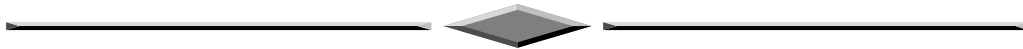


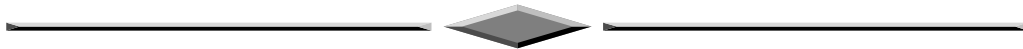
**BID, SPECIFICATIONS AND
CONTRACT DOCUMENTS**
FOR

**TWEDDLE PARK
PUMP STATION RETROFIT PROJECT**



FOR:

TOWN OF GOLDEN BEACH



November 2023



CAS Project No. 08-23-037

CRAIG A. SMITH & ASSOCIATES
Consulting Engineers, Planners, Surveyors
1425 E. Newport Center Drive
Deerfield Beach, FL 33432
(561) 314-4445

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PART 1 GENERAL

1.01 SUMMARY

- A. Itemized below are the Contract Drawings for Craig A. Smith and Associates, Inc.
Project Number **08-23-037, Town of Golden Beach Tweddle Park Pump Station Retrofit Project:**

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END OF SECTION

TOWN OF GOLDEN BEACH
INVITATION TO BID
RFP 2024-001
TWEDDLE PARK PUMP STATION RETROFIT PROJECT
CAS PROJECT NO. 08-23-037

Sealed bids for the construction of the following project will be **received by Town of Golden Beach (Town) until 2:00 p.m., on Thursday, February 29, 2024 at 1 Golden Beach Drive, Golden Beach, FL 33160.** Any bids received after the time specified will not be accepted. The bid opening will occur immediately after the deadline for receipt.

All material furnished and all work performed shall be in accordance with the Drawings, Specifications and Contract Documents pertaining thereto, which may be examined at or obtained from:

(Project Engineer)
Craig A. Smith & Associates of Florida, Inc.
1425 E. Newport Center Drive
Deerfield Beach, FL 33432
(561) 314-4445

Work to be performed under this Contract consists of furnishing materials, equipment, and labor necessary for the proposed retrofit of an existing stormwater pumping station and drainage improvements as shown in the Engineering Drawings and described in the Specifications. The Construction activity shall be performed within the limits of the Town of Golden Beach's rights-of-way.

A non-refundable deposit of \$75.00 will be required for the complete set of Drawings, Specifications and Contract Documents if a printed copy is requested. Checks are to be made payable to Craig A. Smith & Associates, Inc. (CAS). Plans and Contract documents can be downloaded from the Town's website (www.goldenbeach.us) or on www.DemandStar.com.

Bidders will confine their bids to the project in its entirety. Partial bids will not be accepted. Each bidder will submit with its bid evidence that the bidder is licensed to perform the work and services. Bidders who fail to include proper evidence of licensure will be considered non-responsive and their Bid will be discarded.

Each bid must be submitted either electronically through the DemandStar E-Bid process, or hard-copy in TRIPLICATE (ONE ORIGINAL AND TWO COPIES) plus one electronic copy (USB flash drive) and accompanied by an acceptable Bid Bond in an amount equal to at least five percent (5%) of the amount of the bid payable to Town, as a guarantee that if the bid is accepted the bidder will execute the contract and file acceptable performance and payment surety bonds, each equal to one hundred percent (100%) of the contract price within ten (10) days after written notice of the award of contract.

Contractors currently in default on a construction contract or currently in litigation with the Town or another municipality may not submit a Bid Proposal for this Contract. In addition, no entity convicted of a public entity crime may submit a bid for a period of 36 months from the date of being placed on the convicted vendor list. Contractors submitting a bid under any of the circumstances mentioned above will be rejected as being non-responsive.

No bidder may withdraw their bid for a period of ninety (90) days after date set for opening of this bid. It is incumbent upon each bidder to check the listed CAS link for addendums and submit addendum acknowledgements as required and with the bid submittal.

There will be a **mandatory** Zoom pre-bid conference at 11:00 A.M. on Wednesday, February 7, 2024.
Zoom Link: <https://us02web.zoom.us/j/84374030864?pwd=VFQ1WFpYTGpUZE5rMnpwWG1neUFHQOT09>
Meeting ID # **843 7403 0864**, Passcode: **028149**.

The Town reserves the right to reject all bids, waive informalities in any bid, and delete any portion of the project, whenever such action is in the interest of the Town.

If in the opinion of the bidder, inconsistencies appear to exist in the specifications, it is the bidder's responsibility to seek clarification from the Project Engineer in writing. Last day to submit requests for additional information is on Wednesday, 5:00 p.m., February 14th, 2024. Additionally, it is incumbent upon all bidders to conduct a personal investigation as to the requirements of the Town/Project.

If submitting electronically through DemandStar, bidders must choose the sealed option. If submitting hard copies, bids must be sealed and the outside of the envelope MUST be marked: **"BID – TOWN OF GOLDEN BEACH TWEDDLE PARK PUMP STATION RETROFIT PROJECT– RFP 2024-001, CAS PROJECT NO. 08-23-037."**

END OF SECTION

SECTION 00200

INSTRUCTIONS TO BIDDERS

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1. FORMAT

The Contract Documents are divided into parts, divisions, and sections in keeping with accepted industry practice to separate categories of subject matter for convenient reference thereto. Generally, there has been no attempt to divide the specification sections into work performed by the various building trades, work by separate subcontractors, or work required for separate facilities in the project.

2. SPECIFICATION LANGUAGE

"Command" type sentences are used in the Contract Documents. These refer to and are directed to the Contractor.

3. GENERAL DESCRIPTION OF THE PROJECT

A general description of the work to be done is contained in the Invitation to Bid. The scope is indicated on the plans and is specified in applicable parts of these Contract Documents. Bidders shall rely on the drawings, specifications, contract documents and addenda in preparing their proposal.

4. QUALIFICATION OF CONTRACTORS

The prospective bidders must meet the statutorily prescribed requirements before Award of Contract by **the Town of Golden Beach**.

5. DOCUMENT INTERPRETATION

The Contract Drawings governing the work proposed herein consist of the Drawings and all material bound herewith. These Contract Documents are intended to be mutually cooperative and to provide all details reasonably required for the execution of the proposed work. Any person contemplating the submission of a proposal shall have thoroughly examined all of the various parts of these documents, and should there be any doubt as to the meaning or intent of said Contract Documents, the Bidder should request the Engineer, in writing, (at least seven (7) calendar days prior to bid opening or as specified in the bid advertisement) an interpretation thereof. Any interpretation or change in said Contract Documents will be made only in writing, in the form of Addenda to the Documents which will be furnished to all Bidders receiving a set of the Documents. Bidders shall submit with their proposals, or indicate receipt of, all Addenda. Neither Owner nor Engineer will be responsible for any other explanation or interpretations of said Documents not issued in writing by Addendum.

6. BIDDER'S UNDERSTANDING

Each Bidder must inform himself of the conditions relating to the execution of the work and it is assumed that he will inspect the site and make himself thoroughly familiar with all the Contract Documents. Failure to do so will not relieve the successful Bidder of his obligation to enter into a Contract and complete the contemplated work in strict accordance with the Contract Documents. It shall be the Bidder's obligation to verify for himself and to his complete satisfaction all information concerning site and subsurface conditions. Bidders are responsible for basing their bids on the most recent plans and specifications.

- 6.1 Information derived from inspection of Drawings showing location of utilities and structures will not in any way relieve the Contractor from any risk, or from properly examining the sites and making such additional investigations as he may elect, or from properly fulfilling all the terms of the Contract Documents.
- 6.2 Each Bidder shall inform himself of, and the Bidder awarded a Contract shall comply with, Federal, State and local laws, statutes, and ordinances relative to the execution of the work. This requirement includes, but is not limited to, applicable regulations concerning minimum wage rates, nondiscrimination in the employment of labor, protection of public and employee safety and health, environmental protection, the protection of natural resources, fire protection, burning and non-burning requirements, permits, fees, and similar subjects.

7. DRAWINGS

No return of Drawings is required and no refund of the Drawing purchase price will be made.

8. TYPE OF PROPOSAL

When the Proposal for the work is to be submitted on a unit price basis, unit price Proposals will be accepted on all items of work set forth in the Proposal, except those designated to be paid for as a lump sum. The estimate of quantities of work to be done is tabulated in the Proposal and, although stated with as much accuracy as possible, is approximate only and is assumed solely for the basis of calculation upon which the award of Contract shall be made. Payment to the Contractor will be made on the measurement of the work actually performed by the Contractor as specified in the Contract Documents. The Owner reserves the right to increase or decrease the amount of any class of work as may be deemed necessary, unless otherwise specified in the Supplementary Conditions.

- 8.1 When the proposal for the work is to be submitted on a lump sum basis, the lump sum price shall include all labor, materials, and equipment to complete the work described in the bid item included in the bid schedule. The bid items are intended to be general in nature and are not meant to be exhaustive in detail. Payment for all portions of the work associated with and necessary for the completion of a bid item shall be included in the lump sum price for that item whether or not it is mentioned specifically in the bid item description. All work described in the plans and specifications shall be accomplished and paid for as a part of one or more bid items. If the Contractor believes that a portion of the work as described in the plans and specifications has not been included in any bid item, he shall bring this fact to the attention of the Engineer at least one week before the bids are to be received. Otherwise, it shall be assumed that the Contractor's proposal includes reimbursement for all work described in the plans and specifications.

9. PREPARATION OF PROPOSALS

Bidders must complete and return the following:

- Bid - Section 00410
- Bid Bond - Section 00433
- Contractor's Qualifications Form – Section 00451
- Disadvantaged Business Enterprise Form - Section 00452

- Sworn Statement On Public Entity Crimes - Section 00453
- Acknowledgment Of Conformance With O.S.H.A. Standards - Section 00457
- Bidder's Affidavit In Compliance With Florida Trench Safety Act - Section 00458
- Drug Free Work Place Form - Section 00459
-

- 9.1 Bidders must submit bid prices for all items. All blank spaces in the Proposal form must be filled in, preferably in blue ink, in both words and figures where required. No changes shall be made in the phraseology of the forms. Written amount shall govern in case of discrepancy between the amounts stated in writing and the amounts stated in figures. In case of discrepancy between unit prices and totals, unit prices will prevail. Bidders must complete all forms included with the Bid Documents accompanied by such certificates and forms as specified elsewhere herein.
- 9.2 Any proposal shall be deemed non-responsive which contains materials omissions, or irregularities, or in which any of the prices are obviously unbalanced, or which in any manner shall fail to conform to the conditions of the published Invitation to Bid.
- 9.3 Only one bid from any individual, firm, partnership, or corporation, under the same or different names, will be considered. Should it appear to the Owner that any Bidder is interested in more than one bid for work contemplated, all bids in which such a Bidder is interested will be rejected.
- 9.4 The bidder shall sign his Proposal in the blank space provided therefore. If the Bidder is a corporation, the legal name of the corporation shall be set forth above, together with the signature of the officer or officers authorized to sign Contracts on behalf of the corporation. If Bidder is a partnership, the true name of the firm shall be set forth above, together with the signature of the partner or partners authorized to sign Contracts in behalf of the partnership. If signature is by an agent, other than an officer of a corporation or a member of a partnership, a notarized power-of-attorney must be on file with the Owner prior to opening of proposals or submitted with the Proposal.

10. CHANGES IN QUANTITIES

The Owner reserves the right to increase or decrease the amount of any class of unit price work that may be deemed necessary, except that such increases or decreases in amounts shall not be more than twenty-five (25%) percent of the quantities shown on the Drawings, and Specifications without a negotiated Change Order.

11. STATE AND LOCAL SALES AND USE TAXES

Unless Supplementary Conditions contains a statement that the Owner is exempt from State sales tax on materials incorporated into the work due to the qualification of the work under this Contract, all State and local sales and use taxes, as required by the laws and statutes of the State and its political subdivisions, shall be paid by the Contractor. Prices quoted in the Proposal shall include all nonexempt sales and use taxes, unless provision is made in the proposal form to separately itemize the tax.

12. SUBMISSION OF PROPOSALS

All Proposals must be received not later than the time prescribed, at the place, and in the manner set forth in the Invitation to Bid. Proposals must be made on the Proposal Forms provided herein.

- 12.1 The Owner will not accept Proposal forms separated from the Contract Documents. Each Proposal must be submitted in a sealed envelope, marked "BID – TOWN OF GOLDEN BEACH TWEDDLE PARK PUMP STATION RETROFIT PROJECT", CAS PROJECT NO. 08-23-037. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to **Town of Golden Beach, 1 Golden Beach Drive, Golden Beach, FL 33160**.

13. TELEGRAPHIC OR WRITTEN MODIFICATION OF PROPOSAL

Any Bidder may modify his bid by telegraphic or written communication at any time prior to the scheduled closing time for receipt of bids, provided such communication is received by the Owner prior to the closing time. The telegraphic or written communication should not reveal the bid price; it should, however, state the addition or subtraction or modification so that the final prices or terms will not be known by the Owner until the sealed bid is opened.

14. WITHDRAWAL OF PROPOSAL

Any Proposal may be withdrawn prior to the scheduled time for the opening of proposals either by telegraphic or written request, or in person. No proposal may be withdrawn after the time scheduled for opening of proposals, for a period of 90 days.

15. BID SECURITY

Proposals must be accompanied by cash, a certified check, or cashier's check drawn on a local bank in good standing, or a bid bond issued by a Surety authorized to issue such bonds in the State of Florida, in the amount of five (5%) percent of the total amount of the Proposal submitted. This bid security shall be given as guarantee that the Bidder will not withdraw or modify his Proposal for a period of ninety (90) days after bid opening, and that if awarded the Contract, the successful bidder will execute the attached Contract and furnish properly executed Performance and Payment Bonds, equal to the total price of the Contract within the time specified.

- 15.1 The Attorney-in-Fact (Resident Agent) who executes this bond in behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond.

- 15.2 If the Bidder elects to furnish a Bid Bond, he shall use the Bid Bond form found bound herewith, or one conforming substantially thereto in form and content.

16. RETURN OF BID SECURITY

Within fifteen (15) days after the award of the Contract, the Owner will return the Bid securities to all Bidders whose Proposals are not to be further considered in awarding the Contract. Retained bid securities will be held until the Contract has been finally executed, after which all bid securities, other than Bidders' bonds and any guarantees which have been forfeited, will be returned to the respective bidders whose proposals they accompanied.

17. AWARD OF CONTRACT

Within thirty (30) calendar days after the opening of Proposals, unless otherwise stated in the Invitation to Bid or Supplementary Conditions of these Documents, the Owner will accept one of the Proposals or will act in accordance with BASIS OF AWARD, below. The acceptance of the Proposal will be by written Notice of Award, mailed or delivered to the office designated in the Proposal. In the event of failure of the lower responsible and responsive qualified Bidder to sign and return the Contract with acceptable Performance and Payment bonds, as prescribed herein, the Owner may award the Contract to the next lowest responsible and responsive qualified Bidder. Such award, if made, will be made within sixty (60) days after the opening of proposals.

18. BASIS OF AWARD

The Contract will be awarded to the responsive, responsible Bidder submitting the lowest acceptable Proposal. Responsive Bidder shall be defined as any person, firm or corporation submitting a bid for the work contemplated whose Bid Form is complete and regular, free of exclusions or special conditions and has no alternative bids for any items unless requested in the technical specifications. Responsible Bidder shall be defined as any person, firm, or corporation, having the proper qualifications, licensure or registration as may be required to perform the work as specified within these Contract Documents, submitting a bid for the work contemplated who maintains a permanent place of business, has adequate personnel and equipment to do the work properly and within the time limit that is established, and has adequate status to meet his obligations contingent to the work.

- 18.1 The Owner reserves the right to award the Contract as best serves the interests of the Owner. In determining a responsible bidder, the Owner may conduct a thorough background investigation of the company, its share holder(s) and officers; take into consideration the experience of the company; take into consideration the experience of the qualifier; current, pending, and/or prior litigation, whether as plaintiff or defendant regardless of whether the claim resulted in a judgment; recommendation by prior employer(s) of company and/or qualifier; bonding/surety company; history of change orders; cost estimate; minority use; warrant; local office; and any other factor the Owner deems appropriate to establish that Proposer is deemed responsible and has adequate status to meet his obligation to perform the work. Further to these items, the Owner, at his discretion and expense, may solicit a report from Dunn & Bradstreet or any other reporting agency to make a determination as to the credit worthiness and solvency of each Proposer. Submission of a bid proposal constitutes an acceptance of these terms and provides the Owner or his designated representative, full permission and authority to perform said background investigations.
- 18.2 The Owner, in the process of evaluating the proposals submitted to determine the lowest responsive and responsible Proposer, may at his discretion analyze in addition to the above the following minimal criteria; experience of the proposing firm, experience of the firm's qualifier, incidents of past utility damage, aggregate bonding capacity, current staffing, equipment and workload and any past or present warranty claim issues.
- 18.3 If, in the opinion of the Owner or his designee, the information gathered or discovered in conjunction with the aforementioned background investigation reflects negatively on the Proposer to such a degree that the Owner has serious doubts or reservations as to the Proposer's ability to perform or complete the required work within the time

specified, the Owner may discard said proposal and award the Contract to the next lowest responsive, responsible Proposer.

- 18.4 If, at the time this Contract is to be awarded, the total of the lowest acceptable Proposal exceeds the funds then estimated by the Owner as available, the Owner may reject all bids or take such other action as best serves the Owner's interests.
- 18.5 The Owner reserves the right to reject any and all Proposals for any reason where the Owner deems rejection to be in its best interest, or to reject any proposal not in compliance with the Contract Documents. The Owner reserves the right to waive any informalities and irregularities in said Proposals.
- 18.6 The decision of the Owner shall be final. Proposers eliminated due to any of the factors listed herein and above shall not be entitled to any compensation or recovery, notwithstanding clear and evident violations of law.

19. EXECUTION OF CONTRACT

The successful Bidder shall, within seven (7) calendar days after receiving notice of award, sign and deliver to the Owner the Contract hereto attached together with the acceptable bonds as required in these Documents. Within fourteen (14) calendar days after receiving the signed Contract with acceptable bonds from the successful Bidder, the Owner's authorized agent will sign the Contract. Signature by both parties constitutes execution of the Contract.

- 19.1 Failure on behalf of the Bidder to deliver the Contract hereto attached together with the acceptable bonds as required in these Documents within seven (7) calendar days shall constitute a finding of default on behalf of the Bidder and shall be grounds for the Owner to award the Contract to the next lowest responsive responsible Bidder as stipulated in Section 18 of these Documents.

20. PLANS FOR CONSTRUCTION

The successful Bidder will be furnished four sets (2 – 24" x 36", 2 – 11" x 17") of Contract Documents without charge. Any additional copies required will be furnished to the Bidder at reproduction cost. Reproduction costs shall be fixed at the rate of \$ 5.00 per sheet in 24" x 36" size and \$ 2.00 per sheet in 11" x 17" size, for the duration of this Agreement.

21. PERFORMANCE AND PAYMENT BOND

The successful Bidder shall file with the Owner a Performance Bond and a Payment Bond on the forms bound herewith, each in the amount of 100 percent of the Contract Price in accordance with the requirement of Florida Statutes Section 255.05 or 713.23, as applicable, as security for the faithful performance of the Contract and the payment of all persons supplying labor and materials for the construction of the work, and to cover all guarantees against defective workmanship or materials for the construction of the work, and to cover all guarantees against defective workmanship or materials, or both, for a period of 1 year after the day of final acceptance of the work by the Owner. The Surety furnishing this bond shall have a sound financial standing and a record of service satisfactory to the Owner, shall be authorized to do business in the State of Florida, and shall be listed on the current U.S. Department of Treasury Circular Number 570, or amendments thereto in the Federal Register, of acceptable Sureties for Federal projects. The attorney-in-fact (Resident Agent) who executes this Performance and Payment Bond in behalf of the Surety must attach a notarized

copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the Bond.

21.1 All Contracts, Performance and Payment Bonds, and respective powers-of-attorney shall have the same date.

22. FAILURE TO EXECUTE CONTRACT AND FURNISH BOND

The Bidder who has a Contract awarded to him and who fails to promptly and properly execute the Contract and furnish the Performance and Payment Bond shall forfeit the bid security that accompanied his bid, and the bid security shall be retained as liquidated damages by the Owner, and it is agreed that this sum is a fair estimate of the amount of damages the Owner will sustain in case the Bidder fails to enter into a Contract and furnish the bond as hereinbefore provided. Bid security deposited in the form of cash, a certified check, or cashier's check drawn on a local bank in good standing shall be subject to the same requirements as a Bid Bond.

23. TIME OF COMPLETION

The time of completion of the work to be performed under this Contract is in the essence of the Contract. Delays and extensions of time may be allowed only in accordance with the provisions stated in the appropriate section of the General Conditions. The time allowed for the completion of the work shall be stated in the proposal.

24. SWORN STATEMENT - PUBLIC ENTITY CRIMES

No public entity shall accept any bid from, award any contract to, or transact any business with any person or affiliate in excess of the threshold for Category II in 287.017, Florida Statutes for a period of thirty-six (36) months from the date the person or affiliate was placed on the convicted vendors list. This applies to contractors, suppliers, subcontractors and consultants.

25. IF THE CONTRACTOR HAD QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT Town of Golden Beach, 1 Golden Beach Drive, Golden Beach, FL 33160, 305.932.0744, lperez@goldenbeach.us.

Contractor is to comply with Florida's Public Records Laws, specifically to:

- a. Keep and maintain public records required by the public agency to perform the service.
- b. Upon request from the public agency's custodian of public records, provide the public agency with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in this chapter 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 contractor 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 the contractor or keep and maintain public records required by the public agency to perform the service. If the contractor transfers all public records to the public agency upon completion of the contract, 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 contract, the contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the public agency, upon request from the public agency's custodian of public records, in a format that is compatible with the information technology systems of the public agency.

END OF SECTION

SECTION 00320

GEOTECHNICAL DATA

PART 1 GENERAL

1.01 SUMMARY

- A. **The OWNER has obtained limited geotechnical information for this project and is attached to this section. This information does not release the bidder from conducting his/her own investigation prior to submitting the bid.**

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)



Engineering Testing and Inspection Service
Established 1949

November 3, 2023

Craig A. Smith & Associates
Attention: Al Caruso, Project Manager
21045 Commercial Trail
Boca Raton, Florida 33486

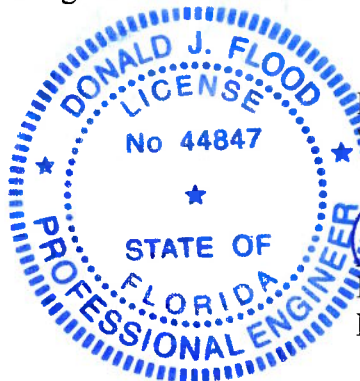
Reference: Addendum to Report of Subsurface Soil Exploration and
Geotechnical Engineering Evaluation of Subsurface Conditions
Project: John Tweddle Park - Stormwater Pump Station Improvements
Location: 107 Golden Beach Drive, Golden Beach, Florida
WLI Order No. 23-1185 Addendum

Gentlemen:

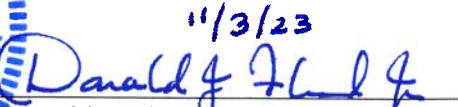
We are pleased to present this addendum to our report of subsurface soil exploration and geotechnical engineering evaluation for the subject site. These services were performed in general accordance with the Professional Services Agreement dated April 26, 2023, and our report was issued May 26, 2023. This addendum and our issued report present our evaluation and specific recommendations for the proposed construction together with the field data.

This addendum and our issued report were prepared in compliance with the 7th Edition of the Florida Building Code (2020).

We appreciate this opportunity to be of service to you during this phase of the project. If you have any questions or comments regarding the information contained in this report, please contact the undersigned.



Respectfully submitted,
WINGERTER LABORATORIES, INC.

11/3/23

Donald J. Flood, Jr., P.E.
Florida Registration No. 44847

enc: Report

In accordance with Rule 61G15-23.001 of the Florida Administrative Code, an original signature is hereby provided for the owner (or owner's representative) and the building official.

ADDENDUM

Wingerter Laboratories, Inc. (WLI) is pleased to present this addendum to our issued report of subsurface soil exploration and geotechnical engineering evaluation for the subject site. The purpose of this investigation was to obtain specific subsurface data in order to provide an engineering evaluation of the subsurface conditions in order to improve stormwater drainage at John Tweddle Park in Golden Beach, Florida.

This addendum letter is to provide further options for the above referenced pump station improvements project. Previous recommendations were made for augercast pilings. Due to the soft organic soils present on the site, a recommendation for driven timber piles is included herein. This type of driven pile is expected to produce more side friction and allow a more feasible pipe support connection process.

This addendum provides an alternative to the options made available in the geotechnical report issued May 26, 2023. Those options can also be used for supporting proposed structures and/or drainage lines if necessary.

Test Boring No. B-1 has shown that a thick layer of very loose sand and organic soils exists from a depth of four to ten feet below existing land surface. These materials are expected to incur settlements and can not be considered as suitable bearing for the pump station and drainage line improvements.

Option 3: Driven Tapered Timber Pile Foundations

The timber piles recommended are based upon a 25 foot long, tapered 12 inch diameter driven timber pile which is embedded five feet into the limestone formation. Note that the test boring obtained did not indicate that refusal could be encountered within the termination point of 30 feet.

The pile vertical capacity has been adjusted to control the pile vertical settlement. Generally, the piles recommended are limited to expect a settlement of less than 0.25 inch. Also, the tabulations for 12 inch diameter pilings' lateral capacities include an expected higher amount of settlement, but still less than 0.50 inch.

12 Inch Driven Tapered Timber Pile Foundations

Design Values	
Shaft Diameter: (round)	12.0 inch
Compressive Capacity:	29 tons
Estimated Settlement:	@ 0.19 inch
Tension Capacity:	5.5 tons
Total Pile Length:	25 feet
Lateral Capacity:	4 tons
Estimated Deflection:	@ 0.43 inch
Rock Embedment into Dense Limestone:	5 feet
Minimum Pile Spacing:	36 inches on center
Load Test Required?	No

Due to the axial load capacity of the above described piles being less than 40 tons, a pile load test is not required by the Florida Building Code 1810.3.3.1.1.

Installation of these piles requires the presence of a geotechnical inspector to monitor and record the pile data. The inspection should be a licensed Geotechnical Engineer's designated representative.

End of Addendum

SECTION 00330

EXISTING CONDITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Site visit is mandatory prior to submittal of a proposal to verify the existing conditions and evaluate the suitability for erection of the facilities.**
- B. Bidders visiting the project site must wear appropriate clothing for safety and identification purposes and must call the Town 24 hours in advance at 305.932.0744. Failure to do so may be considered trespassing and may be asked to leave.**

1.02 RELATED SECTIONS

- A. General Conditions - Bidding and Contract Requirement
- B. General Requirements - Division 1
- C. Construction Photographs and Video Recording - Division 1

1.03 SITE INVESTIGATION AND REPRESENTATION

- A. CONTRACTOR acknowledges the nature and location of the Work, the general and local conditions, particularly those bearing upon availability of transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads, uncertainties of weather or similar physical conditions of the ground, the character of equipment and facilities needed preliminary to and during execution of the work and matters which can affect the work or the cost thereof under this contract.
- B. The CONTRACTOR further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials to be encountered from inspecting the site and from evaluating information derived from exploratory work that may have been done by the OWNER or included in these Contract Documents.
- C. Failure by the CONTRACTOR to acquaint himself with the available information will not relieve him from responsibility for properly estimating the difficulty or cost of successfully performing the work.

1.04 INFORMATION ON SITE CONDITIONS

A. Information obtained by the OWNER regarding site conditions, topography, subsurface information, groundwater elevations, existing construction of site facilities as applicable and similar data will be available for inspection at the office of the ENGINEER upon request.

1. This information is offered as supplementary information only.

2. Neither the ENGINEER nor the OWNER assumes responsibility for the completeness or for the CONTRACTOR's interpretation of this supplementary information.

1.05 SUBSURFACE INFORMATION

A. Information regarding the subsurface at the project site that the OWNER has obtained, may be examined by prospective bidders prior to the receipt of proposals.

1.06 BIDDER'S SUBSURFACE INVESTIGATION

A. Bidders are invited, at their own expense, to make additional subsurface investigation by boring or test pit excavation as may be desired, provided however, that this work be scheduled by appointment with the ENGINEER.

B. Specific to this Bid, excavations within the limestone are expected to be difficult and slow due to the hardness of the rock. Contractors bidding the work should recognize the variable nature of and the very well cemented condition of the rock and be prepared to deal with these conditions accordingly.

1.07 DIFFERING SUBSURFACE CONDITIONS

A. In the event subsurface or latent physical conditions are found materially different from those indicated in these Documents and differing materially from those ordinarily encountered and generally recognized as inherent in the character of work covered in these Contract Documents, promptly and before these conditions are disturbed, notify the ENGINEER in writing of these changed conditions.

B. The ENGINEER will investigate these conditions promptly and following this investigation, the CONTRACTOR shall proceed with the work unless otherwise instructed by the ENGINEER.

1. If the ENGINEER finds that these conditions do so materially differ and cause an increase or decrease in the cost of, or in the time required for performing the work, the ENGINEER will recommend to the OWNER the amount of adjustment in cost and time he considers reasonable.

2. The OWNER will make the final decision on Change Orders to the Contract regarding adjustment in cost or time for completion.

1.08 EXISTING UTILITIES

- A. Known utilities and structures adjacent to or encountered in the work are shown in the Drawings.
 1. The locations shown are taken from existing records and the best information available from existing utility plans; however, it is expected that there may be some discrepancies and omissions in the locations and quantities of utilities and structures shown.
 2. Those shown are for the convenience of the CONTRACTOR only, and no responsibility is assumed by either the OWNER or the ENGINEER for their accuracy or completeness.
- B. Additional costs incurred for idle time of equipment or labor as a result of uncovering unknown utilities shall be for the CONTRACTOR's account.
- C. Notify the ENGINEER of conflict between existing utilities and work to be performed.

1.09 CONTRACTOR'S RESPONSIBILITY FOR UTILITY, PROPERTY, AND SERVICE

- A. Make arrangements for protection of utilities, properties, and services such as railway, telegraph, television, power, oil, gas, water, sewer, or irrigation systems.
- B. Notify utility offices affected by construction operation at least forty-eight (48) hours in advance.
 1. Under no circumstance shall utilities be exposed without first obtaining permission from the appropriate agency.
 2. Once permission has been granted, the existing underground utilities may be located, exposed and temporary support of these utilities shall be provided.
- C. CONTRACTOR is responsible to the owner and operators of these properties for damage, injury, expense, loss, inconvenience, delay, suits, actions, or claims of character brought because of injuries or damage which may result from the construction operations under this Contract.
- D. Neither the OWNER nor its officers or agents shall be responsible to the CONTRACTOR for damages as a result of the CONTRACTOR's failure to protect utilities encountered in the work.

- E. In the event of interruption to domestic water, sewer, storm drain or other utility services as a result of accidental breakage due to construction operations, promptly notify the owner of the utility and cooperate with the owner in restoration of service as promptly as possible and bear costs of repair.
 - 1. In no event shall interruption of utility service be allowed outside working hours unless granted by the owner of the utility.
- F. With prior approval by owner of utility and at CONTRACTOR's expense interfering water service lines may be cut, dug through restored with similar approved materials.
- G. Replace other existing utilities or structures removed or damaged during construction, at CONTRACTOR's expense, unless otherwise provided for in the Contract Documents.

1.10 INTERFERING STRUCTURES

- A. Take necessary precautions to prevent damage to existing structures whether on the surface, above ground, or underground.
 - 1. An attempt has been made to show major structures in the Drawings.
 - 2. While the information has been compiled from the best available sources, its completeness and accuracy cannot be guaranteed, and it is presented as a guide to avoid possible difficulties.
- B. Protect existing structures from damage, whether or not they lie within the limits of the easements obtained by the OWNER.
 - 1. Where existing fences, gates, barns, sheds, buildings, or other structure must be removed to properly carry out the work or are damaged during the work, they shall be restored at the CONTRACTOR's expense to their original condition and to the satisfaction of the property owner.
- C. Without additional compensation, the CONTRACTOR may remove and replace, in a condition as good as or better than original, small structures such as fences, mailboxes, and signposts that interfere with the CONTRACTOR's operations.

1.11 FIELD RELOCATIONS

- A. Relocations shall be made only by direction of the ENGINEER.
- B. If existing structures are encountered that will prevent construction as shown, notify the ENGINEER before continuing with the work in order that the ENGINEER may make these field revisions to avoid conflict with the existing structures.

- C. If the CONTRACTOR fails to notify the ENGINEER when an existing structure is encountered and proceeds with the work despite this interference, he shall do so at his own risk.

1.12 EASEMENTS

- A. Work will be located on County or City owned or leased land, easements, and permits have been provided by the OWNER.
1. Easements will provide for the use of property for construction purposes only to the extent indicated on the easements.
 2. It shall be the CONTRACTOR's responsibility to determine the adequacy of the easement obtained in every case and abide by requirements and provisions of the easement.
 3. Confine contract construction operations to within the easement limits or make special arrangements with the OWNER for the additional area required.
 4. Damage to property, either inside or outside the limits of the easements provided by the OWNER, shall be the responsibility of the CONTRACTOR.

1.13 SURVEYS

- A. Verify accuracy of survey or existing site information shown in the Drawings or in specifications.
1. Notify the ENGINEER immediately upon finding errors, inaccuracies or omissions in the survey data.
 2. The commencing of the work by the CONTRACTOR shall be held as acceptance by the CONTRACTOR of the survey data, after which the CONTRACTOR shall have no claim against the OWNER resulting from alleged errors, inaccuracies, or omissions in the survey data.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 00410

BID FORM

**TOWN OF GOLDEN BEACH
TWEDDLE PARK PUMP STATION RETROFIT PROJECT
CAS PROJECT No. 08-23-037**

THIS BID IS SUBMITTED TO:

**Town of Golden Beach
1 Golden Beach Drive
Golden Beach, FL 33160**

1. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an agreement with Owner in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. BIDDER accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for ninety (90) days after the day of Bid opening. BIDDER will sign and submit the Agreement with the Bonds and other documents required by the Bidding Requirements within ten days after the date of Owner's Notice of Award.
3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:
 - (a) BIDDER has examined copies of all the Bidding Documents and of the following Addenda (receipt of all which is hereby acknowledged.)

Addendum No: _____ Dated: _____

Addendum No: _____ Dated: _____

Addendum No: _____ Dated: _____

Addendum No: _____ Dated: _____

Addendum No: _____ Dated: _____
 - (b) BIDDER has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Law and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.
 - (c) BIDDER has studied carefully all reports and drawings of subsurface conditions and drawings of physical conditions.

- (d) BIDDER has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests and studies (in addition to or to supplement those referred to in (c) above) which pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents, and no additional examinations, investigations, explorations, tests, reports or similar information or data are or will be required by BIDDER for such purposes.
- (e) BIDDER has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports or similar information or data in respect of said Underground Facilities are or will be required to be performed by Owner for Bidder in order for Bidder to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents.
- (f) BIDDER has correlated the results of all such observations, examinations, investigations, explorations, tests, reports and studies with the terms and conditions of the Contract Documents.
- (g) BIDDER has given ENGINEER written notice of all conflicts, errors, discrepancies that it has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to BIDDER.
- (h) This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; BIDDER has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over the Owner.

4. Bidder agrees to complete the work for the following total price:

Bid Total \$ _____
Dollars and cents in numbers

Total Amount in Dollar and cents Written out in words

5. BIDDER agrees that the work will be complete within one hundred twenty (120) calendar days after the date stipulated in the Notice to Proceed.

Bidders Name _____

6. Communications concerning this Bid shall be addressed to:

Bidder: _____
Name of Individual, Firm, Partnership, Corporation or Joint Venture

Address: _____
Mailing address

Address: _____
Street Address, City, State, and Zip Code

To Attention of: _____

7. The terms used in this Bid, which are defined in the General Conditions of the Construction Contract included as part of the Contract documents, have the same meanings assigned to them as found in the General Conditions - Definitions.

SUBMITTED on this _____ day of _____, 20____.

Bidders Name _____

If BIDDER is:

An Individual

By: _____
Individual's Name

(SEAL)

doing business as _____

Business address: _____

Phone No: _____ Facsimile No: _____

E-mail Address: _____ Cellular Phone No: _____

Emergency Contact Number: _____

Emergency Contact Number: _____

Emergency Contact Number: _____

Bidders Name _____

If BIDDER is:

A Partnership

By: _____
Firm's Name

(SEAL)

General Partner

Business address: _____

Phone No: _____ Facsimile No: _____

E-mail Address: _____ Cellular Phone No: _____

Emergency Contact Number: _____

Emergency Contact Number: _____

Emergency Contact Number: _____

Bidders Name _____

If BIDDER is:

A Corporation

By _____
Corporation name

State of Incorporation

By _____
Name of Person Authorized to Sign

Title

(Corporate Seal)

Attest _____
President

Business address: _____

Phone No: _____ Facsimile No: _____

E-mail Address: _____ Cellular Phone No: _____

Emergency Contact Number: _____

Emergency Contact Number: _____

Emergency Contact Number: _____

Bidders Name _____

If BIDDER is:

A Joint Venture

By: _____
Print or Type Name of First Party to Joint Venture

Street Address, City, State, and Zip Code

(Corporate Seal)

Attest _____ Title _____
Signature of Owner, President or Authorized Representative Print or type title

Business address: _____

Phone No: _____ Facsimile No: _____

E-mail Address: _____ Cellular Phone No: _____

Emergency Contact No: _____

Emergency Contact No: _____

Emergency Contact No: _____

By: _____
Print or Type Name of Second Party to Joint Venture

Street Address, City, State, and Zip Code

(Corporate Seal)

Attest _____ Title _____
Signature of Owner, President or Authorized Representative Print or type title

Business address: _____

Phone No: _____ Facsimile No: _____

E-mail Address: _____ Cellular Phone No: _____

Emergency Contact No: _____

Emergency Contact No: _____

Emergency Contact No: _____

(Each Individual, Firm, Partnership, or Corporation of the Joint Venture must sign. The manner of signing for each entity that is a party to the Joint Venture should be in the manner indicated above. Add additional sheets as necessary.)

SUBCONTRACTORS

In the form provided below, the Bidder shall list all Subcontractors proposed for use on this project, if the Bidder is awarded the Contract for this project. Note that all Subcontractors shall meet the standards that apply to the prime contractor.

WORK CLASSIFICATION**NAME AND ADDRESS OF SUBCONTRACTOR**_____
Print or Type Class of Work_____
Print or Type Name of Individual, Firm, Partnership, or Corporation_____
Print or Type Street address, City, State, and Zip Code_____
Print or Type Class of Work_____
Print or Type Name of Individual, Firm, Partnership, or Corporation_____
Print or Type Street address, City, State, and Zip Code_____
Print or Type Class of Work_____
Print or Type Name of Individual, Firm, Partnership, or Corporation_____
Print or Type Street address, City, State, and Zip Code_____
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Print or Type Street address, City, State, and Zip Code_____
Print or Type Class of Work_____
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Print or Type Street address, City, State, and Zip Code_____
Print or Type Class of Work_____
Print or Type Name of Individual, Firm, Partnership, or Corporation_____
Print or Type Street address, City, State, and Zip Code_____
Print or Type Class of Work_____
Print or Type Name of Individual, Firm, Partnership, or Corporation_____
Print or Type Street address, City, State, and Zip Code_____
Print or Type Class of Work_____
Print or Type Name of Individual, Firm, Partnership, or Corporation_____
Print or Type Street address, City, State, and Zip Code

QUESTIONNAIRE

Questionnaire sheet to be filled in by BIDDER.

