be amended with compost or biosolids to meet the requirements of this Section. Use compost in accordance with FDEP Rule 62.709.550 and 62.709.600. Use biosolids in accordance with Florida Rule 62.640.850.

## TRAFFIC CONTROL MATERIALS

### SECTION 990 TEMPORARY TRAFFIC CONTROL DEVICE MATERIALS

#### **990-1 General.**

This Section specifies the material requirements for temporary traffic control devices.

#### **990-2 Retroreflective Sheeting for Temporary Traffic Control Devices.**

**990-2.1 Approved Product List (APL):** Sheeting for use on Temporary Traffic Control Devices shall be one of the products listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6.

**990-2.1.1 Bands for Temporary Tubular Markers, Vertical Panels, Barricades, and other Devices:** Bands for temporary tubular markers, vertical panels, barricades, and other devices shall meet the requirements of ASTM D4956 for Type III or higher retroreflective sheeting materials identified in Section 994.

**990-2.1.2 Collars for Traffic Cones:** Collars for traffic cones shall meet the requirements of ASTM D4956 Type III or higher retroreflective prismatic sheeting materials identified in Section 994 including supplementary requirements for reboundable sheeting. The outdoor weathering shall be for 6 months for all sheeting types.

**990-2.1.3 Drums:** Drums shall meet the requirements of ASTM D4956 for Type III or higher retroreflective sheeting materials identified in Section 994 including supplementary requirements for reboundable sheeting.

**990-2.1.4 Sign Panels:** Meet the requirements of 990-8.

#### **990-3 Portable Devices (Arrow Boards, Changeable Message Signs, Regulatory Signs, Radar Speed Display Units and Truck Mounted Changeable Message Signs), Automated Flagger Assistance Devices).**

**990-3.1 General:** All portable devices shall meet the physical display and operational requirements of the Manual on Uniform Traffic Control Devices (MUTCD) and be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6 and include the following:

1. Certification showing that the product meets the requirements of this Section.

2. Drawings of the device along with technical information necessary for proper application, field assembly, and installation.

Portable devices shall meet the following requirements:

3. Ensure that all assembly hardware less than 5/8 inch in diameter, including nuts, bolts, external screws and locking washers are Type 304 or 316 passivated stainless steel. Stainless steel bolts, screws and studs shall meet ASTM F593. Nuts shall meet ASTM F594. All assembly hardware greater than or equal to 5/8 inch in diameter shall be galvanized. Bolts, studs, and threaded rod shall meet ASTM A307. Structural bolts shall meet ASTM F3125, Grade A325.

4. The controllers and associated on-board circuitry shall meet the requirements of the Federal Communications Commission (FCC) Title 47, Subpart B, Section 15

regulations concerning the emission of electronic noise by Class A digital devices. All electronic assemblies shall meet the requirements of NEMA TS-4-2016 Section 2.

5. The controller and associated on-board circuitry shall not be affected by mobile radio, or any other radio transmissions.

6. An operator's manual shall be furnished with each unit.

7. All portable devices shall be permanently marked with, manufacturer's name or trademark, model/part number, and date of manufacture or serial number.

8. Portable devices and trailers shall be delineated on a permanent basis by affixing retroreflective sheeting in a continuous line on the face of the trailer as seen by oncoming road users.

**990-3.1.1 Electrical Systems:**

**990-3.1.1.1 Solar Powered Unit:** The solar powered unit shall meet the following:

1. The unit shall provide automatic recharging of power supply batteries to normal operating levels with meters showing charge.

2. Solar array recovery time for arrow boards and regulatory signs shall be accomplished in a maximum of three hours.

3. Arrow boards and changeable message signs shall be designed to provide 180 days of continuous operation with minimum onsite maintenance.

**990-3.1.1.2 Battery Life Test:** Meet the following:

1. The photovoltaic unit shall be designed to provide 21 days of continuous operation without sunlight with a minimum of onsite maintenance for arrow boards and changeable message signs, or 10 days of continuous operation without sunlight with a minimum of onsite maintenance for regulatory signs and radar speed display units, or 2 days of continuous operation without sunlight with a minimum of onsite maintenance for Automated Flagger Assistance Devices signs.

2. The battery shall be equipped with a battery controller to prevent overcharging and over-discharging. An external battery level indicator shall be provided.

3. The battery, controller, and power panel shall be designed to be protected from the elements and vandalism.

4. Automatic recharging of power supply batteries shall be provided with charge indicator meter.

5. An AC/DC battery charger unit shall be provided.

**990-3.1.2 Display Panel and Housing:**

1. The display housing assembly shall be weather-tight.

2. Except for Automated Flagger Assistance Devices, the display assembly shall be equipped with an automatic dimming operational mode capable of a minimum of 50% dimming and a separate manual dimmer switch

3. The display panel background and frame for the display assembly shall be painted flat black and shall meet Federal Specification TT-E-489.

4. The display panel for arrow boards and changeable message signs, when raised in the upright position, shall have a minimum height of 7 feet from the bottom of the panel to the ground, in accordance with the MUTCD. The display panel for radar speed display units, when raised in the upright position, will have a minimum height of 5 feet from the bottom of the panel to the ground.

5. The regulatory speed sign panel for regulatory signs and radar speed display units, when raised in the upright position, shall have a minimum height of 7 feet from the bottom of the regulatory sign panel to the ground.

6. The unit shall have an accessible mechanism to easily raise and lower the display assembly. A locking device shall also be provided to ensure the display panel will remain in the raised or lowered position.

7. The display panel for changeable message signs shall have a safety system to protect against the panel falling from the trailer to the roadway should the panel separate from the lift system.

**990-3.1.3 Controller:** The Controller shall meet the following:

1. Controller and control panel shall be housed in a weather, dust, and vandal resistant lockable cabinet.

2. Controller and associated on-board circuitry shall meet the requirements of the FCC Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise by Class A digital devices.

3. For changeable message signs and arrow boards ensure that the sign control software provides an on-site graphical representation that visibly depicts the message displayed on the sign face.

4. For changeable message signs, if remote communication is included, ensure that the sign controller is addressable through the Ethernet communications network using software that complies with the National Transportation Communications for ITS Protocol (NTCIP) 1101 base standard, including all amendments as published at the time of contract letting, the NTCIP Simple Transportation Management Framework, and conforms to Compliance Level 1. Ensure that the software implements all mandatory objects in the supplemental requirement SR-700-4.1.1-01, FDOT Dynamic Message Sign NTCIP Requirements, as published on the FDOT State Traffic Engineering and Operations Office web site at the time of contract letting. Ensure that the sign complies with the NTCIP 1102v01.15, 2101 v01.19, 2103v02.07, 2201v01.15, 2202 v01.05, and 2301v02.19 standards. Ensure that the sign complies with NTCIP 1103v02.17, section 3. Ensure that additional objects implemented by the software do not interfere with the standard operation of mandatory objects.

**990-3.1.4 Support Chassis:** The support chassis shall meet the following:

1. The support chassis shall be self-contained and self-supporting without the use of additional equipment or tools.

2. Both trailer and truck-mounted units are allowed for arrow boards and changeable message signs. Trailer mounted units are required for regulatory signs and radar speed display units. Automated Flagger Assistance Devices may be trailer or non-trailer units.

a. Trailer mounted unit:

1. The sign, power supply unit and all support systems shall be mounted on a wheeled trailer.

2. The trailer shall be equipped with Class A lights, using a plug adaptor.

3. The trailer shall be equipped with adjustable outrigger leveling pads, one on each of the four frame corners.

4. The trailer shall be designed to be set up at the site with its own chassis and outriggers, without being hitched to a vehicle.

5. The trailer shall be equipped with fenders over the tires and shall be made from heavy-duty material sufficient to allow a person to stand and operate or perform maintenance on the unit.

6. The trailer shall meet all equipment specifications set forth in Chapter 316 of the Florida Statutes, and by such rule, regulation or code that may be adopted by the Department of Highway Safety and Motor Vehicles.

**990-3.2 Portable Arrow Board:**

**990-3.2.1 Arrow Board Matrix:**

1. The minimum legibility distance for various traffic conditions are based on the decision-sight distance concept. The minimum legibility distance is the distance at which a driver can comprehend the arrow board message on a sunny day or a clear night. The arrow board size that is needed to meet the legibility distance is listed as follows:

Table 990-1			
Type	Minimum Size	Minimum Number of Elements	Minimum Legibility Distance
B	30 by 60 inches	13	3/4 mile
C	48 by 96 inches	15	1 mile

Type B arrow boards may be used on low to intermediate speed (0 mph to 50 mph) facilities or for maintenance or moving operations on any speed facility. Type C arrow boards shall be used for all other operations on high-speed (50 mph and greater) facilities and may be substituted for Type B arrow boards on any speed facility.

2. Devices shall meet all arrow board displays identified in the MUTCD.

3. The element lens should be 5-3/4 inches in diameter. Smaller element lens diameters are permissible only if they provide an equivalent or greater brightness indication and meet the legibility criteria in 990-3.2.1(a).

4. The color of the light emitted shall be in accordance with the MUTCD.

5. There shall be a 360 degree hood for close-up glare reduction.

6. For solar powered arrow boards the bulbs shall provide a 350 candle power intensity for day use and an automatic reduction or dimming capacity for night use. The dimmed night operation shall provide adequate indication without excessive glare.

7. The flashing rate of the element shall not be less than 25 flashes or more than 40 flashes per minute as required in the MUTCD.

8. The minimum element “on time” shall be 50% for the flashing arrow and 25% for the sequential chevron.

**990-3.3 Portable Changeable Message Sign:**

**990-3.3.1 Message Matrix:**

1. Message matrix panel shall be a maximum height of 7 feet by a maximum width of 146 inches.

2. The matrix must be capable of displaying three lines of 8 characters using an 18 inch or 12 inch font. PCMS with a minimum font size of 18 inches shall be used on any speed facility. PCMS with a minimum font size of 12 inches may be used on facilities with speed limits of 45 mph or less.