The undersigned guarantees the truth and accuracy of all statements and answers herein contained:

1. How many years has your organization been in business as a general contractor?

2. List any public works contracts you have performed with any governmental agency having a value in excess of \$800,000 within the last 10 years:

3. Were all contracts listed in No. 2 above completed within the time period without extensions?

4. Were liquidated damages incurred by you, the contractor, for non-timely completion?

Were liquidated damages incurred by you, the contractor, the extent to which additional time extensions were granted on all contracts that were not so timely completed?

5. Was the Surety on any Public Works Section 255.05 Bond ever notified that the BIDDER was in default in the performance of such contracts? And if such default notice was so given, please indicate in detail how much claim default was resolved:

6. Indicate the number of times in which arbitration or litigation ensued from any said Public Works contract within the last 10 years as well as the result of such arbitration of litigation (i.e. whether the same was settled or resolved by trial and who prevailed between the BIDDER and the governmental agency involved.):

7. Please provide a current work load, percent completed for each project, and history of similar projects you have completed, other than those listed in No. 2 above. Including Project Name, Owner (phone number), Value of Work Performed, Percentage Completed (attach separate sheet as needed).

8. What is the last project of this nature that you have completed involving a stormwater pump station? Provide Owner's name and phone.

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

10. The following are named as three corporations or individuals for which you have performed work and to which you refer.

11. Have you personally inspected the proposed work?

12. How much of the work will you be performing on the project?

Provide a percentage: _____ %

Will you sublet any part of this work? If so, give details and provide percentage breakdowns. Provide references for a subcontractor in the event the subcontractor will be performing the majority (51% or >) of the work if applicable and **provide working relationship history**.

13. **Attach the following requested information to your bid. Failure to do so may render the bid as non-responsive.**

Qualifications

Bidder's relevant experience, qualifications and past performance:

- **An explanation of why the Bidder is the best qualified to perform the contract and demonstrate its qualifications including an item-by-item disclosure outlining how the firm meets or exceeds the requirements of this Bid.**
- **A schedule of proposed services. The schedule should include the Bidder's understanding of the issues and tasks of the project at hand.**
- **A list of similar completed projects for work completed in the last eight (8) years.**
- **Owned equipment to be utilized on the project noting if it is owned by the prime, subcontractor or rented.**

Staffing

Relevant experience and qualifications of key personnel, including key personnel of subcontractors, that will be assigned to this project and experience and qualifications of subcontractors. The composition of the staff team should include:

- **The names of the employees in the area responsible for this contract.**
- **Their function in the company.**
- **The name of the person who will be responsible for the coordination of work.**
- **Experience and qualifications of staff and satisfactory record of performance of staff.**

- Education, certificates and licenses held by key staff.
- Bidder must confirm that it will comply with E-Verify as referenced in the United States Citizenship and Immigration Services with I-9 form to be provided to the Town (<https://www.uscis.gov/e-verify>).

Note: changes in personnel after bid award must receive prior approval by Engineer and/or the Town.

Schedule / Methodology

- Bidders approach methodology to providing the services requested in this solicitation
- Suitability of the methodologies and approaches used in achieving tasks
- Overall organization to completing the project
- Ability to meet desired timelines and deadlines

14. Identify FDEP certified Stormwater, Erosion, and Sedimentation Control Inspector(s) (<http://www.dep.state.fl.us/water/nonpoint/erosion.htm>) on staff. Provide names of personnel responsible to oversee the Erosion, and Sedimentation Control efforts of the project & FDEP Inspector Number for each. Bidder shall maintain daily logs of monitoring and update/maintain all installed control measures.

Are you fully familiar with the implementation of sediment and erosion control best management practices via a stormwater pollution prevention plan (SWPPP) and the regulatory expectations and requirements of the SFWMD, Broward County, & FDEP for proposed construction activities?

(yes/no) _____

15. State the true, exact, correct and complete name of the partnership, corporation or trade name under which you do business, and the address of the place of business. If a corporation, state the name of the president and secretary. If a partnership, state the names of all partners. If a trade name, state the names of the individuals who do business under the trade name). It is absolutely necessary that this information be furnished.

(Correct Name of BIDDER)

(a) The business is a _____

(b) The address of principal place of business is:

(c) The names of the corporate officers, or partners, or individuals doing business under a trade name are as follows:

(BIDDER)

Bidder Name: _____

TOWN OF GOLDEN BEACH

TWEDDLE PARK PUMP STATION RETROFIT PROJECT

FDEP 22FRP40 GRANT

CAS PROJECT NO. 08-23-037

1. BIDDER AGREES TO PERFORM ALL THE WORK DESCRIBED IN THE CONTRACT DOCUMENTS TO PROVIDE A COMPLETE PROJECT AS SHOWN ON THE PLANS AND SPECIFICATIONS FOR THE FOLLOWING LUMP SUM AND/OR UNIT PRICES.

2. BIDS SHALL INCLUDE SALES TAX AND ALL OTHER APPLICABLE TAXES AND FEES.

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL

THE LUMP SUM (LS) PRICES FOR ITEMS 1-4 SHALL BE DONE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND SPECIFICATIONS AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL REQUIREMENTS. COSTS FOR PRE-CONSTRUCTION SURVEY ARE TO BE INCORPORATED INTO ITEM 1.

1	Mobilization	1	LS		
2	Maintenance of Traffic	1	LS		
3	Survey Stakeout and As-Builts	1	LS		
4	Density Testing	1	LS		

THE LUMP SUM (LS) PRICE FOR CLEARING & STRIPPING SHALL INCLUDE BUT NOT BE LIMITED TO REMOVAL AND DISPOSAL OF EXISTING GROUND COVERINGS, ASPHALT PAVEMENT, CONCRETE PAVEMENT, LIMEROCK AND SUBGRADE (WHERE APPLICABLE), TREES AND/OR ALL OTHER ORGANIC MATERIAL FROM RIGHT OF WAY TO RIGHT OF WAY AS NECESSARY TO PERFORM THE WORK STIPULATED IN THESE CONTRACT DOCUMENTS. THE LUMP SUM PRICE SHALL ALSO INCLUDE BUT NOT BE LIMITED TO REMOVAL, PROTECTION, STORAGE AND REINSTALLATION OF PRIVATELY OWNED MAILBOXES, DECORATIVE STONE, LANDSCAPING, SIDEWALKS AND SPRINKLER SYSTEMS EXISTING WITHIN THE WORK ZONE. ALL ITEMS SHALL BE RESTORED TO AS EXISTING OR BETTER CONDITION.

5	Clearing and Stripping	1	LS		
6	Demo within Pump Station	1	LS		

IN ADDITION TO THE ABOVE DESCRIPTION, THE LUMP SUM (LS) PRICE FOR BID ITEM NO. 7 SHALL INCLUDE BUT NOT BE LIMITED TO THE INSTALLATION OF TEMPORARY DAMS, TURBIDITY CURTAINS, SILT FENCES, SOD FOR EROSION CONTROL (NOT FOR FINAL) OR OTHER APPROPRIATE BEST MANAGEMENT PRACTICES TO CONTROL SEDIMENT & EROSION, NPDES PERMITTING, SWPPP PERIODIC MONITORING AND MAINTENANCE, & COMPLIANCE WITH SOUTH FLORIDA WATER MANAGEMENT DISTRICT (SFWMD), COUNTY, & FDEP PERMITS ISSUED FOR THE PROJECT. THE SWPPP PLAN & NPDES PERMIT WILL BE SUBMITTED AT THE PRE-CONSTRUCTION MEETING. CONTRACTOR IS TO ASSUME FULL RESPONSIBILITY WITH ALL APPLICABLE SFWMD, COUNTY, & FDEP PERMITS ISSUED FOR THE PROJECT PERTAINING TO SEDIMENT & EROSION CONTROL & DEWATERING.

7	Environmental Compliance	1	LS		

Bidder Name: _____

TOWN OF GOLDEN BEACH

TWEDDLE PARK PUMP STATION RETROFIT PROJECT

FDEP 22FRP40 GRANT

CAS PROJECT NO. 08-23-037

1. BIDDER AGREES TO PERFORM ALL THE WORK DESCRIBED IN THE CONTRACT DOCUMENTS TO PROVIDE A COMPLETE PROJECT AS SHOWN ON THE PLANS AND SPECIFICATIONS FOR THE FOLLOWING LUMP SUM AND/OR UNIT PRICES.

2. BIDS SHALL INCLUDE SALES TAX AND ALL OTHER APPLICABLE TAXES AND FEES.

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL

DRAINAGE STRUCTURE ITEMS 7 - 11 (Full Restoration)

THE PRICE FOR EACH DRAINAGE STRUCTURE CONSTRUCTION ITEM SHALL INCLUDE BUT NOT BE LIMITED TO ALL LABOR, EQUIPMENT AND MATERIALS NECESSARY TO INSTALL AND CONSTRUCT THESE ITEMS IN ACCORDANCE WITH THESE CONTRACT DOCUMENTS WHICH INCLUDE ALL SAW CUTTING, ASPHALT REMOVAL AND DISPOSAL, EXCAVATION, DE-WATERING, DE-WATERING & NPDES PERMITS, BEDDING MATERIAL, BACKFILL BASE MATERIAL, BACKFILL LIMEROCK BASE MATERIAL, COMPACTION, MATERIAL TO BE RESTORED TO SAME ELEVATION AS EXISTING ASPHALT PAVEMENT (GRADE TO SLOPE) GRADING, TESTING, INSPECTIONS AND ANY OTHER MISCELLANEOUS WORK. NO ADDITIONAL COMPENSATION SHALL BE MADE FOR CHANGES IN ALIGNMENT OR GRADE TO AVOID EXISTING INFRASTRUCTURE UNLESS THE EXCAVATIONS EXCEED TEN (10) FEET IN DEPTH.

8	Coordinate Pump Installation from MWI	1	LS		
9	Disconnect & Reconnect Electric for new Pumps	1	LS		

DRAINAGE STRUCTURE ITEMS 7 - 11 (Full Restoration)

THE PRICE FOR EACH DRAINAGE STRUCTURE CONSTRUCTION ITEM SHALL INCLUDE BUT NOT BE LIMITED TO ALL LABOR, EQUIPMENT AND MATERIALS NECESSARY TO INSTALL AND CONSTRUCT THESE ITEMS IN ACCORDANCE WITH THESE CONTRACT DOCUMENTS WHICH INCLUDE ALL SAW CUTTING, ASPHALT REMOVAL AND DISPOSAL, EXCAVATION, DE-WATERING, DE-WATERING & NPDES PERMITS, BEDDING MATERIAL,

10	5' x 4' MH w/USF 580	1	EA		
11	M-5 Manhole w/USF 580	2	EA		
12	7' x 5' Weir Box w/(2) USF 580	1	EA		
13	8' Diameter Downstream Defender	2	EA		
Pipes & Fitting Items 14 - 28 (Full Restoration)					

THE PRICE FOR EACH CONSTRUCTION ITEM SHALL INCLUDE BUT NOT BE LIMITED TO ALL LABOR, EQUIPMENT AND MATERIALS NECESSARY TO INSTALL AND CONSTRUCT THESE ITEMS IN ACCORDANCE WITH THESE CONTRACT DOCUMENTS WHICH INCLUDE ALL SAW CUTTING, ASPHALT REMOVAL AND DISPOSAL, EXCAVATION, DE-WATERING, DE-WATERING & NPDES PERMITS, BEDDING MATERIAL, BACKFILL BASE MATERIAL, BACKFILL LIMEROCK BASE MATERIAL, COMPACTION, MATERIAL TO BE RESTORED TO SAME ELEVATION AS EXISTING ASPHALT PAVEMENT (GRADE TO SLOPE) GRADING, TESTING, INSPECTIONS AND ANY OTHER MISCELLANEOUS WORK. NO ADDITIONAL COMPENSATION SHALL BE MADE FOR CHANGES IN ALIGNMENT OR GRADE TO AVOID EXISTING INFRASTRUCTURE UNLESS THE EXCAVATIONS EXCEED TEN (10) FEET IN DEPTH.

14	24" A2000 PVC	31	LF		
15	24" DIP	7	LF		
16	30" A2000 PVC	13	LF		
17	42" RCP Pipe	44	LF		

Bidder Name: _____

TOWN OF GOLDEN BEACH

TWEDDLE PARK PUMP STATION RETROFIT PROJECT

FDEP 22FRP40 GRANT

CAS PROJECT NO. 08-23-037

1. BIDDER AGREES TO PERFORM ALL THE WORK DESCRIBED IN THE CONTRACT DOCUMENTS TO PROVIDE A COMPLETE PROJECT AS SHOWN ON THE PLANS AND SPECIFICATIONS FOR THE FOLLOWING LUMP SUM AND/OR UNIT PRICES.

2. BIDS SHALL INCLUDE SALES TAX AND ALL OTHER APPLICABLE TAXES AND FEES.

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
18	16" DIP Force Main	25	LF		
19	30" DIP Force Main	12	LF		
20	16" DIP 90 Degree Flange Bend	2	EA		
21	16" DIP 45 Degree Flange Bend	2	EA		
22	16" x 16" DIP Tee	1	EA		
23	30" x 16" DIP Reducer	1	EA		
24	30" DIP 45 Degree Flange Bend	4	EA		
25	30" x 24" DIP Tee	1	EA		
26	16" Swing Type Lever & Weight Flanged Check Valve	2	EA		
27	16" Resilient Wedge Flanged Gate Valve	2	EA		
28	24" Tideflex Checkmate Valve and install to existing 24" Pipe	1	EA		
	Miscellaneous Items 29 - 43 (Full Restoration)				
THE PRICE FOR EACH CONSTRUCTION ITEM SHALL INCLUDE BUT NOT BE LIMITED TO ALL LABOR, EQUIPMENT AND MATERIALS NECESSARY TO INSTALL AND CONSTRUCT THESE ITEMS IN ACCORDANCE WITH THESE CONTRACT DOCUMENTS WHICH INCLUDE ALL SAW CUTTING, ASPHALT REMOVAL AND DISPOSAL, EXCAVATION, DE-WATERING, DE-WATERING & NPDES PERMITS, BEDDING MATERIAL, BACKFILL BASE MATERIAL, BACKFILL LIMEROCK BASE MATERIAL, COMPACTION, MATERIAL TO BE RESTORED TO SAME ELEVATION AS EXISTING ASPHALT PAVEMENT (GRADE TO SLOPE) GRADING, TESTING, INSPECTIONS AND ANY OTHER MISCELLANEOUS WORK. NO ADDITIONAL COMPENSATION SHALL BE MADE FOR CHANGES IN ALIGNMENT OR GRADE TO AVOID EXISTING INFRASTRUCTURE UNLESS THE EXCAVATIONS EXCEED TEN (10) FEET IN DEPTH.					
29	Remove Existing MH (4' ROUND & 4' X 4' RECT)	2	EA		
30	Augured Piles (For Proposed Drainage Structures, Drainage Pipes & Force Main)	14	EA		
31	Concrete Backfill in Pump Station	6	CY		
32	Connect Existing 30" DIP new to new 30" DIP w/necessary fittings	1	EA		

Bidder Name: _____

TOWN OF GOLDEN BEACH

TWEDDLE PARK PUMP STATION RETROFIT PROJECT

FDEP 22FRP40 GRANT

CAS PROJECT NO. 08-23-037

1. BIDDER AGREES TO PERFORM ALL THE WORK DESCRIBED IN THE CONTRACT DOCUMENTS TO PROVIDE A COMPLETE PROJECT AS SHOWN ON THE PLANS AND SPECIFICATIONS FOR THE FOLLOWING LUMP SUM AND/OR UNIT PRICES.

2. BIDS SHALL INCLUDE SALES TAX AND ALL OTHER APPLICABLE TAXES AND FEES.

ITEM NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
33	Core Exist. Structure and Connect 42" RCP	1	LS		
34	36" Storm Plug for Structure 5 (N)	1	EA		
35	30" Storm Plug for Structure 6 (S)	1	EA		
36	30" Storm Plug at Existing Oil/Water Separator (N)	1	EA		
37	24" Storm Plug at Existing Oil/Water Separator (S)	1	EA		
38	Modification of Existing Weir Wall	1	LS		
39	Stainless Steel Pipe Support	1	LS		
40	Install Doors at Pump Station Building (similar to existing door)	2	EA		
41	Deflect existing Gas main Over/Under Storm	1	EA		
42	Deflect existing watermain Over/Under Storm	1	EA		
43	Permit Allowance for Contractor Permits	1	LS	\$ 8,500	\$ 8,500
BID TOTAL (ITEMS 1 - 43)					

SECTION 00433

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____

as Principal and Contractor, and _____

hereinafter called Surety, are held and firmly bound unto Owner, a political entity of the State of Florida, and represented by its Chairman called Owner, in the sum of five percent (5%) of the total amount bid of:

(Written Dollar Amount)

dollars (\$_____) lawful money of the United States of America, for the payment of which well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally by these presents.

WHEREAS, the Principal contemplates submitting or has submitted, a bid to the Owner for the furnishing of all labor, materials, equipment, machinery, tools, apparatus, means of transportation for, and the performance of the work covered in the Proposal and the detailed Drawings and Specifications, entitled:

**TOWN OF GOLDEN BEACH
TWEDDLE PARK PUMP STATION RETROFIT PROJECT
CAS PROJECT No. 08-23-037**

WHEREAS, it was a condition precedent to the submission of said bid that a cashier's check, certified check, or bid bond in the amount of 5 percent of the Base Bid be submitted with said bid as a guarantee that the Bidder would, if awarded the Contract, enter into a written Contract with the Owner for the performance of said Contract, within 10 consecutive calendar days after written notice having been given of the award of the Contract.

NOW, THEREFORE, the conditions of this obligation are such that if the Principal within 10 consecutive calendar days after written notice of such acceptance, enters into a written Contract with Owner and furnishes the Performance and Payment Bonds, each in an amount equal to 100 percent of the Awarded Bid, satisfactory to the Owner, then this obligation shall be void; otherwise the sum herein stated shall be due and payable to Owner and the Surety herein agrees to pay said sum immediately upon demand of the Owner in good and lawful money of the United States of America, as liquidated damages for failure thereof of said Principal.

IN WITNESS WHEREOF, the said _____
as Principal herein, has caused these presents to be signed in its name by
its _____ and
attested by its _____
under its corporate seal, and the said _____

as Surety herein, has caused these presents to be signed in its name by
its _____
and attested in its name by its _____
under its corporate seal, this _____ day of _____ A.D., 20__.

Signed, sealed and delivered
in the presence of:

PRINCIPAL: _____

BY: _____

NAME: _____

As to Principal

Surety

BY: _____

Attorney-in-Fact
(Power-of-Attorney to be attached)

BY: _____

Resident Agent

As to Surety

END OF SECTION

SECTION 00451

CONTRACTOR'S QUALIFICATIONS FORM

TOWN OF GOLDEN BEACH:

We, _____, hereby attest and
(Prime Contractor)

swear that as CONTRACTORS for **TOWN OF GOLDEN BEACH TWEDDLE PARK
PUMP STATION RETROFIT PROJECT, CAS PROJECT No. 08-23-037** that

(Underground Contractor's Names)

is the Florida Licensed Underground Contractor for this project and that this
Underground Contractor fully complies with Florida regulation governing Underground
Contractors and that:

Prime Contractor

Signature: _____

Printed Name: _____

Title: _____

Company _____

License No. _____
Expiration
Date _____

Underground Contractor

Signature: _____

Printed Name: _____

Title: _____

Company _____

License No. _____
Expiration
Date _____

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

Signature of NOTARY PUBLIC, State of Florida at Large

(Notary Seal)

My Commission expires: _____

END OF SECTION

SECTION 00452
(OPTIONAL)

DISADVANTAGED BUSINESS ENTERPRISE FORM

VENDOR REPRESENTS THAT HE/SHE IS A:

Black Minority Business Enterprise	()	
Hispanic Minority Business Enterprise	()	
Other Minority Business Enterprise	()	Specify: _____
Woman's Business Enterprise	()	
Non-minority Vendor	()	

NAME OF FIRM: _____

BY: _____
(Signature) (Title)

ADDRESS: _____

TELEPHONE NO: _____ STATE LICENSE #: _____
(if applicable)

COUNTY LICENSE #: _____
(if applicable)

CERT. OF COMPLIANCE? YES _____ NO _____

AUTHORIZED NAME TYPED: _____ TITLE: _____

AUTHORIZED SIGNATURE: _____ DATE: _____

END OF SECTION

SWORN STATEMENT
ON PUBLIC ENTITY CRIMES
UNDER FLORIDA STATUTES CHAPTER 287.133(3)(a).

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

1. This sworn statement is submitted with Bid, Proposal or Contract No. _____
for _____.

2. This sworn statement is submitted by _____ (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: _____.)

3. My name is _____ and my
(Please print name of individual signing)

relationship to the entity named above is _____.

4. I understand that a "public entity crime" as defined in Paragraph 287.133(1)(g),
Florida Statutes, means a violation of any state or federal law by a person with
respect to and directly related to the transaction of business with any public entity or
with an agency or political subdivision of any other state or with the United States,
including, but not limited to, any bid or contract for goods or services to be provided
to any public entity or an agency or political subdivision of any other state or of the
United States and involving antitrust, fraud, theft, bribery, collusion, racketeering,
conspiracy, or material misrepresentation.

5. I understand that a "convicted" or "conviction" as defined in Paragraph
287.133(1)(b), Florida Statutes, means a finding of guilt or a conviction of a public
entity crime, with or without an adjudication of guilt, in any federal or state trial court
of record relating to charges brought by indictment or information after July 1, 1989,
as a result of a jury verdict, nonjury trial, or entry of a plea of guilty or nolo
contendere.

6. I understand that an "affiliate" as defined in Paragraph 287.133(1)(a), Florida Statutes, and means:
1. A predecessor or successor of a person convicted of a public entity crime: or
 2. An entity under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime. The term "affiliate" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate. The ownership by one person of shares constituting a controlling interest in another person, or a pooling of equipment or income among persons when not for fair market value under an arm's length agreement, shall be a prima facie case that one person controls another person. A person who knowingly enters into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months shall be considered an affiliate.
7. I understand that a "person" as defined in Paragraph 287.133(1)(e), Florida Statutes, means any natural person or entity organized under the laws of any state or of the United States with the legal power to enter into a binding contract and which bids or applies to bid on contracts for the provision of goods or services let by a public entity, or which otherwise transacts or applies to transact business with a public entity. The term "person" includes those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in management of an entity.
8. Based on information and belief, the statement, which I have marked below, is true in relation to the entity submitting this sworn statement. (Please indicate which statement applies.)

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

___ The entity submitting this sworn statement, or one or more of the officers, directors, executives, partners, shareholders, employees, members, or agents who are active in management of the entity, or an affiliate of the entity has been charged with and convicted of a public entity crime subsequent to July 1, 1989, AND (Please indicate which additional statement applies.)

___ The person or affiliate has not been placed on the convicted vendor list. (Please describe any action taken by or pending with the Department of General Services.)

DATE: _____

STATE OF _____)
) ss.
CITY OF _____)

The foregoing instrument was acknowledged before me this _____ day of _____, 20____ by _____, who is personally known to me or who has produced _____, as identification and who did (did not) take an oath.

(Signature of person taking acknowledgment)

(Name of officer taking acknowledgment)

(Title or Rank)

END OF SECTION

SECTION 00457

ACKNOWLEDGEMENT OF CONFORMANCE
WITH O.S.H.A. STANDARDS

TO TOWN OF GOLDEN BEACH:

We, _____, hereby acknowledge and
(Prime Contractor)

agree that as CONTRACTORS for THE **TOWN OF GOLDEN BEACH TWEDDLE PARK PUMP STATION RETROFIT PROJECT**, as specified have the sole responsibility for compliance with all the requirements of the Federal Occupational Safety and Health Act of 1970, and all State and local safety and health regulations, and agree to indemnify and hold harmless **TOWN OF GOLDEN BEACH** and Craig A. Smith & Associates of Florida, Inc. against any and all liability, claims, damages, losses and expenses they may incur due to the failure of

(Subcontractor's Names)

to comply with such act or regulation.

CONTRACTOR

ATTEST

BY: _____

ATTEST

DATE

END OF SECTION

SECTION 00458

BIDDER'S AFFIDAVIT IN COMPLIANCE WITH
FLORIDA TRENCH SAFETY ACT (CHAPTER 553.60-553.64, FLORIDA STATUTES)

STATE OF FLORIDA)
)ss.
TOWN OF GOLDEN BEACH)

BEFORE ME, the undersigned authority, personally appeared

_____, who being duly sworn deposes and says as follows:

That he/she is duly authorized representative of _____ and such
(Owner) (Partner) (President or other Corporate Officer)
has full authority to execute this Bidder's Affidavit.

1. The full legal name and business address of the person or entity submitting this bid:

2. By submission of this bid and subsequent execution of this Contract, the undersigned Bidder certifies that as successful Bidder (Contractor) all trench excavation done within his control (by his own forces or by his Subcontractors) shall be accomplished in strict adherence with OSHA trench safety standards contained in 29 C.F.R., s. 1926.650, Subpart P, including all subsequent revisions or updates to these standards as adopted by the Department of Labor and Employment Security.
3. The undersigned Bidder certifies that as successful Bidder (Contractor) he has obtained or will obtain identical certification from his proposed Subcontractors that will perform trench excavation prior to award of the subcontracts and that he will retain such certifications in his files for a period of not less than three years following final acceptance.

4. The Bidder acknowledges that included in the various items listed in the Schedule of Prices Bid and in the Total Amount Bid are costs for complying with the Florida Trench Safety Act (Chapter 553.60-553.64, Florida Statutes). The bidder further identifies the costs to be summarized below*:

	Trench Safety Measure	Units of Measure	Unit Quantity	Unit Cost	Extended Cost
A.	_____	_____	_____	_____	
B.	_____	_____	_____	_____	
C.	_____	_____	_____	_____	
D.	_____	_____	_____	_____	
TOTAL:					

Method of Compliance (Specify) _____

Date: _____, 19__

NAME OF AFFIANT

SWORN to and subscribed before me this

_____ day of _____, 20__.

NOTARY PUBLIC, State of Florida at Large

(Notary Seal)

My Commission expires: _____

*Bidders: Add extra sheet(s), if needed.

If Bidder fails to complete and execute this sworn statement/affidavit, his Bid may be declared non-responsive and rejected by **TOWN OF GOLDEN BEACH.**

END OF SECTION

SECTION 00459

DRUG FREE WORK PLACE FORM

The undersigned vendor in accordance with Florida Statute 287-087 hereby certifies that
_____ does:

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

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

Proposer's Signature

END OF SECTION

MEMORANDUM

CRAIG A. SMITH AND ASSOCIATES, INC.
1425 E. Newport Center Drive
Deerfield Beach, FL 33432
TEL (561) 314-4445
FAX (561) 314-4458

To: Bidders

From: Craig A. Smith & Associates

Date:

Project:

Subject: ADDENDUM NO. ____

Bidders are required to acknowledge receipt of this ADDENDUM on Page 00410-1 of the Contract Documents and by returning the acknowledgment on Page 00490-2 of the Contract Documents to our office immediately via fax. Failure to do so may cause the bid to be considered informal or irregular and subject to rejection.

The Contract Documents, Specifications and Drawings are hereby amended as follows:

A. CONTRACT DOCUMENTS AND SPECIFICATIONS:

1.

Addendum No. ____

ACKNOWLEDGMENT OF RECEIPT OF ADDENDUM

I hereby acknowledge receipt of Addendum No. ____ to the Contract Documents, Specifications and Drawings (consisting of ____ pages) for the **TOWN OF GOLDEN BEACH TWEDDLE PARK PUMP STATION RETROFIT PROJECT (CAS PROJECT No. 08-23-037).**

Name of Bidder: _____
Print or type name of firm

By: _____ Title: _____
Print or type name and Title of authorized company official

Signature: _____
Signature OF authorized company official

Date: _____, 20____

END OF SECTION

SECTION 00500

AGREEMENT

THIS AGREEMENT, made and entered into on this ____ day of _____, 2020, by and between _____, Party of the First Part, and **Town of Golden Beach** (OWNER), Party of the Second Part:

W I T N E S S E T H:

That, the First Party, for the consideration hereinafter fully set out, hereby agrees with the Second Party as follows:

1. That the First Party shall furnish all the materials, and perform all of the work in manner and form as provided by the Drawings Identified in Section 00015 List of Drawings, Specifications Identified in Section 00010, and Documents which are attached hereto and made a part hereof, as if fully contained here:
2. That the First Party shall commence the work to be performed under this Agreement on a date to be specified in a written order of the Second Party and shall complete all work hereunder within the length of time stipulated in the BID.
3. That the Second Party hereby agrees to pay to the First Party for the faithful performance of this Agreement, subject to additions and deductions as provided in the Specifications of Proposal, in lawful money of the United States, the amount of:

(Written Dollar Amount)

dollars (\$_____), based on the estimated quantities and Unit or Lump Sum Prices contained herein.

4. That the Second Party shall make monthly partial payments to the First Party on the basis of a duly certified and approved estimate of work performed during each calendar month by the First Party, LESS the retainage provided in the General Conditions, which is to be withheld by the Second Party until work within a particular part has been performed strictly in accordance with this Agreement and until such work has been accepted by the Second Party.
5. That upon submission by the First Party of evidence satisfactory to the Second Party that all payrolls, material bills, and other costs incurred by the First Party in connection with the construction of the work have been paid in full, final payment

on account of this Agreement shall be made within 60 days after the completion by the First Party of all work covered by this Agreement and the acceptance of such work by the Second Party.

6. In the event that the Contractor shall fail to complete the work within the time limit or the extended time limit agreed upon, as more particularly set forth in the Contract Documents, liquidated damages shall be paid at the rate of One Thousand Six Hundred Ninety-Nine and 00/100 Dollars (\$1,699.00) per day until Substantial Completion is reached, plus any monies paid by the OWNER to the Engineer for additional engineering and inspection services associated with such delay.

After Substantial Completion is achieved and in the event that the Contractor shall fail to complete the work within the time limit or the extended time limit agreed upon, as more particularly set forth in the Contract Documents to close-out the project, liquidated damages shall be paid at the rate of Four Hundred ninety and 00/100 Dollars (\$490.00) per day until Final Completion is reached, plus any monies paid by the OWNER to the Engineer for additional engineering and inspection services associated with such delay.

7. It is further mutually agreed between the parties hereto that if, at any time after the execution of this Agreement and the Surety Bond hereto attached for its faithful performance and payment, the Second Party shall deem the Surety or Sureties upon such bond to be unsatisfactory, or if, for any reason such bond ceases to be adequate to cover the performance of the work, the First Party shall, at its expense within 5 days after the receipt of notice from the Second Party so to do, furnish an additional bond or bonds in such form and amount and with such Surety or Sureties as shall be satisfactory to the Second Party. In such event, no further payment to the First Party shall be deemed to be due under this Agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the Second Party.
8. No additional work or extras shall be done unless the same shall be duly authorized by appropriate action by the Party of the Second Part.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and date first above written, in three (3) counterparts, each of which shall, without proof or accounting for the other counterpart be deemed an original Contract.

WITNESSES:

CONTRACTOR:

BY:

NAME:

TITLE:

OWNER:

Town of Golden Beach

BY:

NAME:

TITLE:

AUTHENTICATION:

BY:

NAME:

TITLE:

APPROVED AS TO FORM:

BY:

NAME:

TITLE:

END OF SECTION

SECTION 00510

NOTICE OF AWARD

TO: _____

PROJECT DESCRIPTION: **TOWN OF GOLDEN BEACH TWEDDLE PARK PUMP STATION RETROFIT PROJECT (CAS PROJECT No. 08-23-037)** in accordance with PLANS and CONTRACT DOCUMENTS as prepared by Craig A. Smith & Associates.

TOWN OF GOLDEN BEACH (Owner) has considered the BID submitted by you for the above described WORK in response to its ADVERTISEMENT FOR BIDS and INSTRUCTIONS TO BIDDERS.

You are hereby notified that your Bid has been accepted for the construction in the amount of \$_____.

Upon receipt of the contract documents, you are required by the INSTRUCTIONS TO BIDDERS to execute the AGREEMENT and furnish the required CONTRACTOR'S PERFORMANCE BOND, PAYMENT BOND and certificates of insurance within seven (7) days from the date of this NOTICE to you.

If you fail to execute said AGREEMENT and to furnish said BONDS within seven (7) days from the date of this NOTICE, said Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the Owner.

Dated this ____ day of _____, 20____.

BY: _____
Orlando A. Rubio, PE
Craig A. Smith & Associates

TITLE: Senior Supervising Engineer

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by ____ this ____ day of _____, 20____.

BY: _____

TITLE: _____

END OF SECTION

SECTION 00550

NOTICE TO PROCEED

TO: _____ Date: _____

PROJECT DESCRIPTION: **TOWN OF GOLDEN BEACH TWEDDLE PARK PUMP STATION RETROFIT PROJECT (CAS PROJECT No. 08-23-037)** in accordance with PLANS and CONTRACT DOCUMENTS as prepared by Craig A. Smith & Associates.

You are hereby notified to commence WORK in accordance with the AGREEMENT _____, on or before _____ for the construction and you are to complete this activity prior by _____ achieving substantial completion by _____.

BY: Craig A. Smith & Associates

Orlando A. Rubio, PE
TITLE: VP – Stormwater Engineering

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

_____ this ____ day of _____, 20__.

BY: _____

TITLE: _____

END OF SECTION

SECTION 00614

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____

as Principal and Contractor, and _____
hereinafter called Surety, are held and firmly bound unto

TOWN OF GOLDEN BEACH

a political entity of the State of Florida, and represented by its **MANAGER**, in the sum of

(Written Dollar Amount)

dollars (\$_____), lawful money of the United States of America, for the payment of which well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, by these present.

WHEREAS, the above named Principal has entered into a Contract with **TOWN OF GOLDEN BEACH** (Owner), dated this ____ day of _____, 20__ to furnish at his own cost, charges, and expense all the necessary materials, equipment, and/or labor in strict and express accordance with said Contract **TOWN OF GOLDEN BEACH TWEDDLE PARK PUMP STATION RETROFIT PROJECT (CAS PROJECT No. 08-23-037)** and the Plans, Drawings and Specifications prepared by Craig A. Smith & Associates, all of which is made a part of said contract by certain terms and conditions in said Contract more particularly mentioned, which Contract, consisting of the various Contract Documents specifically mentioned herein and relative thereto, is made a part of this Bond as fully and completely as if said Contract Documents were set forth herein;

NOW THEREFORE, the conditions of this obligation are such that if the above bounded Principal shall in all respects comply with the terms and conditions of said Contract and his obligation thereunder, including the Contract Documents (which include the Plans, Drawings, Specifications and Conditions as prepared by said Consulting Engineers, Invitation to Bid, Instruction to Bidders, the Contractor's Bid as accepted by the Owner against and from all costs, expenses, damages, attorneys fees, including appellate proceedings, injury, or loss to which said Owner may be subject by reason of any wrongdoing, misconduct, want of care or skill, negligence, failure to petition within the prescribed time, or default, including patent infringements, on the part of said Principal, his agents or employees, in the execution or performance of said Contract; then this obligation shall be void; otherwise, to remain in full force and effect for the term of said Contract, including any and all guarantee periods as specifically mentioned in said Contract Documents;

AND, the said Surety for Value received, hereby stipulates and agrees that no change involving any extension of time, or addition to the terms of the Contract or to the work to be performed, or materials to be furnished thereunder, or in the Plans, Drawings and Specifications accompanying the said contract shall affect said obligation of said Surety on this Bond, and the said Surety does hereby waive notice of any such changes, extension of time, alterations, or additions of the terms of the Contract, or to the work, or to the Drawings and Specifications. Claimant shall give written notice to the Contractor and to the Surety as required by Florida Statutes, Section 255.05 or Section 713.23. Any actions against the Contractor or the Surety shall be brought within the time specified by Section 255.05 or Section 713.23.

IN WITNESS WHEREOF, said _____, as Principal and Contractor hereunder has caused these presents to be assigned in three (3) original counterparts in his name, and witnessed by two attesting and subscribing witnesses and the said _____, as Surety, has caused these presents to be signed in three (3) original counterparts in its name by its _____ under its corporate seal, this _____ day of _____ 20__

Signed, sealed and delivered
in the presence of:

PRINCIPAL-CONTRACTOR

BY: _____

TITLE: _____

AS TO PRINCIPAL

SURETY

BY: _____
ATTORNEY-IN-FACT
(POWER-OF-ATTORNEY
TO BE ATTACHED)

AS TO SURETY

BY: _____
RESIDENT AGENT

END OF SECTION

SECTION 00615

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we, _____,
as Principal and Contractor, AND _____

hereinafter called Surety, are held and firmly bound unto

TOWN OF GOLDEN BEACH

a political entity of the State of Florida, and represented by its **MANAGER**, in the sum of

(Written Dollar Amount)

dollars (\$ _____), lawful money of the United State of America, for the payment of which well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, by these present.

WHEREAS, the above named Principal has entered into a Contract with the Owner, dated this ____ day of _____, 20__ to furnish at his own cost, charges and expense all the necessary materials, equipment, and/or labor in strict and express accordance with said Contract **TOWN OF GOLDEN BEACH TWEDDLE PARK PUMP STATION RETROFIT PROJECT (CAS PROJECT No. 08-23-037)** and the Plans, Drawings and Specifications prepared by Craig A. Smith & Associates of which is made a part of said contract by certain terms and conditions in said Contract more particularly mentioned, which Contract, consisting of the various Contract Documents specifically mentioned herein and relative thereto, is made a part of this Bond as fully and completely as if said Contract Documents were set forth herein;

NOW THEREFORE, the conditions of this obligation are such that if the above bounded Principal shall in all respects comply with the terms and conditions of said Contract and his obligation thereunder, including the Contract Documents (which include the Plans, Drawings, Specifications and Conditions as prepared by said Consulting Engineers, Invitation to Bid, Instructions to Bidders, the Contractor's bid as accepted by the Owner, the Bid and the Contract Performance and Payment Bonds, and all Addenda, if any, issued prior to the opening of bids), and further that if said Principal shall promptly make all payments to all persons supplying materials, equipment, and/or labor used directly or indirectly by said Contractor or subcontractors in the prosecution of the work provided for in said Contract in accordance with Florida Statutes, Section 255.05 or Section 713.23; then this obligation shall be void; otherwise, to remain in full force and effect for the term of said Contract, including any and all guarantee periods as specifically mentioned in said Contract Documents;

AND, the said Surety for Value received, hereby stipulates and agrees that no change involving any extension of time, or addition to the terms of the Contract or to the work to be performed, or materials to be furnished thereunder, or in the Plans, Drawings, and Specifications accompanying the said contract shall affect said obligation of said Surety on this Bond, and the said Surety on this Bond, and the said Surety does hereby waive notice of any such changes, extension of time, alterations, or additions of the terms of the Contract, or to the work, or to the Drawings and Specifications. Claimant shall give written notice to the Contractor and to the Surety as required by Florida Statutes, Section 255.05 of Section 713.23.