3. The matrix must display characters that meet or exceed the numeral and letter sizes prescribed in the MUTCD and SHS (Standard Highway Signs) companion document.

Fonts and graphics must mimic the characteristics of fonts and graphics defined in NEMA TS4, the MUTCD, and SHS.

4. Similar components shall be interchangeable.

**990-3.3.2 Operation and Performance:**

1. The message shall be displayed in upper case except when lower case is project specific and is allowed by the MUTCD.

2. The message matrix panel shall be visible from one-half mile.

3. The 18 inch letter height message shall be legible from 650 feet for nighttime conditions and 800 feet for normal daylight conditions.

4. The 12 inch letter height message shall be legible from 650 feet for nighttime conditions and 650 feet for normal daylight conditions.

5. Under variable light level conditions the sign shall automatically adjust its light source to maintain legibility.

6. The message panel shall have adjustable display rates, so that the entire message can be read at least twice at the posted speed.

7. The control panel shall have the capability to store a minimum 50 pre-programmed messages.

8. The controller in the control panel shall be able to remember messages during non-powered conditions.

9. The controller shall allow the operator to generate additional messages on site via the keyboard.

10. All messages shall be flashed or sequenced. In the sequence mode, the controller shall have the capability to sequence three line messages during one cycle.

**990-3.4 Portable Regulatory Signs:**

**990-3.4.1 Sign Panel Assembly:** The sign panel assembly shall consist of a 24 inches by 30 inches “SPEED LIMIT XX” sign panel and a “WHEN FLASHING” sign panel, intended to notify oncoming traffic the speed limit where workers are present. The sign panel assembly shall meet the following minimum physical requirements:

1. The sign panel shall fold down and be pinned in place for towing. Maximum travel height shall be 80 inches.

2. Construct the sign panel and light housing to allow the unit to be operated in the displayed position at speeds of 30 mph. Design the sign panel assembly to withstand transport speeds of 65 mph.

3. Construct the sign panel such that, when in the raised position, the sign panel will have a height of 7 feet from the bottom of the lowest panel to the ground, in accordance with the MUTCD.

4. Provide the unit with a mechanism to raise and lower the sign panel. Provide the unit with a device to lock the sign panel in the raised and lowered position.

**990-3.4.2 Flashing Lights:** Provide a pair of hooded PAR 46 LED advance warning flashing lamps on each side of the top of the sign panel. These lamps shall be visible day or night at a distance of one mile with a flash rate of approximately 55 flashes per minute.

The lamp lens should be at least 5-3/4 inches in diameter. Smaller diameter lens are permissible if they provide an equivalent or greater brightness indication and meet the legibility criteria above.

The color of the light emitted shall be in accordance with the MUTCD. For solar powered units, the bulbs shall provide a 350 candlepower intensity for day use and an

automatic reduction or dimming capacity for night use. The dimmed night operation shall provide adequate indication without excessive glare.

**990-3.5 Portable Radar Speed Display Unit:**

**990-3.5.1 Display Unit Panel and Housing:** Meet the requirements of 990-3.1.2 and the following physical requirements as a minimum:

1. Provide capability to mount a 24 inches by 30 inches regulatory sign with interchangeable numbers showing the posted speed limit above the message display.
2. Provide legend “YOUR SPEED” either above or below the message display.

**990-3.5.2 Message Display:** The message display shall meet the following physical requirements as a minimum:

1. Provide a bright LED, two-digit speed display on a flat black background with bright yellow LEDs.
2. Each digit shall contain either a seven-segment layout or matrix-style design. Each digit shall measure a minimum 18 inches in height.
3. Speed display shall be visible from a distance of at least one-half mile and legible from a distance of at least 650 feet under both day and night conditions.
4. Display shall adjust for day and night operation automatically with a photocell.

**990-3.5.3 Radar:** The radar unit shall not be affected by normal radio transmissions and meet the following physical requirements as a minimum:

1. Approach-Only sensor.
2. Equipped with a low power K-Band transmitter.
3. Part 90 FCC acceptance, 3 amps, 10.8 V<sub>DC</sub> to 16.6 V<sub>DC</sub>. Fuse and reverse polarity protected.
4. Range of 1,000 feet for mid-size vehicle, capable of accurately sensing speeds of 10 mph to 99 mph with over speed function that operates when a vehicle approaches over the posted speed limit.

**990-3.6 Truck Mounted Changeable Message Sign:**

**990-3.6.1 General:** Truck mounted changeable message signs shall meet the physical display and operational requirements of the MUTCD and be listed on the APL.

1. Sign shall be secured on the vehicle for normal operation.
2. A fault light shall be located on rear of the sign and operate whenever the sign is displaying a message. The light shall flash at the same rate as the message being displayed.
3. An operator’s manual shall be furnished with each sign.
4. The manufacturer name, model or part number, and date of manufacture or serial number shall be permanently affixed to the sign housing.

**990-3.6.2 Display Panel and Housing:**

1. The housing maximum size shall not exceed a width of 96 inches.
2. The housing shall be designed to withstand exposure to the elements and include a locking device to secure the housing from unauthorized entry.
3. Provisions (by convection or fan) shall be made for heat dissipation within the unit.
4. The message matrix panel background and frame for the dynamic message assembly shall be painted flat black, Federal Specification TT-E-489.

5. The face of the display shall be easily opened from the front. Faces that open up shall be locked to stay open far enough to allow for servicing of all message panel components.

6. The face of the sign shall be covered by an impact resistant polycarbonate face that aids against glare and includes an ultraviolet inhibitor to protect from fading and yellowing.

7. The display panel support structure, when raised in the upright position, shall be designed to allow for a minimum height of 7 feet from the bottom of the panel to the ground.

8. The unit shall have a manual and automatic control mechanism to raise and lower the display assembly. A locking device shall also be provided to ensure the display panel will remain in the raised or lowered position.

**990-3.6.3 Message Matrix:**

1. The matrix shall utilize light emitting diodes (LED).  
 2. LEDs used shall be amber (590 nm dominate wavelength) and shall meet the visibility requirements of this specification. LEDs shall have a viewing angle no less than 30 degrees. LED intensity shall not fall below 80 percent within three years.

3. All display modules shall be identical and interchangeable.  
 4. The matrix shall be capable of displaying a minimum of two lines of eight characters each, using a 10 inch font that meets the height to width ratio and character spacing requirements in the MUTCD, Section 2L.04 (paragraphs 05, 06, and 08) and Section 6F.60, paragraph 15.

5. The matrix shall provide variable letter, graphic and symbol sizes from 10 to 36 inches. The matrix must display characters that meet or exceed the numeral and letter sizes prescribed in the MUTCD and SHS companion document. Fonts and graphics must mimic the characteristics of fonts and graphics defined in NEMA TS4, the MUTCD, and SHS.

**990-3.6.4 Electrical System:**

1. The power supply shall be a 12 V<sub>DC</sub> system designed to operate the sign with a dedicated battery that is charged by the vehicle electrical system, but isolated so it does not drain the vehicle battery.

2. All internal sign components shall be treated with a protective, weather-resistant polyurethane or silicone conformal coating to protect against the adverse effects of humidity and moisture.

**990-3.6.5 Sign Controller:**

1. The sign controller shall be housed inside the sign and shall be equipped with a security lockout feature to prevent unauthorized use.

2. An external weather-resistant, hand-held control keypad shall be used to display the message on the sign.

3. The sign controller shall have the capability to provide a predetermined or blank default message upon loss of controller function.

**990-3.6.6 Operation and Performance:**

1. The message shall be displayed in upper case.  
 2. The message matrix panel shall be visible from one-half mile. With a 10 inch character displayed, the sign shall be legible from a distance of 400 feet in both day and night conditions. Under variable light level conditions, the sign shall automatically adjust its light source to meet the 400 foot visibility requirement.

3. The sign shall have the capability to store a minimum of 40 common messages and graphics of which a minimum of 30 shall be user-programmable messages.

4. All messages shall be capable of being flashed or sequenced. In the sequence mode, the message shall consist of no more than two phases, with each phase consisting of no more than three lines of text. Both message dwell time and message flash rate shall be individually programmable.

**990-3.7 Automated Flagger Assistance Devices (AFAD):**

**990-3.7.1 General:** AFAD's shall meet the physical display and operational requirements in the MUTCD and be listed on the APL. Manufacturers seeking evaluation of their product for the APL must include detailed vendor drawings, signed and sealed by a Professional Engineer registered in the State of Florida, showing typical application of the device in accordance with Standard Plans, Index 102-603. All electronic assemblies shall meet the requirements of NEMA TS-5-2017 Section 4.

**990-3.7.2 Stop/Slow Automated Flagger Assistance Devices:** Provide a remotely operated Stop/Slow AFAD including a Stop/Slow sign that alternately displays the stop face and the slow face of a Stop/Slow paddle.

When a gate arm is used, ensure that the gate arm descends to a down position across the approach lane of traffic when the stop face is displayed and then ascends to an upright position when the slow face is displayed.

Ensure the gate arm is fully retroreflectorized on both sides, with vertical alternating red and white stripes at 16 inch intervals measured horizontally in accordance with the MUTCD. When the arm is in the down position blocking the approach lane:

1. The minimum vertical aspect of the arm and sheeting shall be 2 inches; and,
2. The end of the arm shall reach at least to the center of the lane being controlled.

**990-3.7.3 Red/Yellow Lens Automated Flagger Assistance Devices:** Provide a remotely operated Red/Yellow Lens AFAD that alternately displays a steadily illuminated circular red lens and a flashing circular yellow lens to control traffic.

Ensure that the Red/Yellow Lens AFAD includes a gate arm that descends to a down position across the approach lane of traffic when the steady circular red lens is illuminated and then ascends to an upright position when the flashing circular yellow lens is illuminated.

Ensure that the gate arm is fully retroreflectorized on both sides, with vertical alternating red and white stripes at 16 inch intervals measured horizontally in accordance with the MUTCD. When the arm is in the down position blocking the approach lane:

1. The minimum vertical aspect of the arm and sheeting shall be 2 inches; and,
2. The end of the arm shall reach at least to the center of the lane being controlled.

Do not provide a change interval between the display of the steady circular red indication and the display of the flashing circular yellow indication. Provide a steady illuminated circular yellow indication, with at least a 5 second duration, between the transition from flashing circular yellow indication and the display of the steady circular red indication. The Engineer may approve a different duration, provided it falls within the range recommended by the MUTCD.

**990-4 Removable Tape.**

**990-4.1 General:** Removable tape shall be one of the products listed on the Department’s Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. Evaluation of Removable Tape will utilize data from an independent laboratory or data from the National Transportation Product Evaluation Program (NTPEP).

**990-4.2 Composition:** Removable tape shall be one of the products listed on the APL. The pavement stripes and markings shall consist of high quality plastic materials, pigments, and glass spheres or other retroreflective materials uniformly distributed throughout their cross-sectional area, with a reflective layer of spheres or other retroreflective material embedded in the top surface. No foil type materials shall be allowed.

**990-4.3 Skid Resistance:** The surface of the stripes and markings shall provide a minimum skid resistance value of 35 BPN (British Pendulum Number) when tested according to ASTM E303. Bike lane symbols and pedestrian crosswalks shall provide a minimum skid resistance value of 55 BPN.

**990-4.4 Thickness:** The APL will list the specified thickness of each approved product.

**990-4.5 Durability and Wear Resistance:** When properly applied, the material shall provide neat, durable stripes and markings. The materials shall provide a cushioned resilient substrate that reduces sphere crushing and loss. The film shall be weather resistant and, through normal wear, shall show no significant tearing, rollback or other signs of poor adhesion. Durability is the measured percent of pavement marking material completely removed from the pavement. The pavement marking material line loss must not exceed 5.0% of surface area.

**990-4.6 Conformability and Resealing:** The stripes and markings shall be capable of conforming to pavement contours, breaks and faults under traffic at pavement temperatures recommended by the manufacturer. The film shall be capable of use for patching worn areas of the same types of film in accordance with the manufacturer’s recommendations.

**990-4.7 Tensile Strength:** The stripes and markings shall have a minimum tensile strength of 40 psi when tested according to ASTM D638. A rectangular test specimen 6 inches by 1 inch by 0.05 inches minimum thickness shall be tested at a temperature range of 40°F to 80°F using a jaw speed of 0.25 inches per minute.

**990-4.8 Elongation:** The stripes and markings shall have a minimum elongation of 25% when tested in accordance with ASTM D638.

**990-4.9 Plastic Pull test:** The stripes and markings shall support a dead weight of 4 pounds for not less than five minutes at a temperature range of 70°F to 80°F. Rectangular test specimen size shall be 6 inches by 1 inch by 0.05 inches minimum thickness.

**990-4.10 Adhesive:** Precoat removable tape with a pressure sensitive adhesive capable of being affixed to asphalt concrete and portland cement concrete pavement surfaces without the use of heat, solvents, and other additional adhesives or activators. Ensure that the adhesive does not require a protective liner when the removable tape is in rolled form for shipment. Ensure that the adhesive is capable of temporarily bonding to the roadway pavement at temperatures of 50°F and the above without pick-up distortion by vehicular traffic.

**990-4.11 Color:** Meet the requirements of 971-1.6.

**990-4.12 Removability:** Ensure that the manufacturer shows documented reports that the removable tape is capable of being removed intact or in substantially large strips after being in place for a minimum of 90 days and under an average daily traffic count per lane of at least 5,000 vehicles per day.

**990-5 Temporary Raised Pavement Markers (RPMs).**

Temporary RPMs shall meet the requirements of Section 970.

**990-6 Temporary Glare Screen.**

**990-6.1 Design and Installation:** Manufactured glare screen systems may be modular or individual units listed on the APL and shall meet the following requirements:

1. Glare screen units shall be manufactured in lengths such that when installed the joint between any one modular unit will not span barrier sections. Color shall be green, similar to FED-STD-595-34227.
2. Blades, rails and/or posts shall be manufactured from polyethylene, fiberglass, plastic, polyester or polystyrene, and be ultraviolet stabilized and inert to all normal atmospheric conditions and temperature ranges found in Florida.
3. For paddle type designs, the blade width shall not be more than 9 inches. Blades or screen for individual or modular systems shall be 24 inches to 30 inches high and capable of being locked down at an angle and spacing to provide a cut-off angle not less than 20 degrees.
4. For glare screen mounted on temporary concrete barrier, a strip (minimum 3 inch width and minimum 72 square inches) of reflective sheeting as specified in 994-2 must be placed on each side of a panel, centered in each barrier section (at a spacing not to exceed 15 feet) and positioned in such a manner as to permit total right angle observation by parallel traffic.
5. Prior to approval an impact test shall be performed by the manufacturer to verify the safety performance of the proposed system. The minimum impact strength of the posts, blades, rail and the barrier attachment design shall be sufficient to prevent the unit from separating from the barrier when impacted by a 3 inches outside diameter steel pipe traveling at 30 mph and impacting mid-height on the glare screen assembly.
6. All hardware shall be galvanized in accordance with ASTM A123 or stainless steel in accordance with AISI 302/305.

Alternative designs for temporary glare screen may be submitted as a Cost Savings Initiative Proposal in accordance with 4-3.9.

**990-7 Temporary Traffic Control Signals.**

**990-7.1 General:** Temporary traffic control signals shall meet the physical display and operational requirements of conventional traffic signal described in the MUTCD for portable traffic signals and be listed on the APL. The standard includes but is not limited to the following:

1. Use signal heads having three 12 inch vehicular signal indications (Red, Yellow and Green). Ensure there are two signal heads for each direction of traffic.
2. The traffic signal heads on this device will be approved by the Department.
3. Department approved lighting sources will be installed in each section in accordance with the manufacturer’s permanent directional markings, that is, an “Up Arrow”, the word “UP” or “TOP,” for correct indexing and orientation within a signal housing.
4. The masts supporting the traffic signal heads will be manufactured with the lowest point of the vehicular signal head as follows:
  - a. Eight feet above finished grade at the point of their installation for “pedestal” type application or
  - b. Seventeen to 19 feet above pavement grade at the center of roadway for “overhead” type application.

5. The yellow clearance interval will be programmed 3 seconds or more. Under no condition can the yellow clearance interval be manually controlled. It must be timed internally by the controller as per Department specifications.

6. The green interval must display a minimum of 5 seconds before being advanced to the yellow clearance interval.

7. The controller will allow for a variable all red clearance interval from 0 seconds to 999 seconds.

8. Portable traffic control signals will be either manually controlled or traffic actuated. Indicator lights for monitoring the signal operation of each approach will be supplied and visible from within the work zone area.

9. When the portable traffic control signals are radio actuated the following will apply:

a. The transmitter will be FCC Type accepted and not exceed 1 watt output per FCC, Part 90.17. The manufacturer must comply with all “Specific limitations” noted in FCC Part 90.17.

b. The Controller will force the traffic signal to display red toward the traffic approach in case of radio failure or interference.

10. The trailer and supports will be painted construction/maintenance orange enamel in accordance with the MUTCD color.

11. Ensure the certification number is engraved or labeled permanently on equipment.

12. Ensure the device has an external, visible, water resistant label with the following information: “Certification of this device by the Florida Department of Transportation allows for its use in Construction Zones Only”.

13. All electronic assemblies shall meet the requirements of NEMA TS-5-2017 Section 4.

## **990-8 Work Zone Signs.**

**990-8.1 Post Mounted Sign Supports:** Provide steel u-channel posts that conform to ASTM A499 Grade 60. For each u-channel post, punch or drill 3/8 inch diameter holes on 1 inch centers through the center of the post, starting approximately 1 inch from the top and extending the full length of the post. Ensure that the weight per foot of a particular manufacturer’s post size does not vary more than plus or minus 3.5% of its specified weight per foot. Taper the bottom end of the post for easier installation. Machine straighten the u-channel to a tolerance of 0.4% of the length. Use only non-corrosive metal, aluminum, or galvanized steel attachment hardware.

**990-8.2 Portable Sign Stands:** Provide portable sign stands that meet the requirements of MASH TL-3.

**990-8.2.1 Product Application:** Manufacturers seeking inclusion on the APL must submit the following:

1. Product Drawing, which at a minimum includes:

a. Model Number

b. Sign panel size

c. Allowable sign panel substrate material

d. Height to bottom of sign panel

e. Any field assembly details and technical information necessary for proper application and installation

2. Crash testing reports.

3. All relevant FHWA Eligibility Letters.

**990-8.3 Sign Panels:** Use signs that meet the material and process requirements of ASTM D4956 and Section 994. Use the Type VI sheeting for vinyl signs. Mesh signs must meet the color, daytime luminance, and non-reflective requirements of Section 994, Type VI. Use Type IV sheeting for fluorescent orange work zone signs. Use Type IV and Type XI sheeting for all other work zone signs.

**990-9 Temporary Raised Rumble Strips.**

**990-9.1 General:** Temporary raised rumble strips shall meet the physical display and operational requirements in the MUTCD for temporary raised rumble strips and be listed on the APL. The temporary raised rumble strip may be either a removable striping type or a portable type described below:

**990-9.1.1 Removable Striping Type:**

Table 990-2	
Characteristic	Requirement
Composition:	Removable Polymer Striping Tape with pre-applied adhesive
Color:	White, Black or Orange
Cross-section:	0.25 in. to 0.50 in. (height) x 4 in. (wide)

**990-9.1.2 Portable Type:**

Table 990-3	
Characteristic	Requirement
Composition:	Molded Engineered Polymer, Steel or Aluminum
Weight	Internally ballasted to a minimum of 100 lbs. to maintain position in use without the use of adhesives or mechanical fasteners
Color:	White, Black or Orange
Shape	Beveled on the leading edge
Cross-section:	0.625 in. to 0.875 in. (height) x 12 in. to 14 in. (wide)

**990-10 Temporary Barrier.**

Producers of temporary concrete barrier seeking inclusion on the Department’s Production Facility Listing shall meet the requirements of Section 105.