IN WITNESS WHEREOF, said _____, as Principal and Contractor hereunder has caused these presents to be assigned in three (3) original counterparts in his name, and witnessed by two attesting and subscribing witnesses and the said _____ as Surety, has caused these presents to be signed in three (3) original counterparts in its name by its _____ under its corporate seal, this ____ day of _____ 20__

Signed, sealed and delivered
in the presence of:

PRINCIPAL-CONTRACTOR

BY: _____

TITLE: _____

AS TO PRINCIPAL

SURETY

BY: _____
ATTORNEY-IN-FACT
(POWER-OF-ATTORNEY
TO BE ATTACHED)

AS TO SURETY

BY: _____
RESIDENT AGENT

END OF SECTION

SECTION 00700

GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:

Acceptance: By the OWNER of the Work as being fully complete in accordance with the Contract Documents subject to waiver of claims.

Agreement: The written agreement between the OWNER and the CONTRACTOR covering the Work to be performed; the Contract Documents are attached to and made a part of the Agreement. Also designated as the Contract.

Addenda: Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the Contract Documents, Drawings and Specifications, by addition, deletions, clarifications or corrections.

Application for Payment: The form furnished by the ENGINEER which is to be used by the CONTRACTOR in requesting progress payments theretofore received from the OWNER on account of the Work have been applied by the CONTRACTOR to discharge in full all of the CONTRACTOR'S obligations stated in prior applications for payment.

Approved: Means approved by the ENGINEER of Record.

Bid: The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bidder: Any person, firm or corporation submitting a BID for Work.

Bonds: Bid, performance and payment bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the Contract Documents and in accordance with the law of the place of the project.

Change Order: A written order to the CONTRACTOR signed by the OWNER authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time issued after execution of the Agreement.

Contract Documents: The Agreement, Addenda, Instructions to Bidders, CONTRACTOR'S Bid, the Bonds, the Notice of Award, these General Conditions, Special Conditions, the Specifications, Drawings and Modifications, Notice to Proceed, Invitation to Bid, Acknowledgment of Conformance with OSHA Standards.

Contract Price: The total monies payable to the CONTRACTOR under the Contract Documents.

Contract Time: The number of calendar days stated in the Agreement for the completion of the Work.

CONTRACTING OFFICER: The owner (Grantee) - The individual who is authorized to sign the contract documents on behalf of the owner's governing body.

CONTRACTOR: The person, firm or corporation with whom the OWNER has executed the Agreement.

Day: A calendar day of twenty-four hours measured from midnight to the next midnight.

Drawings: The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by the ENGINEER and are referred to in the Contract Documents.

ENGINEER: Craig A. Smith & Associates, 1425 E. Newport Center Drive, Deerfield Beach, FL 33432 (561)314-4445.

Field Order: A written order issued by the ENGINEER which clarifies or interprets the Contract Documents in accordance with paragraph 9.3 or orders minor changes in the Work in accordance with paragraph 10.2.

Modification: (a) A written amendment of the Contract Documents signed by both parties, (b) a Change Order, (c) a written clarification or interpretation issued by the ENGINEER in accordance with paragraph 9.3 or (d) a written order for minor change or alteration in the Work issued by the ENGINEER pursuant to paragraph 10.2. A modification may only be issued after execution of the Agreement.

Notice of Award: The written notice by OWNER to the apparent successful Bidder stating that upon compliance with the conditions precedent to be fulfilled by him within the time specified, OWNER will execute and deliver the Agreement to him.

Notice to Proceed: A written notice given by OWNER to CONTRACTOR (with copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform his obligations under the Contract Documents.

OWNER: **TOWN OF GOLDEN BEACH, GOLDEN BEACH, FLORIDA**

Project: The entire construction to be performed as provided in the Contract Documents.

Construction Observer: An authorized representative of the ENGINEER assigned to observe the Work performed and materials furnished by the CONTRACTOR or such other person as may be appointed by the OWNER as his representative. The CONTRACTOR shall be notified in writing of the identity of this representative.

Shop Drawings: All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a subcontractor, manufacturer, supplier, or distributor, and which illustrate the equipment, material, or some portion of the Work and as required by the Contract Documents.

Samples: Physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

Specifications: Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work.

Subcontractor: An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

Substantial Completion: The date as certified by the ENGINEER when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the Project or specified part can be utilized for the purposes for which it was intended; or if there be no such certification, the date when final payment is due in accordance with paragraph 14.11.

Supplier: Any person or organization who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.

Surety: The corporate body which is bound with the CONTRACTOR and which engages to be responsible for the CONTRACTOR and his acceptable performance of the Work.

Work: Any and all obligations, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by CONTRACTOR under the Contract Documents, including all labor, materials, equipment and other incidentals, and the furnishing thereof.

Written Notice: The term "Notice" as used herein shall mean and include all written notices, demands, instructions, claims, approvals, and disapprovals required to obtain compliance with Contract requirements. Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or to an authorized representative or such individual, firm, or corporation, or if delivered at or sent by registered mail to the last business address known to him who gives the notice. Unless otherwise stated in writing,

any notice to or demand upon the OWNER under this Contract shall be delivered to the OWNER through the ENGINEER.

ARTICLE 2 - PRELIMINARY MATTERS

Award:

2.1 The OWNER reserves the right to reject any and all Bids and is not bound by law to accept the lowest Bid. Bids are awarded by the OWNER and its decision is final. No Notice of Award will be given until the OWNER has concluded such investigations as it deems necessary to establish the responsibility, qualifications and financial ability of the Bidders to do the Work in accordance with the Contract Documents to the satisfaction of the OWNER within the time prescribed. The OWNER reserves the right to reject the Bid of any Bidder who does not pass such investigation to the OWNER'S satisfaction. In analyzing Bids, the OWNER may take into consideration alternates and unit prices, if requested by the Bid forms. If the Contract is awarded, the OWNER will issue the Notice of Award and give the successful Bidder a contract for execution within sixty days after opening of Bids.

Execution of Agreement:

2.2 At least four counterparts of the Agreement and such other Contract Documents as practicable will be executed and delivered by CONTRACTOR to the OWNER within 10 calendar days of receipt from the OWNER .

Forfeiture of Bid Security:

2.3 Failure of the successful Bidder to execute and deliver the Agreement and deliver the required bonds as stipulated in paragraph 2.2 shall be cause for the OWNER to annul the Notice of Award and declare the Bid and any security therefore forfeited.

Contractor's Pre-Start Representations:

2.4 CONTRACTOR represents that he has familiarized himself with, and assumes full responsibility for having familiarized himself with the nature and extent of the Contract Documents, work, locality, and with all local conditions and federal, state and local laws, ordinances, rules and regulations that may in any manner affect performance of the Work, and represents that he has correlated his study and observations with the requirements of the Contract Documents. CONTRACTOR also represents that he has studied all surveys and investigation reports of subsurface and latent physical conditions referred to in the specifications and made such additional surveys and investigations as he deems necessary for the performance of the Work at the Contract Documents and that he has correlated the results of all such data with the requirements of the Contract Documents.

Commencement of Contract Time:

2.5 The Contract Time will commence to run on the date stated in the Notice to Proceed.

Starting the Project:

2.6 CONTRACTOR shall start to perform his obligations under the Contract Documents on the date when the Contract Time commences to run. No Work shall be done at the site prior to the date on which the Contract Time commences to run, except with the written consent of the OWNER.

Before Starting Construction:

2.7 Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. He shall at once report in writing to ENGINEER any conflict, error, or discrepancy which he may discover; however, he shall not be liable to OWNER, or ENGINEER for his failure to discover any conflict, error, or discrepancy in the Drawings or Specifications.

Schedule of Completion:

2.8 Within ten days after delivery of the Notice to Proceed by OWNER to CONTRACTOR, CONTRACTOR shall submit to ENGINEER for approval, an estimated progress schedule with earnings indicating the starting and completion dates of the various stages of the Work, and a preliminary schedule of Shop Drawing submissions. See paragraph 6.23. The ENGINEER shall approve this schedule or require revisions thereto within 14 days of its submittal.

If there is more than one CONTRACTOR involved in a Project the responsibility for coordinating the Work of all CONTRACTORS shall be as provided in the Special Conditions and Contract Documents.

Preconstruction Conference:

2.9 Within twenty days after delivery of the executed Agreement by OWNER to CONTRACTOR, but before starting the Work at the site, a preconstruction conference will be held to review the above schedules, to establish procedures for handling Shop Drawings and other submissions, and for processing Applications for Payment, and to establish a working understanding between the parties as to the Project. Present at the conference will be the OWNER or his representative, ENGINEER, Resident Project Representatives, CONTRACTOR and his Superintendent.

Qualification of Subcontractors, Materialmen and Suppliers:

2.10 Within ten working days after bid opening, the CONTRACTOR will submit to the OWNER and the ENGINEER for acceptance a list of the names of subcontractors and such other persons and organizations (including those who are to furnish principal items of materials or equipment) proposed for those portions of the Work as to which the identity of the Subcontractors and other persons and organizations must be submitted as specified in the Contract Documents. Within thirty working days after receiving the list, the ENGINEER will notify the CONTRACTOR in writing if either the OWNER or the ENGINEER, after due investigation, has reasonable objection to any Subcontractor, person, or organization on such list. The failure of the OWNER or the ENGINEER to make objection to any Subcontractor, person or organization on the list within thirty days of receipt shall constitute an acceptance of such Subcontractor, person or organization. Acceptance of any such Subcontractor, person or organization shall not constitute a waiver of any right of the OWNER or the ENGINEER to reject defective Work, material or equipment, or work, material or equipment not in conformance with the requirements of the Contract Documents.

Rejection of Subcontractor:

2.11 If, prior to the Notice of Award, the OWNER or the ENGINEER has reasonable objection to and refuses to accept any Subcontractor, person or organization listed, the apparent low Bidder may, prior to Notice of Award either (i) submit an acceptable substitute without an increase in his bid price or (ii) withdraw his Bid without forfeiting his Bid security.

ARTICLE 3 - CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS

3.1 It is the intent of the Specifications and Drawings to describe a complete Project to be constructed in accordance with the Contract Documents. The Contract Documents comprise the entire Agreement between the OWNER and the CONTRACTOR. They may be altered only by a Modification.

3.2 The Contract Documents are complementary; what is called for by one is as binding as if called for by all. If CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, he shall call it to the ENGINEER's attention in writing at once and before proceeding with the Work affected thereby; however, he shall not be liable to OWNER or ENGINEER for his failure to discover any conflict, error or discrepancy in the Specifications or Drawings. The various Contract Documents shall be given precedence in case of conflict, error or discrepancy, as follows: Supplemental General Conditions, Agreement Modifications, Addenda, Special Conditions, Instructions to Bidders, General Conditions, Specifications and Drawings. If the requirements of other Contract

Documents are more stringent than those of the Supplemental General Conditions, the more stringent requirements shall apply.

3.3 The words "furnish" and "furnish and install", "install", and "provide" or words with similar meaning shall be interpreted, unless otherwise specifically stated, to mean "furnish and install complete in place and ready for service".

3.4 Miscellaneous items and accessories which are not specifically mentioned, but which are essential to produce a complete and properly operating installation, or usable structure or plant, providing the indicated function, shall be furnished and installed without change in the Contract Price. Such miscellaneous items and accessories shall be of the same quality standards, including material, style, finish, strength, class, weight and other applicable characteristics, as specified for the major component of which the miscellaneous item or accessory is an essential part, and shall be approved by the ENGINEER before installation. The above requirement is not intended to include major components not covered by or inferable from the Drawings and Specifications.

3.5 The Work of all trades under this Contract shall be coordinated by the CONTRACTOR in such a manner as to obtain the best workmanship possible for the entire Project, and all components of the Work shall be installed or erected in accordance with the best practices of the particular trade.

3.6 The CONTRACTOR shall be responsible for making the construction of habitable structures under this Contract rainproof, and for making equipment and utility installations properly perform the specified function.

If he is prevented from so doing by any limitations of the Drawings or Specifications, the CONTRACTOR shall immediately notify the ENGINEER in writing of such limitations before proceeding with construction in the area where the problem or limitation exists.

3.7 Manufacturer's literature, when referenced, shall be dated and numbered and is intended to establish the minimum requirements acceptable. Whenever reference is given to codes, or standard specifications or other data published by regulating agencies or accepted organizations, including but not limited to National Electrical Code, applicable State Building Code, Federal Specifications, ASTM Specifications, various institute specifications, and the like, it shall be understood that such reference is to the latest edition including addenda in effect on the date of the Bid.

3.8 Brand names where used in the technical specifications, are intended to denote the standard or quality required for the particular material or product. The term "equal" or "equivalent", when used in connection with brand names, shall be interpreted to mean a material or product that is similar and equal in type, quality, size, capacity, composition, finish, color and other applicable characteristics to the

material or product specified by trade name, and that is suitable for the same use and capable of performing the same function, in the opinion of the ENGINEER, as the material or product so specified. Proposed equivalent items must be approved by ENGINEER before they are purchased or incorporated in the Work. (When a brand name, catalog number, model number, or other identification, is used without the phrase "or equal", the CONTRACTOR shall use the brand specified).

ARTICLE 4 - AVAILABILITY OF LANDS, SUBSURFACE CONDITIONS, REFERENCE POINTS:

Availability of Lands:

4.1 The OWNER will furnish, as indicated in Contract Documents, the lands upon which the Work is to be done, rights-of-way for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the OWNER, unless otherwise specified in the Contract Documents. Other access to such lands or rights-of-way for the CONTRACTOR'S convenience shall be the responsibility of the CONTRACTOR.

The CONTRACTOR will provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of material and equipment.

Bidder's Furnished Copy of Surveys:

4.2 The OWNER will, upon request, furnish to the BIDDERS copies of all available boundary surveys.

Subsurface Conditions:

4.3 The CONTRACTOR acknowledges that he has investigated prior to bidding and satisfied himself as to the conditions affecting the Work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, river stages, tides, water tables or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during prosecution of the Work. The CONTRACTOR further acknowledges that he has satisfied himself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the OWNER/ENGINEER on the site or any contiguous site, as well as from information presented by the Drawings and Specifications made part of this Contract, or any other information made available to him prior to receipt of Bids.

Any failure by the CONTRACTOR to acquaint himself with the available information will not relieve him from responsibility for estimating properly the difficulty or cost of successfully performing the Work. The OWNER assumes no responsibility for any conclusions or interpretations made by the CONTRACTOR on the basis of the information made available by the OWNER/ENGINEER.

Differing Site Conditions:

4.4 (a) The CONTRACTOR shall promptly, and before such conditions are disturbed, notify the OWNER and ENGINEER in writing, of: (1) subsurface or latent physical conditions at the site differing materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this contract. The OWNER shall promptly investigate the conditions, and if he finds that such conditions do materially so differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performance of any part of the work under this contract, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the contract modified in writing accordingly.

(b) No claim of the CONTRACTOR under this clause shall be allowed unless the CONTRACTOR has given the notice required in (a) above; provided, however, the time prescribed therefore may be extended by the OWNER.

(c) No claim by the CONTRACTOR for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

ARTICLE 5 - INSURANCE

Contractor's Liability Insurance:

5.1 The CONTRACTOR will, at his own expense, purchase and maintain such insurance as will protect the OWNER and the CONTRACTOR from claims under Workmen's Compensation laws, disability benefit laws or other similar employee benefits laws; from claims for damages because of bodily injury, occupational sickness or disease, or death of his employees, and claims insured by usual personal injury liability coverage; from claims for damages because of bodily injury, sickness or disease or death of any person other than his employees including claims insured by usual personal bodily injury liability coverage; and from claims for injury to or destruction of tangible property, including loss of use resulting therefrom - any or all of which may arise out of or result from the Contractor's operations under the Contract Documents whether such operations be by any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be legally liable.

This insurance shall be written for not less than \$2,000,000.00 General Liability policy, \$2,000,000.00 as to claims for Auto and Workers Comp and \$1,000,000.00 per accident of any one person for any one occurrence for bodily injury or as required by law, whichever is greater, and shall include contractual liability insurance.

Before starting the work, the CONTRACTOR will file with the OWNER and ENGINEER certificates of such insurance, acceptable to the OWNER; these certificates shall contain a provision that the coverage afforded under the policies will not be cancelled or materially changed until at least 30 days prior written notice has been given to the OWNER and ENGINEER by certified mail. The certificate of insurance shall show the amount of employee's liability coverage that is being carried by the CONTRACTOR under Workmen's Compensation.

Subcontractor's Liability Insurance:

5.2 The CONTRACTOR agrees that if any part of the Work under the Contract is sublet, he will require the Subcontractor(s) to carry insurance as required, and that he will require the Subcontractor(s) to furnish to him insurance certificates similar to those required by the OWNER in 5.1 above.

OWNER's Liability Insurance:

5.3 The OWNER will be responsible for purchasing and maintaining its own liability insurance and, at its option, may purchase and maintain such insurance as will protect it against claims which may arise from operations under the Contract Documents.

Fire and Extended Coverage Insurance (Builders' Risk):

5.4 The CONTRACTOR shall maintain, as applicable, in an Insurance Company or Insurance Companies acceptable to the OWNER, Fire, Extended Coverage and Vandalism & Malicious Mischief Insurance on buildings and structures, while in the course of construction, including foundations, additions, attachments and all permanent fixtures belonging to and constituting a part of said buildings or structures. The policy or policies shall also cover machinery, if the cost of machinery is included in the Contract. The amount of insurance must at all times be at least equal to the actual cash value of the insured property.

The policy shall be in the name of the OWNER and the CONTRACTOR, as their interests may appear, and shall also cover the interests of all Subcontractors performing work.

Proof of Insurance:

5.5 The CONTRACTOR shall provide the OWNER with satisfactory evidence certifying that the foregoing insurance is in force; and such evidence shall include provisions that the insurance shall not be cancelled, allowed to expire or be materially changed without giving the OWNER advance notice by registered mail.

Cancellation and Re-Insurance:

5.6 If any insurance should be cancelled or changed by the insurance company or should any insurance expire during the period of this contract, the CONTRACTOR shall be responsible for securing other acceptable insurance to provide the coverage specified in this section to maintain coverage during the life of this Contract.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendent:

6.1 The CONTRACTOR will supervise and direct the Work. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain a qualified supervisor or superintendent at the work site who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisors shall be present on each site at all times as required to perform adequate supervision and coordination of the work. (Copies of written communications given to the Superintendent shall be mailed to the Contractor's home office).

Labor, Materials and Equipment:

6.2 The CONTRACTOR will provide competent, suitably qualified personnel to lay out the Work and perform construction as required by the Contract Documents. He will at all times maintain good discipline and order at the site.

Contractor Furnishes All Materials:

6.3 The CONTRACTOR will furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, local telephone, water and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of the Work.

Type of Material:

6.4 All materials and equipment will be new, except as otherwise provided in the Contract Documents. When special makes or grades of material which are normally packaged by the supplier or manufacturer are specified or approved, such materials shall be delivered to the site in their original packages or container with seals unbroken and labels intact.

Installation Instructions:

6.5 All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator or processors, except as otherwise provided in the Contract Documents.

Materials, Equipment, Products and Substitutions:

6.6 Materials, equipment and products incorporated in the work must be approved for use before being purchased by the CONTRACTOR. The CONTRACTOR shall submit to the ENGINEER a list of proposed materials, equipment or products, together with such samples as may be necessary for him to determine their acceptability and obtain his approval, within ninety calendar days after award of Contract unless otherwise stipulated in the Special Conditions. No request for payment for "or equal" equipment will be approved until this list has been received and approved by the ENGINEER.

6.6.1 Whenever a material, article or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalog number, it shall be understood that this is referenced for the purpose of defining the performance of other salient requirements, and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the Contract Documents by reference to brand name or catalog number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution and use by the CONTRACTOR. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the Contract Price or Contract time.

6.6.2 No substitute shall be ordered or installed without the written approval of the ENGINEER who shall be the judge of equality.

6.6.3 Delay caused by obtaining approvals for substitute materials will not be considered justifiable grounds for an extension of construction time.

6.6.4 Should any work or materials, equipment or products not conform with requirements of the Drawings and Specifications or become damaged during the progress of the Work, such Work or materials shall be removed and replaced, together with any Work disarranged by such alterations, at any time before completion and acceptance of the Project. All such work shall be done at the expense of the CONTRACTOR. See paragraph 7.10.

6.6.5 No materials or supplies for the Work shall be purchased by the CONTRACTOR or by any Subcontractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest is retained by the Seller. The CONTRACTOR warrants that he has good title to all materials and supplies used by him in the Work.

Concerning Subcontractors:

6.7 The CONTRACTOR will not employ any subcontractor, other person or organization of the types referred to in paragraph 2.10 (whether initially or as a substitute) against whom the OWNER or the ENGINEER may have reasonable objection, nor will the CONTRACTOR be required to employ any Subcontractor who has been accepted by the OWNER and the ENGINEER, unless the ENGINEER determines that there is good cause for doing so.

Contractor Responsibilities:

6.8 The CONTRACTOR shall be fully responsible for all acts and omissions of his Subcontractors and of persons and organizations directly or indirectly employed by them and of persons and organizations for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between OWNER or ENGINEER and any Subcontractor or other person or organization having a direct contract with CONTRACTOR, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any persons due any Subcontractor or other person or organization, except as may otherwise be required by law. OWNER or ENGINEER may furnish to any Subcontractor or other person or organization, to the extent practicable, evidence of amounts paid to CONTRACTOR on account of specific Work done in accordance with the schedule of values.

Identification of Drawings:

6.9 The divisions and sections of the Specifications and the identifications of any Drawings shall not control the CONTRACTOR in dividing the Work among Subcontractors or delineating the Work to be performed by any specific trade.

Subcontractor's Terms:

6.10 The CONTRACTOR agrees to bind specifically every Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of the OWNER and agree to incorporate the terms and conditions of the contract into all subcontracts.

Subcontractor's Agreement:

6.11 All Work performed for the CONTRACTOR by a Subcontractor shall be pursuant to an appropriate agreement between the CONTRACTOR and the Subcontractor.

Subcontractor's Provisions:

6.12 The CONTRACTOR shall be responsible for the coordination of the trades, Subcontractors and materialmen engaged upon his Work.

6.12.1 The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the CONTRACTOR by the terms of these General Conditions and other Contract Documents insofar as applicable to the Work of Subcontractors, and give the CONTRACTOR the same power as regards to terminating any subcontract that the OWNER may exercise over the CONTRACTOR under any provisions of the Contract Documents.

6.12.2 The OWNER or ENGINEER will not undertake to settle any differences between the CONTRACTOR and his Subcontractors or between Subcontractors.

6.12.3 If in the opinion of the ENGINEER, any subcontractor on the Project proves to be incompetent or otherwise unsatisfactory, he shall be replaced if and when directed by the ENGINEER in writing.

Patent Fees and Royalties:

6.13 The CONTRACTOR will pay all license fees and royalties and assume all costs incident to the use of any invention, design, process or device which is the subject of patent rights or copyrights held by others. He will indemnify and hold harmless the OWNER and the ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorneys' fees) arising out of any infringement of such rights during or after completion of the Work, and shall defend all such claims in connection with any alleged infringement of such rights.

Determining Application:

6.14 The CONTRACTOR shall be responsible for determining the application of patent rights and royalties on materials, appliances, articles or systems prior to

bidding. However, he shall not be responsible for such determination on systems which do not involve purchase by him of materials, appliances and articles.

Permits

6.15 The CONTRACTOR will secure and pay for all construction permits and licenses and will pay for all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of his Bid.

When such charges are normally made by the OWNER and when so stated in the SPECIAL CONDITIONS, there will be no charges to the CONTRACTOR. The OWNER shall assist the CONTRACTOR, when necessary, in obtaining such permits and licenses. The CONTRACTOR will also pay all public utility charges.

Electric Power and Lighting:

6.16 Electrical power required during construction shall be provided by each prime contractor as required by him. This service shall be installed by a qualified electrical contractor approved by the ENGINEER. Lighting shall be provided by the General CONTRACTOR in all spaces at all times where necessary for good and proper workmanship, for inspection or for safety. No temporary power shall be used off temporary lighting lines without specific approval of the General CONTRACTOR.

Laws and Regulations:

6.17 The CONTRACTOR will give all notices and comply with all laws, ordinances, rules and regulations applicable to the Work. Contractor agrees to follow all Federal, State and Local laws, rules and regulations applicable to the material excavated from and/or removed from the project site. This includes, but is not limited to, the storage, disposal, incorporation or use of said material in any way. Contractor represents that it has familiarized itself with the Federal, State and Local laws, rules and regulations regarding the same. If the CONTRACTOR observes that the Specifications or Drawings are at variance therewith, he will give the ENGINEER prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate modification. If the CONTRACTOR performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the ENGINEER, he will bear all costs arising therefrom; however, it shall not be his primary responsibility to make certain that the Drawings and Specifications are in accordance with such laws, ordinances, rules and regulations.

Taxes:

6.18 Cost of all sales and other taxes for which the CONTRACTOR is liable under the Contract shall be included in the Contract Price stated by the CONTRACTOR.

Record Drawings:

6.19 The CONTRACTOR will keep one record copy of all Specifications, Drawings, Addenda, Modifications and Shop Drawings at the site in good order and annotated to show all changes made during the construction process. The CONTRACTOR must provide complete RECORD DRAWINGS signed and sealed by a Registered Surveyor in the State of Florida for all underground utilities (water and sewer).

Safety and Protection:

6.20 The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to:

6.20.1 All employees on the Work and other persons who may be affected thereby,

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

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

Prevention of Accidents:

6.21 The CONTRACTOR will designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the CONTRACTOR'S superintendent unless otherwise designated in writing by the CONTRACTOR to the OWNER.

Emergencies:

6.22 In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ENGINEER or OWNER, is obligated to act, at his discretion, to prevent threatened damage, injury or loss. He will give the ENGINEER prompt written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby, and a Change Order shall thereupon be issued covering the changes and deviations involved. If the CONTRACTOR believes that additional work done by him in an emergency which arose from causes beyond his control entitles him to an increase in the Contract Price or an

extension of the Contract Time, he may make a claim therefore as provided in Articles 11 and 12.

Shop Drawings and Samples:

6.23 After checking and verifying all field measurements, the CONTRACTOR will submit to the ENGINEER for review, in accordance with the accepted schedule of shop drawing submissions (see paragraph 2.8) six copies (or at the ENGINEER'S option, one reproducible copy) of all Shop Drawings, which shall have been checked by and stamped with the approval of the CONTRACTOR and identified as the ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to dimensions, design criteria, materials of construction and the like to enable the ENGINEER to review the information as required.

Samples Required by Contractor:

6.24 The CONTRACTOR will also submit to the ENGINEER for review, with such promptness as to cause no delay in Work, all samples required by the Contract Documents.

All samples will have been checked by and stamped with the approval of the CONTRACTOR, identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which intended.

Deviations in Shop Drawings:

6.25 At the time of each submission, the CONTRACTOR will in writing call the ENGINEER'S attention to any deviations that the Shop Drawings or sample may have from the requirements of the Contract Documents.

Review of Shop Drawings:

6.26 The ENGINEER will review with responsible promptness Shop Drawings and samples, but his review shall be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents. The review of a separate item as such will not indicate review of the assembly in which the item functions. The CONTRACTOR will make any corrections required by the ENGINEER and will return the required number of corrected copies of Shop Drawings and resubmit new samples until the review is satisfactory to the ENGINEER. The CONTRACTOR shall direct specific attention in writing or on resubmitted Shop drawings to revisions other than the corrections called for by the ENGINEER on previous submissions. The CONTRACTOR'S stamp of approval on any Shop Drawing or sample shall constitute representation to the OWNER and the ENGINEER that the CONTRACTOR has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers and similar data or he assumes full responsibility for

doing so, and that he has reviewed or coordinated each Shop Drawing or sample with the requirements of the Work and the Contract Documents.

Commencing Work:

6.27 No work requiring a Shop Drawing or sample submission shall be commenced until the submission has been reviewed by the ENGINEER. A copy of each Shop Drawing and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

Deviations in Work:

6.28 The ENGINEER'S review of Shop Drawings or samples shall not relieve the CONTRACTOR from his responsibility for any deviations from the requirements of the Contract Documents unless the CONTRACTOR has in writing called the ENGINEER'S attention to each deviation at the time of submission and the ENGINEER has given written approval to the specific deviation, nor shall any review by the ENGINEER relieve the CONTRACTOR from responsibility for errors or omissions in the Shop Drawings.

Cleaning Up Site:

6.29 The CONTRACTOR shall clean up behind the Work as much as is reasonably possible as the work progresses. Upon completion of the Work, and before acceptance of final payment for the Project by the OWNER, the CONTRACTOR shall remove all his surplus and discarded materials, excavated material and rubbish from the roadways, sidewalks, parking areas, lawn and all adjacent property; shall clean his portion of Work involved in any building under this Contract, so that no further cleaning by the OWNER is necessary prior to his occupancy; shall restore all property, both public and private, which has been disturbed or damaged during the prosecution of the Work; and shall leave the whole in a neat and presentable condition.

Cleaning Up General:

6.30 In case of dispute, the OWNER may remove the rubbish and charge the cost to the CONTRACTOR as the ENGINEER shall determine to be just.

Public Convenience and Safety:

6.31 The CONTRACTOR shall, at all times, conduct the Work in such manner as to insure the least practicable obstruction to public travel. The convenience of the general public and of the residents along and adjacent to the area of Work shall be provided for in a satisfactory manner, consistent with the operation and local conditions. "Street Closed" signs shall be placed immediately adjacent to the Work, in a conspicuous position, at such locations as traffic demands. At any time

that streets are required to be closed, the CONTRACTOR shall notify law enforcement agencies vehicles before the street is closed and again as soon as it is opened. Access to fire hydrants and other fire extinguishing equipment shall be provided and maintained at all times.

Sanitary Provisions:

6.32 The General CONTRACTOR shall provide on-site office, and necessary toilet conveniences, secluded from public observation, for use of all personnel on the Work, whether or not in his employ. They shall be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the Public Authorities having jurisdiction. He shall commit no public nuisance. Temporary field office and sanitary facilities shall be removed upon completion of the Work and the premises shall be left clean.

Indemnification:

6.33 In consideration of twenty-five dollars (\$25.00) and other valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the CONTRACTOR shall indemnify and save harmless the OWNER and ENGINEER, their officers, agents and employees, from or on account of any injuries or damages, received or sustained by any person or persons during or on account of any operations connected with the construction of this Project; or by or in consequence of any negligence (excluding negligence of OWNER and ENGINEER), in connection with the same; or by use of any improper materials or by or on account of any act or omission of the said CONTRACTOR or his Subcontractor, agents, servants or employees. The CONTRACTOR will indemnify and hold harmless the OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than Work itself) including the loss of use resulting therefrom, (b) is caused in whole or in part by any negligent act or omission of the CONTRACTOR, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder, or (c) is caused by or related to, arising out of or resulting from the performance of the Work, including, but not limited to, violations of any Federal, State or local laws, rules and regulations, or claims raised against the OWNER or the ENGINEER as a result of CONTRACTOR's failure to properly perform the WORK.

Claims:

6.34 In any and all claims against the OWNER or the ENGINEER or any of their agents or employees, by any employee of the CONTRACTOR, any Subcontractor,

anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.33 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any Subcontractor under workman's compensation acts, disability acts or other employee benefit acts.

Liability of Engineer:

6.35 The obligations of the CONTRACTOR under paragraph 6.33 shall not extend to the liability of the ENGINEER, his agents or employees arising out of (a) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications or (b) the giving of or the failure to give directions or instructions by the ENGINEER, his agents or employees provided such giving or failure to give is the primary cause of injury or damage.

Responsibility for Connection to Existing Work:

6.36 It shall be the express responsibility of the CONTRACTOR to connect his Work to each part of the existing work or work previously installed as required by the Drawings and Specifications to provide a complete installation.

Work in Street, Highway and Other Rights-of-Way:

6.37 Excavation, grading, fill, storm drainage, paving and any other construction or installations in rights-of-way of streets, highways, public carrier lines, utility lines either aerial, surface or subsurface), etc., shall be done in accordance with requirements of the special conditions. The OWNER will be responsible for obtaining all permits necessary for the Work. Upon completion of the Work, the CONTRACTOR shall present to the ENGINEER certificates, in triplicate, from the proper authorities stating that the Work has been done in accordance with their requirements.

6.37.1 The OWNER will cooperate with the CONTRACTOR in obtaining action from any utilities or public authorities involved in the above requirements.

6.37.2 The CONTRACTOR shall be responsible for obtaining elevations of curbs and gutters, pavement, storm drainage structures, and other items as soon as grading operations are begun on the site and, in any case, sufficiently early in the construction period to prevent any adverse affect on the Project.

Cooperation with Governmental Departments Public Utilities, Etc.:

6.38 The CONTRACTOR shall be responsible for making all necessary arrangements with governmental departments, public utilities, public carriers,

service companies and corporations owning or controlling roadways, railways, water, sewer, gas, electrical, telephone, and telegraph facilities such as pavements, tracks, piping, wires, cables, conduits, poles, guys, etc., including incidental structures connected therewith, that are encountered in the Work in order that such items may be properly shored, supported and protected, or the CONTRACTOR may relocate them if he so desires. The CONTRACTOR shall give all proper notices, shall comply with requirements of such parties in the performance of his Work, shall permit entrance of such parties on the project in order that they may perform their necessary work, and shall pay all charges and fees made by such parties for this Work.

6.38.1 The CONTRACTOR'S attention is called to the fact that there may be delays on the Project due to Work to be done by governmental departments, public utilities, and others in repairing or moving poles, conduits, etc. The CONTRACTOR shall cooperate with the above parties in every way possible, so that the construction can be completed in the least possible time.

6.38.2 The CONTRACTOR shall have made himself familiar with all codes, laws, ordinances, and regulations which in any manner affect those engaged or employed in the Work, or materials and equipment used in or upon the Work, or in any way affect the conduct of the Work, and no plea of misunderstanding will be considered on account of his ignorance thereof.

Use of Premises:

6.39 CONTRACTOR shall confine his apparatus, storage of materials, and operations of his workmen to the limits indicated by law, ordinances, permits and directions of ENGINEER and OWNER, and shall not unnecessarily encumber any part of the site.

6.39.1 CONTRACTOR shall not overload or permit any part of any structure to be loaded with such weight as will endanger its safety, nor shall he subject any part of the work to stresses or pressures that will endanger it.

6.39.2 CONTRACTOR shall enforce ENGINEER'S and OWNER'S instructions in connection with signs, advertisements, fires and smoking.

6.39.3 CONTRACTOR shall arrange and cooperate with OWNER in routing and parking of automobiles of his employees, subcontractors and other personnel, and in routine material delivery trucks and other vehicles to the Project site.

6.39.4 The CONTRACTOR shall furnish, install and maintain adequate construction office facilities for all workmen employed by him or by his Subcontractors. Temporary offices shall be provided and located where

directed and approved by the ENGINEER. All such facilities shall be furnished in strict accordance with existing governing regulations. Field offices shall include telephone facilities.

Protection of Existing Property Improvements:

6.40 The locations of existing utilities within the work areas shown on the plan **are approximate** and are not guaranteed to be complete. Any existing surface or subsurface improvements, such as pavements, curbs, sidewalks, pipes or utilities, footings, or structures (including portions thereof), trees and shrubbery, not indicated on the Drawings or noted in the Specifications as being removed or altered shall be protected from damage during construction of the Project. Any such improvements damaged during construction of the Project shall be restored at the expense of the CONTRACTOR to a condition equal to that existing at the time of award of Contract.

Explosives:

6.41 When the use of explosives is necessary in the prosecution of the Work, the CONTRACTOR shall be charged with the utmost care in the handling and usage of such explosives to the protection of life and property. When directed by the ENGINEER, the number and size of charges shall be reduced. All explosives shall be stored in a safe manner and storage places shall be clearly marked "Danger - Explosives", and placed in the care of competent watchmen. When such use of explosives becomes necessary, the CONTRACTOR shall furnish to the ENGINEER competent proof of coverage adequately providing public liability and property damage insurance, as a rider attached to his regular policies unless otherwise included.

ARTICLE 7 - WORK BY OTHERS

7.1 The OWNER may perform additional work related to the Project by himself, or he may let other direct contracts therefore which shall contain General Conditions similar to these.

The CONTRACTOR will afford the other contractors who are parties to such direct contracts (or the OWNER, if he is performing the additional Work himself), reasonable opportunity for the introduction and storage of materials and equipment and the execution of Work, and shall properly connect and coordinate his Work with theirs.

7.2 If any part of the CONTRACTOR'S Work depends for proper execution or results upon the Work of any such other CONTRACTOR (or the OWNER), the CONTRACTOR will promptly report to the ENGINEER in writing any defects or

deficiencies in such Work that render it unsuitable for such proper execution and results.

7.3 The CONTRACTOR will do all cutting, fitting and patching of his Work that may be required to make its several parts come together properly and fit it to receive or be received by such other work. The CONTRACTOR will not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of the ENGINEER and of the other Contractors whose work will be affected.

7.4 If the performance of additional work by other contractors or the OWNER is not noted in the Contract Documents prior to the execution of the Contract, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional work. If the CONTRACTOR believes that the performance of such additional work by the OWNER or others involves him in additional expense or entitles him to an extension of the Contract Time, he may make a claim therefore as provided in Articles 11 and 12.

7.5 Where practicable, the General CONTRACTOR shall build around the work of other separate contractors or shall leave chases, slots and holes as required to receive and to conceal within the general construction work the work of such other separate contractors as directed by them. Where such chases, slots, etc., are impracticable, the work shall require specific approval of the ENGINEER.

7.6 Necessary chases, slots, and holes not built or left by the General CONTRACTOR shall be cut by the separate contractor requiring such alterations after approval of the General CONTRACTOR. The General CONTRACTOR shall do all patching and finishing of his Work where cut by other contractors at the expense of such other contractors.

7.7 Cooperation is required in the use of site facilities and in the detailed execution of the Work. Each CONTRACTOR shall coordinate his operations with those of the other contractors for the best interest of the Work in order to prevent delay in the execution thereof.

7.8 Each CONTRACTOR shall keep himself informed of the progress of the Work of other contractors. Should lack of progress or defective workmanship on the part of other contractors interfere with his operations, the CONTRACTOR shall notify the ENGINEER immediately. Lack of such notice to the ENGINEER will be construed as acceptance by the CONTRACTOR of the status of the work of other contractors as being satisfactory for proper coordination of his own Work.

7.9 Each CONTRACTOR shall give notices of the progress of his work so as to allow other contractors adequate work. The General CONTRACTOR shall give notices of the progress of his Work so that work of other contractors, when required to be concealed, may be placed before the general construction Work.

All such notices shall be submitted to the ENGINEER with copies of other prime contractors on the Project sufficiently ahead of job progress to permit adequate time for the other prime contractors to coordinate their work.

7.10 The cost of extra work resulting from lack of notices, untimely notices, failure to respond to notices, defective work or lack of coordination shall be borne by the CONTRACTOR responsible for such lack of notices, etc.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.1 The OWNER will issue all communications to the CONTRACTOR through the ENGINEER.

8.2 In case of termination of employment of the ENGINEER, the OWNER will appoint an engineer against whom the CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

8.3 The OWNER will furnish the data required of him under the Contract Documents promptly and shall make payments to the CONTRACTOR promptly after they are due as provided in paragraph 14.4.

8.4 The OWNER's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.2. The OWNER shall provide sufficient survey staking to set up horizontal and vertical controls. All re-staking or additional staking required by CONTRACTOR shall be by the OWNER'S surveyor at the CONTRACTOR'S expense. Paragraph 4.2 refers to the OWNER'S identifying and making available to the CONTRACTOR copies of surveys and investigation reports of subsurface and latent physical conditions at the site or otherwise affecting performance of the Work which have been relied upon by the ENGINEER in preparing the Drawings and Specifications.