Manufacturers seeking evaluation of proprietary temporary barrier systems for inclusion on the APL must meet MASH TL-3 criteria and submit the following:

1. Product drawings, signed and sealed by a Professional Engineer registered in the State of Florida, which at a minimum must include:
  - a. Freestanding and anchored details, as appropriate
  - b. Section views and tables showing required setback distance (deflection space) for all installation configuration options
  - c. Alignment and Length of Need requirements
  - d. Transition and overlap details
  - e. End treatment details
2. Installation manuals
3. Crash testing reports

4. All relevant FHWA Eligibility Letters

**990-11 Temporary Crash Cushion (Redirective or Gating).**

Manufacturers seeking evaluation of crash cushions for inclusion on the APL must meet MASH TL-2 or TL-3 criteria and submit the following:

1. Product drawings, signed and sealed by a Professional Engineer registered in the State of Florida, which at a minimum must include:
  - a. Anchorage details for both the crash cushion and abutting temporary barrier
  - b. Tables showing the relevant system information and lengths for all options
  - c. Length of need location
  - d. Transition details
  - e. List of all components
2. Installation manuals
3. Crash testing reports
4. All relevant FHWA Eligibility Letters

**990-12 Truck Mounted Attenuators and Trailer Mounted Attenuators:**

Equip truck mounted and trailer mounted attenuator units with lights and reflectors in compliance with applicable Florida motor vehicle laws, including turn signals, dual tail lights, and brake lights. Ensure that lights are visible in both the raised and lowered positions if the unit is capable of being raised.

Install either alternating black with yellow or white with orange sheeting on the rear of trailer mounted attenuators and truck mounted attenuators in both the operating and raised position. Use Type III (work zone) or Type IV sheeting consisting of 4 or 6 inch wide stripes installed to form chevrons that point upward. All sheeting except black must be retroreflective.

Manufacturers seeking evaluation of truck mounted attenuators or trailer mounted attenuators for inclusion on the APL must meet the MASH TL-2 or TL-3 criteria and submit the following:

1. Minimum and maximum support vehicle weights
2. User manuals
3. Crash testing reports
4. All relevant FHWA Eligibility Letters

**990-13 Channelizing Devices.**

**990-13.1 General:** Provide channelizing devices in accordance with the MUTCD and the dimensions shown in the Standard Plans.

**990-13.2 Product Application:** Manufacturers seeking inclusion of channelizing devices on the APL shall submit the following:

1. For Cones, Drums, and Temporary Tubular Markers:
  - a. Photographs
  - b. Drawings of sufficient detail to distinguish between similar devices
  - c. Manufacturer self-certification of MASH compliant
2. For Barricades and Vertical Panels:
  - a. Installations Instructions
  - b. Photographs

- c. Drawings (may be included in Installation Instructions) of sufficient detail to distinguish between similar devices
- d. Any field assembly details and technical information necessary for proper application and installation
- e. Crash testing reports demonstrating the device meets MASH TL-3
- f. All relevant FHWA Eligibility Letters

**990-14 Pedestrian Longitudinal Channelizing Devices.**

**990-14.1 General:** Provide pedestrian Longitudinal Channelizing Devices (LCDs) in accordance with the MUTCD and the Standard Plans.

**990-14.2 Product Application:** Manufacturers seeking inclusion of pedestrian LCDs on the APL must submit the following:

- a. Installations Instructions
- b. Photographs
- c. Drawings (may be included in Installations Instructions) of sufficient detail to distinguish between similar devices
- d. Any field assembly details and technical information necessary for proper application and installation
- e. Crash testing reports demonstrating the device meets MASH TL-3
- f. All relevant FHWA Eligibility Letters

**990-15 Flagger Equipment.**

**990-15.1 STOP/SLOW Paddles:** Provide STOP/SLOW paddles with rigid handles in accordance with the MUTCD and the Standard Plans.

**990-15.1.1 Product Application:** Manufacturers seeking inclusion of STOP/SLOW Paddles on the APL must submit the following:

- a. Photographs or drawings of sufficient detail to distinguish between similar devices
- b. Manufacturer self-certification of MASH compliance

**990-16 Portable Temporary Lane Separator.**

**990-16.1 General:** Provide portable temporary lane separator in accordance with the Standard Plans and must come in connectable sections of 36 inches to 48 inches in length.

**990-16.2 Product Application:** Manufacturers seeking inclusion of portable temporary lane separator on the APL shall submit the following:

- a. Installations Instructions
- b. Photographs
- c. Drawings (may be included in Installation Instructions) of sufficient detail to distinguish between similar devices
- d. Any field assembly details and technical information necessary for proper application and installation
- e. Crash testing reports demonstrating the device meets MASH TL-3
- f. All relevant FHWA Eligibility Letters

**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.**

**BID ATTACHMENT 4, GEOTECHNICAL ENGINEERING SERVICES REPORT**

# TIERRA

August 25, 2021

Black & Veatch  
550 King Street, Suite 400  
Charleston, SC 29403

Attn: Ms. Michelle Tudor, P.E.

**RE: Report of Geotechnical Engineering Services  
Manatee County Force Main Upsizing  
Manatee County, Florida  
Tierra Project No.: 6511-20-288**

Ms. Tudor:

Tierra, Inc. (Tierra) has completed the geotechnical engineering study for the above referenced project. The results of the study are provided herein.

Should there be any questions regarding the report, please do not hesitate to contact our office at (813) 989-1354. Tierra would be pleased to continue providing geotechnical services throughout the implementation of the project. We look forward to working with you and your organization on this and future projects.

Respectfully Submitted,

**TIERRA, INC.**



Daniel R. Ruel, P.E.  
Geotechnical Engineer  
Florida License No. 82404



Kevin H. Scott, P.E.  
Senior Geotechnical Engineer  
Florida License No. 65514

# TABLE OF CONTENTS

<b>PROJECT DESCRIPTION .....</b>	<b>1</b>
Project Information .....	1
Scope of Services .....	1
<b>SITE AND SUBSURFACE CONDITIONS .....</b>	<b>2</b>
General Site Information .....	2
USGS Quadrangle Maps .....	2
Potentiometric Surface Maps.....	2
Manatee County Soil Survey.....	2
Subsurface Conditions.....	5
Groundwater Information .....	5
<b>EVALUATION AND RECOMMENDATIONS .....</b>	<b>6</b>
General.....	6
Shallow Rock .....	6
Pipe Bedding.....	6
Organic Material.....	7
Dewatering .....	7
Excavations.....	7
<b>REPORT LIMITATIONS .....</b>	<b>7</b>
 <b>APPENDIX</b>	
Report of Core Borings (US 301)	
Report of Core Borings (2 <sup>nd</sup> Ave West)	

## PROJECT DESCRIPTION

### Project Information

Based on the information provided by Black & Veatch, Tierra understands the project consists of:

- Replacing approximately 900 linear feet of force main along US 301 between Lift Station (LS) 539 and LS 504.
- Replacing approximately 500 linear feet of force main along 2<sup>nd</sup> Ave West between LS 557 and Manhole (MH) 11839.

We understand the installation of the force mains will be performed through open cut trenching and/or Horizontal Directional Drilling (HDD) methods. The geotechnical services herein provide subsurface soil conditions and relevant geotechnical engineering information as they pertain to the proposed force main replacements.

### Scope of Services

The objective of our study was to identify existing soils and groundwater conditions at the test locations along the proposed force main replacement alignments.

In order to meet the preceding objectives, Tierra provided the following services:

1. Reviewed published soils and topographic information. This published information was obtained from the appropriate Florida Quadrangle Map published by the United States Geological Survey (USGS) and the Soil Survey of Manatee County, Florida, published by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS).
2. Executed a program of subsurface exploration consisting of borings, subsurface sampling and field testing. Tierra performed a total of four (4) Standard Penetration Test (SPT) borings to a depth of 15 feet below existing grade and five (5) hand auger borings to depths ranging from 4½ to 7 feet below grade.
3. Visually classified the samples in the laboratory using the Unified Soil Classification System (USCS). Identified soil conditions at each boring location.
4. Collected groundwater level measurements.
5. Prepared this engineering report that summarizes the course of study pursued, the field data generated and subsurface conditions encountered.

The scope of our services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic materials in the soil, bedrock, groundwater, or air, on or below or around this site. The scope of our services did not include determination of the potential for sinkhole activity. Any statements in this report or on the boring logs regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of our client.

## SITE AND SUBSURFACE CONDITIONS

### General Site Information

Land use in the project areas consists of developed land with roadways with adjacent residential and commercial developments.

### USGS Quadrangle Maps

Based on the “Palmetto, Florida” United States Geological Survey (USGS) Quadrangle Map, the natural ground surface elevation at the project sites is reported as follows:

Location	Approximate Ground Surface (ft, NGVD 29)
US 301	+5 to +10
2 <sup>nd</sup> Avenue West	+10 to +15

### Potentiometric Surface Maps

Based on a review of the “Potentiometric surface elevation of the upper Floridan Aquifer, West-Central Florida” maps published by the USGS, the potentiometric surface elevation of the upper Floridan Aquifer at the project sites is on the order of approximately +20 feet, NGVD 29.

### Manatee County Soil Survey

The Manatee County Soil Survey published by the USDA NRCS was reviewed for the two force main replacement locations. Four (4) soil mapping units were identified at the locations described below. The soil information is provided in the following paragraphs and table.

Location	USDA Soil Map Unit(s)
US 301	5, 13, 48
2 <sup>nd</sup> Avenue West	20

Bradenton Fine Sand, Limestone Substratum (Unit 5): The Bradenton, limestone substratum component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on rises on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits over limestone. Depth to a root restrictive layer, bedrock, lithic, is 40 to 80 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 5 percent.