8.5 The OWNER'S responsibilities in respect of liability and property insurance are set forth in paragraph 5.3.

8.6 In addition to his rights to request changes in the Work in accordance with Article 10, the OWNER (especially in certain instances as provided in paragraph 10.4) will be obligated to execute Change Orders.

8.7 In connection with the OWNER'S right to stop Work or suspend Work, see paragraph 15.1. Paragraph 15.3 deals with the OWNER'S right to terminate services of the CONTRACTOR under certain circumstances.

8.8 The OWNER shall have the right to take possession of and use any completed or partially completed portions of the Work, notwithstanding the fact that

the time for completing the entire Work or any portion thereof 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. If such prior use increases the cost of or delays the Work, the CONTRACTOR shall be entitled to such extra compensation or extension of time or both, except by prior agreement, as the ENGINEER may determine. See paragraph 14.11.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative:

9.1 The ENGINEER shall be the OWNER'S representative during the construction period. The duties and responsibilities and the limitations of authority of the ENGINEER as the

OWNER'S representative during construction are set forth in Articles 1 through 16 of these General Conditions and shall not be extended without written consent of the OWNER and the ENGINEER.

9.1.1 The ENGINEER'S decision, in matters relating to aesthetics, shall be final, if within the terms of the Contract Documents.

Visits to Site:

9.2 The ENGINEER will provide an inspector to make periodic visits to the site to observe the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the Contract Documents. His efforts will be directed toward providing assurance for the OWNER that the completed Project will conform to the requirements of the Contract Documents. On the basis of these on-site observations as an experienced and qualified design professional, he will keep the OWNER informed of the progress of the work and will endeavor to guard the OWNER against defects and deficiencies in the work of contractors.

Clarifications and Interpretations:

9.3 The ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the Contract Documents (in the form of Drawings or otherwise) as he may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If the CONTRACTOR believes that a written clarification and interpretation entitles him to an increase in the Contract Price or extension of Contract Time, he may make a claim therefore as provided in Articles 11 and 12.

Measurement of Quantities:

9.4 All work completed under the Contract will be measured by the ENGINEER according to the United States Standard Measures. All linear surface measurements will be made horizontally or vertically as required by the item measured.

Rejecting Defective Work:

9.5 The ENGINEER will have authority to disapprove or reject Work which is "defective" (which term is hereinafter used to describe Work that is unsatisfactory, faulty or defective, or does not conform to the requirements of the Contract Documents or does not meet the requirements of any inspection, test or approval referred to in the Special Condition, or has been damaged prior to final acceptance). He will also have authority to require special inspection or testing of the Work as provided in the Special Conditions whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.6 In connection with the ENGINEER'S responsibility as to Shop Drawings and samples, see paragraphs 6.25 through 6.28, inclusive.

Responsibility for Change Orders:

9.7 In connection with the ENGINEER'S responsibility for Change Orders, see Articles 10, 11, and 12.

Application of Payments:

9.8 In connection with the ENGINEER'S responsibilities in respect of Application of Payment, etc., see Article 14.

Resident Project Representative:

9.9 The ENGINEER will provide construction observation and inspection sufficient to confirm to the OWNER and all applicable regulatory agencies that construction is in compliance with the Construction Drawings and the contract specifications.

Decisions on Disagreements:

9.10 The ENGINEER will be the interpreter of the terms and conditions of the Contract Documents and the judge of the performance thereunder. In his capacity as interpreter and judge he will exercise his best efforts to insure faithful performance by both the OWNER and the CONTRACTOR. He will not show partiality to either and shall not be liable for the result of any interpretation or decision rendered in good faith. Claims, disputes and other matters relating to the

execution and progress of the Work or the interpretation of a performance under the Contract Documents shall be referred to the ENGINEER for decision, which he shall render in writing within ten days of the time that such claim has been presented to him in writing.

Limitations on Engineer's Responsibilities:

9.11.1 Neither the ENGINEER'S authority to act under this Article 9 nor any decision made by him in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any of their agents or employees or any other person performing any of the Work.

9.11.2 The ENGINEER will not be responsible for the construction means, methods, techniques, sequences or procedures, or the safety precautions and programs incident thereto, and he will not be responsible for the CONTRACTOR'S failure to perform the Work in accordance with the Contract Documents.

9.11.3 The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR, or any Subcontractors, or any of his or their agents or employees, or any other persons performing any of the work.

ARTICLE 10 - CHANGES IN THE WORK

10.1 Without invalidating the Agreement, the OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work; these shall be authorized by Change Orders. Upon receipt of a Change Order, the CONTRACTOR will proceed with the Work involved. All such Work shall be executed under the applicable conditions of the Contract Documents. If any Change Order causes an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, an equitable adjustment will be made as provided in Article 11 or Article 12. A Change Order signed by the CONTRACTOR indicates his agreement therewith.

10.2 The ENGINEER may authorize minor changes or alterations in the Work not involving extra cost and not inconsistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order. If the CONTRACTOR believes that any minor change or alteration authorized by the ENGINEER entitles him to an increase in the Contract Price or extension of Contract Time, he may make a claim therefor as provided in Articles 11 and 12.

10.3 Additional Work performed by the CONTRACTOR without authorization of a Change Order will not entitle him to an increase in the Contract Price or an extension of the Contract Time, except in the case of an emergency as provided in paragraph 6.22 and except as provided in paragraph 10.2.

10.4 The OWNER will execute appropriate Change Orders prepared by the ENGINEER covering changes in the Work, to be performed as provided in paragraph 4.4, and Work performed in an emergency as provided in paragraph 6.22 and any other claim of the CONTRACTOR for a change in the Contract Time or the Contract Price which is approved by the ENGINEER.

10.5 It is the CONTRACTOR'S responsibility to notify his surety of any changes affecting the general scope of the

Work or change in the Contract Price and the amount of the applicable bonds shall be adjusted accordingly. The CONTRACTOR will furnish proof of such an adjustment to the OWNER.

ARTICLE 11 - CHANGE OF CONTRACT PRICE

11.1 The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the work. All duties, responsibilities and obligations assigned to or undertaken by the CONTRACTOR shall be at his expense without changing the Contract Price.

11.2 (a) The OWNER may, at any time, without written notice to the sureties, by written order designated or indicated to be a change order, make any change in the Work within the general scope of the Contract, including but not limited to changes:

- (1) in the specifications (including drawings and designs);
- (2) in the method or manner of performance of the work.
- (3) in the OWNER-furnished facilities, equipment, materials, services, or site; or
- (4) directing acceleration in the performance of the work.

(b) Any other written order or an oral order (which terms as used in this paragraph (b) shall include direction, instruction, interpretation or determination) from the OWNER, which causes any such change, shall be treated as a change order under this clause, provided that the CONTRACTOR gives the OWNER written notice stating the date, circumstances, and source of the order and that the CONTRACTOR regards the order as a change order.

(c) Except as herein provided, no order, statement, or conduct of the OWNER shall be treated as a change under this clause or entitle the CONTRACTOR to an equitable adjustment hereunder.

(d) If any change order under this clause causes an increase or decrease in the CONTRACTOR'S cost of, or the time required for, the performance of any part of the work, under this contract, whether or not changed by any order, an equitable adjustment shall be made and the contract modified in writing accordingly: Provided, however, that except for claims based on defective specifications, no claim for any change order under (b) above shall be allowed for any costs incurred more than 20 days before the CONTRACTOR gives written notice as therein required: and provided further, that in the case of defective specifications for which the OWNER is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the CONTRACTOR in attempting to comply with such defective specifications.

(e) If the CONTRACTOR intends to assert a claim for an equitable adjustment under this clause, he must, within 30 days after receipt of a written change order under (a) above or the furnishing of a written notice under (b) above, submit to the OWNER a written statement setting forth the general nature and monetary extent of such claim, unless this period is extended by the OWNER. The statement of claim hereunder may be included in the notice under (b) above.

(f) No claim by the CONTRACTOR for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

11.3 The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1 Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved. Should the Work (by quantity) be increased or decreased by 15 percent from that stipulated in the Contract Documents, the OWNER and the CONTRACTOR may request adjustment of the unit prices by negotiation.

11.3.2 By negotiated lump sum.

11.3.3 The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the work plus a fixed amount to be agreed upon to cover the cost of general overhead and profit to be negotiated.

11.4 The term Cost of the Work means the sum of all costs necessarily incurred and paid by the CONTRACTOR in the proper performance of the Work.

Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5.

11.4.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the costs of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing work after regular working hours, on Sunday or legal holidays shall be include in the above to the extent authorized by OWNER.

11.4.2 Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and manufacturers' field services required in connection therewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds, and all returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3 Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to him and shall deliver such bids to OWNER who will then determine with the advice of ENGINEER, which Bids will be accepted. If a subcontract provides that the Subcontractor is to be paid on the basis of Cost of Work plus a fee, the cost of the Work shall be determined in accordance with paragraphs 11.4 and 11.5. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4 Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, lawyers and accountants) employed for services specifically related to the Work.

11.4.5 Supplemental costs including the following:

11.4.5.1 The proportion of necessary transportation, traveling and subsistence expenses of CONTRACTORS' employees incurred in discharge of duties connected with the Work.

11.4.5.2 Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the Workmen, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remains the property of CONTRACTOR.

11.4.5.3 Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advise of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof - all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

11.4.5.4 Sales, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by any governmental authority.

11.4.5.5 Deposits lost for causes other than CONTRACTOR'S negligence, royalty payments and fees for permits and licenses. Costs for permits and licenses must be shown as a separate item.

11.4.5.6 Losses, damages and expenses, not compensated by insurance or otherwise sustained by CONTRACTOR in connection with the execution of, and to, the Work, provided they have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR'S fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, he shall be paid for his services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7 The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8 Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9 Cost of premiums for additional Bonds and Insurance be required because of changes in the Work.

11.5 The term Cost of the Work shall not include any of the following:

11.5.1 Payroll costs and other compensation of CONTRACTOR'S officers, executives, principal (of partnership and sole proprietorships), general managers, engineers, architects, estimators, lawyers, agents, expeditors, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in his principal or a branch office for general administration of the Work and not specifically included in the schedule referred to in subparagraph 11.4.1 - all of which are to be considered administrative costs covered by the CONTRACTOR'S fee.

11.5.2 Expenses of CONTRACTOR'S principal and branch offices other than his office at the site.

11.5.3 Any part of CONTRACTOR'S capital expenses, including interest on CONTRACTOR'S capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4 Cost of premiums for all bonds and for all insurance policies whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except as otherwise provided in subparagraph 11.4.5.9).

11.5.5 Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective work, disposal of materials or equipment wrongly supplied and making good any damage to property.

11.5.6 Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

11.6 The CONTRACTOR'S fee which shall be allowed to CONTRACTOR for his overhead and profit shall be determined as follows:

11.6.1 A mutually acceptable firm fixed price; or if none can be agreed upon,

11.6.2 A mutually acceptable fixed fee based on the estimate of the various portions of the Cost of the Work.

11.7 The amount of credit to be allowed by CONTRACTOR to OWNER for any such change which results in a net decrease in cost, will be the amount of the actual net decrease. When both additions and credits are involved in any one change, the net shall be computed to include overhead and profit, identified separately, for both additions and credits.

11.8 Whenever cost of any Work is to be determined pursuant to paragraphs 11.4 and 11.5, CONTRACTOR will submit in form prescribed by ENGINEER an itemized cost breakdown together with supporting data.

11.9 Allowances: It is understood that the CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such materialmen, suppliers or Subcontractors and for such sums within the limit of the allowances as the ENGINEER may approve. Upon final payment, the Contract Price shall be adjusted as required and an appropriate Change Order issued. The CONTRACTOR agrees that the original Contract Price includes such sums as he deems proper for costs and profit on account of cash allowances. No demand for additional cost or profit in connection therewith will be allowed.

11.9.1 These allowances shall cover the cost to the CONTRACTOR, less any applicable trade discount, of the materials and equipment required by the allowance delivered at the site, and all applicable taxes.

11.9.2 The CONTRACTOR'S costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Price and not in the allowance.

11.9.3 Whenever the cost, as described in 11.9.1 above, is more than or less than the allowance, the Contract Price shall be adjusted accordingly by Change Order. The amount of the Change Order will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses, except that whenever unit price allowances are stipulated for Work, the Change Order will not include any cost as described in 11.5 above.

ARTICLE 12 - TIME FOR COMPLETION, LIQUIDATED DAMAGES AND CHANGE OF THE CONTRACT TIME

12.1 The date of beginning and the time for completion of the Work are essential conditions of the CONTRACT DOCUMENTS and the Work embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

12.2 The CONTRACTOR will proceed with the Work at such rate of progress to insure full completion within the CONTRACT TIME. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the CONTRACT TIME for the completion of the Work described herein is a reasonable time, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

12.3 If the CONTRACTOR shall fail to complete the Work within the CONTRACT TIME, or extension of time granted by the OWNER, then the CONTRACTOR will pay to the OWNER the amount for liquidated damages as specified in the BID for each calendar day that the CONTRACTOR shall be default after the time stipulated in the CONTRACT DOCUMENTS.

12.4 The CONTRACT TIME may only be changed by a Change Order. Any claim for an extension in the CONTRACT TIME shall be based on written notice delivered to the OWNER and ENGINEER within ten days of the occurrence of the event giving rise to the claim.

Notice of the extent of the claim with supporting data shall be delivered within forty-five days of such occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data. All claims for adjustment in the CONTRACT TIME shall be determined by ENGINEER if OWNER and CONTRACTOR cannot otherwise agree. Any change in the CONTRACT TIME resulting from any such claim shall be incorporated in a Change Order.

12.5 The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR if he makes a claim therefore as provided in paragraph 12.4 Such delays shall include, but not be restricted to, acts or neglect by any separate contractor employed by OWNER, fires, floods, labor disputes, epidemics, abnormal weather conditions, or acts of God.

12.6 All time limits stated in the Contract Documents are of The essence of the Agreement. The provisions of this Article 12 shall not exclude recovery for damages (including compensation for additional professional services) for delay by either party.

12.7 No claim for delay shall be allowed because of failure to furnish Drawings until two weeks after demand for such Drawings and not then unless such claim be reasonable.

12.8 This article does not exclude the recovery of damages for delay by either party under other provisions in the Contract Documents.

12.9 No claim for extension of time will be considered because of unusual weather conditions, and no reparation shall be made to the CONTRACTOR for

damages to the Work resulting therefrom, except as stipulated in paragraph 15.2 and as follows. The ENGINEER shall be responsible for determining the extent of extension of time, and shall notify the OWNER and CONTRACTOR in writing thereof within seven days after CONTRACTOR has been notified to resume work. Such extension shall be covered by a Change Order adjusting the Contract Time.

ARTICLE 13 - GUARANTEE

13.1 The CONTRACTOR shall guarantee all materials and equipment furnished and Work performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. The OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or the Work that may be made necessary by such defects, the OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The performance BOND shall remain in full force and effect through the guarantee period.

ARTICLE 14 - PAYMENTS AND COMPLETION

Payments to Contractor:

14.1 At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to the ENGINEER a partial payment estimate filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require.

If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or near site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect his interest therein, including applicable insurance. The CONTRACTOR shall replace at his expense any stored materials paid for which are either damaged or stolen before installation. The ENGINEER will, within ten (10) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to the OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. The

OWNER, will within thirty (30) days of presentation to him of any approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate. Except as State law otherwise provides, the OWNER may retain ten (10) percent of the amount of each payment until final completion and acceptance of all work covered by the Contract Documents. The OWNER at any time, however, after fifty (50) percent of the Work has been completed, if he finds that satisfactory progress is being made, may reduce retainage on the current and remaining estimates upon recommendation by the ENGINEER. When the work is substantially complete (operational or beneficial occupancy), the retained amount may be further reduced to only that amount necessary to assure completion upon recommendation by the ENGINEER. On completion and acceptance of a part of the Work on which the price is stated separately in the Contract Documents, payment may be made in full, including retained percentages, less authorized deductions. The OWNER may reinstate up to 10 percent withholding if the OWNER determines, at its discretion, that the CONTRACTOR is not making satisfactory progress or there is other specific cause for such withholding.

Final Release of Lien:

14.2 The OWNER shall receive from the CONTRACTOR, before he shall receive final payment, final releases of lien executed by all persons, firms or corporations who have performed or furnished labor, services or materials, directly or indirectly, used in the Work. Likewise, as a condition to receiving any progress payment, the OWNER shall require the CONTRACTOR to furnish partial releases of lien executed by all persons, firms and corporations who have furnished labor, services or materials incorporated into the Work during the period of time for which the progress payment is due, releasing such lien rights as those persons, firms or corporations may have for that period.

Contractor's Warranty of Title:

14.3 The CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by an Application for Payment, whether incorporated in the Project or not, will have passed to the OWNER prior to the making of the Application for Payment, free and clear of all liens, claims, security interests and encumbrances (hereafter in these General Conditions referred to as "Liens"); and that no work, materials or equipment covered by an Application for Payment will have been acquired by the CONTRACTOR or by any other person performing the Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or encumbrance thereon is retained by the seller or otherwise imposed by the CONTRACTOR or such other person.

Approval of Payments:

14.4 The ENGINEER will, within ten days after receipt of each Application for Payment, either indicate in writing his approval of payment and present the Application to the OWNER, or return the Application to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make necessary corrections and resubmit the application. The OWNER will, within thirty days of presentation to him of an approved Application for Payment, pay the CONTRACTOR the amount approved by the ENGINEER.

Representation:

14.5 The ENGINEER'S approval of any payment requested in an Application for Payment shall constitute a representation by him to the OWNER, based on the ENGINEER'S on-site observations of the Work in progress as an experienced and qualified design professional and on his review of the Application for Payment and the supporting data, that the Work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning Project upon substantial completion, to the results of any subsequent tests called for in the Contract Documents and any qualifications stated in his approval); and that the CONTRACTOR is entitled to payment of the amount approved. However, by approving any such payment the ENGINEER shall not thereby be deemed to have represented that he made exhaustive or continuous on-site observations to check the quality or the quantity of the Work, or that he has reviewed the means, methods, techniques, sequences and procedures of construction or that he has made any examination to ascertain how or for what purpose the CONTRACTOR has used the moneys paid or to be paid to him on account of the Contract Price, or that title to any Work, materials, or equipment has passed to the OWNER free and clear of any liens.

Certification on Request:

14.6 The CONTRACTOR shall make the following certification on each request for payment: "I hereby certify that the labor and materials listed on this request for payment have been used in the construction of this work or that all materials included in this request for payment and not yet incorporated into the construction are now on the site or stored at an approved location; and payment received from the last request for payment has been used to make payments to all first tier subcontractors and suppliers except as listed below".

Final Payment:

14.7 The ENGINEER'S approval of final payment shall constitute an additional representation by him to the OWNER that the conditions precedent to the CONTRACTOR'S being entitled to final payment as set forth in paragraph 14.13 have been fulfilled.

Refusal to Pay:

14.8 The ENGINEER may refuse to approve the whole or any part of any payment if, in his opinion, he is unable to make such representations to the OWNER. He may also refuse to approve any such payment, or because of subsequently discovered evidence or the results of subsequent inspection or tests, nullify any such payment previously approved, to such extent as may be necessary in his opinion to protect the OWNER from loss because:

14.8.1 The Work is defective, or completed Work has been damaged requiring correction or replacement,

14.8.2 The Work for which payment is requested cannot be verified,

14.8.3 Claims or Liens have been filed or there is reasonable evidence indicating the probable filing thereof,

14.8.4 The Contract Price has been reduced because of modifications,

14.8.5 The OWNER has been required to correct defective Work or complete the Work in accordance with Article 13.

14.8.6 Of unsatisfactory prosecution of the Work, including failure to clean up as required by paragraphs 6.29 and 6.30,

14.8.7 Of persistent failure to cooperate with other contractors on the Project and persistent failure to carry out the Work in accordance with the Contract Documents,

14.8.8 Of liquidated damages payable by the CONTRACTOR, or

14.8.9 Of any other violation of, or failure to comply with, the provisions of the Contract Documents.

Substantial Completion:

14.9 Prior to Substantial Completion, the OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the Work. Such use shall not constitute an acceptance of such portions of the Work.

Entering Premises:

14.10 The OWNER shall have the right to enter the premises for the purpose of doing work not covered by the Contract Documents. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care

and protection of the Work, or the restoration of any damaged Work except such as may be caused by agents or employees of the OWNER.

Engineer's Certificate:

14.11 Upon completion and acceptance of the Work the ENGINEER shall issue a certificate attached to the final payment request that the Work has been accepted by him under the conditions of the Contract Documents. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the CONTRACTOR within thirty (30) days of completion and acceptance of the Work.

Indemnification:

14.12 The CONTRACTOR will indemnify and save the OWNER or the OWNER'S agents harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the Work. The CONTRACTOR shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the CONTRACTOR fails to do so the OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed, in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the CONTRACTOR, his Surety, or any third party. In paying unpaid bills of the CONTRACTOR, any payment so made by the OWNER shall be considered as a payment made under the Contract Documents by the OWNER to the CONTRACTOR and the OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

Acceptance of Final Payment as Release:

14.13 The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to the OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this Work and for every act and neglect of the OWNER and others relating to or arising out of this Work. Any payment, however, final or otherwise, shall not release the CONTRACTOR or his sureties from any obligations under the Contract Documents or the Performance Bond and Payment Bonds.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

OWNER May Suspend Work:

15.1 The OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to the CONTRACTOR and the ENGINEER which shall fix the date on which Work shall be resumed. The CONTRACTOR will resume the Work on the date so fixed. The CONTRACTOR will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if he makes a claim therefor as provided in Articles 11 and 12.

Work During Inclement Weather:

15.2 No work shall be done under these specifications except by permission of the ENGINEER when the weather is unfit for good and careful work to be performed. Should the severity of the weather continue, the CONTRACTOR, upon the direction of the ENGINEER, shall suspend all work until instructed to resume operations by the ENGINEER and the Contract Time shall be extended to cover the duration of the order. Work damaged during periods of suspension due to inclement weather shall be repaired and/or replaced by the CONTRACTOR. Any compensation for repairs or replacements shall be subject to approval of the OWNER.

OWNER May Terminate:

15.3 If the CONTRACTOR is adjudged bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or similar laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to Subcontractors or for labor, materials or equipment or he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction, or if he disregards the authority of the ENGINEER, or if he otherwise violates any provision of, the Contract Documents, then the OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and his surety seven days' written notice, terminate the services of the CONTRACTOR and take possession of the Project and of all materials, equipment, tools, construction equipment and machinery thereon owned by the CONTRACTOR, and finish the Work by whatever method he may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct and indirect costs of completing the Project, including compensation for additional professional services, such excess shall be paid to the CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to

the OWNER. Such costs incurred by the OWNER will be determined by the ENGINEER and incorporated in a Change Order.

Contractor Termination:

15.4 Where the CONTRACTOR'S services have been so terminated by the OWNER, said terminations shall not affect any rights of the OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys by the OWNER due the CONTRACTOR will not release the CONTRACTOR from liability.

Seven Days Notice:

15.5 Upon seven days' written notice to the CONTRACTOR and the ENGINEER, the OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Project and terminate the Agreement. In such case, the CONTRACTOR shall be paid for all Work executed and any expense sustained plus a reasonable profit.

Removal of Equipment::

15.6 In the case of termination of this Contract before completion for any cause whatever, the CONTRACTOR, if notified to do so by the OWNER, shall promptly remove any part or all of his equipment and supplies from the property of the OWNER. Should the CONTRACTOR not remove such equipment and supplies, the OWNER shall have the right to remove them at the expense of the CONTRACTOR. Equipment and supplies shall not be construed to include such items for which the CONTRACTOR has been paid in whole or in part.

Contractor May Stop Work or Terminate:

15.7 If, through no act or fault of the CONTRACTOR, the Work is suspended for a period of more than ninety days by the OWNER or under an order of court or other public authority, or the ENGINEER fails to act on any Application for Payment within thirty days after it is submitted, or the OWNER fails to pay the CONTRACTOR any sum approved by the ENGINEER, within thirty days of its approval and presentation, then the CONTRACTOR may, upon seven days' written notice to the OWNER and the ENGINEER, terminate the Agreement and recover from the OWNER payment for all Work executed and any expense sustained plus a reasonable profit. In addition and in lieu of terminating the Agreement, if the ENGINEER has failed to act on an Application for Payment or the OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon seven days' notice to the OWNER and the ENGINEER stop the Work until he has been paid all amounts then due.

OWNER Furnished Equipment:

15.8 In case the OWNER furnishes equipment to the CONTRACTOR to install, but fails to deliver it to the CONTRACTOR as required by SUPPLEMENTARY CONDITIONS or SPECIAL CONDITIONS, and in case such failure causes the CONTRACTOR additional expense or need for extension of time, the CONTRACTOR may make such claims upon the OWNER and obtain adjustments as provided herein.

ARTICLE 16 - MISCELLANEOUS

16.1 Whenever any provision of the Contract Documents requires the giving of written notice it shall be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to him who gives the notice.

16.2 All Specifications, Drawings and copies thereof furnished by the ENGINEER shall remain his property. They shall not be used on another Project, and with the exception of those sets which have been signed in connection with the execution of the Agreement, shall be returned to him on request upon completion of the Project.

16.3 The duties and obligations imposed by these General Conditions, Special Conditions and Supplemental Conditions and the rights and remedies available hereunder, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.36 and 14.3 and those in the Special Conditions and the rights and remedies available to the OWNER and ENGINEER thereunder, shall be in addition to, and shall not be construed in any way as a limitation of, any rights and remedies available by law, by special guarantee or by other provisions of the Contract Documents.

16.4 Should the OWNER or the CONTRACTOR suffer injury or damage to its person or property because of any error, omission, or act of the other or of any of his employees or agents or others for whose acts he is legally liable, claim shall be made in writing to the other party within a reasonable time of the first observance of such injury or damage.

16.5 The Parties to this agreement hereby agree that sole and exclusive jurisdiction for any dispute or action, judicial or otherwise, arising from or related to this agreement, shall lie in a Judicial Circuit, in and for Miami-Dade County Florida. The Parties further agree that the prevailing party in any such action, judicial or otherwise, shall be entitled to an award of their attorney's fees and costs. The Parties to this agreement hereby intentionally waive their right to trial by jury for any dispute arising from or related to this agreement in any way.

The Parties agree that an absolute condition precedent to commencing any action, judicial or otherwise, arising from or related to this agreement, shall be the completion of mediation before a mutually agreed upon mediator. If a mediator cannot be agreed upon, one shall be selected randomly from a group of six (6) mediators chosen three (3) and three (3) by the CONTRACTOR and the OWNER respectively. The cost of mediation shall be born equally by all parties participating in the same.

END OF SECTION

SECTION 00800

SPECIAL CONDITIONS & SUPPLEMENTARY CONDITIONS

ENGINEER is as follows:

CRAIG A. SMITH & ASSOCIATES
1425 E. Newport Center Drive
Deerfield Beach, FL 33432
(561) 314-4445
FAX (561) 314-4458

1.0 HOURS OF CONSTRUCTION & LIMITS OF CONSTRUCTION:

Normal work hours for this project are from 8:00 AM to 5:00 PM Monday through Friday. Any work done outside these hours will require permission from the OWNER. No work will be allowed on federally recognized holidays. Noises from construction activity, tools or equipment used and operated on a construction site between the hours mentioned, provided that all tools or motorized equipment used in such activity are equipped with all sound reducing features and equipment originally part of the tool or equipment, or other effective sound control devices similar to those provided or as effective as that installed as original equipment.

2.0 FIELD TESTING (where applicable):

The OWNER and/or ENGINEER shall be present during all necessary testing. The CONTRACTOR shall notify the engineer at least forty-eight (48) hours in advance of any field testing. The CONTRACTOR shall pay for the cost of any required test(s).

3.0 STANDARD SPECIFICATIONS:

Except as noted herein and other sections of the contract specifications, all construction methods, quality of materials, and workmanship shall meet the requirements of the following Standards:

- A. Miami-Dade County Current Minimum Standards (hereinafter Standards),
- B. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Current Edition and Current Supplements (hereinafter FDOT Standards),
- C. Florida Department of Transportation Design Standards, Current Edition (hereinafter FDOT Design Standards) and all addenda thereto.
- D. The Technical Provisions contained herein and in other sections of the contract specifications are only additional provisions and/or revisions to the Standard Specifications mentioned above. CONTRACTOR shall adhere to the strictest interpretation of the Standards listed herein.

4.0 PERMITS AND LICENSES:

All permits, licenses and fees including but not limited to all licenses, occupational license, certificate of occupancy, impact fees or inspection fees necessary for the prosecution of the work undertaken by the CONTRACTOR pursuant to this CONTRACT shall be secured and paid for by the CONTRACTOR. The Permits indicated in Section 00890 have been obtained for the project by the OWNER. The OWNER/ENGINEER shall secure all permit extensions as required for the project for the permits the OWNER has already obtained. The CONTRACTOR shall pay all costs of permit extensions resulting from the CONTRACTOR's failure to complete the work within the proposed CONTRACT time. It is the CONTRACTOR's responsibility to have and maintain appropriate certificate(s) of competency, valid for the work to be performed and valid for the jurisdiction in which the work is to be performed.

5.0 LUMP SUM BID ITEMS:

Although some bid items will be bid on a lump sum price, most of these items are composed of numerous elements that make up the total and as such shall necessitate an individual bid price listing for each and every item encompassed in this construction phase. It shall be the responsibility of the CONTRACTOR to supply the OWNER and ENGINEER a detailed price list of each component of these Lump Sum Items at the pre-construction meeting held by the OWNER and ENGINEER after the CONTRACT has been awarded. These detailed price lists shall be the basis of any increase or decrease in the original scope of work.

6.0 ADJUSTMENT OF LUMP SUM ITEMS IN CONTRACT:

No adjustment will be made to Lump Sum Items of work under the CONTRACT without specific detailed information as to the exact relationship between that Lump Sum Item and any other unit price item of work, which may change. The CONTRACTOR shall supply this information for the ENGINEER'S evaluation prior to considering the adjustment of any Lump Sum Item of work in the CONTRACT via the change order process. No automatic increases will be permitted to Lump Sum Items of work under the CONTRACT.

7.0 PROTECTION AND RESTORATION OF SURVEY MONUMENTS:

The CONTRACTOR shall carefully protect from disturbance all survey monuments, stakes and bench marks, whether or not established by him, and he shall not remove or destroy any surveying point until it has been properly witnessed or otherwise disposed of by the ENGINEER. All major survey monuments such as section corners, one quarter section corners, property corners or block control points shall be replaced at the CONTRACTOR'S expense with monument(s) of a quality equal to current standards. The replacement shall be under the supervision of a Professional Land Surveyor registered in the State of Florida.

8.0 UTILITY LOCATION:

The CONTRACTOR shall notify each utility company sufficiently ahead of construction to arrange for positive underground locations (Soft Digs), relocation or support of its utility where that utility may be in conflict with or endangered by the proposed construction. Moving any water/sewer mains or utilities solely for the convenience of the CONTRACTOR shall be paid for by the CONTRACTOR. All charges by utility companies for temporary support of its utilities shall be paid for by the CONTRACTOR. All costs of Soft Digs and permanent utility relocations to avoid conflict shall be the responsibility of the

CONTRACTOR and the UTILITY involved. No additional payment shall be made for any form of utility relocation, whether or not said relocation is necessitated by this project to avoid conflict therewith. No contract time extensions shall be allowed to the CONTRACTOR for utility conflict resolutions.

- A. As far as possible, all existing utility lines in the project area have been shown on the Plans. However, the OWNER does not guarantee that all lines are shown, or that the ones indicated are in their true location. It shall be the CONTRACTOR's responsibility to identify and locate all underground or overhead utility lines or equipment affected by the project. No additional payment shall be made to the CONTRACTOR because of discrepancies in actual and plan location of utilities and damages suffered as a result thereof. When the ENGINEER'S redesign is required to avoid utility conflicts, it is the CONTRACTOR'S responsibility to inform the ENGINEER and submit detailed survey information of the conflict sufficiently ahead of construction to allow for redesign at no additional extension of contract time.
- B. All overhead, surface or underground structures and utilities encountered in trenching, whether shown on the Plans or not shown on the Plans, are to be carefully protected from injury or displacement. All damage to such structures is to be completely repaired within a reasonable time; needless delay will not be tolerated. The OWNER reserves the right to make such repairs at the expense of the CONTRACTOR.
 - 1. All such repairs made by the CONTRACTOR are to be made to the satisfaction of the Utility Owner; all damaged utilities shall be replaced or prevented from leaking. All repairs are to be inspected by the Utility Owner prior to backfilling.
- C. The CONTRACTOR should be aware of the One-Call Center, which has a free locating service for CONTRACTOR's and excavators.
 - 1. Within forty-eight (48) hours before excavating, dial toll free 1-800-432-4770 anywhere from Miami-Dade up to the Brevard/Indian River County Line, and a locator shall be dispatched to the work location.
- D. Where it is necessary for the CONTRACTOR to interrupt water and sewer service to existing buildings, the CONTRACTOR shall prepare and submit to the ENGINEER (forty-eight (48) hours prior to commencing work), a complete description of his proposed procedure and a **time schedule which, the CONTRACTOR shall guarantee**. Twenty-four (24) hours prior to the time proposed for starting the work, the CONTRACTOR will be notified whether or not the work shall be permitted as proposed.
 - 1. In no case shall the CONTRACTOR be permitted to interfere with any existing service until all materials, supplies, equipment, tools and incidentals necessary to complete the work are on the job site.
 - 2. The OWNER, through the OWNER's ENGINEER representative, reserves the right to require the CONTRACTOR to work twenty-four (24) hours per day in all cases where interference with existing water and sewer service may result in health hazards, offensive conditions, or serious inconveniences to persons served by the system.

E. Conflicts and Conflict Manholes/Inlets - The CONTRACTOR shall abide by the following schedule of criteria concerning conflicts with other contractors and other utilities.

1. The CONTRACTOR shall verify the location of each utility line suspected of conflict prior to ordering the structure involved in the conflict and make it known to the ENGINEER of any adjustment required for the structures.
2. In no case shall there be less than three-tenths (0.3') of a foot between any two (2) pipelines or between pipelines and structures.
3. In cases of unforeseen utility conflicts the CONTRACTOR may be required to build conflict structures in place to avoid time delays.
4. The ENGINEER representative of the OWNER shall have full authority on behalf of the OWNER, to direct the placement of the various pipes and structures in order to facilitate construction, expedite completion and avoid conflicts.
5. Where an existing utility is to go through a conflict manhole/inlet, the manhole/inlet shall have a steel sleeve completely through the structure to protect the utility from breakage due to possible structure settlement. The steel sleeve shall meet the requirement of ASTM; cost to be included in manhole/inlet unit price. For further details, see FDOT Standard Indices and Local Utility Authority.

F. Adjust Existing Valves, Meters, Catch Basins and Manholes:

It shall be the CONTRACTOR's responsibility to make all adjustments to existing water meters, valves, catch basins and manholes encountered during construction, in order to meet all final grades, unless otherwise instructed by the ENGINEER or the respective UTILITY owner. Omission of such structures from the CONTRACT or Plans does not relieve the CONTRACTOR from responsibility for making such adjustments as may be deemed necessary.

1. The CONTRACTOR shall take this provision into account when personally performing the investigation of the site prior to bidding. Payment for such known and anticipated utility adjustments shall be included in the unit prices for various contract items.
2. Payment for the costs of other utility adjustments unknown or unforeseen and all related tests shall be the responsibility of the CONTRACTOR or the UTILITY. The OWNER will not pay any additional or separate costs for utility adjustments.

9.0 EQUIPMENT:

All equipment necessary and required for the proper construction sequence of facilities shall be on the construction site, in first-class working condition, and shall have been approved by the ENGINEER before construction on that particular sequence of work is permitted to start. The CONTRACTOR shall provide such tamping tools and equipment as are necessary for the proper compaction of the backfill.

- A. CONTRACTOR shall make provisions for backup equipment to replace project equipment, in case of equipment breakdowns or failures.

10.0 **RECORD DRAWINGS:**

The Engineering plans were created using Autodesk Civil3D 2019 and the CONTRACTOR is to utilize a surveyor knowledgeable of Autodesk Civil3D 2019. Knowledgeable, for all intents and purposes, shall mean using the software's intelligence to its full capability. CAS will not be modifying electronic files for third party use.

Use of any version or other software not compatible with this version is not allowed. The CONTRACTOR shall coordinate with the Owner's Engineer (CAS) to maintain field drawings on full size, reproducible paper and shall reflect the "As-Built" items of work as the work progresses. Below are minimum representative items of work that shall be shown as verified, changed, or added. The completed (or final) Record Drawings shall be certified by a Professional Land Surveyor, registered in the State of Florida. A total of four (4) sets of reproducible drawings and one (1) Computer Diskette in Autodesk Civil3D 2019, shall be furnished by the Surveyor to the Owner. All "As-Built" locations shall be identified by station and offset referenced to the centerline of construction. All "As-Built" information shall be shown and repeated where the label or note exists by lightly crossing out original label and placing "As-Built" label adjacent to it on all applicable sheets including drainage structures, summary of drainage structure, plan and profile views, cross sections, and/or such other similar and related sheets as provided.

- 10.1 Where applicable, representative items of work that shall be shown on the Record Drawings as verified, changed or added, are shown below:

A. Roadway / Drainage Plans:

1. Drainage structure types, locations with grate or rim and flowline elevations.
2. Sewer type, size and elevations.
3. Utility type, location, size, material composition and elevation in conflict structures.
4. Type and location of all manholes, valves, meters, hydrants and related appurtenances within right-of-way.
5. Spot (critical) elevations at all locations reflected in the plans as "bubble" grades.

B. Pavement Marking and Signing:

Sign location where shown or tabulated.

C. Utility Relocation Plans:

1. Sewer manhole location with rim and flow line elevations.
2. Sewer pipe type, size, location and slope.

3. Water main pipe type, size, location and top of pipe elevation.
4. Type and location of all valves, hydrants, meters and fittings.

D. Completion:

1. Upon completion of the work the SURVEYOR shall furnish Record Drawings to the Project Manager and Contractor. The Contractor shall verify the completed Record Drawings as correct. The Contractor shall submit a letter acknowledging agreement and acceptance of the Record Drawings and certifying that the quantities reflected therein are true and correct. The acceptance and certification letter shall be submitted along with CONTRACTOR's request for substantial completion certification. The semi-final inspection shall not be conducted unless the Record Drawings and the Contractor's letter of acceptance and certification are in the possession of the Owner's representative.
2. The cost for maintaining record changes, and preparation of the Record Drawings are included in the prices furnished for Survey Stakeout and As-Built, exclusive of any additional services requested by the Contractor.

11.0 STORAGE SITES:

The CONTRACTOR shall furnish, at his expense, properly zoned areas suitable for field offices, material storage and equipment service and storage.

- 11.1 The CONTRACTOR shall maintain these areas in a clean, orderly condition so as not to cause a nuisance in the area.

12.0 PRE-WORK CONFERENCE:

After the award of CONTRACT and prior to the start of construction, a pre-work conference shall be held between the OWNER, CONTRACTOR, the ENGINEER, other interested agencies, representatives of utility companies, and others affected by the work. The ENGINEER will set the time and place of this conference.

- 12.1 The CONTRACTOR shall bring with him to the conference, a copy of his proposed work schedule for the concurrence by the ENGINEER. If the work schedule is found to be satisfactory, the ENGINEER will approve the work schedule and the work shall be performed in accordance with such schedule or approved amendments thereto.