Chobee Loamy Fine Sand, Frequently Ponded, 0 to 1 Percent Slopes (Unit 13): The Chobee component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on depressions on marine terraces on coastal plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly

drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is not flooded. It is frequently ponded. A seasonal zone of water saturation is at 0 inches during July, August, September, and October. Organic matter content in the surface horizon is about 5 percent.

EauGallie-EauGallie Wet, Fine Sand, 0 to 2 Percent Slopes (Unit 20): The EauGallie component makes up 70 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, October, and November. Organic matter content in the surface horizon is about 3 percent.

The EauGallie, wet component makes up 15 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during July, August, September, and October. Organic matter content in the surface horizon is about 3 percent.

The Wabasso component makes up 70 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during June, July, August, September, October, and November. Organic matter content in the surface horizon is about 2 percent.

Wabasso-Wabasso, Wet, Fine Sand, 0 to 2 Percent Slopes (Unit 48): The Wabasso, wet component makes up 15 percent of the map unit. Slopes are 0 to 2 percent. This component is on flatwoods on marine terraces on coastal plains. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 6 inches during July, August, September, and October. Organic matter content in the surface horizon is about 2 percent.

Summary of USDA Soil Survey Manatee County, Florida							
USDA Map Symbol and Soil Name	Soil Classification				pH	Seasonal High Water Table	
	Depth (in)	USCS	AASHTO	Permeability (in/hr)		Depth (feet)	Months
(5) Bradenton	0-6	SP-SM	A-2-4, A-3	6.0 - 20.0	5.6-7.3	0.0-1.0	Jun-Dec
	6-13	SM, SP-SM	A-2-4, A-3	6.0 - 20.0	5.6-7.3		
	13-47	SC, SC-SM, SM	A-2-4, A-2-6	0.6 - 2.0	6.6-7.8		
	>47-51	Unweathered Bedrock		2.0 - 20.0	—		
(13) Chobee loamy fine sand	0-8	SM	A-4, A-2-4	2.0 - 6.0	6.1-8.4	+2.0-0.0	Jan-Feb, Jun-Dec
	8-51	SC, CL, SC-SM	A-4, A-6, A-7-6	0.1 - 0.6	6.1-8.4		
	51-80	SM, SC	A-6, A-2-4	0.2 - 6.0	6.1-8.4		
(20) EauGallie	0-6	SM, SP-SM	A-3, A-2-4	6.0 - 20.0	3.5-6.0	0.5-1.5	Jun-Nov
	6-23	AM, SP-SM	A-2-4, A-3	6.0 - 20.0	3.5-6.0		
	23-47	SM, SP-SM	A-3, A-2-4	6.0 - 20.0	3.5-7.3		
	47-55	SM, SP-SM	A-2-4, A-3	0.6 - 6.0	3.5-7.8		
	55-80	SM, SC	A-2-4, A-6, A-4	0.1 - 0.2	3.5-7.8		
EauGallie Wet	0-5	SP-SM, SM	A-2-4, A-3	6.0 - 20.0	3.5-6.0	0.3-1.5	Jul-Oct
	5-17	SP-SM, SM	A-3, A-2-4	6.0 - 20.0	3.5-6.0		
	17-26	SP-SM, SM	A-2-4, A-3	6.0 - 20.0	3.5-7.3		
	26-48	SP-SM, SM	A-2-3, A-3	0.6 - 2.0	3.5-7.8		
	48-72	SP-SM, SM	A-3, A-2-4	0.6 - 2.0	3.5-7.8		
	72-80	SC, CL, SC-SM	A-4, A-6, A-2-4	0.6 - 2.0	3.5-7.8		
(48) Wabasso	0-7	SP-SM, SM	A-2-4, A-3	6.0 - 20.0	3.5-6.5	0.5-1.5	Jun-Nov
	7-24	SP-SM, SM	A-3, A-2-4	6.0 - 20.0	3.5-6.5		
	24-35	SP-SM, SM	A-2-4, A-3	0.6 - 2.0	3.5-5.9		
	35-39	SP-SM, SM	A-2-4, A-3	6.0 - 20.0	5.1-7.3		
	39-80	CL, SC-SM	A-6, A-7-6, A-2-4	0.6 - 2.0	5.1-8.4		
Wabasso Wet	0-7	SP-SM, SM	A-2-4, A-3	6.0 - 20.0	3.5-6.5	0.3-1.5	Jul-Oct
	7-24	SP-SM, SM	A-3, A-2-4	6.0 - 20.0	3.5-6.5		
	24-35	SP-SM, SM	A-2-4, A-3	0.6 - 2.0	3.5-5.9		
	35-39	SP-SM, SM	A-2-4, A-3	6.0 - 20.0	5.1-7.3		
	39-80	CL, SC-SM	A-6, A-7-6, A-2-4	0.6 - 2.0	5.1-8.4		

It should be noted that information contained in the USDA/NRCS Soil Survey may not be reflective of current subsurface conditions, particularly if recent development in the project vicinity has modified existing soils or surface/subsurface drainage.

## Subsurface Conditions

Tierra performed four (4) SPT borings to depths of 15 feet below grade and five (5) hand auger borings to depths ranging from 4½ to 7 feet below grade to evaluate the subsurface conditions along the force main replacement alignments.

The borings were located in the field using hand-held Garmin Global Positioning System (GPS) equipment with a reported accuracy of ±10 feet. The approximate boring locations are presented on the **Report of Core Borings** sheet in the **Appendix**.

The SPT borings were performed with the use of a drill rig using Bentonite Mud drilling procedures. The soil sampling was performed in general accordance with American Society for Testing and Materials (ASTM) Test Designation D-1586. The initial 4 to 6 feet of the SPT borings were manually advanced by hand auger to verify utility clearance. Thereafter, SPT resistance N-values were recorded continuously to a depth of 10 feet and at 5 foot intervals thereafter. The soil samples were classified in the field and transported to our laboratory for review and stratification.

The soil strata encountered in the SPT borings performed at the project site are summarized in the following table:

Stratum Number	Soil Description	USCS Symbol	AASHTO Classification
1	Gray to Light Brown to Brown Sand to Sand With Silt, Occasionally with Rock Fragments	SP/SP-SM	A-3
2	Brown Silty Sand, Occasionally Cemented	SM	A-2-4
3	Light Brown to Brown Clayey Sand	SC	A-2-6/A-4
4	Gray to Orange-Brown to Brown Sandy Clay to Clay	CL/CH	A-6/A-7-5/A-7-6
5	Weathered Limestone to Calcareous Clay	--- <sup>(1)</sup>	--- <sup>(1)</sup>

<sup>(1)</sup> USCS and AASHTO do not provide nomenclature for natural limestone.

The subsurface soil stratification is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The soil profiles included in the **Appendix** should be reviewed for specific information at the boring locations. The profile includes soil description, stratification, and penetration resistances, when applicable. The stratifications shown on the boring profiles represent the conditions only at the actual boring location. Variations did occur and should be expected within the project area. The stratification represents the approximate boundary between subsurface soils and the actual transition may be gradual.

## Groundwater Information

The groundwater levels were encountered at depths ranging from approximately 3¼ to 6 feet below the existing ground surface. The encountered groundwater levels are depicted adjacent to the soil profiles on the **Report of Core Borings** sheets in the **Appendix**.

It should be noted that groundwater levels tend to fluctuate during periods of prolonged drought and extended rainfall and may be affected by man-made influences. In addition, a seasonal effect will also occur in which higher groundwater levels are normally recorded in rainy seasons.

## EVALUATION AND RECOMMENDATIONS

### General

The results of the borings performed are presented on the **Report of Core Borings** sheets in the **Appendix**. Tierra recommends that the design team review the data provided as it pertains to the force main installations. The contractor should review the soil profiles and evaluate the soil types as they relate to their installation methods for the project.

### Shallow Rock

Weathered limestone was encountered within the borings along the US 301 site at depths of 10 feet below grade. The design team should review the depth of the limestone relative to the force main invert elevations and determine impacts to the design. Additionally, the Contractor shall anticipate variations in the depth and hardness of this material. Tierra recommends the following note is included in the plans.

Weathered limestone was encountered within the borings. This material is rock. Drilling and excavations into and/or through this material will be difficult and will require non-conventional construction techniques and specialized drilling equipment. Limestone is porous and will be difficult to dewater.

### Potentiometric Surface

Based on a review of the "Potentiometric surface elevation of the upper Floridan Aquifer, West-Central Florida" maps and the "Palmetto, Florida" quadrangle map published by the USGS, Tierra recommends the following note is included in the plans:

Based on a review of the "Potentiometric surface elevation of the upper Floridan Aquifer, West-Central Florida" maps published by the USGS, the potentiometric surface elevation of the upper Floridan Aquifer at the project sites is on the order of +20 feet, NGVD 29. The natural ground elevation at the project sites ranges from approximately +5 to +15 feet, NGVD 29. The Contractor's tools and construction methods should be equipped to handle potentiometric surface levels up to +20 feet, NGVD 29.

### Pipe Bedding

In general, the soils of Stratum 1 (SP/SP-SM) [A-3] may be moved and used for pipe bedding, provided it is free of organic materials, clay, debris or any other material deemed unsuitable for construction. The appropriate FDOT (Specification 125) and/or jurisdictional requirements should be consulted to determine the specific use/suitability of the soil types encountered during construction.

Clayey soils (A-2-6/A-4/A-6/A-7) were encountered within anticipated excavation depths. These soils are not suitable within 1 foot of the bottom of structure and/or pipe invert elevations. These soils shall be removed and backfilled with suitable coarse sand or approved granular material (placed and compacted in accordance with FDOT Specification 125). The clayey soils may be utilized from a point 12 inches above the top of pipe to finished grade.

## Organic Material

Organic soils were not encountered within the borings performed for this study. However, if encountered during construction, this material should be removed and backfilled with suitable material per the project's pipe bedding and backfill requirements.