13.0 SITE INVESTIGATION:

The CONTRACTOR, by virtue of signing the CONTRACT, acknowledges that he and all his subcontractors have satisfied themselves as to the nature and location of the work, the general and local conditions including, but not restricted to: those bearing upon transportation; disposal, handling and storage of materials; access roads to the site; the confirmation and conditions of the work area; and the character of equipment and facilities

needed preliminary to and during the performance of the work. Failure on the part of the CONTRACTOR to completely or properly evaluate any factors of costs prior to bidding shall not form a basis for additional compensation if he is awarded the CONTRACT.

14.0 RESTORATION OF PROPERTY:

Property, public or private, if damaged during construction or removed for the convenience of the work, shall be repaired or replaced at the expense of the CONTRACTOR to its original condition as acceptable to the ENGINEER, prior to the final acceptance of the work. Such facilities shall include, but are not limited to: signalization equipment, miscellaneous hardware removed from the construction site, driveways, walkways, walls, fences, footings, underground utilities, traffic and street signs, mailboxes, decorative walls, gates, ornamental lawn or landscape accessories.

14.1 Private vegetation, fencing, enclosures, materials and sprinkler systems (collectively "private materials") currently occupy portions of the work area. Unless said private materials are specified as approved in Section 14.2 below, Contractor shall remove and dispose of said private materials. If private materials exist within the work area and are specified as approved in Section 14.2 below, Contractor shall either: (a) leave said private materials within the project area; (b) relocate said private materials within the designated five (5) foot buffer zone, as directed by Owner. Any additional time or cost associated with relocation approved private materials into the designated five (5) foot buffer zone, shall be subject to a negotiated change order between the Contractor and Owner, as approved by the Engineer.

14.2 The CONTRACTOR shall ensure that all landscaping, public or private, disturbed by or during the prosecution of the work, shall be replaced in like for like fashion and shall be returned to original or better condition. The cost of any such restoration is understood to be included in various contract unit items. No additional compensation will be paid to the CONTRACTOR for required property restoration.

15.0 CONTRACTOR'S COMPENSATION FOR ADDITIONAL AND/OR REVISIONS TO CONTRACT AFTER COMMENCEMENT OF WORK:

The CONTRACTOR will be furnished with three (3) revised prints for any substantial design changes during construction at the discretion of the ENGINEER. The OWNER/ENGINEER may, at any time during the CONTRACT, issue field orders or directives to further illustrate the intent or requirements of a particular item or items of work. The CONTRACTOR at no additional cost shall execute such orders or directives, which do not substantially or materially alter the character or scope of the work, in the sole opinion of the ENGINEER. The CONTRACTOR shall be entitled to receive proper compensation for increases in quantities resulting from any field orders or directives. The ENGINEER is the final arbiter in disputes regarding this issue and decisions by the ENGINEER are final and binding.

15.1 The OWNER and/or ENGINEER may, at any time during the CONTRACT, increase or decrease the quantity of CONTRACT items to be constructed. The CONTRACTOR will be paid at the contract unit price for the actual quantities constructed. The unit prices reflected in the CONTRACTOR's bid proposal shall reflect full and complete compensation for each item of work including but not limited to all labor, materials, equipment, direct and indirect overhead and profit.

15.2 When the CONTRACTOR requests additional compensation for Maintenance of Traffic Operations he shall provide a breakdown of this daily cost along with the time

extension request. This cost breakdown shall be limited to the following items: superintendent, construction signs, barricades, construction yard rent, latrine rent, and construction yard fence rent.

16.0 LABORATORY TESTS:

Testing procedures in the FDOT Standards may be required at the discretion of the ENGINEER or the OWNER.

- 16.1 Except as otherwise provided, sampling and testing of all materials, and the laboratory methods and testing equipment required under these Specifications shall be in accordance with the latest standards or tentative of the American Society for Testing Materials (ASTM) or the latest standards or methods of the American Association of State Highway and Transportation Officials (AASHTO).
- 16.2 The testing samples and materials shall be made at the expense of the CONTRACTOR, except where indicated otherwise. The CONTRACTOR shall furnish the required samples without charge. The CONTRACTOR shall give sufficient notification (forty-eight (48) hours minimum) of the placing of the orders for materials to permit testing.
- 16.3 All material tests shall be made by a competent testing laboratory to be approved by the OWNER and ENGINEER.
- 16.4 Density tests shall be performed by the approved testing service and paid for by the CONTRACTOR.
- 16.5 The frequency of tests shall be the option of and as directed by the ENGINEER.

17.0 SOIL BORINGS:

Soil boring information may be furnished to the CONTRACTOR, on request, for general information, only. Such data is not guaranteed to be correct; the CONTRACTOR, by virtue of signing the CONTRACT, acknowledges that he and his subcontractor's have satisfied themselves as to the nature and extent of soil and (underground) water conditions on the project site. No additional payment will be made to the CONTRACTOR because of differences between actual conditions and those shown by any existing or furnished soil boring logs.

18.0 NO ADJUSTED PAYMENT FOR OVER-THICKNESS OF MATERIALS:

There are no special provisions to this CONTRACT, which provide for adjusted payment for materials to be paid for based on finished area of work. No adjustment(s) will be made to quantities based on actual thickness versus nominal thickness. All materials in this CONTRACT shall be paid for as though they are installed at the nominal thickness required on the Plans. All materials shall be installed to the tolerances required in the FDOT Standards. The OWNER will not pay additional costs for materials, which exceed the tolerances required by the Specifications. Materials, which fail to meet tolerances, shall be replaced or corrected by the CONTRACTOR, as directed by the ENGINEER at no additional cost to the OWNER.

19.0 COMPUTATION OF CONTRACT TIME:

Contract time extension shall not be automatically applied or increased. It shall be the CONTRACTOR's responsibility to request for contract time extensions and CONTRACTOR shall provide adequate justification. Only if the CONTRACTOR can justify increasing the contract time will an extension to the contract time be considered. Contract time is calculated with consideration given that significant work is not normally accomplished around holidays and vacation periods. Therefore, no contract time adjustments shall be allowed for holidays and vacations.

20.0 EXCESS MATERIAL:

Upon direction of the ENGINEER, all vegetation, debris, concrete or other unsuitable materials shall be disposed of in areas provided by the CONTRACTOR, and approved by the ENGINEER. Any excess material desired to be retained by the OWNER shall be delivered by the CONTRACTOR to a designated area within a five(5) mile radius of the project, at no extra cost to the OWNER.

21.0 LINE AND GRADE:

The ENGINEER has provided vertical control for layout of the work in the form of benchmarks located adjacent to the work. From these benchmarks and from horizontal controls provided by the ENGINEER, the CONTRACTOR shall develop and make all detailed surveys needed for construction and shall establish all working points, lines and elevations necessary to perform the work. This surveying work shall be supervised by a Professional Land Surveyor registered in the State of Florida.

21.1 It is the sole responsibility of the CONTRACTOR to confirm and verify the accuracy of horizontal and vertical controls prior to commencement of construction. CONTRACTOR shall not be allowed additional payments on the basis of incorrect horizontal and vertical controls.

22.0 CRITICAL PATH METHOD (CPM) SCHEDULING:

22.1 References

The General Conditions, Supplementary Conditions, and applicable portions apply to the work of this Section as if printed herein. **The Contractor will be required to submit a construction schedule using Microsoft Projects (or approved equivalent) with Gantt Bar charts. The schedule must be detailed enough for the Engineer and Owner to monitor work progress. The initial schedule must be submitted on or before the pre-construction meeting.** The schedule will be updated and submitted monthly to CAS with pay requests.

The subsequent paragraphs (22.##) in this section are shown for reference or guidance only.

22.2 General:

A. The CONTRACTOR shall develop a Computerized Cost Loaded schedule network diagram (within CPM), demonstrating complete fulfillment of all CONTRACT requirements, shall keep the network plan up-to-date in accordance with the requirements of this section and shall utilize this plan in

planning, coordinating and performing the work under this CONTRACT (including all activities of subcontractors, equipment vendors and suppliers). I-J notation or Precedence technique may be used.

- B. The CONTRACTOR is encouraged to involve all subcontractors in the development, implementation and updating process of its schedule.
- C. The schedules and reports required by this section are to be prepared and submitted by the CONTRACTOR to the ENGINEER for review in accordance with Table 1 of this section.
- D. Failure of the CONTRACTOR to prepare, submit and update the schedules and reports in accordance with the Specification shall be cause for the OWNER to withhold payment on the CONTRACTOR'S Monthly Application for Payment. The Schedules and Reports are due and shall be delivered to the ENGINEER with the CONTRACTOR'S Monthly Application for Payment.

22.3 CPM Subcontractor:

- A. To assist in the preparation and production of the CPM network diagram and computer-produced report sorts required under this section, the CONTRACTOR shall engage at his own expense a CPM subcontractor having the following qualifications (except that the CONTRACTOR may perform these services with his own organization if the CONTRACTOR himself meets the following requirements applicable to the CPM subcontractor, subject to the approval of the ENGINEER. It is the responsibility of the CONTRACTOR to satisfactorily demonstrate that such individuals are fully qualified and that the services shall be equal to that of a CPM subcontractor).
 - 1. Has at least one full-time employee skilled in the application of computerized CPM network techniques to construction projects of the magnitude and complexity of this project.
 - 2. Has on site a computer program for the production of the required CPM network, schedule reports and cost payment reports; and
 - 3. Has on site the computer facilities with the capability of delivering the CPM network and the required reports.
- B. Within ten (10) days of CONTRACT award and prior to engaging a CPM subcontractor or commencing performance of the work required under this section with his own forces, the CONTRACTOR shall submit to the ENGINEER:
 - 1. The name and address of the proposed CPM subcontractor;
 - 2. Information sufficient to show that the proposed CPM subcontractor or the CONTRACTOR's own organization has staff and computer facilities meeting the requirements specified in this paragraph; and

22.4 Initial Submittal:

- A. Before proceeding with any work on the site and within twenty (20) calendar days after receipt of CONTRACT award, the CONTRACTOR shall provide a preliminary network for the project. The preliminary network shall be computerized and define the CONTRACTOR's planned operations during the first one hundred and twenty (120) calendar days of the contract period and shall include the general approach for the balance of the project. The preliminary network shall include event number, activity description, activity duration, and activity value and activity logic for the first one hundred and twenty (120) calendar days. The critical path shall be shown graphically on the preliminary network. After review by the OWNER, the CPM subcontractor shall accept or reject in writing within seven (7) calendar days all comments to the schedule made by the OWNER and resubmit for final acceptance. Upon final acceptance, the preliminary network shall not be changed, except as provided by this section, and be incorporated in its entirety into the complete schedule described in section 22.4, C., below.
- B. Within thirty (30) calendar days after receipt of CONTRACT award, the CONTRACTOR shall submit for the ENGINEER'S review and approval a computerized CPM network diagram and accompanying reports describing the activities to be accomplished and their dependency relationships, together with a computer produced schedule in accordance with the requirements of subarticle H, COMPUTER-PRODUCED SCHEDULE REQUIREMENTS, showing the starting and completion dates for each activity in terms of calendar days from receipt of CONTRACT award. All completion dates shown shall be within the period specified for CONTRACT completion. The resource loading described in 22.6, C., 4., is considered part of the complete schedule submittal.
- C. Submittal of the CPM Progress Schedule shall be understood to be the CONTRACTOR's representation that:
 - 1. Schedule meets the requirements of the CONTRACT Documents and that Work shall be executed in the sequence indicated on the schedule.
 - 2. CONTRACTOR has distributed progress schedule to Subcontractor's for review and acceptance.

22.5. Review and Approval:

- A. Within ten (10) calendar days after receipt of the complete schedule submittal and accompanying reports, the ENGINEER or representative shall meet with the CONTRACTOR for joint review, comment, and evaluation of the proposed plan and schedule. After the joint review, the CONTRACTOR shall accept or promptly reject in writing within seven (7) calendar days, all comments to the schedule made by the OWNER and shall submit four signed copies of the revised CPM diagram to the ENGINEER. The re-submission will be reviewed by the ENGINEER and, if found to be adequate, will be approved; an approved copy will be returned to the CONTRACTOR. Upon approval of the schedule, the CONTRACT Notice to Proceed (NTP) will be issued. Any increased costs to the CONTRACT due to the delay of the NTP under this section shall be the responsibility of the CONTRACTOR. The approved schedule shall then be the schedule to be used for planning,

organizing and directing the work, reporting progress, and requesting payment for the work accomplished. If the CONTRACTOR thereafter decides to make changes in his network logic or method of operating and scheduling, he shall notify the ENGINEER in writing of the reason for the change. The ENGINEER will review and approve all changes prior to insertion into the approved schedule.

22.6. Detailed CPM Diagram Requirements:

- A. A detailed CPM diagram shall show the sequence and interdependencies of activities required for complete performance. In preparing the CPM diagram, the CONTRACTOR shall break-up the work into activities of a duration of no longer than fifteen (15) working days each, except as to non-construction activities (such as procurement of materials, delivery of equipment and concrete curing) and any other activities for which the ENGINEER may approve the showing of longer duration. The selection and number of activities shall be the responsibility of the CONTRACTOR but shall be subject to the approval of the ENGINEER. Network activities shall include, in addition to construction activities, activities for submittal of materials, samples, shop drawings, operation and maintenance manuals, master equipment lists, spare parts lists, and other related documents. Also included shall be activities for the procurement of all major or critical materials and equipment, including fabrication and delivery, installation and testing. Of particular interest shall be those material and equipment procurement items that are expected to be critical to the progress of actual construction. Activities of the OWNER/ENGINEER indicating reviews and approvals of materials, equipment, testing, and other actions that effect progress shall be shown. Time frames for OWNER activities shall not be less than specified and shall include reasonable time for activities that do not have time indicated.
- B. Windowing (chronologically selected portions of the network) specified for reports or diagramming shall be possible on the CONTRACTOR provided computer workstation. A network information report, listing the information contained in the reference menu and logic diagram, shall be provided for the initially approved network as well as each update, which incorporates a logic change.
- C. Activity duration (i.e. the single best estimate, considering the scope of the activity and the resources planned for the activity) shall be shown for each activity on the diagram. Failure to include any element of work required for the performance of this CONTRACT shall not excuse the CONTRACTOR for completing all work required within any applicable completion date, notwithstanding the ENGINEER's approval of CPM diagrams.
 - 1. The construction schedule shall represent a particle plan to complete the work within the CONTRACT duration. A schedule extending beyond the contract time will not be accepted. A schedule showing the work completing in less than the contract time, which is approved by the ENGINEER, shall be considered to have float. The float is the time between the schedule completion of the work and the CONTRACT completion date.

2. Float is defined as the amount of time between the early start date and the late start date, or the early finish date and the late finish date, of any activity in the project schedule. Total float is defined as the amount of time any given activity or path of activities may be delayed before it will affect the project completion time. Float is a resource available to both the OWNER and the CONTRACTOR.
3. The CPM schedule's critical or near critical activities should not exceed thirty-five (35%) percent of the project's total activities. Critical path activities are designed as those with zero (0) float while near critical are those having ten (10) days or less of float.
4. The CONTRACTOR shall resource load and cost-load all activities (to equal the CONTRACT value) requiring the use of CONTRACTOR resources. The CONTRACTOR may, at his option, decide on greater detail for his own purposes, but if this option is elected, the system shall be able to consolidate resources into the above defined categories for use by the ENGINEER.
 - a. All activities of the OWNER that affect progress will be included in the network and be coded to allow a separate report.
5. A summary network schedule shall be developed. It shall be included in the detailed network and shall include all milestones and other activities of significant importance. The selection and number of activities, expected to be twenty to forty (20-40) activities, shall be subject to the ENGINEER's approval. The network analysis system shall identify each activity on the diagram along with description of that activity, cost of the activity, and activity duration in work days. The total value of all activities in the summary network shall equal the CONTRACT value. Activities of the summary network shall hammock the detailed activities of a major portion of work, and be coded to allow for a separate report.

22.7 CPM Network Diagram Supporting Data

- A. The CONTRACTOR shall concurrently furnish the following supporting data with the CPM network diagram.
 1. Cost estimate for each activity. The total of all activity costs shall equal the CONTRACT price.
 2. Construction manpower loading as a function of time of each activity.
 3. Other data such as the proposed number of working days per week, the planned number of shifts per day and the number of hours per shift.
- B. The CONTRACTOR shall furnish with the CPM network diagram, and each submittal or revision thereto which affects the CONTRACT time, cash flow in a suitable scale indicating graphically the total percentage of activity dollar value scheduled to be in place based on both early and late finish dates.

22.8 Computer-Produced Schedule Requirements

- A. The CONTRACTOR shall furnish with the CPM network diagram, and each submittal or revision thereof, computer-produced reports (listed in 22.8, C.), showing the following minimum data for each activity:
1. Activity beginning event number.
 2. Activity ending event number (mandatory only when I-J format is used).
 3. Activity description.
 4. Activity duration estimate.
 5. Remaining duration.
 6. Activity cost estimate.
 7. Trade code (responsibility code including CONTRACTOR, subcontractor, supplier and OWNER).
 8. Early start date - by calendar date.
 9. Early finish date - by calendar date.
 10. Late start date - by calendar date.
 11. Late finish date - by calendar date.
 12. Actual start date - by calendar date.
 13. Actual finish date - by calendar date.
 14. Total float.
 15. Percent completed.
 16. CONTRACTOR's earnings based on portion of activity completed.
 17. Resource loading.
- B. The program used in making the mathematical computation shall be capable of compiling the total value of completed and partially completed activities. The program shall also be capable of calculating time data without being effected from the cost/value data.
- C. As a minimum, the following computer-produced report sorts of the basic activity data shall be supplied with clear identification on the first page of each report:
1. Activity listing by number sequence.

2. Activity sort by total float - early start date - early finish date, late start.
3. Activity sort by trade - early start date - total float, late start date, late finish.
4. CONTRACTOR's monthly payment request sorted by trade.
5. By milestone items. (See Summary Network, Paragraph 22.6, C., 5. above).
6. S-curve

Construction Progress S-curves: This report shall be a plot of the three S-curves of the value of the work-in-place. The curves shall be clearly distinguishable from each other, and shall represent the following:

- a. The projected cumulative value of work-in-place if the early start and finish dates are used.
- b. The projected cumulative value of work-in-place if the late start and finish dates are used.
- c. The actual cumulative payments to the CONTRACTOR to date. This curve shall be extended to project completion to show a forecast of final cumulative CONTRACTOR payments.
 - 1) This report shall be time scaled, with the X-axis representing the project calendar, and the Y-axis representing cumulative payments to the CONTRACTOR.
 - 2) The ENGINEER shall be allowed to request network reports based on any (allowable) combination of the sorting criteria.
 - 3) Initial submittal, complete revisions, monthly pay requests and change orders requesting time extension shall be submitted in four copies.

22.9 Progress Reporting and Changes

- A. The CONTRACTOR shall submit, at monthly intervals (end of each month), a report of the actual construction progress by updating the network and producing an updated network report. The submittal shall include the CPM network, summary network and the sorts listed in 22.8, C., of this section. The monthly update report shall show current status (to include completed activities, actual start and finish dates) and explanation for any out of sequence progress. If the ENGINEER feels the out of sequence progress is distorting the network, he may require an update of the CPM logic and submittal of the new network for approval at no additional cost to the OWNER.

- B. Once a month, prior to the date specified by the ENGINEER for submission of updated computer-produced CPM network and reports, the CONTRACTOR shall make entries in the preceding computer-produced calendar-dated schedule:
1. To show actual progress and percent completed of those activities in progress;
 2. To identify those activities started and those completed during the previous period;
 3. To show the estimated time required to complete each activity started but not yet completed;
 4. To reflect any changes in the CPM diagram approved by the Constructing Officer Representative.
 - a. The CONTRACTOR shall submit for approval an updated computer-produced CPM network and reports in the detail specified in subarticle H, COMPUTER-PRODUCED SCHEDULE REQUIREMENTS, to the office designated by the ENGINEER, no later than the close of business on the date specified by the ENGINEER.
- C. Extension of time for performance required under the General Conditions pertaining to equitable time adjustment will be granted only to the extent that the equitable time adjustment exceeds total float in the activity or path of activities affected at the time CONTRACT award was issued for the change. The CONTRACTOR shall indicate in his cost proposal, all activities affected, activities added or activities deleted. A subnet of activities affected by the change shall also be submitted in four hard copies. Resubmission of the entire network diagram in hard copy will not necessarily be required. Each monthly updating of the network reports shall include revisions incorporated into the system of all approved modifications.
- D. In addition to the foregoing, the CONTRACTOR shall submit a narrative report once each month with the updated schedule in a form agreed upon by the CONTRACTOR and the ENGINEER. The narrative report shall include a description of the progress during the last month in terms of current and anticipated delaying factors and their estimated impact on the cost of performance of other activities and completion dates, and an explanation of corrective action taken or proposed.
- E. A monthly joint update meeting is required. The purpose of these joint update meetings is to maintain proper communications and understanding regarding the project schedule. Attendees should include all contracted parties who are concerned with schedule and performance, especially major subcontractors.

22.9 Payments to CONTRACTOR

The CONTRACTOR's monthly progress billings shall be based on the cost estimates allocated to each schedule activity.

- A. The CONTRACTOR shall be entitled to progress payment only upon approval of estimates as determined from the updated CPM network and reports submitted and approved for month of current invoice.
- B. If the CONTRACTOR fails to submit the CPM diagram and computer-produced schedule within the time prescribed, or the updated monthly schedule within the time requested, the ENGINEER will withhold approval of progress payment estimates until such time as the CONTRACTOR submits the required schedules, that conform to the Specifications found in this section.

22.10. Responsibility for Completion

- A. If, in the opinion of the ENGINEER, the CONTRACTOR falls behind the progress schedule, the CONTRACTOR shall immediately take any and all steps necessary to improve his progress at no additional cost to the OWNER, such as the following:
 - 1. Increase construction manpower in such quantities and crafts as will substantially eliminate the lag in scheduled progress.
 - 2. Increase the number of working hours per shift, shifts per working day, working days per week, or the amount of construction equipment, or any combination of the foregoing, as required to substantially eliminate the lag in scheduled progress.
 - 3. Reschedule sequence activities to achieve maximum practical concurrence accomplishment of work activities.
- B. The ENGINEER may also require the CONTRACTOR to submit for approval and at no additional cost to the OWNER a revised logic diagram as may be deemed necessary to demonstrate the manner in which the approved progress schedule will be regained.
- C. Failure of the CONTRACTOR to comply with the requirements of the ENGINEER under this subarticle 22.10 shall be grounds for determination by the ENGINEER that the CONTRACTOR is not prosecuting the work with such diligence as will insure completion within the time specified. Upon such determination the ENGINEER may terminate the CONTRACTOR's right to proceed with the work, or any separable part thereof, in accordance with the applicable provisions of the General Conditions.

**Table 1
REPORTING FREQUENCY OF SCHEDULES AND REPORTS**

Reporting Frequency				
Description of Schedule or Report	Paragraph	Within 20 Days of Contract Award	Within 30 Days of Contract Award	Each Month
Preliminary Network	22.4, A.	X		
Detailed CPM Network (on floppy	22.4, B.		X	X

disk & print)				
Resource Loading	22.6, C., 4.		X	X
Summary Network	22.6, C., 5.		X	X
Updated Network Reports	22.8, C.		X	X
S-Curve	22.8, C.		X	X
Explanation of out of Sequence Work	22.9, A.		X	X
Narrative Report	22.9, D.		X	X
Monthly Update Meeting/Minutes	22.9, E.			X

Four Prints of each schedule or report shall be submitted.

23.0 LAMPING AND VIDEO-TAPING OF STORM SEWER SYSTEM: (N/A)

The CONTRACTOR shall thoroughly clean storm structures and make the system available for lamping prior to any punchlist inspections. Once the system has been lamped, the CONTRACTOR shall protect the system from further contamination. If the CONTRACTOR's operations contaminate the system, the CONTRACTOR shall make the system available to the ENGINEER/OWNER for a second lamping after Substantial Completion. All lamping costs shall be included in the unit prices bid for storm sewer pipe.

23.1 When the Contractor considers the project to be substantially complete, and after all pipe sections have been successfully lamped and have passed preliminary infiltration/exfiltration testing and inspection, Contractor shall provide written notice to the ENGINEER and shall schedule video camera inspection of the storm sewer system. The results shall be stored on premium quality DVD at a speed that provides the highest quality and picture resolution. The videoing shall be performed in a logical manner showing information, in detail, by ascending structure number (e.g., 1,2,3,); showing a complete run of pipe from structure to structure; and the taped information provided shall include a visible and legible, on-screen display of time, date, distance, structure designation, pipe size and material composition, including clear and audible narrative descriptions of each scene and feature, by the operator.

23.2 Engineer shall have the final approval to accept or reject the taped information. Contractor shall immediately perform re-taping of rejected section(s), until acceptance by the Engineer. All costs associated with the video taping inspection shall be included in the line item prices for stormwater drainage facilities and components. All costs for any re-taping required and provided shall be at no additional cost to the Owner.

23.3 Video-taped section(s) showing evidence of damage and/or infiltration/exfiltration shall be cause for further inspection and repair. All repaired section(s) shall be re-taped at no additional cost to the Owner and such information provided to the Engineer.

23.4 Record Retention:

Contractor shall maintain a record of video tapes for a period of three (3) years after completion and acceptance of the project.

24.0 PROJECT SIGN:

Each CONTRACTOR shall furnish and erect a sign at his project site. One sign shall be required for each part of the CONTRACT. Each sign shall be made of three-quarter ($\frac{3}{4}$ ") inch plywood, substantially in accordance with the drawing in this Section below. Signs shall be placed at both ends of the project in a prominent location and maintained in good condition until completion of the project when signs shall then become the property of the OWNER.

24.1 Dimensions of Project Sign:

Three-quarter ($\frac{3}{4}$ ") inch thick marine plywood, four (4') feet vertically by eight (8') feet horizontally, two (2) signs required three (3") radius on each corner.

Sign Detail:

TOWN OF GOLDEN BEACH TWEDDLE PARK PUMP STATION RETROFIT PROJECT

FUNDING PROVIDED BY: Florida Department of Environmental Protection
Resilient Florida Program



Golden
BEACH

Glenn Singer, Mayor
Kenneth Bernstein, Vice Mayor
Bernard Einstein, Councilmember
Judy Lusskin, Councilmember
Jaime Mendal, Councilmember

Town Manager - Alexander Diaz
One Golden Beach Drive
Golden Beach, FL 33160
Phone: 305.932.0744
<http://www.goldenbeach.us/>

Town Engineer - Craig A Smith & Associates
Orlando A. Rubio, PE
1425 E. Newport Center Drive
Deerfield Beach, FL 33432
Phone: 561.314.4445
www.craigasmith.com



PROJECT COST: TBD

CONSTRUCTED BY: TBD

25.0 MAINTENANCE AND PROTECTION OF TRAFFIC:

25.1 Description of Work:

- A. Provide all items necessary to protect, warn and/or maintain vehicular and pedestrian traffic during the course of construction.
- B. Arrange for the services of a Traffic Engineer, registered as a Professional Engineer in the State of Florida, to prepare conceptual and detailed Traffic Control Plans (TCP) for approval by OWNER and ENGINEER prior to the start of construction activities.
- C. The Traffic Control Plan (TCP) and all traffic warning and control devices shall conform to the applicable provisions of the national "Manual On Uniform Traffic Control Devices" (MUTCD), the State of Florida Department of Transportation's Roadway and Traffic Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, Current Edition, and OWNER of Highland's "Minimum Standards Applicable to Public Rights-of-Way Under Highland County Jurisdiction".
- D. CONTRACTOR shall have, in his employ, an American Traffic Safety Services Association (ATSSA) or International Municipal Signal Association (IMSA) "Certified Worksite Traffic Supervisor" to be responsible for all TCP actions on the jobsite.
- E. The fee for Engineering Services for the preparation and any necessary revisions to the required TCP shall be included in Pay Item No. 102-1, Maintenance of Traffic.

25.2 Traffic Control Plan:

- A. The CONTRACTOR shall submit to OWNER and ENGINEER for review and approval, a conceptual Traffic Control Plan at the Pre-Work Conference, identifying the phases of construction that the CONTRACTOR plans to proceed with and identifying traffic flows during each phase. The ENGINEER will notify the CONTRACTOR of any comments within fifteen (15) calendar days of receipt of the conceptual plan. A Notice to Proceed will not be issued until an approved conceptual Traffic Control Plan is in place. When the conceptual Traffic Control Plan has been approved, the CONTRACTOR's Traffic Engineer shall prepare and submit for review to OWNER and ENGINEER a detailed Traffic Control Plan for each phase of work, indicating the proposed location of construction signs, channelizing devices, temporary pavement markings and symbols, lighting devices, barricades, barrier walls and all other required devices. The detailed plan shall be reviewed by both OWNER and ENGINEER with all comments forwarded to the CONTRACTOR within a fifteen (15) calendar day period. Upon the start of construction, the CONTRACTOR shall comply with all provisions of the detailed Traffic Control Plan. In the event of non-compliance by the CONTRACTOR, the ENGINEER will have the authority to order the CONTRACTOR to cease construction operations without compensation of time or money until the violation(s) have been corrected.

- B. The detailed Traffic Control Plan shall include provisions for pedestrian and/or school student traffic as well as vehicular (including bus) traffic. The following are minimum requirements:
1. A safe walk route for all school students within the vicinity of the construction zone shall be maintained during the times students are arriving at or leaving school. If the existing walking surface cannot be maintained, a temporary walk route four (4) feet in width shall be constructed of compacted limerock. The safe walk route shall be separated from construction activity by a highly visible construction fence for any part of the walk route, which lies within the "Construction Zone".
 2. All construction equipment around any designated crosswalk shall cease to operate during the times students are arriving at or leaving school. All construction equipment adjacent to a designated walk route shall cease operating unless the walk route is protected by a suitable concrete barrier.
 3. In the event that a designated crossing or any portion of the designated walk route cannot be maintained because of construction activities, the CONTRACTOR shall notify the School Safety Coordinator (or equivalent personnel) at Highland County, a minimum of ten (10) working days prior to closing that route in order that an alternate crossing/route can be established.
 4. It shall be the responsibility of the CONTRACTOR to install any necessary pavement, road rock, pavement marking and signage and/or any pedestrian signalization and/or signal modification to accommodate an existing or alternate walk route.
 5. It shall be the CONTRACTOR's responsibility to provide State Certified School Crossing Guards or off duty Sheriff Officers to cross students other than those previously designated. The CONTRACTOR may use flaggers, if they are State Certified as School Crossing Guards.
 6. The CONTRACTOR shall be responsible for providing a safe and adequate walking surface for all school children/pedestrians. This safe walk route shall be part of the Traffic Control Plan.
- C. The Traffic Control Plan shall show and describe proposed location and time duration's of the following:
1. Public vehicular traffic routing.
 2. Traffic blockage and lane closings anticipated due to construction operations.
 3. Staging/storage areas and haulage routes.
 4. Allowable on-street parking in vicinity of work site.

5. Access to buildings adjacent to work site.
6. Driveways, which will be blocked by construction operations.
7. Temporary commercial and industrial loading and unloading zones.
8. Temporary traffic control and channelizing devices and markings.
9. Individual street closings with locations and time durations.
10. Detour facilities.

D. General:

1. The CONTRACTOR shall be responsible for the proper maintenance, control and detour of traffic in the area of construction during the course of construction. All traffic control and maintenance procedures shall be in accordance with the Drawings and these Technical Provisions. It shall be the CONTRACTOR's responsibility as Bidder, prior to submitting his bid, to determine the amount of work required so that his proposal reflects all costs to be incurred including clearing and grubbing, necessary fill and excavation, suitable rock base and pavement for temporary pavement, temporary signing and marking, and all other incidental items necessary to maintain traffic as outlined in this Manual. No claims for additional payment will be considered for costs incurred in the proper maintenance, control, detour and protection of traffic and no extensions in CONTRACT time will be granted due to this Maintenance of Traffic Item.
2. Access to adjoining properties shall not be blocked for a period to exceed two (2) hours. Property owners shall be notified twenty-four (24) hours prior to blocking access to their property.
3. The CONTRACTOR shall install Type III wooden barricades (with "Road Closed" signs), flashers and other warning/ protective devices as required by the "Manual On Uniform Traffic Control Devices". These safety/warning installations shall be approved by the ENGINEER prior to the CONTRACTOR'S beginning work.
4. The CONTRACTOR shall keep all law enforcement, fire protection and ambulance agencies informed, in advance, of his construction schedules and shall notify all such agencies forty-eight (48) hours in advance in the event of detour of any roadway.
5. All traffic control signs and devices, barricades, flashers, flambeaus and similar devices shall be furnished and maintained by the CONTRACTOR.
6. The CONTRACTOR shall provide the services of uniformed off duty police officers to supervise traffic control and maintain safety along the routes of the work particularly when working near intersections or at any other area where his operation causes traffic congestion such that police supervision is required to protect the public safety and the work.

7. Excavated or other material stored adjacent to or partially upon a roadway pavement, shall be adequately marked for traffic and pedestrian safety at all times. Necessary access to adjacent property shall be provided at all times, except as noted in paragraph (3) above.
8. In the event the CONTRACTOR shall detour or close off residential street traffic, he shall submit a plan (or field sketch) for approval depicting a method of providing one-way operation or run-around detour route to the respective traffic agency having jurisdiction, a minimum of five days prior to any street closing.
9. The CONTRACTOR shall be responsible for performing daily inspections, including weekends and holidays, with some inspections at night time, of the installations on the project and replace all equipment and devices not conforming to the approved standards during that inspection. The ENGINEER shall be advised of the schedule of these inspections and be given the opportunity to participate in the inspection.
10. It shall be required that the CONTRACTOR shall protect and keep operational, all information, regulatory markings and street name signs in their proper location throughout the entire construction zone. This requirement will be for the entire period of construction.

11. Barricades and Protection of Work

CONTRACTOR shall protect his work throughout its length by the erection of suitable barricades and handrails, where required. He shall further indicate this work at night by the maintenance of suitable lights or flares, especially along or across thoroughfares. Wherever it is necessary to cross a public walk, he shall provide a suitable safe walkway with hand railings. He shall also comply with all laws or ordinances covering the protection of such work and the safety measures to be employed therein. The CONTRACTOR shall carry out his work so as not to deny access to private property. All utility access manholes, valves, fire hydrants and letter boxes shall be kept accessible at all times. The placement of these barricades shall be in conformance with the "Manual on Uniform Traffic Control Devices".

25.3 Products:

A. Traffic Control and Channelizing Devices

1. Provide devices complying with the standards referenced in paragraph 25.1, C., above.

25.4 Execution:

A. Maintenance of Traffic:

1. The CONTRACTOR, at all times, shall conduct the work in such a manner as to ensure the least obstruction to traffic as is practical.

The safety and convenience of the general public and of the residents adjacent to the work shall be provided for in a satisfactory manner, as determined by the ENGINEER.

2. Sidewalks, gutter, drains, fire hydrants and private drives shall, insofar as practical, be kept in good condition for their intended uses. Fire hydrants on or adjacent to the work shall be kept accessible to fire apparatus at all times, and no material or obstruction shall be placed within ten (10) feet of any such hydrant.
3. Construction materials temporarily stored within the road Right-of-Way shall be placed so as to cause as little obstruction to the general public as is reasonably possible.
4. Streets shall not be closed, except in accordance with the approved Traffic Control Plan and, whenever the street is not closed, the work shall be conducted with provisions for a safe passageway for traffic at all times. The CONTRACTOR shall make all necessary arrangements with the ENGINEER concerning maintenance of traffic and selection of required detours.
5. All existing stop signs and traffic signals shall be maintained by the CONTRACTOR for as long as deemed necessary by the ENGINEER.

B. Diversion/Detouring of Traffic:

1. When permission has been granted to close an existing roadway, the CONTRACTOR shall furnish and erect signs, channelizing devices, lights, flags and other protective devices, which shall conform to the requirements of paragraph 25.1, C., above, and be subject to the approval of the ENGINEER. The CONTRACTOR shall furnish and maintain proper protective devices at such locations for the entire time of closure as the ENGINEER may direct.
2. The CONTRACTOR shall furnish a sufficient number of protective devices to protect and divert vehicular and pedestrian traffic from working areas closed to traffic, or to protect any new work. Failure to comply with this requirement shall result in the ENGINEER shutting down the work until the CONTRACTOR provides the necessary protection.
3. The CONTRACTOR may be required to reposition existing traffic signal heads in order to maintain traffic flows at diverted intersections. If this should be necessary, the CONTRACTOR shall submit a plan for approval showing the course of work and the planned repositioning. No separate payment for repositioning the existing traffic signal heads will be made. The cost of this work shall be included in the bid item for Maintenance of Traffic.

26.0 STORMWATER POLLUTION PREVENTION PLAN:

The CONTRACTOR, within thirty (30) days of the Notice of Intent to Award, shall prepare and submit to the ENGINEER for review and approval, a Stormwater Pollution Prevention Plan (SWPPP).

26.1 The SWPPP shall define all measures to be taken by the CONTRACTOR to ensure compliance with the Nation Pollution Discharge Elimination System (NPDES) regulations. The required measures include, but are not limited to, placement of bailed hay or straw around all existing drainage structures, placement of filter fabric under catch basin grates, placement of silt fences, barriers and turbidity screens/barriers.

26.2 The SWPPP can be prepared by an Engineer (recommended), Registered in the State of Florida and knowledgeable of the NPDES and Applicable OWNER Codes. The SWPPP shall be signed and sealed by the Engineer, retained by the CONTRACTOR and contractor shall be responsible to ensure the proper performance and compliance with the SWPPP and all applicable codes.

27.0 CLEARING AND GRUBBING:

This item includes, but is not limited to, removal of all existing drainage structures and culverts as specified on the Plans or as directed by the ENGINEER, existing roadway pavement, sidewalks, curb and gutter. This item shall also include all costs for adjustment of adjacent properties' irrigation systems that encroach into proposed construction areas. Irrigation systems shall be adjusted to a state better than or equal to that of the existing systems. This adjustment work includes but is not limited to furnishing all labor, equipment, material, and incidentals necessary to complete the work.

28.0 REMOVAL OF EXISTING STRUCTURES:

This item includes removal and disposal of existing structures necessary for the construction of the proposed work.

29.0 EMBANKMENT:

The quantities for this item do not take into account soil shrinkage factors and compaction factors. This item includes all costs for compaction of soil to final grades.

30.0 REGULAR EXCAVATION (ROADWAY):

All suitable excavated materials shall remain the property of the OWNER. After final job requirements for fill and backfill materials have been fulfilled the CONTRACTOR shall haul and place all excess material in a location designated by the OWNER, but within a five (5) mile radius of the construction site. Costs to be included in the CONTRACT and no additional payment will be made for transporting of excess material. If the OWNER does not wish to keep the surplus material, he shall issue a written order to the CONTRACTOR authorizing him to dispose of the material outside the right-of-way to the satisfaction of the ENGINEER and at no additional cost to the project. The maximum tolerance for swale excavation shall be one-tenth (0.1) of a foot.

31.0 MEASUREMENT FOR PAYMENT - EARTHWORK QUANTITIES:

The CONTRACTOR shall be responsible for obtaining field cross-sections (and other measurements as necessary) where excavation and/or embankment construction is indicated on the plans. Cross-sections shall be taken as follows:

- 31.1 Original ground prior to construction.
- 31.2 Upon completion of channel excavation, regular excavation and subsoil excavation activities.
- 31.3. Upon completion of embankment/earthwork activities.

All field survey work shall be performed under the supervision of a Professional Land Surveyor licensed in the State of Florida. The cross-sections shall be plotted at a suitable scale, and payment quantities determined; these drawings and calculations shall be made available for review by the ENGINEER and shall be sealed by a Florida Licensed Professional Land Surveyor.

32.0 WATER QUALITY:

The CONTRACTOR shall take all steps necessary to protect water quality in the connected waters around the project and shall utilize such additional measures as directed by the ENGINEER. Silt screens adjacent to the bridge sites or outfall construction shall not be removed until the turbidity of the affected waters is equal to or lower than the ambient turbidity of undisturbed segments of the canal. The CONTRACTOR shall ensure compliance with all local, state and federal regulations regarding construction activities within the canal(s) and shall take any and all necessary steps to ensure minimum water quality standards. These steps shall include but not be limited to the placement of floating turbidity barriers, silt fencing, cofferdams or other approved methods of protecting water quality. The cost of these measures is understood to be included in the bid price for items to which they would most logically be associated.

33.0 OWNERSHIP OF EXISTING MATERIALS:

All materials removed or excavated from the job site shall remain the property of the OWNER until released by the ENGINEER, at such time it shall become the property of the CONTRACTOR, who shall dispose of it in a manner satisfactory to the ENGINEER in areas provided by the CONTRACTOR.

34.0 PROTECTION OF WILDLIFE:

The CONTRACTOR shall take all precautions to ensure the protection of wildlife within the project limits. The aquatic life is defined as, but not limited to, all species of fish and aquatic vegetation that reside within the canal system.

35.0 PROTECTION OF THE WEST INDIAN OR FLORIDA MANATEE:

The aquatic mammal known as the "Manatee" is a federally protected endangered species. The "Manatee" has been known to frequent the warm inland waters in and around the vicinity of this project. The CONTRACTOR shall take all necessary precautions to ensure the safety of "Manatees" that may enter the construction area.

- 35.1 Manatees are not to be fed or harassed and work within the canal will be halted if a Manatee is sighted within fifty (50) yards of the work area. Work can resume only after the Manatee(s) have cleared the work zone.
- 35.2 The CONTRACTOR shall contact the Florida Game & Fish Commission, Bureau of Protected Species Management for the current rules and regulations regarding the treatment and protection of Manatees. The cost of any measures necessary for Manatee protection is understood to be included in various CONTRACT unit prices.
- 35.3 The CONTRACTOR shall not be entitled to any claim for damages or delay resulting from the presence of Manatees within the work zone.

36.0 DRAINAGE MATERIALS

- 36.1 The CONTRACTOR shall use the type, size and diameter of pipe specified in the Engineering Plans.
- 36.2 Coarse Aggregate:

The Coarse Aggregate shall meet the gradation requirements as specified for No. 4 stone in Standard 901-6.
- 36.3 Select Fill:

The select fill shall consist of well-graded limerock or limerock and sand fill. Sand, or fill having a high proportion of sand, shall not be accepted as select fill. All select fill shall be approved by the ENGINEER prior to placing.
- 36.4 Excavating Trench:
The trench shall be excavated carefully to such depths as required to permit the pipe to be placed in accordance with the details shown on the plans.
- 36.5 Laying Pipe:

All pipe shall be carefully laid in conformity with the lines and grades specified in the plans and in accordance with these Specifications. Unless otherwise specified in the plans, the pipe shall be set with a minimum cover of twenty-four (24") inches.
- 36.6 Ensuring Watertight System:

After the pipe has been laid and prior to placement of backfill, the pipe sections shall be tested to ensure proper sealing and to demonstrate water tightness.

A section of pipe for testing purposes is defined as the pipe placed between two structures and sealed into the respective structures. Each section shall be flooded with water and pressurized or maintained for the period of time required to demonstrate to the satisfaction of the ENGINEER, an effective watertight installation. Where the pipe is below the water table, water shall be pumped out for the test period.
- 36.7 Method of Measurement:

The quantity of drainage pipe to be paid for under this Section shall be the length in linear feet measured in place, completed and accepted.

36.8 Basis of Payment:

The quantity determined as provided above shall be paid for at the CONTRACT Unit Price per linear foot for drainage pipe. Such price and payment shall be full compensation for all the work specified in this Section and shall include all materials and all excavation. Such price and payment shall also include all disposal of surplus material, pavement restoration, backfilling and tamping, but shall not include payment for items paid for elsewhere in the Specifications.

37.0 FLOATING SILT-BARRIER:

The work specified under this item shall conform to Section 104 of FDOT's Standards. The design and location for use of the Silt Barrier shall meet the approval of the ENGINEER.

37.1 Individual barriers may be used at more than one location dependent on construction sequence.

38.0 MEASUREMENT FOR PAYMENT:

The Land Surveyor for measurement for payment, shall be the Contractor's Surveyor, who will measure all "As-Built" quantities for payment. In the event of disputes as to quantity, the Owner's ENGINEER, CAS shall make the final determination; no additional compensation will be made for surveying services. This work shall be supervised by a Florida Licensed Registered Land Surveyor in the employment of CAS.

39.0 CONTRACTOR'S OFFICE:

The CONTRACTOR shall provide and maintain an office near the project site with telephone facilities where he or a responsible representative of his organization may be reached at any time while work is in progress.

40.0 SODDING:

Sodding for this project shall be St. Augustine or Floratam and/or shall reasonably match the existing or adjacent undisturbed sod or grassing present prior to commencement of the project. Proposed elevations, where indicated on the plans in areas to be sodded, refer to top of sod, after installation. If project contains plans prepared by a Landscape Architect, the sod will comply with the landscape plans.

41.0 THIRD PARTY CAVEAT:

Whenever the CONTRACT verbiage addresses a third party, i.e., a manufacturer, Subcontractor, or other similar or related entity, related to the work or agreement in some fashion, it is in fact to mean the CONTRACTOR through the third party.

41.1 Whenever the CONTRACT verbiage addresses a Subconsultant to the prime ENGINEER who is under contract with the OWNER, it is in fact to be construed as the prime ENGINEER through the Subconsultant.

42.0 SIGNS AND PAVEMENT MARKINGS:

42.1 HIGHWAY SIGNING:

Highway signing shall conform to the applicable amended Technical Specifications Section 700 of the FDOT Standards and the following additional requirements.

42.2 HIGHWAY DELINEATOR:

Highway delineators shall conform to the applicable amended Technical Specifications (Section 705) of the FDOT Standards.

42.3 RAISED REFLECTIVE PAVEMENT MARKERS:

Raised reflective pavement markers shall conform to the applicable amended Technical Specifications (Section 706) of the FDOT Standards.

42.4 PAINTED TRAFFIC STRIPES:

Painted traffic stripes shall conform to the applicable amended Technical Specifications (Section 710) of the FDOT Standards.

42.5 THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS:

A. Description:

The work under this section consists of placing traffic stripes and markings in accordance with the details shown in the plans, using a thermoplastic compound meeting the requirements specified herein.

B. The thermoplastic compound shall be extruded or sprayed onto the pavement surface in a molten state by mechanical means, with surface application of glass spheres, when required, and upon cooling to ambient pavement temperature shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation.

C. The color of the compound shall be white, black or yellow, as specified in the plans. Where the compound is to be applied to cement concrete pavement, a sealing primer as specified in D., 2., shall be applied to the pavement in advance of the placing of the stripes.

D. Materials:

1. Thermoplastic Compound: This material shall meet the requirements of AASHTO M 249-79 (1986) with these exceptions and additions:

a. Either alkyd or hydrocarbon resin type may be used. When alkyd resin type is used, it shall be supplied in the block form only.

- b. Black thermoplastic shall not contain premixed beads and its color shall be a visual match of Federal Standard 595a, shade 37056.
 - c. Alkyd binder shall consist of a mixture of synthetic resins, at least one of which is solid at room temperature, and high boiling point plasticizers. At least one-third of the binder composition shall be the solid maleic-modified glycerol ester of wood rosin and shall be no less than eight percent by weight of the entire material formulation. The binder shall not contain petroleum based hydrocarbon resins, tall oil resins, blends of tall oil resin and wood rosin or similar derivatives.
- 2. Seating Primer: The particular type and the proportions used shall be as recommended by the manufacturer of the thermoplastic compound.
 - 3. Glass Spheres: The reflective glass spheres premixed in the compound shall be as specified in AASHTO M 249 as referenced in 42.5, D., 1., above. Spheres for surface application shall meet the requirements of AASHTO M 247, Type I, 80 percent rounds minimum.
 - 4. Properties of Finished Striping and Marking Installations:
 - a. The stripe shall not be slippery when wet.
 - b. The compound shall not lift from the pavement in freezing weather.
 - c. The compound shall not deteriorate by contact with sodium chloride, calcium chloride or oil drippings from traffic.
 - d. After application and proper drying time the stripe shall show no appreciable deformation or discoloration under traffic and under road temperatures up to 140°F (60°C).
 - e. The stripe or marking shall maintain its original dimensions and placement. The exposed surface shall be free from tack. Cold ductility of the material shall be such as to permit normal movement with the road surface without chipping or cracking.

E. Equipment:

The material shall be applied to the pavement utilizing either extrusion or spray application equipment.

- 1. The application equipment shall be so constructed as to provide continuous mixing and agitation of the material. Conveying parts of the equipment between the main material reservoir and the shaping die or gun shall be so constructed as to prevent accumulation and clogging. All parts of the equipment, which come in contact with the material, shall be so constructed as to be easily accessible and exposable for cleaning and maintenance. The equipment shall be constructed so that all mixing and conveying parts up to and including the shaping die or

gun, maintain the material at the plastic temperature with heat transfer oil or electrical element controlled heat. Direct fire heat transfer shall not be allowed.

2. The application equipment shall be so constructed as to insure continuous uniformity in the dimensions of the stripe. The applicator shall provide a means for cleanly cutting off square stripe ends and shall provide a method of applying "skip" lines. The use of pans, aprons, or similar appliances, which the die overruns, shall not be permitted under this Specification. The equipment shall be so constructed as to provide for varying widths to produce varying widths of traffic markings.
3. Glass spheres applied to the surface of the completed stripe shall be applied by an automatic bead dispenser attached to the striping machine in such a manner that the beads are dispensed almost instantaneously upon the installed line. The glass sphere dispenser cut-off shall be synchronized with the automatic cut-off of the thermoplastic material.
4. Special kettle(s) shall be provided for melting and heating the thermoplastic material. The kettle(s) shall be equipped with automatic thermostatic control devices in order to provide uniform temperature control and prevent overheating of the material. The applicator and kettle(s) shall be so equipped and arranged as to satisfy the requirements of the National Fire Protection Association (NFPA), the State of Florida Office of the Fire Marshall, and local authorities.
 - A. The minimum number and type of fire extinguishers, required for such operations, shall be on hand and in proper working order prior to the beginning of each installation of thermoplastic.
5. Applicators shall be mobile and maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc.
6. The applicator equipment to be used on roadway installations shall consist of either hand equipment or truck mounted units depending on the type of marking required.
7. The hand applicator equipment shall be insulated and shall have sufficient capacity to hold one hundred and fifty (150) pounds of molten material and shall be sufficiently maneuverable to install crosswalks, lane, edge, and center lines; arrows and legends. The truck mounted unit for lane, edge, and center line shall consist of a mobile self contained unit carrying its own material capable of operating at a minimum speed of five (5) miles per hour, while installing striping.

F. Application:

1. General: Alignment, dimensions and correction of defective stripes shall be in accordance with FDOT Standards for roadway striping.

- a. Application time, weather limitations and surface preparation, shall be in accordance with FDOT Standards for roadway striping.
 - b. The material, when formed into traffic stripes or other markings shall be readily renewable by placing an overlay of new material directly over an old line of compatible material. Such new material shall bond itself to the old material in such a manner that no splitting or separation takes place.
2. Sealing Primer: Where required, the sealing primer shall be sprayed on the road surface in a continuous film prior to application of the compound. Spraying shall be done by use of conventional mobile spray equipment in accordance with the manufacturer's recommendations.
3. Application Temperature: This temperature shall be within the range specified by the manufacturer of the thermoplastic compound being used.
4. Thickness: All pavement edge lines, gore, island and diagonal strip markings, bike lane symbols and messages, wherever located, shall have a minimum thickness of 0.060 inch at the edges and a maximum thickness of 0.120 inch at the center. A minimum average film thickness of 0.060 inch shall be maintained.
 - a. All lane lines, center lines, transverse markings (except shoulder markings) and pavement markings within traffic wearing area (such as dotted turning guide lines) shall have a minimum thickness of 0.090 inch at the edges and a maximum thickness of 0.188 inch at the center. A minimum average film thickness of 0.090 inch shall be maintained.
 - b. The measurements of strip thickness shall be done by placing black tapes, films, or metal plates of known and uniform thickness in the area to be striped. Once the striper has passed over, the sample is removed by making sharp cuts with a knife and measurement of the stripe plus film are made with a micrometer or vernier calipers with a proper correction for the film base. For longitudinal lines, these thickness checks shall be made each one-third (1/3) mile or more frequently at the judgment of the Engineer. For symbols and intersection markings the frequency of checking shall be at the option of the Engineer. These thicknesses shall be considered as the average of two (2) or more measurements made in a three (3') foot distance.
 - c. The glass sphere top coating shall be applied by a type of glass sphere dispenser or gun, which shall embed the spheres into the line surface to at least one-half their diameter. The glass sphere top coating shall not incur more than a ten (10%) percent loss during the first thirty (30) days of traffic exposure.

- d. Longitudinal lines shall be offset at least two (2") inches from construction joints of Portland Cement Concrete Pavements.
5. Application Over Existing Skip Traffic Stripe: When being applied over existing stripes, each stripe shall end with a clean cut-off free of tapers and drips. A longitudinal tolerance of plus or minus two (2) inches at the beginning and end of each stripe and a horizontal tolerance of plus or minus one-half (1/2") inch will be allowed. Skip traffic stripes not applied in accordance with these requirements shall be corrected at the CONTRACTOR's expense.
6. Application of Spheres: Reflective glass spheres shall be applied immediately behind the striping mechanism, at the rate of one pound of spheres for each ten (10) square feet of compound.
 - a. Reflective glass spheres shall be applied to all white and yellow stripes or markings.
 - b. To all thermoplastic bike lane symbols and longitudinal lines adjacent to or in a proposed bike lane, a mixture consisting of 50 percent glass spheres and 50 percent sharp silica sand shall be thoroughly pre-mixed and applied at a rate of two (2) pounds for each ten (10) square feet of thermoplastic surface.
 - c. The sharp silica sand shall meet the following gradation requirements:

U.S. Sieve Number	Percent Passing
20	100
50	0-10

G. Packaging:

1. The material shall be delivered in fifty (50) pound unit cardboard containers or fifty (50) pound bags of sufficient strength to permit normal handling during shipment and transportation on the job without loss of material.
2. Each unit container shall be clearly and adequately marked to indicate the color of the material, the process batch number or other similar manufacturer's identification, the manufacturer's name and address of the plant and the date of manufacture.
3. Alkyd type compound shall be supplied in block form only.

H. Protection of Newly Applied Stripes and of Traffic:

The provisions of FDOT Standards for roadway striping shall apply to the work under this Section.

I. Acceptance of the Work

The provisions for acceptance of the striping work, as set forth in FDOT Standards for roadway striping, shall apply to the work under this Section.

J. Certification of Tests:

The producer of the compound described in this Section shall furnish to the ENGINEER three copies of certified test reports showing results of all tests specified herein, and shall certify that the material meets all requirements of this Section. Acceptance, however, will be based on test results of samples obtained after delivery of the compound.

K. Method of Measurement:

The quantities to be paid under this Section shall be as follows:

1. The net length, in linear feet, of each of the various types of thermoplastic lines, stripes and bands authorized and acceptably applied.
2. The number of thermoplastic pavement messages and of directional arrows authorized and acceptably applied.
3. The total traversed distance in gross miles of skip line. The actual applied line is twenty-five (25%) percent of the traversed distance for a 1:3 ratio. This equates to 1,320 feet of marking per mile of single line.
4. The area, in square feet, of Remove Existing Markings (Thermoplastic), acceptably removed.
5. The length, in net miles, of Solid Traffic Stripe, authorized and acceptably applied.
6. The length, in gross miles, of Alternating Skip Traffic Stripe, authorized and acceptably applied.

L. Basis of Payment:

The contract price per linear foot or gross mile for each separate type of line or stripe, and the contract unit price each, for Pavement Messages and Directional Arrows, shall be full compensation for all work specified in this Section and shall include all cleaning and preparing of surfaces, furnishing of all materials, the application, curing and protection of all items, the protection from traffic, the furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work.

1. Payment shall be made under:

Roadway Striping

43.0 PLUG AND ABANDON EXISTING PIPE:

The work specified in this section shall consist of filling and plugging existing storm water pipes, water mains and force mains at the locations and in accordance with the details shown

in the plans. Filling shall be done with grout and plugging shall be in accordance with FDOT Standard Index No. 280.

- 43.1 Grout used in filling the pipes shall be composed of one part Portland cement and twelve parts of clean sharp sand.
- 43.2 The quantity to be paid for under this section shall be in linear feet completed and accepted.
- 43.3 The quantity of Filling and Plugging Pipe, determined as provided above, shall be paid for as a part of Clearing & Grubbing. Such price and payment shall be full compensation for all work and materials required to complete the work.

44.0 RECORDS:

- 44.1. The CONTRACTOR shall maintain at the job site, open to inspection by OWNER at any time during regular working hours, 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 Shop Drawings issued subsequent to the execution of the CONTRACT, progress reports and other project-related documents.
- 44.2. The CONTRACTOR shall keep a diary or log book, open to inspection by OWNER at any time during regular working hours, which record hours on the job site, weather conditions two times a day and any other time that a weather condition may affect the work, data relative to questions of extras or deductions, list of principal visitors, daily activities including, but not limited to, CONTRACTOR's manpower (including classification and number of personnel in each) and equipment (including number and type), decisions, observations in general and specific terms as to the daily progress of construction, and detailed observations as they relate to test procedures. A copy of any and all of the foregoing shall be provided to OWNER at its request.
- 44.3. The CONTRACTOR shall record names, addresses and telephone numbers of all CONTRACTOR's and major suppliers of equipment and materials, which information shall be provided to OWNER at its request.

45.0 RECLAIMED ASPHALTIC CONCRETE MATERIAL:

Reclaimed asphaltic concrete material shall not be used for the manufacture of asphaltic concrete paving materials to be used in the top two (2") inches of the roadway construction but may be used for other applications as specified herein.

46.0 EXISTING SPRINKLER SYSTEMS:

The CONTRACTOR shall use caution to avoid sprinkler systems. **The CONTRACTOR at no additional cost to the OWNER shall replace sprinklers, damaged by the CONTRACTOR.** Private sprinkler systems, which exist within the construction limits and can be utilized for irrigation after construction, (i.e. swales) shall be protected by the CONTRACTOR.

47.0 ASBESTOS-CEMENT PIPE REMOVAL:

The CONTRACTOR shall comply with all Federal and State laws in the removal of all asbestos-cement pipe. The CONTRACTOR shall use caution while removing any asbestos-cement pipe. Pipe shall be disconnected at joints and removed and disposed of without breaking. If the existing pipe is friable or requires cutting, the CONTRACTOR shall remove and dispose of the pipe in accordance with EPA regulations.

SPECIAL CONDITIONS

CONSTRUCTION POLLUTION PREVENTION PLAN

(Provided for Reference of Guidance Only)

1.0 Site Description:

1.1 Project Name:

Town of Golden Beach Tweddle Park Pump Station Retrofit Project
CAS Project No. 08-23-037

1.2 Location: East of Address below

1.3 Owner Contact Name and Address:

**Town of Golden Beach
1 Golden Beach Drive
Golden Beach, FL 33160**

1.4 Description:

The proposed project consists of the retrofit of an existing stormwater pumping station and associated drainage improvements per the engineering plans and technical specifications. The Construction activity shall be performed within the limits of the Town of Golden Beach's rights-of-way.

- A. Soil disturbing activities at the site include clearing and grubbing within the right-of-ways where the stormwater system is planned as well as installing temporary erosion and sedimentation controls at the project site. Construction activity shall also include the installation five culvert crossings and a dry retention area.

1.5 Runoff Coefficient:

The final coefficient of runoff (rational) for the project area shall be approximately $C=0.70$.

1.6 Site Area:

The total drainage area is approximately 15.73 acres.

1.7 Sequence of Major Activities: This shall be left up to the contractor's means and methods.

The order of activities may be as follows:

- A. Install filter fabric or hay bales at all existing catch basins and ditches to avoid sediment buildup.
- B. Clear and grub areas of construction within the road right-of-way.

- C. Begin underground storm water construction and outfall to canal.
- D. Provide filter fabric on all installed drainage catch basin inlets until final landscaping is in place.
- E. Removal of the floating turbidity screen shall not occur until the canal has met State Turbidity Standards.
- F. CONTRACTOR shall inspect all erosion control measures weekly and after any intense rainfall greater than 0.5-inches and repair as necessary.

1.8 Name of Receiving Waters:

The receiving body of water is the Intracoastal Waterway (ICWW).

2.0 Controls:

2.1 Erosion and Sediment Controls:

A. Stabilization Practices:

Canal banks and fill stockpiles where adjacent construction activity ceases for at least twenty-one (21) days shall be stabilized by seeding and mulching in accordance with Section 570, FDOT Standards. Seed and mulch shall be applied no later than fourteen (14) days from the last construction activity in the area.

B. Permanent Stabilization:

All landscaping including placing sod shall be installed in accordance with the approved landscape plan within fourteen (14) days of the last construction activity, in any area of the site.

C. Structural Practices:

A silt fence/windscreen shall be installed in areas as deemed necessary during the construction process to reduce windblown and stormwater driven erosion.

3.0 Other Controls

3.1 Waste Disposal:

A. Waste Materials:

All waste materials shall be collected in metal dumpsters rented from a licensed solid waste management company. The dumpsters shall meet all local and state solid waste management regulations. Dumpsters shall not be allowed to overflow and shall be emptied on a regular basis, as required. All trash shall be disposed of in accordance with all federal, state and local criteria. CONTRACTOR shall not bury any garbage, trash, or other excess and/or waste materials on site. All sub-contractors and personnel working on

the site shall be instructed in the proper disposal of waste materials. A notice outlining these procedures shall be posted in the construction trailer and the Project Manager for the site shall be responsible for ensuring that these procedures are followed.

B. Hazardous Waste:

All hazardous waste shall be disposed of in accordance with Federal, State and local regulations. The CONTRACTOR's Project Manager shall be the person responsible for seeing that these practices are followed.

C. Sanitary Waste:

Sanitary waste shall be collected in portable units placed on the site in accordance with Occupational, Safety and Health Administration (OSHA) requirements. Sanitary waste from these units shall be collected on a regular basis as required based on usage.

3.2 Off-Site Vehicle Tracking:

The paved street serving as the construction entrance as well as streets adjacent to the construction areas shall be swept on a regular basis to remove any accumulation of dirt or rocks, which have been tracked from the site. All dump trucks bringing material to, or leaving the site, shall be covered with a tarpaulin.

4.0 Timing of Controls / Measures:

Turbidity screens and silt fences shall be in place prior to beginning construction on the site. Any area where construction activity ceases for more than 21 days shall receive temporary sedimentation controls. All existing and constructed catch basins on the site shall contain sediment traps and filter fabric to prevent sedimentation from entering the storm drainage system during construction. Landscaping, including final sodding, shall be installed within fourteen (14) days of the completion of construction on any area of the site.

5.0 Certification of Compliance with Federal, State and Local Regulations:

The paving, grading, and drainage plan is in compliance with the following Local, County and State requirements for stormwater management and erosion and sediment control:

5.1. Applicable Owner Codes and Standards.

5.2. Miami-Dade County Standards.

6.0 Maintenance / Inspection Procedures:

6.1 Erosion and Sediment Control Inspection and Maintenance Practices:

A. The following inspection and maintenance practices shall be used to maintain erosion and sediment controls:

- B. All control measures shall be inspected at least once weekly and following any storm event greater than one-half (1/2") inch.
- C. Repairs shall be completed within twenty-four (24) hours.
- D. The canal bank shall be inspected regularly and regraded as necessary to remove the built up sediment.
- E. Temporary seed and mulch areas and permanent sod areas shall be inspected regularly for bare spots and to ensure adequate growth.
- F. Filter fabric over all catch basins shall be inspected regularly to ensure that there are not tears or pullouts, allowing direct discharge into the basin.
- G. Buildup of sediment on filter fabric shall be removed on a regular basis.
- H. CONTRACTOR shall inspect and repair Turbidity screens and windscreens regularly, or as necessary.
- I. The Project Manager for this site shall be responsible for ensuring that all controls are in good working order.

6.2 Non-Stormwater Discharges:

It is expected that the following non-stormwater discharges will occur from the site during the construction period:

- A. Uncontaminated groundwater (from dewatering).
- B. Water from waterline flushings.
- C. Pavement wash waters (where no spills or leaks of toxic or hazardous materials have occurred).

7.0 **Inventory for Pollution Prevention Plan:**

7.1 The following materials or substances are expected to be present on-site during construction:

- A. Concrete
- B. Timber
- C. Masonry Block
- D. Cleaning solvents
- E. Petroleum based products
- F. Fertilizers
- G. Asphaltic Prime and Tack Coats
- H. Paints
- I. Detergents

8.0 **Spill Prevention:**

8.1 Material Management Practices:

The following are the practices that shall be used to reduce the risk of spills or other exposure of materials and substances to stormwater runoff.

A. Good Housekeeping:

1. An effort shall be made to store only enough products required to do the job.
2. Products shall be kept in their original containers with the original manufacturer's label.
3. All materials stored on-site shall be stored in a neat, orderly manner in their appropriate containers and, whenever possible, under a roof or other enclosure.
4. Substances shall not be mixed with one another unless recommended by the manufacturer.
5. Whenever possible, all of the product shall be used up before disposing of the container.
6. Manufacturer's recommendations for proper use and disposal shall be followed.
7. The Site Superintendent shall inspect daily to ensure the proper use and disposal of materials on-site.

B. Hazardous Products:

1. Products shall be kept in original containers unless they are not resealable. Labels of Hazardous Products shall be protected on containers and separately, in a file for Hazardous Materials, maintained by the CONTRACTOR throughout the project.
2. Original labels and Material Safety Data Sheets (MSDS) shall be retained.
3. All surplus Hazardous Product(s) shall be disposed of in accordance with manufacturer's label, Florida Department of Environmental Protection procedures, Florida Administrative Code (FAC) procedures, or the Florida Statutes (FS), whichever procedure or law applies.

8.2 Product Specific Practices:

The following product specific practices shall be followed on-site:

A. Petroleum Products:

All vehicles shall be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. All petroleum products shall be stored in tightly sealed containers, which are clearly labeled. All asphalt

substances shall be applied in accordance with the manufacturer's recommendations.

B. Fertilizers:

Fertilizers shall be applied in accordance with the minimum amounts recommended by the manufacturer. All fertilizers shall be stored in a covered location. No partially used bags of fertilizer shall be stored on-site.

C. Paints:

All containers shall be tightly sealed and stored when not required for use. Excess paint shall not be discharged to the soil or storm sewer system, but shall be properly disposed of according to the manufacturer's instructions or state and local regulations.

D. Concrete Trucks:

Concrete trucks shall not be allowed to wash out or discharge surplus concrete or drum wash water where discharge will flow off-site or into the canal.

8.3 Spill Control Practices:

The following practices shall be followed for spill prevention and clean up:

- A. Manufacturer's recommended methods for spill cleanup shall be clearly posted and site personnel shall be made aware of the procedures and the location of the information and clean up supplies.
- B. Materials and equipment necessary for spill cleanup shall be kept in a material storage area onsite. Equipment and materials shall include, but not be limited to, brooms, dustpans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
- C. All spills shall be cleaned up immediately after discovery.
- D. The spill area shall be kept ventilated and personnel shall wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- E. Spills of toxic or hazardous material shall be reported to the appropriate State or Local government agency, regardless of the size.
- F. The spill prevention plan shall be adjusted to include measures to prevent this type of spill from reoccurring and shall address how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures shall also be included.
- G. The Project Manager for this site shall be responsible for the day-to-day site operations, and shall be the spill prevention and cleanup coordinator. He shall designate at least one other site person who shall receive spill prevention and cleanup training. These individuals shall each become responsible for a particular phase of prevention and cleanup. The names of

spill personnel shall be posted in the material storage area and in the office trailer on-site.

9.0 Pollution Prevention Plan Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief true accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

**TOWN OF GOLDEN BEACH
1 GOLDEN BEACH DRIVE
GOLDEN BEACH, FL 33160**

By: _____
Name and Title

Date: _____ . _____ 20____

10. CONTRACTOR'S CERTIFICATION:

I hereby certify, under penalty of law, that I understand the terms and conditions of the General National Pollutant Discharge Elimination System (NPDES) permit that authorizes the stormwater discharges associated with industrial activity from the construction site identified as part of this certification.

General Contractor:

By: _____
Name and Title

Date: _____ . _____ 20____

State of Florida
County _____

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

NOTARY PUBLIC, State of Florida at Large
My Commission expires: _____

(Notary Seal)

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Standard Grant Agreement**

This Agreement is entered into between the Parties named below, pursuant to Section 215.971, Florida Statutes:

1. Project Title (Project): **Town of Golden Beach Pump Station at Tweedle Park** Agreement Number: **22FRP40**

2. Parties **State of Florida Department of Environmental Protection,
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000** (Department)

Grantee Name: **Town of Golden Beach** Entity Type: **Local Government**

Grantee Address: **1 Golden Beach Drive, Golden Beach, Florida 33160** FEID: **59-6000326** (Grantee)

3. Agreement Begin Date: **Upon Execution** Date of Expiration: **9/30/2026**

4. Project Number: **FRP040** Project Location(s): **Miami-Dade County**
(If different from Agreement Number)

Project Description: **The project will repair elements of the stormwater system to reduce flooding at several government buildings including their EOC.**

5. Total Amount of Funding:	Funding Source?	Award #s or Line Item Appropriations:	Amount per Source(s):
\$ 500,000.00	☐ State ☒ Federal	152-D 22	\$ 500,000.00
	☐ State ☐ Federal		\$
	☒ Grantee Match		\$ 198,748.00
Total Amount of Funding + Grantee Match, if any:			\$ 698,748.00

6. Department's Grant Manager Name: Hanna Tillotson or successor Address: Resilient Florida Program 2600 Blair Stone Road, MS235 Tallahassee, Florida 32399 Phone: 850-245-7540 Email: Hanna.Tillotson@FloridaDEP.gov	Grantee's Grant Manager Name: Lissett Rovira or successor Address: 1 Golden Beach Drive Golden Beach, Florida 33160 Phone: 305-932-0744 Email: LRovira@goldenbeach.us

7. The Parties agree to comply with the terms and conditions of the following attachments and exhibits which are hereby incorporated by reference:

☒ Attachment 1: Standard Terms and Conditions Applicable to All Grants Agreements
☒ Attachment 2: Special Terms and Conditions
☒ Attachment 3: Grant Work Plan
☒ Attachment 4: Public Records Requirements
☒ Attachment 5: Special Audit Requirements
☒ Attachment 6: Program-Specific Requirements
☐ Attachment 7: Grant Award Terms (Federal) *Copy available at https://facts.fldfs.com , in accordance with §215.985, F.S.
☒ Attachment 8: Federal Regulations and Terms (Federal)
☐ Additional Attachments (if necessary):
☒ Exhibit A: Progress Report Form
☐ Exhibit B: Property Reporting Form
☒ Exhibit C: Payment Request Summary Form
☐ Exhibit D: Quality Assurance Requirements
☐ Exhibit E: Advance Payment Terms and Interest Earned Memo
☒ Exhibit J: Common Carrier or Contracted Carrier Attestation Form PUR1808
☒ Additional Exhibits (if necessary): Exhibit F: Final Report Form, Exhibit G: Photographer Release Form, and Exhibit H: Contractual Services Certification

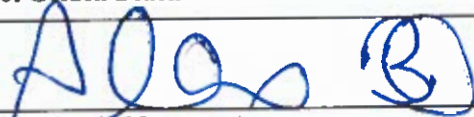
8. The following information applies to Federal Grants only and is identified in accordance with 2 CFR 200.331 (a) (1):	
Federal Award Identification Number(s) (FAIN):	SLFRP0125
Federal Award Date to Department:	2/4/2022
Total Federal Funds Obligated by this Agreement:	\$500,000
Federal Awarding Agency:	U.S. Department of Treasury
Award R&D?	☐ Yes ☒ N/A

IN WITNESS WHEREOF, this Agreement shall be effective on the date indicated by the Agreement Begin Date unless another date is specified in the grant documents.

Town of Golden Beach

GRANTEE

By


(Authorized Signature)

Date Signed

Alexander Diaz

Print Name and Title of Person Signing

State of Florida Department of Environmental Protection

DEPARTMENT

By


Secretary or Designee

10/31/2023

Date Signed

Alex Reed, Director of the Office of Resilience and Coastal Protection

Print Name and Title of Person Signing

☒ Additional signatures attached on separate page.

ORCP Additional Signatures



DEP Grant Manager, Hanna Tillotson



DEP QC Reviewer, Charles Neuhauser

Grantee may add additional signatures below, if needed.

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STANDARD TERMS AND CONDITIONS
APPLICABLE TO GRANT AGREEMENTS**

ATTACHMENT 1

1. Entire Agreement.

This Grant Agreement, including any Attachments and Exhibits referred to herein and/or attached hereto (Agreement), constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements, whether written or oral, with respect to such subject matter. Any terms and conditions included on Grantee's forms or invoices shall be null and void.

2. Grant Administration.

- a. Order of Precedence. If there are conflicting provisions among the documents that make up the Agreement, the order of precedence for interpretation of the Agreement is as follows:
 - i. Standard Grant Agreement
 - ii. Attachments other than Attachment 1, in numerical order as designated in the Standard Grant Agreement
 - iii. Attachment 1, Standard Terms and Conditions
 - iv. The Exhibits in the order designated in the Standard Grant Agreement
- b. All approvals, written or verbal, and other written communication among the parties, including all notices, shall be obtained by or sent to the parties' Grant Managers. All written communication shall be by electronic mail, U.S. Mail, a courier delivery service, or delivered in person. Notices shall be considered delivered when reflected by an electronic mail read receipt, a courier service delivery receipt, other mail service delivery receipt, or when receipt is acknowledged by recipient. If the notice is delivered in multiple ways, the notice will be considered delivered at the earliest delivery time.
- c. If a different Grant Manager is designated by either party after execution of this Agreement, notice of the name and contact information of the new Grant Manager will be submitted in writing to the other party and maintained in the respective parties' records. A change of Grant Manager does not require a formal amendment or change order to the Agreement.
- d. This Agreement may be amended, through a formal amendment or a change order, only by a written agreement between both parties. A formal amendment to this Agreement is required for changes which cause any of the following:
 - (1) an increase or decrease in the Agreement funding amount;
 - (2) a change in Grantee's match requirements;
 - (3) a change in the expiration date of the Agreement; and/or
 - (4) changes to the cumulative amount of funding transfers between approved budget categories, as defined in Attachment 3, Grant Work Plan, that exceeds or is expected to exceed twenty percent (20%) of the total budget as last approved by Department.A change order to this Agreement may be used when:
 - (1) task timelines within the current authorized Agreement period change;
 - (2) the cumulative transfer of funds between approved budget categories, as defined in Attachment 3, Grant Work Plan, are less than twenty percent (20%) of the total budget as last approved by Department;
 - (3) changing the current funding source as stated in the Standard Grant Agreement; and/or
 - (4) fund transfers between budget categories for the purposes of meeting match requirements.This Agreement may be amended to provide for additional services if additional funding is made available by the Legislature.
- e. All days in this Agreement are calendar days unless otherwise specified.

3. Agreement Duration.

The term of the Agreement shall begin and end on the dates indicated in the Standard Grant Agreement, unless extended or terminated earlier in accordance with the applicable terms and conditions. The Grantee shall be eligible for reimbursement for work performed on or after the date of execution through the expiration date of this Agreement, unless otherwise specified in Attachment 2, Special Terms and Conditions. However, work performed prior to the execution of this Agreement may be reimbursable or used for match purposes if permitted by the Special Terms and Conditions.

4. Deliverables.

The Grantee agrees to render the services or other units of deliverables as set forth in Attachment 3, Grant Work Plan. The services or other units of deliverables shall be delivered in accordance with the schedule and at the pricing outlined in the Grant Work Plan. Deliverables may be comprised of activities that must be completed prior to Department making payment on that deliverable. The Grantee agrees to perform in accordance with the terms and conditions set forth in this Agreement and all attachments and exhibits incorporated by the Standard Grant Agreement.

5. Performance Measures.

The Grantee warrants that: (1) the services will be performed by qualified personnel; (2) the services will be of the kind and quality described in the Grant Work Plan; (3) the services will be performed in a professional and workmanlike manner in accordance with industry standards and practices; (4) the services shall not and do not knowingly infringe upon the intellectual property rights, or any other proprietary rights, of any third party; and (5) its employees, subcontractors, and/or subgrantees shall comply with any security and safety requirements and processes, if provided by Department, for work done at the Project Location(s). The Department reserves the right to investigate or inspect at any time to determine whether the services or qualifications offered by Grantee meet the Agreement requirements. Notwithstanding any provisions herein to the contrary, written acceptance of a particular deliverable does not foreclose Department's remedies in the event deficiencies in the deliverable cannot be readily measured at the time of delivery.

6. Acceptance of Deliverables.

- a. Acceptance Process. All deliverables must be received and accepted in writing by Department's Grant Manager before payment. The Grantee shall work diligently to correct all deficiencies in the deliverable that remain outstanding, within a reasonable time at Grantee's expense. If Department's Grant Manager does not accept the deliverables within 30 days of receipt, they will be deemed rejected.
- b. Rejection of Deliverables. The Department reserves the right to reject deliverables, as outlined in the Grant Work Plan, as incomplete, inadequate, or unacceptable due, in whole or in part, to Grantee's lack of satisfactory performance under the terms of this Agreement. The Grantee's efforts to correct the rejected deliverables will be at Grantee's sole expense. Failure to fulfill the applicable technical requirements or complete all tasks or activities in accordance with the Grant Work Plan will result in rejection of the deliverable and the associated invoice. Payment for the rejected deliverable will not be issued unless the rejected deliverable is made acceptable to Department in accordance with the Agreement requirements. The Department, at its option, may allow additional time within which Grantee may remedy the objections noted by Department. The Grantee's failure to make adequate or acceptable deliverables after a reasonable opportunity to do so shall constitute an event of default.

7. Financial Consequences for Nonperformance.

- a. Withholding Payment. In addition to the specific consequences explained in the Grant Work Plan and/or Special Terms and Conditions, the State of Florida (State) reserves the right to withhold payment when the Grantee has failed to perform/comply with provisions of this Agreement. None of the financial consequences for nonperformance in this Agreement as more fully described in the Grant Work Plan shall be considered penalties.
- b. Invoice reduction
If Grantee does not meet a deadline for any deliverable, the Department will reduce the invoice by 1% for each day the deadline is missed, unless an extension is approved in writing by the Department.
- c. Corrective Action Plan. If Grantee fails to correct all the deficiencies in a rejected deliverable within the specified timeframe, Department may, in its sole discretion, request that a proposed Corrective Action Plan (CAP) be submitted by Grantee to Department. The Department requests that Grantee specify the outstanding deficiencies in the CAP. All CAPs must be able to be implemented and performed in no more than sixty (60) calendar days.
 - i. The Grantee shall submit a CAP within ten (10) days of the date of the written request from Department. The CAP shall be sent to the Department's Grant Manager for review and approval. Within ten (10) days of receipt of a CAP, Department shall notify Grantee in writing whether the CAP proposed has been accepted. If the CAP is not accepted, Grantee shall have ten (10) days from receipt of Department letter rejecting the proposal to submit a revised proposed CAP. Failure to obtain Department approval of a CAP as specified above may result in Department's termination of this Agreement for cause as authorized in this Agreement.
 - ii. Upon Department's notice of acceptance of a proposed CAP, Grantee shall have ten (10) days to commence implementation of the accepted plan. Acceptance of the proposed CAP by Department does not relieve Grantee of any of its obligations under the Agreement. In the event the CAP fails to correct or eliminate performance deficiencies by Grantee, Department shall retain the right to

require additional or further remedial steps, or to terminate this Agreement for failure to perform. No actions approved by Department or steps taken by Grantee shall preclude Department from subsequently asserting any deficiencies in performance. The Grantee shall continue to implement the CAP until all deficiencies are corrected. Reports on the progress of the CAP will be made to Department as requested by Department's Grant Manager.