## Dewatering

The contractor's means and methods for dewatering should be performed to a depth sufficient to achieve compaction at the lowest levels of the pipe bedding (i.e. maintain a dry working condition). Tierra anticipates the required dewatering depth will be a minimum of 1 foot below the lowest excavation elevation. However, the actual dewatering depth required may be deeper in order to obtain the required compaction.

## Excavations

Excavations and temporary side slopes should comply with the Occupational Safety and Health Administration's (OSHA) trench safety standards, 29 C.F.R., s. 1926.650, Subpart P, all subsequent revisions or updates of OSHA's referenced standard adopted by the Department of Labor and Employment Security and Florida's Trench Safety Act, Section 553.62, Florida Statutes.

We are providing this information solely as a service to our client. Tierra does not assume responsibility for construction site safety or the contractor's or other party's compliance with local, state, and federal safety or other regulations.

## REPORT LIMITATIONS

The information contained in this report are opinions based on the site conditions and project layout described herein and further assume that the conditions observed in the exploratory boring are representative of the subsurface conditions throughout the site, i.e., the subsurface conditions elsewhere on the site are the same as those disclosed by the borings. If, during construction, subsurface conditions different from those encountered in the exploratory boring are observed or appear to be present beneath excavations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary.

If there is a substantial lapse in time between the submittal of this report and the start of work at the site, or if conditions or project layout are changed due to natural causes or construction operations at or adjacent to the site, we recommend that this report be reviewed to determine the applicability of conclusions and recommendations considering the changed conditions and time lapse.

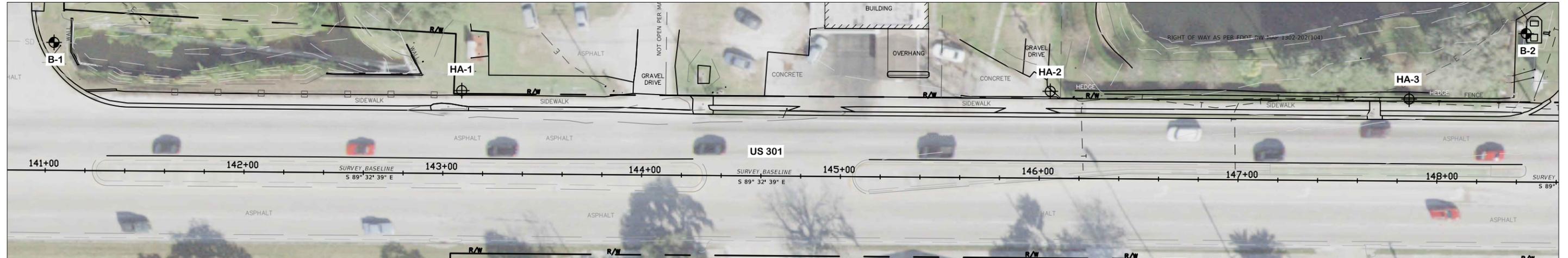
This report was prepared for the exclusive use of Black and Veatch and their clients for evaluating the design of the project as it relates to the geotechnical aspects discussed herein. It should be made available to prospective contractors for information on factual data only and not as a warranty of subsurface conditions included in this report. Unanticipated soil conditions may require that additional expense be made to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

## **APPENDIX**

Report of Core Borings (US 301)

Report of Core Borings (2<sup>nd</sup> Ave West)

# BORING LOCATION PLAN



**NOTES:**

1. BASE MAP PROVIDED BY BLACK AND VEATCH
2. BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE ELEVATION OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION OF THE UPPER FLORIDAN AQUIFER AT THE PROJECT SITES IS ON THE ORDER OF +20 FEET, NGVD 29. THE NATURAL GROUND ELEVATION AT THE PROJECT SITES RANGES FROM APPROXIMATELY +5 TO +15 FEET, NGVD 29. THE CONTRACTOR'S TOOLS AND CONSTRUCTION METHODS SHOULD BE EQUIPPED TO HANDLE POTENTIOMETRIC SURFACE LEVELS UP TO +20 FEET, NGVD 29.
3. WEATHERED LIMESTONE WAS ENCOUNTERED WITHIN THE BORINGS. THIS MATERIAL IS ROCK. DRILLING AND EXCAVATIONS INTO AND/OR THROUGH THIS MATERIAL WILL BE DIFFICULT AND WILL REQUIRE NON-CONVENTIONAL CONSTRUCTION TECHNIQUES AND SPECIALIZED DRILLING EQUIPMENT. LIMESTONE IS POROUS AND WILL BE DIFFICULT TO DEWATER.

## LEGEND

- |   |  |   |          |   |
|---|--|---|----------|---|
| 1 |  | GRAY TO LIGHT BROWN TO BROWN SAND TO SAND WITH SILT OCCASIONALLY WITH ROCK FRAGMENTS (SP/SP-SM) [A-3] |          | GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION  |
| 2 |  | BROWN SILTY SAND OCCASIONALLY CEMENTED (SM) [A-2-4]   | N        | SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)   |
| 3 |  | LIGHT BROWN TO BROWN CLAYEY SAND (SC) [A-4/A-2-6]   | SP       | UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2488) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW  |
| 4 |  | GRAY TO ORANGE-BROWN TO BROWN SANDY CLAY TO CLAY (CL/CH) [A-6/A-7-5/A-7-6]                            | A-3      | AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW   |
| 5 |  | CALCAREOUS CLAY TO WEATHERED LIMESTONE  | 50/4     | NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION   |
| P |  | PAVEMENT AND BASE MATERIAL  | HA       | HAND AUGERED TO VERIFY UTILITY CLEARANCES   |
|   |  | APPROXIMATE LOCATION OF AUGER BORING  | GNE      | GROUNDWATER TABLE NOT ENCOUNTERED   |
|   |  | APPROXIMATE LOCATION OF SPT BORING  | REFUSAL  | HAND AUGER REFUSAL DUE TO CONCRETE  |
|   |  |   | EASTING  | EASTING COORDINATE REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, FLORIDA WEST ZONE, N.A.D. 83 DETERMINED USING HAND-HELD GARMIN ETREX GPS EQUIPMENT WITH A REPORTED ACCURACY OF +/- 10 FEET  |
|   |  |   | NORTHING | NORTHING COORDINATE REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, FLORIDA WEST ZONE, N.A.D. 83 DETERMINED USING HAND-HELD GARMIN ETREX GPS EQUIPMENT WITH A REPORTED ACCURACY OF +/- 10 FEET |

## SOIL PROFILES

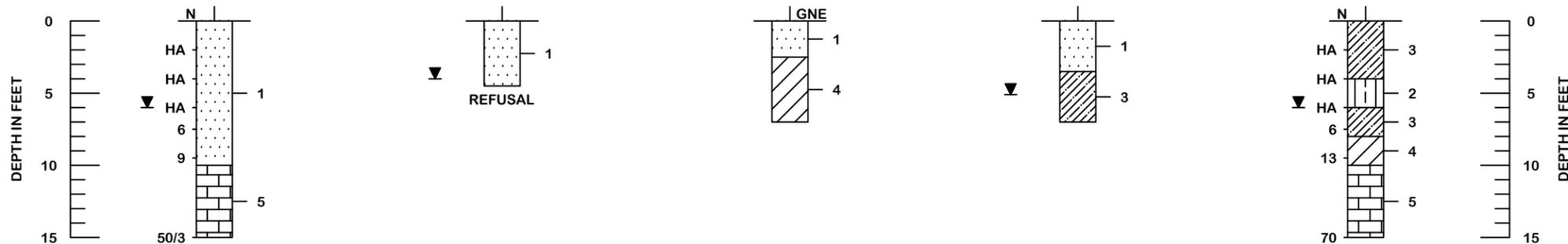
BOR # B-1  
EASTING 483563  
NORTHING 1159271  
DATE 7/27/2021  
DRILLER D. STAKELIN  
HAMMER AUTOMATIC  
RIG CME 55

BOR # HA-1  
EASTING 483768  
NORTHING 1159247  
DATE 7/28/2021

BOR # HA-2  
EASTING 484064  
NORTHING 1159246  
DATE 7/28/2021

BOR # HA-3  
EASTING 484245  
NORTHING 1159242  
DATE 7/28/2021

BOR # B-2  
EASTING 484303  
NORTHING 1159275  
DATE 7/27/2021  
DRILLER D. STAKELIN  
HAMMER AUTOMATIC  
RIG CME 55



AUTOMATIC HAMMER	
GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

DRAWN BY:  
**SW**

APPROVED BY:  
**DRR**

ENGINEER OF RECORD:  
**DANIEL R. RUEL, P.E.**  
FLORIDA LICENSE NO.:  
**82404**



**TIERRA**  
7351 Temple Terrace Highway  
Tampa, Florida 33637  
Phone: 813-989-1354 Fax: 813-989-1355

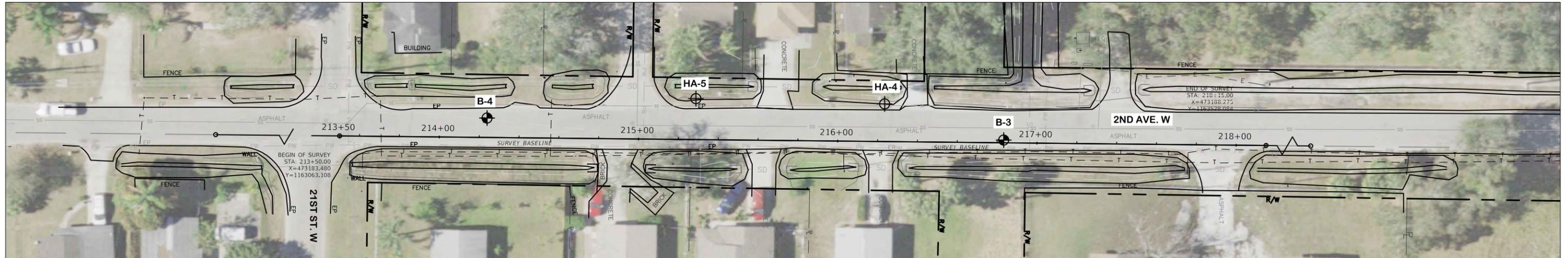
SCALE:  
**NOTED**

PROJECT NUMBER:  
**6511-20-288**

**GEOTECHNICAL ENGINEERING SERVICES**  
**US 301 FORCE MAIN**  
**MANATEE COUNTY, FLORIDA**

**SHEET 2**

# BORING LOCATION PLAN



**NOTES:**

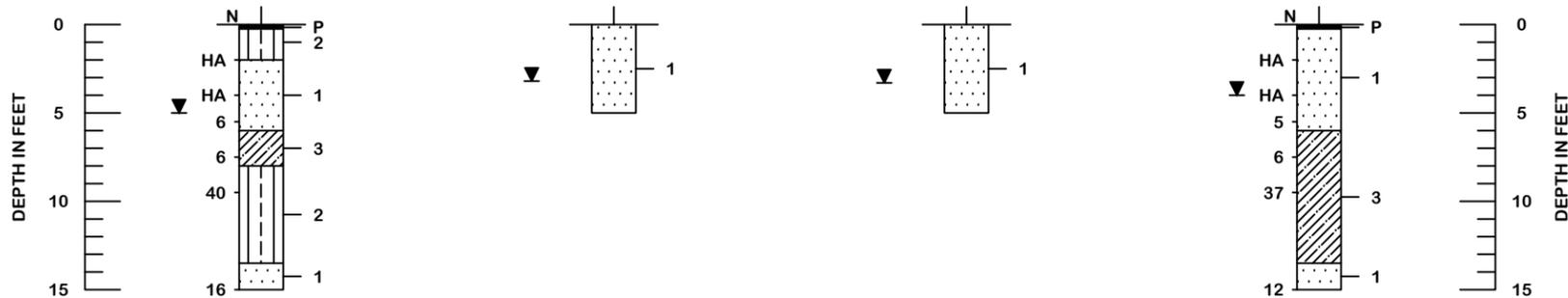
1. BASE MAP PROVIDED BY BLACK AND VEATCH
2. BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE ELEVATION OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION OF THE UPPER FLORIDAN AQUIFER AT THE PROJECT SITES IS ON THE ORDER OF +20 FEET, NGVD 29. THE NATURAL GROUND ELEVATION AT THE PROJECT SITES RANGES FROM APPROXIMATELY +5 TO +15 FEET, NGVD 29. THE CONTRACTOR'S TOOLS AND CONSTRUCTION METHODS SHOULD BE EQUIPPED TO HANDLE POTENTIOMETRIC SURFACE LEVELS UP TO +20 FEET, NGVD 29.

## LEGEND

- |   |  |   |          |   |
|---|--|---|----------|---|
| 1 |  | GRAY TO LIGHT BROWN TO BROWN SAND TO SAND WITH SILT OCCASIONALLY WITH ROCK FRAGMENTS (SP/SP-SM) [A-3] |          | GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION  |
| 2 |  | BROWN SILTY SAND OCCASIONALLY CEMENTED (SM) [A-2-4]   | N        | SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)   |
| 3 |  | LIGHT BROWN TO BROWN CLAYEY SAND (SC) [A-4/A-2-6]   | SP       | UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2488) GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW  |
| 4 |  | GRAY TO ORANGE-BROWN TO BROWN SANDY CLAY TO CLAY (CL/CH) [A-6/A-7-5/A-7-6]                            | A-3      | AASHTO GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW AND LABORATORY TESTING ON SELECTED SAMPLES FOR CONFIRMATION OF VISUAL REVIEW   |
| 5 |  | CALCAREOUS CLAY TO WEATHERED LIMESTONE  | 50/4     | NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION   |
| P |  | PAVEMENT AND BASE MATERIAL  | HA       | HAND AUGERED TO VERIFY UTILITY CLEARANCES   |
|   |  | APPROXIMATE LOCATION OF AUGER BORING  | GNE      | GROUNDWATER TABLE NOT ENCOUNTERED   |
|   |  | APPROXIMATE LOCATION OF SPT BORING  | REFUSAL  | HAND AUGER REFUSAL DUE TO CONCRETE  |
|   |  |   | EASTING  | EASTING COORDINATE REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, FLORIDA WEST ZONE, N.A.D. 83 DETERMINED USING HAND-HELD GARMIN ETREX GPS EQUIPMENT WITH A REPORTED ACCURACY OF +/- 10 FEET  |
|   |  |   | NORTHING | NORTHING COORDINATE REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, FLORIDA WEST ZONE, N.A.D. 83 DETERMINED USING HAND-HELD GARMIN ETREX GPS EQUIPMENT WITH A REPORTED ACCURACY OF +/- 10 FEET |

## SOIL PROFILES

BOR #	B-4	BOR #	HA-5	BOR #	HA-4	BOR #	B-3
EASTING	473175	EASTING	473166	EASTING	473168	EASTING	473186
NORTHING	1163139	NORTHING	1163244	NORTHING	1163339	NORTHING	1163398
DATE	7/27/2021	DATE	7/28/2021	DATE	7/28/2021	DATE	7/27/2021
DRILLER	I. POORAN			DRILLER	I. POORAN	DRILLER	I. POORAN
HAMMER	AUTOMATIC			HAMMER	AUTOMATIC	HAMMER	AUTOMATIC
RIG	D-25			RIG	D-25	RIG	D-25



AUTOMATIC HAMMER	
GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY	SPT (BLOWS/FT.)
VERY SOFT	LESS THAN 2
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

DRAWN BY: <b>SW</b>  CHECKED BY: <b>DRR</b>	APPROVED BY: <b>DRR</b>  DATE: <b>JUL 2021</b>	ENGINEER OF RECORD: <b>DANIEL R. RUEL, P.E.</b> FLORIDA LICENSE NO.: <b>82404</b>	7351 Temple Terrace Highway Tampa, Florida 33637 Phone: 813-989-1354 Fax: 813-989-1355	SCALE: <b>NOTED</b>	PROJECT NUMBER: <b>6511-20-288</b>	GEOTECHNICAL ENGINEERING SERVICES <b>2ND AVE. WEST FORCE MAIN</b> MANATEE COUNTY, FLORIDA	SHEET 1  510
---	--	--	--	------------------------	---------------------------------------	---	--------------------

**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)

AGREEMENT NO.

**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 Construction No. \_\_\_\_\_ (the “IFBC”), 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:

<b>Portion of Work</b>	<b>Substantial Completion Date</b>
------------------------	------------------------------------

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 (10) 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](mailto: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

*(Remainder of this page intentionally left blank)*

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: \_\_\_\_\_

GENERAL CONDITIONS  
*of the*  
CONSTRUCTION AGREEMENT

TABLE OF CONTENTS FOR GENERAL CONDITIONS

	<u>Page</u>
<b>Article I -- Definitions.....</b>	<b>GC-1</b>
1.1 Definitions.....	GC-1
A. Acceptance.....	GC-1
B. Application for Payment.....	GC-1
C. Architect/Engineer .....	GC-1
D. Change Order .....	GC-1
E. Construction Services.....	GC-1
F. Construction Team .....	GC-1
G. Contract Sum.....	GC-1
H. Contract Time.....	GC-1
I. Contractor's Personnel.....	GC-1
J. Days.....	GC-1
K. Defective.....	GC-2
L. Field Directive .....	GC-2
M. Final Completion Date .....	GC-2
N. Float Time .....	GC-2
O. Force Majeure.....	GC-2
P. Notice to Proceed .....	GC-2
Q. Owner .....	GC-2
R. Owner's Project Representative.....	GC-2
S. Payment and Performance Bond .....	GC-2
T. Permitting Authority .....	GC-2
U. Procurement Ordinance.....	GC-2
V. Progress Report.....	GC-2
W. Project .....	GC-2
X. Project Costs .....	GC-3
Y. Project Manager .....	GC-3
Z. Project Plans and Specifications .....	GC-3
AA Project Schedule .....	GC-3
BB. Project Site.....	GC-3
CC. Subcontractor .....	GC-3
DD. Substantial Completion and Substantially Complete.....	GC-3
EE. Substantial Completion Date .....	GC-3
FF. Substitute.....	GC-3
GG. Unit Price Work .....	GC-4
HH. Work .....	GC-4
II. Work Directive Change.....	GC-4
<b>Article II -- Relationship and Responsibilities .....</b>	<b>GC-4</b>

2.1	Relationship between Contractor and Owner .....	GC-4
	A. <i>Purpose</i> .....	GC-4
	B. <i>Construction Team</i> .....	GC-4
	C. <i>Owner’s Reliance on Bid (or GMP)</i> .....	GC-4
2.2	General Contractor Responsibilities .....	GC-5
	A. <i>Personnel</i> .....	GC-5
	B. <i>Cooperation with Architect/Engineer</i> .....	GC-5
	C. <i>Timely Performance</i> .....	GC-5
	D. <i>Duty to Defend Work</i> .....	GC-5
	E. <i>Trade and Industry Terminology</i> .....	GC-5
2.3	Project Schedule.....	GC-6
2.4	Construction Services .....	GC-7
	A. <i>Construction of Project</i> .....	GC-7
	B. <i>Notice to Proceed</i> .....	GC-7
	C. <i>Quality of Work</i> .....	GC-7
	D. <i>Materials</i> .....	GC-7
	E. <i>Accountability for Work</i> .....	GC-7
	F. <i>Contract Sum</i> .....	GC-8
	G. <i>Governing Specifications</i> .....	GC-8
	H. <i>Adherence to Project Schedule</i> .....	GC-8
	I. <i>Superintendent</i> .....	GC-8
	J. <i>Work Hours</i> .....	GC-8
	K. <i>Overtime-Related Costs</i> .....	GC-8
	L. <i>Insurance, Overhead and Utilities</i> .....	GC-9
	M. <i>Cleanliness</i> .....	GC-9
	N. <i>Loading</i> .....	GC-9
	O. <i>Safety and Protection</i> .....	GC-9
	P. <i>Emergencies</i> .....	GC-10
	Q. <i>Substitutes</i> .....	GC-10
	R. <i>Surveys and Stakes</i> .....	GC-10
	S. <i>Suitability of Project Site</i> .....	GC-11
	T. <i>Project Specification Errors</i> .....	GC-11
	U. <i>Remediation of Contamination</i> .....	GC-11
	V. <i>Interfacing</i> .....	GC-12
	W. <i>Job Site Facilities</i> .....	GC-13
	X. <i>Weather Protection</i> .....	GC-13
	Y. <i>Performance and Payment Bond</i> .....	GC-13
	Z. <i>Construction Phase; Building Permit; Code Inspections</i> .....	GC-13
	(1) <i>Building Permit</i> .....	GC-13
	(2) <i>Code Inspections</i> .....	GC-14
	(3) <i>Contractor’s Personnel</i> .....	GC-14
	(4) <i>Lines of Authority</i> .....	GC-14
	AA. <i>Quality Control</i> .....	GC-14
	BB. <i>Management of Subcontractors</i> .....	GC-15
	CC. <i>Job Requirements</i> .....	GC-15
	DD. <i>As-Built Drawings</i> .....	GC-17