- iii. Failure to respond to a Department request for a CAP or failure to correct a deficiency in the performance of the Agreement as specified by Department may result in termination of the Agreement.

8. Payment.

- a. Payment Process. Subject to the terms and conditions established by the Agreement, the pricing per deliverable established by the Grant Work Plan, and the billing procedures established by Department, Department agrees to pay Grantee for services rendered in accordance with section 215.422, Florida Statutes (F.S.).
- b. Taxes. The Department is exempted from payment of State sales, use taxes and Federal excise taxes. The Grantee, however, shall not be exempted from paying any taxes that it is subject to, including State sales and use taxes, or for payment by Grantee to suppliers for taxes on materials used to fulfill its contractual obligations with Department. The Grantee shall not use Department's exemption number in securing such materials. The Grantee shall be responsible and liable for the payment of all its FICA/Social Security and other taxes resulting from this Agreement.
- c. Maximum Amount of Agreement. The maximum amount of compensation under this Agreement, without an amendment, is described in the Standard Grant Agreement. Any additional funds necessary for the completion of this Project are the responsibility of Grantee.
- d. Reimbursement for Costs. The Grantee shall be paid on a cost reimbursement basis for all eligible Project costs upon the completion, submittal, and approval of each deliverable identified in the Grant Work Plan. Reimbursement shall be requested on Exhibit C, Payment Request Summary Form. To be eligible for reimbursement, costs must be in compliance with laws, rules, and regulations applicable to expenditures of State funds, including, but not limited to, the Reference Guide for State Expenditures, which can be accessed at the following web address: <https://www.myfloridacfo.com/docs-sf/accounting-and-auditing-libraries/state-agencies/reference-guide-for-state-expenditures.pdf>.
- e. Invoice Detail. All charges for services rendered or for reimbursement of expenses authorized by Department pursuant to the Grant Work Plan shall be submitted to Department in sufficient detail for a proper pre-audit and post-audit to be performed. The Grantee shall only invoice Department for deliverables that are completed in accordance with the Grant Work Plan.
- f. State Funds Documentation. Pursuant to section 216.1366, F.S., if Contractor meets the definition of a non-profit organization under section 215.97(2)(m), F.S., Contractor must provide the Department with documentation that indicates the amount of state funds:
 - i. Allocated to be used during the full term of the contract or agreement for remuneration to any member of the board of directors or an officer of Contractor.
 - ii. Allocated under each payment by the public agency to be used for remuneration of any member of the board of directors or an officer of the Contractor.The documentation must indicate the amounts and recipients of the remuneration. Such information must be posted on the State's the contract tracking system and maintained pursuant to section 215.985, F.S., and must be posted on the Contractor's website, if Contractor maintains a website.
- g. Interim Payments. Interim payments may be made by Department, at its discretion, if the completion of deliverables to date have first been accepted in writing by Department's Grant Manager.
- h. Final Payment Request. A final payment request should be submitted to Department no later than sixty (60) days following the expiration date of the Agreement to ensure the availability of funds for payment. However, all work performed pursuant to the Grant Work Plan must be performed on or before the expiration date of the Agreement.
- i. Annual Appropriation Contingency. The State's performance and obligation to pay under this Agreement is contingent upon an annual appropriation by the Legislature. This Agreement is not a commitment of future appropriations. Authorization for continuation and completion of work and any associated payments may be rescinded, with proper notice, at the discretion of Department if the Legislature reduces or eliminates appropriations.
- j. Interest Rates. All interest rates charged under the Agreement shall be calculated on the prevailing rate used by the State Board of Administration. To obtain the applicable interest rate, please refer to: <https://www.myfloridacfo.com/division/aa/local-governments/judgement-interest-rates>.

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- k. Refund of Payments to the Department. Any balance of unobligated funds that have been advanced or paid must be refunded to Department. Any funds paid in excess of the amount to which Grantee or subgrantee is entitled under the terms of the Agreement must be refunded to Department. If this Agreement is funded with federal funds and the Department is required to refund the federal government, the Grantee shall refund the Department its share of those funds.

9. Documentation Required for Cost Reimbursement Grant Agreements and Match.

If Cost Reimbursement or Match is authorized in Attachment 2, Special Terms and Conditions, the following conditions apply. Supporting documentation must be provided to substantiate cost reimbursement or match requirements for the following budget categories:

- a. Salary/Wages. Grantee shall list personnel involved, position classification, direct salary rates, and hours spent on the Project in accordance with Attachment 3, Grant Work Plan in their documentation for reimbursement or match requirements.
- b. Overhead/Indirect/General and Administrative Costs. If Grantee is being reimbursed for or claiming match for multipliers, all multipliers used (i.e., fringe benefits, overhead, indirect, and/or general and administrative rates) shall be supported by audit. If Department determines that multipliers charged by Grantee exceeded the rates supported by audit, Grantee shall be required to reimburse such funds to Department within thirty (30) days of written notification. Interest shall be charged on the excessive rate.
- c. Contractual Costs (Subcontractors). Match or reimbursement requests for payments to subcontractors must be substantiated by copies of invoices with backup documentation identical to that required from Grantee. Subcontracts which involve payments for direct salaries shall clearly identify the personnel involved, salary rate per hour, and hours spent on the Project. All eligible multipliers used (i.e., fringe benefits, overhead, indirect, and/or general and administrative rates) shall be supported by audit. If Department determines that multipliers charged by any subcontractor exceeded the rates supported by audit, Grantee shall be required to reimburse such funds to Department within thirty (30) days of written notification. Interest shall be charged on the excessive rate. Nonconsumable and/or nonexpendable personal property or equipment costing \$5,000 or more purchased for the Project under a subcontract is subject to the requirements set forth in chapters 273 and/or 274, F.S., and Chapter 69I-72, Florida Administrative Code (F.A.C.) and/or Chapter 69I-73, F.A.C., as applicable. The Grantee shall be responsible for maintaining appropriate property records for any subcontracts that include the purchase of equipment as part of the delivery of services. The Grantee shall comply with this requirement and ensure its subcontracts issued under this Agreement, if any, impose this requirement, in writing, on its subcontractors.
- i. For fixed-price (vendor) subcontracts, the following provisions shall apply: The Grantee may award, on a competitive basis, fixed-price subcontracts to consultants/contractors in performing the work described in Attachment 3, Grant Work Plan. Invoices submitted to Department for fixed-price subcontracted activities shall be supported with a copy of the subcontractor's invoice and a copy of the tabulation form for the competitive procurement process (e.g., Invitation to Bid, Request for Proposals, or other similar competitive procurement document) resulting in the fixed-price subcontract. The Grantee may request approval from Department to award a fixed-price subcontract resulting from procurement methods other than those identified above. In this instance, Grantee shall request the advance written approval from Department's Grant Manager of the fixed price negotiated by Grantee. The letter of request shall be supported by a detailed budget and Scope of Services to be performed by the subcontractor. Upon receipt of Department Grant Manager's approval of the fixed-price amount, Grantee may proceed in finalizing the fixed-price subcontract.
- ii. If the procurement is subject to the Consultant's Competitive Negotiation Act under section 287.055, F.S. or the Brooks Act, Grantee must provide documentation clearly evidencing it has complied with the statutory or federal requirements.
- d. Travel. All requests for match or reimbursement of travel expenses shall be in accordance with section 112.061, F.S.
- e. Direct Purchase Equipment. For the purposes of this Agreement, Equipment is defined as capital outlay costing \$5,000 or more. Match or reimbursement for Grantee's direct purchase of equipment is subject to specific approval of Department, and does not include any equipment purchased under the delivery of services to be completed by a subcontractor. Include copies of invoices or receipts to document purchases, and a properly completed Exhibit B, Property Reporting Form.
- f. Rental/Lease of Equipment. Match or reimbursement requests for rental/lease of equipment must include copies of invoices or receipts to document charges.
- g. Miscellaneous/Other Expenses. If miscellaneous or other expenses, such as materials, supplies, non-excluded phone expenses, reproduction, or mailing, are reimbursable or available for match or reimbursement under the

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terms of this Agreement, the documentation supporting these expenses must be itemized and include copies of receipts or invoices. Additionally, independent of Grantee's contract obligations to its subcontractor, Department shall not reimburse any of the following types of charges: cell phone usage; attorney's fees or court costs; civil or administrative penalties; or handling fees, such as set percent overages associated with purchasing supplies or equipment.

- h. Land Acquisition. Reimbursement for the costs associated with acquiring interest and/or rights to real property (including access rights through ingress/egress easements, leases, license agreements, or other site access agreements; and/or obtaining record title ownership of real property through purchase) must be supported by the following, as applicable: Copies of Property Appraisals, Environmental Site Assessments, Surveys and Legal Descriptions, Boundary Maps, Acreage Certification, Title Search Reports, Title Insurance, Closing Statements/Documents, Deeds, Leases, Easements, License Agreements, or other legal instrument documenting acquired property interest and/or rights. If land acquisition costs are used to meet match requirements, Grantee agrees that those funds shall not be used as match for any other Agreement supported by State or Federal funds.

10. Status Reports.

The Grantee shall submit status reports quarterly, unless otherwise specified in the Attachments, on Exhibit A, Progress Report Form, to Department's Grant Manager describing the work performed during the reporting period, problems encountered, problem resolutions, scheduled updates, and proposed work for the next reporting period. Quarterly status reports are due no later than twenty (20) days following the completion of the quarterly reporting period. For the purposes of this reporting requirement, the quarterly reporting periods end on March 31, June 30, September 30 and December 31. The Department will review the required reports submitted by Grantee within thirty (30) days.

11. Retainage.

The following provisions apply if Department withholds retainage under this Agreement:

- a. The Department reserves the right to establish the amount and application of retainage on the work performed under this Agreement up to the maximum percentage described in Attachment 2, Special Terms and Conditions. Retainage may be withheld from each payment to Grantee pending satisfactory completion of work and approval of all deliverables.
- b. If Grantee fails to perform the requested work or fails to perform the work in a satisfactory manner, Grantee shall forfeit its right to payment of the retainage associated with the work. Failure to perform includes, but is not limited to, failure to submit the required deliverables or failure to provide adequate documentation that the work was actually performed. The Department shall provide written notification to Grantee of the failure to perform that shall result in retainage forfeiture. If the Grantee does not correct the failure to perform within the timeframe stated in Department's notice, the retainage will be forfeited to Department.
- c. No retainage shall be released or paid for incomplete work while this Agreement is suspended.
- d. Except as otherwise provided above, Grantee shall be paid the retainage associated with the work, provided Grantee has completed the work and submits an invoice for retainage held in accordance with the invoicing procedures under this Agreement.

12. Insurance.

- a. Insurance Requirements for Sub-Grantees and/or Subcontractors. The Grantee shall require its sub-grantees and/or subcontractors, if any, to maintain insurance coverage of such types and with such terms and limits as described in this Agreement. The Grantee shall require all its sub-grantees and/or subcontractors, if any, to make compliance with the insurance requirements of this Agreement a condition of all contracts that are related to this Agreement. Sub-grantees and/or subcontractors must provide proof of insurance upon request.
- b. Deductibles. The Department shall be exempt from, and in no way liable for, any sums of money representing a deductible in any insurance policy. The payment of such deductible shall be the sole responsibility of the Grantee providing such insurance.
- c. Proof of Insurance. Upon execution of this Agreement, Grantee shall provide Department documentation demonstrating the existence and amount for each type of applicable insurance coverage *prior to* performance of any work under this Agreement. Upon receipt of written request from Department, Grantee shall furnish Department with proof of applicable insurance coverage by standard form certificates of insurance, a self-insured authorization, or other certification of self-insurance.
- d. Duty to Maintain Coverage. In the event that any applicable coverage is cancelled by the insurer for any reason, or if Grantee cannot get adequate coverage, Grantee shall immediately notify Department of such cancellation and shall obtain adequate replacement coverage conforming to the requirements herein and provide proof of such replacement coverage within ten (10) days after the cancellation of coverage.

- e. Insurance Trust. If the Grantee's insurance is provided through an insurance trust, the Grantee shall instead add the Department of Environmental Protection, its employees, and officers as an additional covered party everywhere the Agreement requires them to be added as an additional insured.

13. Termination.

- a. Termination for Convenience. When it is in the State's best interest, Department may, at its sole discretion, terminate the Agreement in whole or in part by giving 30 days' written notice to Grantee. The Department shall notify Grantee of the termination for convenience with instructions as to the effective date of termination or the specific stage of work at which the Agreement is to be terminated. The Grantee must submit all invoices for work to be paid under this Agreement within thirty (30) days of the effective date of termination. The Department shall not pay any invoices received after thirty (30) days of the effective date of termination.
- b. Termination for Cause. The Department may terminate this Agreement if any of the events of default described in the Events of Default provisions below occur or in the event that Grantee fails to fulfill any of its other obligations under this Agreement. If, after termination, it is determined that Grantee was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of Department. The rights and remedies of Department in this clause are in addition to any other rights and remedies provided by law or under this Agreement.
- c. Grantee Obligations upon Notice of Termination. After receipt of a notice of termination or partial termination unless as otherwise directed by Department, Grantee shall not furnish any service or deliverable on the date, and to the extent specified, in the notice. However, Grantee shall continue work on any portion of the Agreement not terminated. If the Agreement is terminated before performance is completed, Grantee shall be paid only for that work satisfactorily performed for which costs can be substantiated. The Grantee shall not be entitled to recover any cancellation charges or lost profits.
- d. Continuation of Prepaid Services. If Department has paid for any services prior to the expiration, cancellation, or termination of the Agreement, Grantee shall continue to provide Department with those services for which it has already been paid or, at Department's discretion, Grantee shall provide a refund for services that have been paid for but not rendered.
- e. Transition of Services Upon Termination, Expiration, or Cancellation of the Agreement. If services provided under the Agreement are being transitioned to another provider(s), Grantee shall assist in the smooth transition of Agreement services to the subsequent provider(s). This requirement is at a minimum an affirmative obligation to cooperate with the new provider(s), however additional requirements may be outlined in the Grant Work Plan. The Grantee shall not perform any services after Agreement expiration or termination, except as necessary to complete the transition or continued portion of the Agreement, if any.

14. Notice of Default.

If Grantee defaults in the performance of any covenant or obligation contained in the Agreement, including, any of the events of default, Department shall provide notice to Grantee and an opportunity to cure that is reasonable under the circumstances. This notice shall state the nature of the failure to perform and provide a time certain for correcting the failure. The notice will also provide that, should the Grantee fail to perform within the time provided, Grantee will be found in default, and Department may terminate the Agreement effective as of the date of receipt of the default notice.

15. Events of Default.

Provided such failure is not the fault of Department or outside the reasonable control of Grantee, the following non-exclusive list of events, acts, or omissions, shall constitute events of default:

- a. The commitment of any material breach of this Agreement by Grantee, including failure to timely deliver a material deliverable, failure to perform the minimal level of services required for a deliverable, discontinuance of the performance of the work, failure to resume work that has been discontinued within a reasonable time after notice to do so, or abandonment of the Agreement;
- b. The commitment of any material misrepresentation or omission in any materials, or discovery by the Department of such, made by the Grantee in this Agreement or in its application for funding;
- c. Failure to submit any of the reports required by this Agreement or having submitted any report with incorrect, incomplete, or insufficient information;
- d. Failure to honor any term of the Agreement;
- e. Failure to abide by any statutory, regulatory, or licensing requirement, including an entry of an order revoking the certificate of authority granted to the Grantee by a state or other licensing authority;
- f. Failure to pay any and all entities, individuals, and furnishing labor or materials, or failure to make payment to any other entities as required by this Agreement;

- g. Employment of an unauthorized alien in the performance of the work, in violation of Section 274 (A) of the Immigration and Nationality Act;
- h. Failure to maintain the insurance required by this Agreement;
- i. One or more of the following circumstances, uncorrected for more than thirty (30) days unless, within the specified 30-day period, Grantee (including its receiver or trustee in bankruptcy) provides to Department adequate assurances, reasonably acceptable to Department, of its continuing ability and willingness to fulfill its obligations under the Agreement:
 - i. Entry of an order for relief under Title 11 of the United States Code;
 - ii. The making by Grantee of a general assignment for the benefit of creditors;
 - iii. The appointment of a general receiver or trustee in bankruptcy of Grantee's business or property; and/or
 - iv. An action by Grantee under any state insolvency or similar law for the purpose of its bankruptcy, reorganization, or liquidation.

16. Suspension of Work.

The Department may, in its sole discretion, suspend any or all activities under the Agreement, at any time, when it is in the best interest of the State to do so. The Department shall provide Grantee written notice outlining the particulars of suspension. Examples of reasons for suspension include, but are not limited to, budgetary constraints, declaration of emergency, or other such circumstances. After receiving a suspension notice, Grantee shall comply with the notice. Within 90 days, or any longer period agreed to by the parties, Department shall either: (1) issue a notice authorizing resumption of work, at which time activity shall resume; or (2) terminate the Agreement. If the Agreement is terminated after 30 days of suspension, the notice of suspension shall be deemed to satisfy the thirty (30) days' notice required for a notice of termination for convenience. Suspension of work shall not entitle Grantee to any additional compensation.

17. Force Majeure.

The Grantee shall not be responsible for delay resulting from its failure to perform if neither the fault nor the negligence of Grantee or its employees or agents contributed to the delay and the delay is due directly to acts of God, wars, acts of public enemies, strikes, fires, floods, or other similar cause wholly beyond Grantee's control, or for any of the foregoing that affect subcontractors or suppliers if no alternate source of supply is available to Grantee. In case of any delay Grantee believes is excusable, Grantee shall notify Department in writing of the delay or potential delay and describe the cause of the delay either (1) within ten days after the cause that creates or will create the delay first arose, if Grantee could reasonably foresee that a delay could occur as a result; or (2) if delay is not reasonably foreseeable, within five days after the date Grantee first had reason to believe that a delay could result. **THE FOREGOING SHALL CONSTITUTE THE GRANTEE'S SOLE REMEDY OR EXCUSE WITH RESPECT TO DELAY.** Providing notice in strict accordance with this paragraph is a condition precedent to such remedy. No claim for damages, other than for an extension of time, shall be asserted against Department. The Grantee shall not be entitled to an increase in the Agreement price or payment of any kind from Department for direct, indirect, consequential, impact or other costs, expenses or damages, including but not limited to costs of acceleration or inefficiency, arising because of delay, disruption, interference, or hindrance from any cause whatsoever. If performance is suspended or delayed, in whole or in part, due to any of the causes described in this paragraph, after the causes have ceased to exist Grantee shall perform at no increased cost, unless Department determines, in its sole discretion, that the delay will significantly impair the value of the Agreement to Department, in which case Department may: (1) accept allocated performance or deliveries from Grantee, provided that Grantee grants preferential treatment to Department with respect to products subjected to allocation; (2) contract with other sources (without recourse to and by Grantee for the related costs and expenses) to replace all or part of the products or services that are the subject of the delay, which purchases may be deducted from the Agreement quantity; or (3) terminate Agreement in whole or in part.

18. Indemnification.

- a. The Grantee shall be fully liable for the actions of its agents, employees, partners, or subcontractors and shall fully indemnify, defend, and hold harmless Department and its officers, agents, and employees, from suits, actions, damages, and costs of every name and description arising from or relating to:
 - i. personal injury and damage to real or personal tangible property alleged to be caused in whole or in part by Grantee, its agents, employees, partners, or subcontractors; provided, however, that Grantee shall not indemnify for that portion of any loss or damages proximately caused by the negligent act or omission of Department;
 - ii. the Grantee's breach of this Agreement or the negligent acts or omissions of Grantee.

- b. The Grantee's obligations under the preceding paragraph with respect to any legal action are contingent upon Department giving Grantee: (1) written notice of any action or threatened action; (2) the opportunity to take over and settle or defend any such action at Grantee's sole expense; and (3) assistance in defending the action at Grantee's sole expense. The Grantee shall not be liable for any cost, expense, or compromise incurred or made by Department in any legal action without Grantee's prior written consent, which shall not be unreasonably withheld.
- c. Notwithstanding sections a. and b. above, the following is the sole indemnification provision that applies to Grantees that are governmental entities: Each party hereto agrees that it shall be solely responsible for the negligent or wrongful acts of its employees and agents. However, nothing contained herein shall constitute a waiver by either party of its sovereign immunity or the provisions of section 768.28, F.S. Further, nothing herein shall be construed as consent by a state agency or subdivision of the State to be sued by third parties in any matter arising out of any contract or this Agreement.
- d. No provision in this Agreement shall require Department to hold harmless or indemnify Grantee, insure or assume liability for Grantee's negligence, waive Department's sovereign immunity under the laws of Florida, or otherwise impose liability on Department for which it would not otherwise be responsible. Any provision, implication or suggestion to the contrary is null and void.

19. Limitation of Liability.

The Department's liability for any claim arising from this Agreement is limited to compensatory damages in an amount no greater than the sum of the unpaid balance of compensation due for goods or services rendered pursuant to and in compliance with the terms of the Agreement. Such liability is further limited to a cap of \$100,000.

20. Remedies.

Nothing in this Agreement shall be construed to make Grantee liable for force majeure events. Nothing in this Agreement, including financial consequences for nonperformance, shall limit Department's right to pursue its remedies for other types of damages under the Agreement, at law or in equity. The Department may, in addition to other remedies available to it, at law or in equity and upon notice to Grantee, retain such monies from amounts due Grantee as may be necessary to satisfy any claim for damages, penalties, costs and the like asserted by or against it.

21. Waiver.

The delay or failure by Department to exercise or enforce any of its rights under this Agreement shall not constitute or be deemed a waiver of Department's right thereafter to enforce those rights, nor shall any single or partial exercise of any such right preclude any other or further exercise thereof or the exercise of any other right.

22. Statutory Notices Relating to Unauthorized Employment and Subcontracts.

- a. The Department shall consider the employment by any Grantee of unauthorized aliens a violation of Section 274A(e) of the Immigration and Nationality Act. If Grantee/subcontractor knowingly employs unauthorized aliens, such violation shall be cause for unilateral cancellation of this Agreement. The Grantee shall be responsible for including this provision in all subcontracts with private organizations issued as a result of this Agreement.
- b. Pursuant to sections 287.133, 287.134, and 287.137 F.S., the following restrictions apply to persons placed on the convicted vendor list, discriminatory vendor list, or the antitrust violator vendor list:
 - i. Public Entity Crime. A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity; may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals, or replies on leases of real property to a public entity; may not be awarded or perform work as a Grantee, supplier, subcontractor, or consultant under a contract with any public entity; and may not transact business with any public entity in excess of the threshold amount provided in section 287.017, F.S., for CATEGORY TWO for a period of 36 months following the date of being placed on the convicted vendor list.
 - ii. Discriminatory Vendors. An entity or affiliate who has been placed on the discriminatory vendor list may not submit a bid, proposal, or reply on a contract to provide any goods or services to a public entity; may not submit a bid, proposal, or reply on a contract with a public entity for the construction or repair of a public building or public work; may not submit bids, proposals, or replies on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity; and may not transact business with any public entity.
 - iii. Antitrust Violator Vendors. A person or an affiliate who has been placed on the antitrust violator vendor list following a conviction or being held civilly liable for an antitrust violation may not submit a bid, proposal, or reply on any contract to provide any good or services to a public entity;

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may not submit a bid, proposal, or reply on any contract with a public entity for the construction or repair of a public building or public work; may not submit a bid, proposal, or reply on leases of real property to a public entity; may not be awarded or perform work as a Grantee, supplier, subcontractor, or consultant under a contract with a public entity; and may not transact new business with a public entity.

- iv. **Notification.** The Grantee shall notify Department if it or any of its suppliers, subcontractors, or consultants have been placed on the convicted vendor list, the discriminatory vendor list, or antitrust violator vendor list during the life of the Agreement. The Florida Department of Management Services is responsible for maintaining the discriminatory vendor list and the antitrust violator vendor list and posts the list on its website. Questions regarding the discriminatory vendor list or antitrust violator vendor list may be directed to the Florida Department of Management Services, Office of Supplier Diversity, at (850) 487-0915.

23. Compliance with Federal, State and Local Laws.

- a. The Grantee and all its agents shall comply with all federal, state and local regulations, including, but not limited to, nondiscrimination, wages, social security, workers' compensation, licenses, and registration requirements. The Grantee shall include this provision in all subcontracts issued as a result of this Agreement.
- b. No person, on the grounds of race, creed, color, religion, national origin, age, gender, or disability, shall be excluded from participation in; be denied the proceeds or benefits of; or be otherwise subjected to discrimination in performance of this Agreement.
- c. This Agreement shall be governed by and construed in accordance with the laws of the State of Florida.
- d. Any dispute concerning performance of the Agreement shall be processed as described herein. Jurisdiction for any damages arising under the terms of the Agreement will be in the courts of the State, and venue will be in the Second Judicial Circuit, in and for Leon County. Except as otherwise provided by law, the parties agree to be responsible for their own attorney fees incurred in connection with disputes arising under the terms of this Agreement.

24. Build America, Buy America Act (BABA) - Infrastructure Projects with Federal Funding.

This provision does not apply to Agreements that are wholly funded by Coronavirus State and Local Fiscal Recovery Funds under the American Rescue Plan Act. Also, this provision does not apply where there is a valid waiver in place. However, the provision may apply to funds expended before the waiver or after expiration of the waiver.

If applicable, Recipients or Subrecipients of an award of Federal financial assistance from a program for infrastructure are required to comply with the Build America, Buy America Act (BABA), including the following provisions:

- a. All iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;
- b. All manufactured products used in the project are produced in the United States--this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and
- c. All construction materials are manufactured in the United States--this means that all manufacturing processes for the construction material occurred in the United States.

The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project but are not an integral part of the structure or permanently affixed to the infrastructure project.

25. Investing in America

Grantees of an award for construction projects in whole or in part by the Bipartisan Infrastructure Law or the Inflation Reduction Act, including the following provision:

- a. **Signage Requirements**
 - a. **Investing in America Emblem:** The recipient will ensure that a sign is placed at construction sites supported in whole or in part by this award displaying the official Investing in America emblem and must identify the project as a "project funded by President Biden's Bipartisan

Infrastructure Law” or “project funded by President Biden’s Inflation Reduction Act” as applicable. The sign must be placed at construction sites in an easily visible location that can be directly linked to the work taking place and must be maintained in good condition throughout the construction period.

The recipient will ensure compliance with the guidelines and design specifications provided by EPA for using the official Investing in America emblem available at:

<https://www.epa.gov/invest/investing-america-signage>.

b. Procuring Signs: Consistent with section 6002 of RCRA, 42 U.S.C. 6962, and 2 CFR 200.323, recipients are encouraged to use recycled or recovered materials when procuring signs. Signage costs are considered an allowable cost under this assistance agreement provided that the costs associated with signage are reasonable. Additionally, to increase public awareness of projects serving communities where English is not the predominant language, recipients are encouraged to translate the language on signs (excluding the official Investing in America emblem or EPA logo or seal) into the appropriate non-English language(s). The costs of such translation are allowable, provided the costs are reasonable.

26. Scrutinized Companies.

- a. Grantee certifies that it is not on the Scrutinized Companies that Boycott Israel List or engaged in a boycott of Israel. Pursuant to section 287.135, F.S., the Department may immediately terminate this Agreement at its sole option if the Grantee is found to have submitted a false certification; or if the Grantee is placed on the Scrutinized Companies that Boycott Israel List or is engaged in the boycott of Israel during the term of the Agreement.
- b. If this Agreement is for more than one million dollars, the Grantee certifies that it is also not on the Scrutinized Companies with Activities in Sudan, Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or engaged with business operations in Cuba or Syria as identified in section 287.135, F.S. Pursuant to section 287.135, F.S., the Department may immediately terminate this Agreement at its sole option if the Grantee is found to have submitted a false certification; or if the Grantee is placed on the Scrutinized Companies with Activities in Sudan List, or Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or engaged with business operations in Cuba or Syria during the term of the Agreement.
- c. As provided in subsection 287.135(8), F.S., if federal law ceases to authorize these contracting prohibitions, then they shall become inoperative.

27. Lobbying and Integrity.

The Grantee agrees that no funds received by it under this Agreement will be expended for the purpose of lobbying the Legislature or a State agency pursuant to section 216.347, F.S., except that pursuant to the requirements of section 287.058(6), F.S., during the term of any executed agreement between Grantee and the State, Grantee may lobby the executive or legislative branch concerning the scope of services, performance, term, or compensation regarding that agreement. The Grantee shall comply with sections 11.062 and 216.347, F.S.

28. Record Keeping.

The Grantee shall maintain books, records and documents directly pertinent to performance under this Agreement in accordance with United States generally accepted accounting principles (US GAAP) consistently applied. The Department, the State, or their authorized representatives shall have access to such records for audit purposes during the term of this Agreement and for five (5) years following the completion date or termination of the Agreement. In the event that any work is subcontracted, Grantee shall similarly require each subcontractor to maintain and allow access to such records for audit purposes. Upon request of Department’s Inspector General, or other authorized State official, Grantee shall provide any type of information the Inspector General deems relevant to Grantee’s integrity or responsibility. Such information may include, but shall not be limited to, Grantee’s business or financial records, documents, or files of any type or form that refer to or relate to Agreement. The Grantee shall retain such records for the longer of: (1) three years after the expiration of the Agreement; or (2) the period required by the General Records Schedules maintained by the Florida Department of State (available at:

<http://dos.myflorida.com/library-archives/records-management/general-records-schedules/>).

29. Audits.

- a. Inspector General. The Grantee understands its duty, pursuant to section 20.055(5), F.S., to cooperate with the inspector general in any investigation, audit, inspection, review, or hearing. The Grantee will comply with this duty and ensure that its sub-grantees and/or subcontractors issued under this Agreement, if any, impose this requirement, in writing, on its sub-grantees and/or subcontractors, respectively.

- b. Physical Access and Inspection. Department personnel shall be given access to and may observe and inspect work being performed under this Agreement, with reasonable notice and during normal business hours, including by any of the following methods:
 - i. Grantee shall provide access to any location or facility on which Grantee is performing work, or storing or staging equipment, materials or documents;
 - ii. Grantee shall permit inspection of any facility, equipment, practices, or operations required in performance of any work pursuant to this Agreement; and,
 - iii. Grantee shall allow and facilitate sampling and monitoring of any substances, soils, materials or parameters at any location reasonable or necessary to assure compliance with any work or legal requirements pursuant to this Agreement.
- c. Special Audit Requirements. The Grantee shall comply with the applicable provisions contained in Attachment 5, Special Audit Requirements. Each amendment that authorizes a funding increase or decrease shall include an updated copy of Exhibit 1, to Attachment 5. If Department fails to provide an updated copy of Exhibit 1 to include in each amendment that authorizes a funding increase or decrease, Grantee shall request one from the Department's Grants Manager. The Grantee shall consider the type of financial assistance (federal and/or state) identified in Attachment 5, Exhibit 1 and determine whether the terms of Federal and/or Florida Single Audit Act Requirements may further apply to lower tier transactions that may be a result of this Agreement. For federal financial assistance, Grantee shall utilize the guidance provided under 2 CFR §200.331 for determining whether the relationship represents that of a subrecipient or vendor. For State financial assistance, Grantee shall utilize the form entitled "Checklist for Nonstate Organizations Recipient/Subrecipient vs Vendor Determination" (form number DFS-A2-NS) that can be found under the "Links/Forms" section appearing at the following website: <https://apps.fldfs.com/fsaa>.
- d. Proof of Transactions. In addition to documentation provided to support cost reimbursement as described herein, Department may periodically request additional proof of a transaction to evaluate the appropriateness of costs to the Agreement pursuant to State guidelines (including cost allocation guidelines) and federal, if applicable. Allowable costs and uniform administrative requirements for federal programs can be found under 2 CFR 200. The Department may also request a cost allocation plan in support of its multipliers (overhead, indirect, general administrative costs, and fringe benefits). The Grantee must provide the additional proof within thirty (30) days of such request.
- e. No Commingling of Funds. The accounting systems for all Grantees must ensure that these funds are not commingled with funds from other agencies. Funds from each agency must be accounted for separately. Grantees are prohibited from commingling funds on either a program-by-program or a project-by-project basis. Funds specifically budgeted and/or received for one project may not be used to support another project. Where a Grantee's, or subrecipient's, accounting system cannot comply with this requirement, Grantee, or subrecipient, shall establish a system to provide adequate fund accountability for each project it has been awarded.
 - i. If Department finds that these funds have been commingled, Department shall have the right to demand a refund, either in whole or in part, of the funds provided to Grantee under this Agreement for non-compliance with the material terms of this Agreement. The Grantee, upon such written notification from Department shall refund, and shall forthwith pay to Department, the amount of money demanded by Department. Interest on any refund shall be calculated based on the prevailing rate used by the State Board of Administration. Interest shall be calculated from the date(s) the original payment(s) are received from Department by Grantee to the date repayment is made by Grantee to Department.
 - ii. In the event that the Grantee recovers costs, incurred under this Agreement and reimbursed by Department, from another source(s), Grantee shall reimburse Department for all recovered funds originally provided under this Agreement and interest shall be charged for those recovered costs as calculated on from the date(s) the payment(s) are recovered by Grantee to the date repayment is made to Department.
 - iii. Notwithstanding the requirements of this section, the above restrictions on commingling funds do not apply to agreements where payments are made purely on a cost reimbursement basis.

30. Conflict of Interest.

The Grantee covenants that it presently has no interest and shall not acquire any interest which would conflict in any manner or degree with the performance of services required.

31. Independent Contractor.

The Grantee is an independent contractor and is not an employee or agent of Department.

32. Subcontracting.

Attachment 1

11 of 13

- a. Unless otherwise specified in the Special Terms and Conditions, all services contracted for are to be performed solely by Grantee.
- b. The Department may, for cause, require the replacement of any Grantee employee, subcontractor, or agent. For cause, includes, but is not limited to, technical or training qualifications, quality of work, change in security status, or non-compliance with an applicable Department policy or other requirement.
- c. The Department may, for cause, deny access to Department's secure information or any facility by any Grantee employee, subcontractor, or agent.
- d. The Department's actions under paragraphs b. or c. shall not relieve Grantee of its obligation to perform all work in compliance with the Agreement. The Grantee shall be responsible for the payment of all monies due under any subcontract. The Department shall not be liable to any subcontractor for any expenses or liabilities incurred under any subcontract and Grantee shall be solely liable to the subcontractor for all expenses and liabilities incurred under any subcontract.
- e. The Department will not deny Grantee's employees, subcontractors, or agents access to meetings within the Department's facilities, unless the basis of Department's denial is safety or security considerations.
- f. The Department supports diversity in its procurement program and requests that all subcontracting opportunities afforded by this Agreement embrace diversity enthusiastically. The award of subcontracts should reflect the full diversity of the citizens of the State. A list of minority-owned firms that could be offered subcontracting opportunities may be obtained by contacting the Office of Supplier Diversity at (850) 487-0915.
- g. The Grantee shall not be liable for any excess costs for a failure to perform, if the failure to perform is caused by the default of a subcontractor at any tier, and if the cause of the default is completely beyond the control of both Grantee and the subcontractor(s), and without the fault or negligence of either, unless the subcontracted products or services were obtainable from other sources in sufficient time for Grantee to meet the required delivery schedule.

33. Guarantee of Parent Company.

If Grantee is a subsidiary of another corporation or other business entity, Grantee asserts that its parent company will guarantee all of the obligations of Grantee for purposes of fulfilling the obligations of Agreement. In the event Grantee is sold during the period the Agreement is in effect, Grantee agrees that it will be a requirement of sale that the new parent company guarantee all of the obligations of Grantee.

34. Survival.

The respective obligations of the parties, which by their nature would continue beyond the termination or expiration of this Agreement, including without limitation, the obligations regarding confidentiality, proprietary interests, and public records, shall survive termination, cancellation, or expiration of this Agreement.

35. Third Parties.

The Department shall not be deemed to assume any liability for the acts, failures to act or negligence of Grantee, its agents, servants, and employees, nor shall Grantee disclaim its own negligence to Department or any third party. This Agreement does not and is not intended to confer any rights or remedies upon any person other than the parties. If Department consents to a subcontract, Grantee will specifically disclose that this Agreement does not create any third-party rights. Further, no third parties shall rely upon any of the rights and obligations created under this Agreement.

36. Severability.

If a court of competent jurisdiction deems any term or condition herein void or unenforceable, the other provisions are severable to that void provision, and shall remain in full force and effect.

37. Grantee's Employees, Subcontractors and Agents.

All Grantee employees, subcontractors, or agents performing work under the Agreement shall be properly trained technicians who meet or exceed any specified training qualifications. Upon request, Grantee shall furnish a copy of technical certification or other proof of qualification. All employees, subcontractors, or agents performing work under Agreement must comply with all security and administrative requirements of Department and shall comply with all controlling laws and regulations relevant to the services they are providing under the Agreement.

38. Assignment.

The Grantee shall not sell, assign, or transfer any of its rights, duties, or obligations under the Agreement, or under any purchase order issued pursuant to the Agreement, without the prior written consent of Department. In the event of any assignment, Grantee remains secondarily liable for performance of the Agreement, unless Department expressly waives such secondary liability. The Department may assign the Agreement with prior written notice to Grantee of its intent to do so.

39. Compensation Report.

If this Agreement is a sole-source, public-private agreement or if the Grantee, through this agreement with the State, annually receive 50% or more of their budget from the State or from a combination of State and Federal funds, the

Grantee shall provide an annual report, including the most recent IRS Form 990, detailing the total compensation for the entities' executive leadership teams. Total compensation shall include salary, bonuses, cashed-in leave, cash equivalents, severance pay, retirement benefits, deferred compensation, real-property gifts, and any other payout. The Grantee must also inform the Department of any changes in total executive compensation between the annual reports. All compensation reports must indicate what percent of compensation comes directly from the State or Federal allocations to the Grantee.

40. Execution in Counterparts and Authority to Sign.

This Agreement, any amendments, and/or change orders related to the Agreement, may be executed in counterparts, each of which shall be an original and all of which shall constitute the same instrument. In accordance with the Electronic Signature Act of 1996, electronic signatures, including facsimile transmissions, may be used and shall have the same force and effect as a written signature. Each person signing this Agreement warrants that he or she is duly authorized to do so and to bind the respective party to the Agreement.

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Special Terms and Conditions
AGREEMENT NO. 22FRP40**

ATTACHMENT 2

These Special Terms and Conditions shall be read together with general terms outlined in the Standard Terms and Conditions, Attachment 1. Where in conflict, these more specific terms shall apply.

1. Scope of Work.

The Project funded under this Agreement is Town of Golden Beach Pump Station at Tweddle Park. The Project is defined in more detail in Attachment 3, Grant Work Plan.