EE. Progress Reports.....	GC-17
FF. Contractor’s Warranty.....	GC-17
GG. Apprentices.....	GC-18
HH. Schedule of Values .....	GC-18
II. Other Contracts.....	GC-18
<b>Article III -- Compensation.....</b>	<b>GC-18</b>
3.1 Compensation .....	GC-18
A. Adjustments.....	GC-18
B. Valuation .....	GC-18
C. Unit Price Work .....	GC-19
3.2 Schedule of Compensation .....	GC-19
A. Periodic Payments for Services.....	GC-19
B. Payment for Materials and Equipment .....	GC-19
C. Credit toward Contract Sum .....	GC-19
3.3 Invoice and Payment.....	GC-20
A. Invoices.....	GC-20
B. Additional Information; Processing of Invoices.....	GC-20
C. Architect/Engineer’s Approval.....	GC-20
D. Warrants of Contractor with Respect to Payments.....	GC-20
E. All Compensation Included .....	GC-20
<b>Article IV -- Subcontractors .....</b>	<b>GC-21</b>
4.1 Subcontracts.....	GC-21
A. Subcontracts Generally .....	GC-21
B. No Damages for Delay .....	GC-21
C. Subcontractual Relations .....	GC-21
D. Insurance; Acts & Omissions.....	GC-22
4.2 Relationship and Responsibilities .....	GC-22
4.3 Payments to Subcontractors; Monthly Statements .....	GC-22
A. Payment .....	GC-22
B. Final Payment of Subcontractors .....	GC-22
4.4 Responsibility for Subcontractors.....	GC-22
4.5 Contingent Assignment of Subcontracts.....	GC-23
<b>Article V -- Changes in Work .....</b>	<b>GC-23</b>
5.1 General.....	GC-23
5.2 Minor Changes in the Work.....	GC-23
5.3 Emergencies.....	GC-24
5.4 Concealed Conditions .....	GC-24
5.5 Hazardous Materials .....	GC-24
5.6 Change Orders; Adjustments to Contract Sum.....	GC-25
A. Change Orders Generally .....	GC-25

5.7 Owner-Initiated Changes .....	GC-25
5.8 Unauthorized Work.....	GC-25
5.9 Defective Work.....	GC-25
5.10 Estimates for Changes.....	GC-26
5.11 Form of Proposed Changes.....	GC-26
5.12 Changes to Contract Time .....	GC-26
<b>Article VI -- Role of Architect/Engineer.....</b>	<b>GC-26</b>
6.1 General.....	GC-26
<i>A. Retaining</i> .....	GC-26
<i>B. Duties</i> .....	GC-26
<i>C. Termination</i> .....	GC-26
6.2 Administration .....	GC-27
<i>A. Site Visits</i> .....	GC-27
<i>B. Reporting</i> .....	GC-27
6.3 Interpretation of Project Plans and Specifications.....	GC-27
6.4 Rejection of Non-Conforming Work .....	GC-27
6.5 Correction of Work.....	GC-27
6.6 Timely Performance of Architect/Engineer.....	GC-28
<b>Article VII -- Owner's Rights and Responsibilities .....</b>	<b>GC-28</b>
7.1 Project Site; Title .....	GC-28
7.2 Project Plans and Specifications; Architect/Engineer.....	GC-28
7.3 Surveys; Soil Tests and Other Project Site Information .....	GC-28
7.4 Information; Communication; Coordination .....	GC-29
7.5 Governmental Body .....	GC-29
7.6 Pre-Completion Acceptance .....	GC-29
7.7 Ownership and Use of Drawings, Specifications and Other Instruments of Service.....	GC-29
7.8 Owner's Project Representative.....	GC-30
<i>A. Responsibilities</i> .....	GC-30
<i>B. Limitations</i> .....	GC-31
<b>Article VIII -- Resolution of Disagreements; Claims for Compensation.....</b>	<b>GC-31</b>
8.1 Owner to Decide Disputes .....	GC-31
8.2 Finality .....	GC-31
8.3 No Damages for Delay.....	GC-31
8.4 Permitted Claims Procedure .....	GC-32
8.5 Contract Claims and Disputes.....	GC-32
8.6 Claims for Consequential Damages.....	GC-33
<b>Article IX -- Indemnity.....</b>	<b>GC-33</b>
9.1 Indemnity .....	GC-33

A. Indemnification Generally.....	GC-33
B. Indemnification; Enforcement Actions.....	GC-33
C. Claims by Employees.....	GC-33
9.2 Duty to Defend.....	GC-33
<b>Article X-- Accounting Records; Ownership of Documents.....</b>	<b>GC-33</b>
10.1 Accounting Records.....	GC-34
10.2 Inspection and Audit.....	GC-34
10.3 Access.....	GC-34
10.4 Ownership of Documents.....	GC-34
<b>Article XI -- Public Contract Laws.....</b>	<b>GC-35</b>
11.1 Equal Opportunity Employment.....	GC-35
A. Employment.....	GC-35
B. Participation.....	GC-35
11.2 Immigration Reform and Control Act of 1986.....	GC-35
11.3 No Conflict of Interest.....	GC-35
A. No Interest in Business Activity.....	GC-35
B. No Appearance of Conflict.....	GC-36
11.4 Truth in Negotiations.....	GC-36
11.5 Public Entity Crimes.....	GC-36
<b>Article XII-- Force Majeure, Fire or Other Casualty.....</b>	<b>GC-36</b>
12.1 Force Majeure.....	GC-36
A. Unavoidable Delays.....	GC-36
B. Concurrent Contractor Delays.....	GC-36
C. Notice; Mitigation.....	GC-36
12.2 Casualty; Actions by Owner and Contractor.....	GC-37
12.3 Approval of Plans and Specifications.....	GC-37
12.4 Notice of Loss or Damage.....	GC-37
<b>Article XIII -- Representations, Warranties and Covenants.....</b>	<b>GC-38</b>
13.1 Representations and Warranties of Contractor.....	GC-38
13.2 Representations of the Owner.....	GC-40
<b>Article XIV -- Termination and Suspension.....</b>	<b>GC-41</b>
14.1 Termination for Cause by Owner.....	GC-41
A. Nonperformance.....	GC-41
B. Insolvency.....	GC-42
C. Illegality.....	GC-42
D. Rights of Owner.....	GC-42

14.2 Termination without Cause by Owner .....GC-42  
    *A. Release of Contractor* .....GC-43  
    *B. Waiver of Protest* .....GC-43  
14.3 Suspension without Cause .....GC-43  
14.4 Termination Based Upon Abandonment, Casualty or Force Majeure.....GC-43  
14.5 Vacation of Project Site; Delivery of Documents.....GC-43  
14.6 Termination by the Contractor .....GC-44

SAMPLE

**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 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.

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.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 excuse 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 a 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 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 that all procurement of long-lead items, the separate construction Subcontractors, 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 additive riders to the Payment and Performance Bond.

Z. Construction Phase; Building Permit; 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 Permit. 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. The 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 for 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 and 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. Subcontracts 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 election 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; or
- (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 will 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 in 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 on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents;
- (5) Advise on 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 a 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 will 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 retraining, 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 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 or 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 and 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.

(Remainder of this page intentionally left blank)

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: \_\_\_\_\_

<b>CERTIFICATE OF SUBSTANTIAL COMPLETION (S.C.)</b>	<b>CHECK ONE:</b>	
	Partial	Total
Project Title:	Date Submitted:	
Contractor Data: Name: Address: City/State/Zip:	Project No:	
	S. C. Date (Proposed)	
<p>If the "Partial" completion box above is checked, the following description applies to the work for which substantial completion is being sought. Otherwise, the work described in the Contract including approved changes, if any, is certified to be substantially complete: (Description of the portion of work substantially completed):</p> <p style="text-align: center;">(USE CONTINUATION SHEETS IF NECESSARY)</p>		
<p>A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item does not alter the Contractor's responsibility to complete all of the contract work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by the Contractor within _____ days of substantial completion. The approved substantial completion date is: _____</p>		
_____ Contractor Signature	_____ Date	_____ Engineer's Approval
_____ Printed Name and Title	_____ Printed Name and Title	_____ Date
<p>The Contractor shall be responsible for security, operation, safety, maintenance, HVAC, insurance and warranties in accordance with the Contract. The County will assume the responsibility for paying the cost of electrical power from midnight of the date of Engineer's approval as indicated above.</p> <p><b>ATTACH THE INSPECTOR'S FINAL WALKTHROUGH LIST OF DEFICIENCIES.</b></p>		

**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:** \_\_\_\_\_  
**Contractor Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

THE NET CHANGE OF  
 ADJUSTS THE CURRENT CONTRACT AMOUNT FROM  
 \_\_\_\_\_ TO  
 \_\_\_\_\_

\_\_\_\_ 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