2. Duration.

- a. Reimbursement Period. The reimbursement period for this Agreement is the same as the term of the Agreement.
- b. Extensions. There are extensions available for this Project.
- c. Service Periods. Additional service periods may be added in accordance with 2.a above and are contingent upon proper and satisfactory technical and administrative performance by the Grantee and the availability of funding.

3. Payment Provisions.

- a. Compensation. This is a cost reimbursement Agreement. The Grantee shall be compensated under this Agreement as described in Attachment 3.
- b. Invoicing. Invoicing will occur as indicated in Attachment 3.
- c. Advance Pay. Advance Pay is not authorized under this Agreement.

4. Cost Eligible for Reimbursement or Matching Requirements.

Reimbursement for costs or availability for costs to meet matching requirements shall be limited to the following budget categories, as defined in the Reference Guide for State Expenditures, as indicated:

<u>Reimbursement</u>	<u>Match</u>	<u>Category</u>
☐	☐	Salaries/Wages
		Overhead/Indirect/General and Administrative Costs:
☐	☐	a. Fringe Benefits, N/A.
☐	☐	b. Indirect Costs, N/A.
☒	☒	Contractual (Subcontractors)
☐	☐	Travel, in accordance with Section 112, F.S.
☐	☐	Equipment
☐	☐	Rental/Lease of Equipment
☐	☐	Miscellaneous/Other Expenses
☐	☐	Land Acquisition

5. Equipment Purchase.

No Equipment purchases shall be funded under this Agreement.

6. Land Acquisition.

There will be no Land Acquisitions funded under this Agreement.

7. Match Requirements

The Agreement requires at least a 28% match on the part of the Grantee. Therefore, the Grantee is responsible for providing \$198,748 through cash or third party in-kind towards the project funded under this Agreement.

The Grantee may claim allowable project expenditures made on July 1, 2021 or after for purposes of meeting its match requirement as identified above.

Each payment request submitted shall document all matching funds and/or match efforts (i.e., in-kind services) provided during the period covered by each request. The final payment will not be processed until the match requirement has been met.

8. Insurance Requirements

Required Coverage. At all times during the Agreement the Grantee, at its sole expense, shall maintain insurance coverage of such types and with such terms and limits described below. The limits of coverage under each policy maintained by the Grantee shall not be interpreted as limiting the Grantee's liability and obligations under the Agreement. All insurance policies shall be through insurers licensed and authorized to issue policies in Florida, or alternatively, Grantee may provide coverage through a self-insurance program established and operating under the laws of Florida. Additional insurance requirements for this Agreement may be required elsewhere in this Agreement, however the minimum insurance requirements applicable to this Agreement are:

a. **Commercial General Liability Insurance.**

The Grantee shall provide adequate commercial general liability insurance coverage and hold such liability insurance at all times during the Agreement. The Department, its employees, and officers shall be named as an additional insured on any general liability policies. The minimum limits shall be \$250,000 for each occurrence and \$500,000 policy aggregate.

b. **Commercial Automobile Insurance.**

If the Grantee's duties include the use of a commercial vehicle, the Grantee shall maintain automobile liability, bodily injury, and property damage coverage. Insuring clauses for both bodily injury and property damage shall provide coverage on an occurrence basis. The Department, its employees, and officers shall be named as an additional insured on any automobile insurance policy. The minimum limits shall be as follows:

\$200,000/300,000	Automobile Liability for Company-Owned Vehicles, if applicable
\$200,000/300,000	Hired and Non-owned Automobile Liability Coverage

c. **Workers' Compensation and Employer's Liability Coverage.**

The Grantee shall provide workers' compensation, in accordance with Chapter 440, F.S. and employer liability coverage with minimum limits of \$100,000 per accident, \$100,000 per person, and \$500,000 policy aggregate. Such policies shall cover all employees engaged in any work under the Grant.

d. **Other Insurance.** None.

9. Quality Assurance Requirements.

There are no special Quality Assurance requirements under this Agreement.

10. Retainage.

Retainage is permitted under this Agreement. Retainage may be up to a maximum of 5% of the total amount of the Agreement.

11. Subcontracting.

The Grantee may subcontract work under this Agreement without the prior written consent of the Department's Grant Manager except for certain fixed-price subcontracts pursuant to this Agreement, which require prior approval. The Grantee shall submit a copy of the executed subcontract to the Department prior to submitting any invoices for subcontracted work. Regardless of any subcontract, the Grantee is ultimately responsible for all work to be performed under this Agreement.

12. State-owned Land.

The work will not be performed on State-owned land.

13. Office of Policy and Budget Reporting.

There are no special Office of Policy and Budget reporting requirements for this Agreement.

14. Common Carrier.

- a. Applicable to contracts with a common carrier – firm/person/corporation that as a regular business transports people or commodities from place to place. If applicable, Contractor must also fill out and return PUR 1808 before contract execution. If Contractor is a common carrier pursuant to section

908.111(1)(a), Florida Statutes, the Department will terminate this contract immediately if Contractor is found to be in violation of the law or the attestation in PUR 1808.

- b. Applicable to solicitations for a common carrier – Before contract execution, the winning Contractor(s) must fill out and return PUR 1808, and attest that it is not willfully providing any service in furtherance of transporting a person into this state knowing that the person unlawfully present in the United States according to the terms of the federal Immigration and Nationality Act, 8 U.S.C. ss. 1101 et seq. The Department will terminate a contract immediately if Contractor is found to be in violation of the law or the attestation in PUR 1808.

15. Additional Terms.

Documentary Evidence Requirement for Subcontractor(s). If any work associated with this Agreement is completed by a subcontractor(s), the Grantee shall require that such subcontractor(s) submit documentary evidence (e.g., workshop agendas; meeting recordings) to Grantee demonstrating that the subcontractor(s) has fully performed its Project obligation(s). The Grantee shall forward copies of all such documentary evidence to the Department with the Grantee's relevant deliverable(s), using the approved Project Timeline set forth in Attachment 3 to this Agreement (Grant Work Plan).

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
GRANT WORK PLAN
AGREEMENT NO. 22FRP40**

ATTACHMENT 3

PROJECT TITLE: Town of Golden Beach Pump Station at Tweddle Park

PROJECT LOCATION: The Project is located in the Town of Golden Beach within Miami-Dade County, Florida.

PROJECT DESCRIPTION:

The Town of Golden Beach (Grantee) will implement the Town of Golden Beach Pump Station at Tweddle Park project (Project) to demolish the existing pump station and associated above ground piping and construct a new underground pump station and water treatment system discharging to the existing outfall. Site preparation including demolition of an existing storage building and site restoration for affected roadways, curbs and gutters will also be performed. The Project includes survey, design and permitting, bidding and contractor selection, project management, and construction activities.

TASKS AND DELIVERABLES:

Task 1 - Sea Level Impact Projection (SLIP) Study Report

Description: The Grantee will submit a SLIP study report, if applicable, pursuant to the relevant Florida Statute (F.S.; s. 161.551, F.S., before July 1, 2024, and s. 380.0937, F.S., thereafter) and Chapter 62S-7, Florida Administrative Code (F.A.C.). The SLIP study report must be submitted to the Department, approved, and published for at least 30 days before construction begins. This will inform the project owner about the potential effects of sea level rise and coastal flooding on the structure so they can use this information in project planning and adaptation. Visit the SLIP tool website ([Florida SLIP Tool](#)) for more information.

Deliverables: The Grantee will submit:

- **1.1:** Published SLIP Study Report and the confirmation email stating the report was published on the Department's website for no less than thirty (30) days before construction commences. **This is a no cost deliverable.**

Task 2 - Design and Permitting

Description: The Grantee will acquire professional services for the engineering and design of the replacement of a stormwater pump station and installation of a water treatment system and obtain all necessary permits for construction of the Project.

Design and permitting activities may include coastal or civil engineering analyses, preparation of plans and specifications, physical and environmental surveys, cultural resource surveys, design-level geotechnical services, environmental analyses, orthophotography, plan formulations and other necessary studies for obtaining environmental permits, and other Project-related authorizations. The Grantee will submit all work products to the appropriate local, state, and federal regulatory agencies.

Deliverables: The Grantee will submit:

- **2.1:** All final design documents as signed by a Florida-registered Professional Engineer or other applicable Florida Licensed Professional in responsible charge of the design.
- **2.2:** A copy of final permit documents from all applicable local, state, and federal regulatory agencies.

Task 3 - Bidding and Contractor Selection

Description: The Grantee will prepare a bid package, publish a public notice, solicit bids, conduct pre-bid meetings, and respond to bid questions in accordance with the Grantee's procurement process in order to select one or more qualified and licensed contractors to complete construction of the new stormwater pump station.

Deliverables: The Grantee will submit:

- **3.1:** The public notice of advertisement for the bid;
- **3.2:** The final bid package including all inquiries, questions, comments regarding the bid; and
- **3.3:** A written notice of the selected contractor(s).

Task 4 - Project Management

Description: The Grantee will acquire professional services to perform project management, to include field engineering services, construction observation, site meetings with construction contractor(s) and design professionals, and overall project coordination and supervision.

Deliverables: The Grantee will submit:

- **4.1:** Project management reports signed by a Florida-registered Professional Engineer, to include:
 - A summary of project and site inspections;
 - Meeting minutes; and
 - Field notes, as applicable.

Task 5 - Construction

Description: The Grantee will construct the stormwater pump station replacement which entails demolishing the existing pumpstation and an existing storage structure, installing a new underground concrete structure to house a new mechanical pump, installing the new water treatment system and restoring the affected infrastructure such as roadways, curbs, and gutters; in accordance with the construction contract documents. Project costs associated with the Construction task include work approved through construction bids and/or construction-phase engineering and monitoring services contracts. Eligible activities may include mobilization, demobilization, construction observation or inspection services, physical and environmental surveys, and mitigation projects. Construction shall be conducted in accordance with all local, state, and federal permits.

Deliverables: The Grantee will submit:

- **5.1:** A copy of the record (as-built) drawings;
- **5.2:** A Certificate of Completion signed by a Florida-registered Professional Engineer; and
- **5.3:** Coordinate final site visit with Department and submit the Closeout Site Visit Form received from assigned Field Agent.

PERFORMANCE MEASURES: The Grantee will submit all deliverables for each task to the Department's Grant Manager on or before the Task Due Date listed in the Project Timeline. The Department's Grant Manager will review the deliverable(s) to verify that they meet the specifications in

the Grant Work Plan and the task description, to include any work being performed by any subcontractor(s), and will provide written acceptance or denial of the deliverable(s) to the Grantee within thirty (30) calendar days. Tasks may include multiple deliverables to be completed. The Department will accept partial and full deliverables. Incomplete deliverables will not be accepted. A “partial deliverable” is defined as a deliverable consisting of one (1) or more (but not all) subcomponents listed in the deliverable list for a single task, where such subcomponent(s) are delivered to the Department at one hundred percent (100%) completion. A “full deliverable” is defined as a deliverable comprising all subcomponents listed in the deliverable list for a single task, all delivered to the Department at one hundred percent (100%) completion. An “incomplete deliverable” is defined as a deliverable for which one hundred percent (100%) completion has not been achieved for any of the subcomponents listed in the deliverable list for a single task. A task is considered one hundred percent (100%) complete upon the Department’s receipt and approval of all deliverable(s) listed within the task and the Department’s approval provided by the Deliverable Acceptance Letter.

CONSEQUENCES FOR NON-PERFORMANCE: For each task deliverable not received by the Department at one hundred percent (100%) completion and by the specified due date listed in the Agreement’s most recent Project Timeline, the Department will reduce the relevant Task Funding Amount(s) paid to Grantee in proportion to the percentage of the deliverable(s) not fully completed and/or submitted to the Department in a timely manner.

PAYMENT REQUEST SCHEDULE: Following the Grantee’s full or partial completion of a task’s deliverable(s) and acceptance by the Department’s Grant Manager, the Grantee may submit a payment request for cost reimbursement using the Exhibit C, Payment Request Summary Form. All payment requests must be accompanied by the Deliverable Acceptance Letter; the Exhibit A, Progress Report Form, detailing all progress made in the invoice period; and supporting fiscal documentation including match, if applicable. Interim payments will not be accepted. Upon the Department’s receipt of the aforementioned documents and supporting fiscal documentation, the Department’s Grant Manager will have ten (10) working days to review and approve or deny the payment request.

PROJECT TIMELINE AND BUDGET DETAIL: The tasks must be completed by, and all deliverables received by, the corresponding task due date listed in the table below. Cost-reimbursable grant funding must not exceed the budget amounts indicated below. Requests for any change(s) must be submitted prior to the current task due date listed in the Project Timeline. Requests are to be sent via email to the Department’s Grant Manager, with the details of the request and the reason for the request made clear.

Task No.	Task Title	Budget Category	DEP Amount	Match Amount	Total Amount	Task Start Date	Task Due Date
1	Sea Level Impact Projection (SLIP) Study Report	No-Cost Deliverable	\$0	\$0	\$0	Upon Execution	6/30/2026
2	Design and Permitting	Contractual Services	\$45,000	\$33,576	\$78,576	Upon Execution	6/30/2026
3	Bidding and Contractor Selection	Contractual Services	\$5,500	\$4,000	\$9,500	Upon Execution	6/30/2026
4	Project Management	Contractual Services	\$35,000	\$22,441	\$57,441	Upon Execution	6/30/2026
5	Construction	Contractual Services	\$414,500	\$138,731	\$553,231	Upon Execution	6/30/2026
Total:			\$500,000	\$198,748	\$698,748		

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Public Records Requirements**

Attachment 4

1. Public Records.

- a. If the Agreement exceeds \$35,000.00, and if Grantee is acting on behalf of Department in its performance of services under the Agreement, Grantee must allow public access to all documents, papers, letters, or other material, regardless of the physical form, characteristics, or means of transmission, made or received by Grantee in conjunction with the Agreement (Public Records), unless the Public Records are exempt from section 24(a) of Article I of the Florida Constitution or section 119.07(1), F.S.
- b. The Department may unilaterally terminate the Agreement if Grantee refuses to allow public access to Public Records as required by law.

2. Additional Public Records Duties of Section 119.0701, F.S., If Applicable.

For the purposes of this paragraph, the term “contract” means the “Agreement.” If Grantee is a “contractor” as defined in section 119.0701(1)(a), F.S., the following provisions apply and the contractor shall:

- a. Keep and maintain Public Records required by Department to perform the service.
- b. Upon request, provide Department with a copy of requested Public Records or allow the Public Records to be inspected or copied within a reasonable time at a cost that does not exceed the cost provided in Chapter 119, F.S., or as otherwise provided by law.
- c. A contractor who fails to provide the Public Records to Department within a reasonable time may be subject to penalties under section 119.10, F.S.
- d. 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 contractor does not transfer the Public Records to Department.
- e. Upon completion of the contract, transfer, at no cost, to Department all Public Records in possession of the contractor or keep and maintain Public Records required by Department to perform the service. If the contractor transfers all Public Records to Department upon completion of the contract, 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 contract, the contractor shall meet all applicable requirements for retaining Public Records. All Public Records stored electronically must be provided to Department, upon request from Department’s custodian of Public Records, in a format specified by Department as compatible with the information technology systems of Department. These formatting requirements are satisfied by using the data formats as authorized in the contract or Microsoft Word, Outlook, Adobe, or Excel, and any software formats the contractor is authorized to access.

f. IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, F.S., TO THE CONTRACTOR’S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THE CONTRACT, CONTACT THE DEPARTMENT’S CUSTODIAN OF PUBLIC RECORDS AT:

Telephone: (850) 245-2118
Email: public.services@floridadep.gov
Mailing Address: Department of Environmental Protection
ATTN: Office of Ombudsman and Public Services
Public Records Request
3900 Commonwealth Boulevard, MS 49
Tallahassee, Florida 32399

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Special Audit Requirements
(State and Federal Financial Assistance)**

Attachment 5

The administration of resources awarded by the Department of Environmental Protection (*which may be referred to as the "Department", "DEP", "FDEP" or "Grantor", or other name in the agreement*) to the recipient (*which may be referred to as the "Recipient", "Grantee" or other name in the agreement*) may be subject to audits and/or monitoring by the Department of Environmental Protection, as described in this attachment.

MONITORING

In addition to reviews of audits conducted in accordance with 2 CFR Part 200, Subpart F-Audit Requirements, and Section 215.97, F.S., as revised (see "AUDITS" below), monitoring procedures may include, but not be limited to, on-site visits by DEP Department staff, limited scope audits as defined by 2 CFR 200.425, or other procedures. By entering into this Agreement, the recipient agrees to comply and cooperate with any monitoring procedures/processes deemed appropriate by the Department of Environmental Protection. In the event the Department of Environmental Protection determines that a limited scope audit of the recipient is appropriate, the recipient agrees to comply with any additional instructions provided by the Department to the recipient regarding such audit. The recipient further agrees to comply and cooperate with any inspections, reviews, investigations, or audits deemed necessary by the Chief Financial Officer (CFO) or Auditor General.

AUDITS

PART I: FEDERALLY FUNDED

This part is applicable if the recipient is a State or local government or a non-profit organization as defined in 2 CFR §200.330

1. A recipient that expends \$750,000 or more in Federal awards in its fiscal year, must have a single or program-specific audit conducted in accordance with the provisions of 2 CFR Part 200, Subpart F. EXHIBIT 1 to this Attachment indicates Federal funds awarded through the Department of Environmental Protection by this Agreement. In determining the federal awards expended in its fiscal year, the recipient shall consider all sources of federal awards, including federal resources received from the Department of Environmental Protection. The determination of amounts of federal awards expended should be in accordance with the guidelines established in 2 CFR 200.502-503. An audit of the recipient conducted by the Auditor General in accordance with the provisions of 2 CFR Part 200.514 will meet the requirements of this part.
2. For the audit requirements addressed in Part I, paragraph 1, the recipient shall fulfill the requirements relative to auditee responsibilities as provided in 2 CFR 200.508-512.
3. A recipient that expends less than \$750,000 in federal awards in its fiscal year is not required to have an audit conducted in accordance with the provisions of 2 CFR Part 200, Subpart F-Audit Requirements. If the recipient expends less than \$750,000 in federal awards in its fiscal year and elects to have an audit conducted in accordance with the provisions of 2 CFR 200, Subpart F-Audit Requirements, the cost of the audit must be paid from non-federal resources (i.e., the cost of such an audit must be paid from recipient resources obtained from other federal entities).
4. The recipient may access information regarding the Catalog of Federal Domestic Assistance (CFDA) via the internet at <https://sam.gov/content/assistance-listings>.

PART II: STATE FUNDED

This part is applicable if the recipient is a nonstate entity as defined by Section 215.97(2), Florida Statutes.

1. In the event that the recipient expends a total amount of state financial assistance equal to or in excess of \$750,000 in any fiscal year of such recipient (for fiscal years ending June 30, 2017, and thereafter), the recipient must have a State single or project-specific audit for such fiscal year in accordance with Section 215.97, F.S.; Rule Chapter 69I-5, F.A.C., State Financial Assistance; and Chapters 10.550 (local governmental entities) or 10.650 (nonprofit and for-profit organizations), Rules of the Auditor General. EXHIBIT 1 to this form lists the state financial assistance awarded through the Department of Environmental Protection by this agreement. In determining the state financial assistance expended in its fiscal year, the recipient shall consider all sources of state financial assistance, including state financial assistance received from the Department of Environmental Protection, other state agencies, and other nonstate entities. State financial assistance does not include federal direct or pass-through awards and resources received by a nonstate entity for Federal program matching requirements.
2. In connection with the audit requirements addressed in Part II, paragraph 1; the recipient shall ensure that the audit complies with the requirements of Section 215.97(8), Florida Statutes. This includes submission of a financial reporting package as defined by Section 215.97(2), Florida Statutes, and Chapters 10.550 (local governmental entities) or 10.650 (nonprofit and for-profit organizations), Rules of the Auditor General.
3. If the recipient expends less than \$750,000 in state financial assistance in its fiscal year (for fiscal year ending June 30, 2017, and thereafter), an audit conducted in accordance with the provisions of Section 215.97, Florida Statutes, is not required. In the event that the recipient expends less than \$750,000 in state financial assistance in its fiscal year, and elects to have an audit conducted in accordance with the provisions of Section 215.97, Florida Statutes, the cost of the audit must be paid from the non-state entity's resources (i.e., the cost of such an audit must be paid from the recipient's resources obtained from other than State entities).
4. For information regarding the Florida Catalog of State Financial Assistance (CSFA), a recipient should access the Florida Single Audit Act website located at <https://apps.fldfs.com/fsaa> for assistance. In addition to the above websites, the following websites may be accessed for information: Legislature's Website at <http://www.leg.state.fl.us/Welcome/index.cfm>, State of Florida's website at <http://www.myflorida.com/>, Department of Financial Services' Website at <http://www.fldfs.com/> and the Auditor General's Website at <http://www.myflorida.com/audgen/>.

PART III: OTHER AUDIT REQUIREMENTS

(NOTE: This part would be used to specify any additional audit requirements imposed by the State awarding entity that are solely a matter of that State awarding entity's policy (i.e., the audit is not required by Federal or State laws and is not in conflict with other Federal or State audit requirements). Pursuant to Section 215.97(8), Florida Statutes, State agencies may conduct or arrange for audits of State financial assistance that are in addition to audits conducted in accordance with Section 215.97, Florida Statutes. In such an event, the State awarding agency must arrange for funding the full cost of such additional audits.)

PART IV: REPORT SUBMISSION

1. Copies of reporting packages for audits conducted in accordance with 2 CFR Part 200, Subpart F-Audit Requirements, and required by PART I of this form shall be submitted, when required by 2 CFR 200.512, by or on behalf of the recipient directly to the Federal Audit Clearinghouse (FAC) as provided in 2 CFR 200.36 and 200.512
 - A. The Federal Audit Clearinghouse designated in 2 CFR §200.501(a) (the number of copies required by 2 CFR §200.501(a) should be submitted to the Federal Audit Clearinghouse), at the following address:

By Mail:

Federal Audit Clearinghouse
Bureau of the Census
1201 East 10th Street
Jeffersonville, IN 47132

Submissions of the Single Audit reporting package for fiscal periods ending on or after January 1, 2008, must be submitted using the Federal Clearinghouse's Internet Data Entry System which can be found at <http://harvester.census.gov/facweb/>

2. Copies of financial reporting packages required by PART II of this Attachment shall be submitted by or on behalf of the recipient directly to each of the following:

- A. The Department of Environmental Protection at one of the following addresses:

By Mail:

Audit Director

Florida Department of Environmental Protection
Office of Inspector General, MS 40
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Electronically:

FDEPSingleAudit@dep.state.fl.us

- B. The Auditor General's Office at the following address:

Auditor General
Local Government Audits/342
Claude Pepper Building, Room 401
111 West Madison Street
Tallahassee, Florida 32399-1450

The Auditor General's website (<http://flauditor.gov/>) provides instructions for filing an electronic copy of a financial reporting package.

3. Copies of reports or management letters required by PART III of this Attachment shall be submitted by or on behalf of the recipient directly to the Department of Environmental Protection at one of the following addresses:

By Mail:

Audit Director

Florida Department of Environmental Protection
Office of Inspector General, MS 40
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Electronically:

FDEPSingleAudit@dep.state.fl.us

4. Any reports, management letters, or other information required to be submitted to the Department of Environmental Protection pursuant to this Agreement shall be submitted timely in accordance with 2 CFR 200.512, section 215.97, F.S., and Chapters 10.550 (local governmental entities) or 10.650 (nonprofit and for-profit organizations), Rules of the Auditor General, as applicable.

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5. Recipients, when submitting financial reporting packages to the Department of Environmental Protection for audits done in accordance with 2 CFR 200, Subpart F-Audit Requirements, or Chapters 10.550 (local governmental entities) and 10.650 (non and for-profit organizations), Rules of the Auditor General, should indicate the date and the reporting package was delivered to the recipient correspondence accompanying the reporting package.

PART V: RECORD RETENTION

The recipient shall retain sufficient records demonstrating its compliance with the terms of the award and this Agreement for a period of **five (5)** years from the date the audit report is issued, and shall allow the Department of Environmental Protection, or its designee, Chief Financial Officer, or Auditor General access to such records upon request. The recipient shall ensure that audit working papers are made available to the Department of Environmental Protection, or its designee, Chief Financial Officer, or Auditor General upon request for a period of **three (3)** years from the date the audit report is issued, unless extended in writing by the Department of Environmental Protection.

EXHIBIT – 1

FUNDS AWARDED TO THE RECIPIENT PURSUANT TO THIS AGREEMENT CONSIST OF THE FOLLOWING:

Note: If the resources awarded to the recipient represent more than one federal program, provide the same information shown below for each federal program and show total federal resources awarded

Federal Resources Awarded to the Recipient Pursuant to this Agreement Consist of the Following:					
Federal Program A	Federal Agency	CFDA Number	CFDA Title	Funding Amount	State Appropriation Category
Original Agreement	U.S. Department of Treasury	21.027	SLFRP0125	\$500,000.00	152-D22
Federal Program B	Federal Agency	CFDA Number	CFDA Title	Funding Amount	State Appropriation Category
				\$	

Note: Of the resources awarded to the recipient represent more than one federal program, list applicable compliance requirements for each federal program in the same manner as shown below:

Federal Program A	First Compliance requirement: i.e.: (what services of purposes resources must be used for)	
	Second Compliance requirement: i.e.: (eligibility requirement for recipients of the resources)	
	Etc.	
	Etc.	
Federal Program B	First Compliance requirement: i.e.: (what services of purposes resources must be used for)	
	Second Compliance requirement: i.e.: (eligibility requirement for recipients of the resources)	
	Etc.	
	Etc.	

Note: If the resources awarded to the recipient for matching represent more than one federal program, provide the same information shown below for each federal program and show total state resources awarded for matching.

State Resources Awarded to the Recipient Pursuant to this Agreement Consist of the Following <u>Matching</u> Resources for Federal Programs:					
Federal Program A	Federal Agency	CFDA	CFDA Title	Funding Amount	State Appropriation Category
Federal Program B	Federal Agency	CFDA	CFDA Title	Funding Amount	State Appropriation Category

Note: If the resources awarded to the recipient represent more than one state project, provide the same information shown below for each state project and show total state financial assistance awarded that is subject to section 215.97, F.S.

State Resources Awarded to the Recipient Pursuant to this Agreement Consist of the Following Resources Subject to Section 215.97, F.S.:						
State Program A	State Awarding Agency	State Fiscal Year ¹	CSFA Number	CSFA Title or Funding Source Description	Funding Amount	State Appropriation Category
State Program B	State Awarding Agency	State Fiscal Year ²	CSFA Number	CSFA Title or Funding Source Description	Funding Amount	State Appropriation Category

Total Award	\$500,000.00	

Note: List applicable compliance requirement in the same manner as illustrated above for federal resources. For matching resources provided by the Department for DEP for federal programs, the requirements might be similar to the requirements for the applicable federal programs. Also, to the extent that different requirements pertain to different amount for the non-federal resources, there may be more than one grouping (i.e. 1, 2, 3, etc.) listed under this category.

For each program identified above, the recipient shall comply with the program requirements described in the Catalog of Federal Domestic Assistance (CFDA) [<https://sam.gov/content/assistance-listings>] and/or the Florida Catalog of State Financial Assistance (CSFA) [<https://apps.fldfs.com/fsaa/searchCatalog.aspx>], and State Projects Compliance Supplement (Part Four: State Projects Compliance Supplement [https://apps.fldfs.com/fsaa/state_project_compliance.aspx]). The services/purposes for which the funds are to be used are included in the Agreement's Grant Work Plan. Any match required by the Recipient is clearly indicated in the Agreement.

¹ Subject to change by Change Order.

² Subject to change by Change Order.

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
PROGRAM-SPECIFIC REQUIREMENTS
RESILIENT FLORIDA PROGRAM**

ATTACHMENT 6

1. Sea Level Impact Projection Study Requirement. If the project is within the designated area, pursuant to Section 161.551, F.S. and Chapter 62S-7, *Florida Administrative Code*, the Grantee is responsible for performing a Sea Level Impact Projection (SLIP) study and submitting the resulting report to the Department. The SLIP study report must be received by the Department, approved by the Department, and be published on the Department's website for at least thirty (30) days before construction can commence. This rule went into effect July 1, 2021, and applies to certain state-funded construction projects located in the coastal building zone as defined in the rule.
2. Permits. The Grantee acknowledges that receipt of this grant does not imply nor guarantee that a federal, state, or local permit will be issued for a particular activity. The Grantee agrees to ensure that all necessary permits are obtained prior to implementation of any grant-funded activity that may fall under applicable federal, state, or local laws. Further, the Grantee shall abide by all terms and conditions of each applicable permit for any grant-funded activity. Upon request, the Grantee must provide a copy of all acquired and approved permits for the project.
3. Attachment 3, Grant Work Plan, Performance Measures. All deliverables and reports submitted to the Department should be submitted electronically and must be compliant with the Americans with Disabilities Act, also known as "508 Compliant," in all formats provided.
4. Copyright, Patent and Trademark. The Department reserves a royalty-free, nonexclusive, and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, for state government purposes:
 - a. The copyright in any work developed under this Agreement; and
 - b. Any rights or copyright to which the Grantee or subcontractor purchases ownership with grant support.
5. Grant funds may not be used to support ongoing efforts to comply with legal requirements, including permit conditions, mitigation, and settlement agreements.
6. Funding Source. With the exception of audiovisuals not intended for presentation to the general public that are produced either as research instruments or for documenting experimentation or findings (unless otherwise required under the special terms of this Agreement), Grantee agrees to include the Department's logo (which can be found on the Department's website at: <https://floridadep.gov> or by contacting the Grant Manager for a copy) on all publications, printed reports, maps, audiovisuals (including videos, slides, and websites), and similar materials, as well as the following language:

"This work was funded in part through a grant agreement from the Florida Department of Environmental Protection's Office of Resilience and Coastal Protection Resilient Florida Program. The views, statements, findings, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida or any of its subagencies."

The next printed line must identify the month and year of the publication.

7. Final Project Report. The Grantee must submit Exhibit F, Final Project Report Form, prior to requesting final payment. The Final Project Report may be submitted in lieu of the final quarterly status report, only in instances where the next quarterly report falls after the project's completion date.

8. Project Photos. The Grantee must submit Exhibit G, Photo Release Form, with the first submission of deliverables and reports (Exhibit A and F) that include photos.
9. Contractual Services. For all grant agreements that include Contractual Services as an expenditure category, the Grantee must submit Exhibit H, Contractual Services Certification, and all required supporting documentation for all contractors conducting work under the grant agreement, prior to requesting payment that includes contractual services.
10. Vulnerability Assessments. For all Planning grant agreements (Resilient Florida Grant Program and Regional Resilience Entities), the Grantee must submit Exhibit I, Vulnerability Assessment Compliance Checklist Certification, with the final grant deliverable(s).
11. Geographic Information System (GIS) files and associated metadata. All GIS files and associated metadata must adhere to the Resilient Florida Program's GIS Data Standards (found on the Resilient Florida Program website: <https://floridadep.gov/rcp/resilient-florida-program/documents/resilient-florida-program-gis-data-standards>), and raw data sources shall be defined within the associated metadata.
12. State and Local Fiscal Recovery Funds. For all grant agreements funded with the Coronavirus State and Local Fiscal Recovery Funds (SLFRF) under the American Rescue Plan Act, the Grantee must submit the SLFRF Reporting Requirements Form upon execution of the grant agreement.

ATTACHMENT 8

Contract Provisions for Coronavirus State and Local Fiscal Recovery Funds (SLFRF) Agreements

The Department, as a Non-Federal Entity as defined by 2 CFR §200.69, shall comply with the following provisions, where applicable. For purposes of this Grant Agreement between the Department and the Grantee, the term “Recipient” shall mean “Grantee.”

Further, the Department, as a pass-through entity, also requires the Grantee to pass on these requirements to all lower tier subrecipients/contractors, and to comply with the provisions of the award, the SLFRF implementing regulation, including applicable provisions of the OMB Uniform Guidance (2 CFR Part 200), and all associated terms and conditions. Therefore, Grantees must include these requirements in all related subcontracts and/or sub-awards. Grantees can include these requirements by incorporating this Attachment in the related subcontract and/or sub-awards, however for all such subcontracts and sub-awards, the Grantee shall assume the role of the Non-Federal Entity and the subrecipients shall assume the role of the Recipient.

2 CFR PART 200 APPENDIX 2 REQUIREMENTS

1. Administrative, Contractual, and Legal Remedies

The following provision is required if the Agreement is for more than \$150,000. In addition to any of the remedies described elsewhere in the Agreement, if the Recipient materially fails to comply with the terms and conditions of this Contract, including any Federal or State statutes, rules, or regulations, applicable to this Contract, the Non-Federal Entity may take one or more of the following actions.

- A. Temporarily withhold payments pending correction of the deficiency by the Recipient.
- B. Disallow (that is, deny both use of funds and any applicable matching credit for) all or part of the cost of the activity or action not in compliance.
- C. Wholly or partly suspend or terminate this Contract.
- D. Take other remedies that may be legally available.

The remedies identified above, do not preclude the Recipient from being subject to debarment and suspension under Presidential Executive Orders 12549 and 12689. The Non-Federal entity shall have the right to demand a refund, either in whole or part, of the funds provided to the Recipient for noncompliance with the terms of this Agreement.

2. Termination for Cause and Convenience

Termination for Cause and Convenience are addressed elsewhere in the Agreement.

3. Equal Opportunity Clause

The following provision applies if the agreement meets the definition of “federally assisted construction contract” as defined by 41 CFR Part 60-1.3:

During the performance of this Agreement, the Recipient agrees as follows:

- A. The Recipient will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Recipient will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:
 - i. Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Recipient agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- B. The Recipient will, in all solicitations or advertisements for employees placed by or on behalf of the Recipient, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
- C. The Recipient will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's

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essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the Recipient's legal duty to furnish information.

- D. The Recipient will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Agreement or understanding, a notice to be provided advising the said labor union or workers' representatives of the Recipient's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- E. The Recipient will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- F. The Recipient will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- G. In the event of the Recipient's noncompliance with the nondiscrimination clauses of this Agreement or with any of the said rules, regulations, or orders, this Agreement may be canceled, terminated, or suspended in whole or in part and the Recipient may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- H. The Recipient will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Recipient will take such action with respect to any subcontractor purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance.

4. Contract Work Hours and Safety Standards Act

Where applicable, if the Agreement is in excess of \$100,000 and involves the employment of mechanics or laborers, the Recipient must comply with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each Recipient must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

5. Rights to Inventions Made Under Agreement

If the Federal award meets the definition of "funding agreement" under 37 CFR §401.2 (a) and the Non-Federal Entity or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that "funding agreement," the Non-Federal Entity or subrecipient must comply with the requirements of 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.

6. Clean air Act (42 U.S.C. 7401-7671q.), the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), and EPA Regulations

If the Agreement is in excess of \$100,000, the Recipient shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control

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Act as amended (33 U.S.C. 1251-1387), and by the EPA (40 CFR Part 15). Violations must be reported to the Federal Awarding Agency and the Regional Office of the Environmental Protection Agency (EPA).

- i. The Grantee shall include these requirements for the Clean Air Act and the Federal Water Pollution Act in each subcontract exceeding \$100,000 financed in whole or in part with SLFRF funds.

7. Debarment and Suspension (Executive Orders 12549 and 12689)

The Recipient certifies that it is not listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 and 2 CF 1200 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), “Debarment and Suspension.”

8. Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)

The Recipient certifies that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. If applicable, the Recipient shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award, using form SF-LLL, available at:

https://apply07.grants.gov/apply/forms/sample/SFLLL_1_2_P-V1.2.pdf.

- i. Grantees who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-federal funds that takes place in connection with obtaining any federal award. Such disclosures are forwarded from tier to tier, up to the recipient.

9. Procurement of Recovered Materials

The Recipient must comply with Section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act as described in 2 CFR part 200.322.

10. Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment

The Recipients and subrecipients are prohibited from obligating or expending loan or grant funds to procure or obtain; extend or renew a contract to procure or obtain; or enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. See Section 889 of Public Law 115-232 (National Defense Authorization Act 2019). Also, see 2 CFR 200.216 and 200.471.

11. Domestic Preferences for Procurement

The Recipients and subrecipients must, to the greatest extent practical, give preference to the purchase, acquisition, or use of goods, products, or materials produced in the United States in accordance with 2 CFR 200.322.

ADMINISTRATIVE

1. General Federal Regulations

Recipients shall comply with the regulations listed in 2 CFR 200, 48 CFR 31, and 40 U.S.C. 1101 *et seq.*

2. Rights to Patents and Inventions Made Under a Contract or Agreement

Rights to inventions made under this assistance agreement are subject to federal patent and licensing regulations, which are codified at Title 37 CFR Part 401 and Title 35 U.S.C. 200 through 212.

3. Compliance with the Trafficking Victims Protection Act of 2000 (2 CFR Part 175)

Recipients, their employees, subrecipients under this award, and subrecipients' employees may not:

- A. Engage in severe forms of trafficking in persons during the period of time that the award is in effect;
- B. Procure a commercial sex act during the period of time that the award is in effect; or
- C. Use forced labor in the performance of the award or subawards under the award.

4. Whistleblower Protection

Recipients shall comply with U.S.C. §4712, Enhancement of Recipient and Subrecipient Employee Whistleblower Protection. This requirement applies to all awards issued after July 1, 2013 and effective December 14, 2016 has been permanently extended (Public Law (P.L.) 114-261).

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- A. This award, related subawards, and related contracts over the simplified acquisition threshold and all employees working on this award, related subawards, and related contracts over the simplified acquisition threshold are subject to the whistleblower rights and remedies in the pilot program on award recipient employee whistleblower protections established at 41 U.S.C. 4712 by section 828 of the National Defense Authorization Act for Fiscal Year 2013 (P.L. 112-239).
- B. Recipients, their subrecipients, and their contractors awarded contracts over the simplified acquisition threshold related to this award, shall inform their employees in writing, in the predominant language of the workforce, of the employee whistleblower rights and protections under 41 U.S.C. 4712.
- C. The Recipient shall insert this clause, including this paragraph C, in all subawards and in contracts over the simplified acquisition threshold related to this award; best efforts should be made to include this clause, including this paragraph C in any subawards and contracts awarded prior to the effective date of this provision.

5. Notification of Termination (2 CFR § 200.340)

In accordance with 2 CFR § 200.340, in the event that the Agreement is terminated prior to the end of the period of performance due to the Recipient's or subcontractor's material failure to comply with Federal statutes, regulations or the terms and conditions of this Agreement or the Federal award, the termination shall be reported to the Office of Management and Budget (OMB)-designated integrity and performance system, accessible through System for Award Management (SAM) currently the Federal Awardee Performance and Integrity Information System (FAPIIS). The Non-Federal Entity will notify the Recipient of the termination and the Federal requirement to report the termination in FAPIIS. See 2 CFR § 200.340 for the requirements of the notice and the Recipient's rights upon termination and following termination.

6. Additional Lobbying Requirements

- A. The Recipient certifies that no funds provided under this Agreement have been used or will be used to engage in the lobbying of the Federal Government or in litigation against the United States unless authorized under existing law.
- B. The Lobbying Disclosure Act of 1995, as amended (2 U.S.C. §1601 et seq.), prohibits any organization described in Section 501(c)(4) of the Internal Revenue Code, from receiving federal funds through an award, grant (and/or subgrant) or loan unless such organization warrants that it does not, and will not engage in lobbying activities prohibited by the Act as a special condition of such an award, grant (and/or subgrant), or loan. This restriction does not apply to loans made pursuant to approved revolving loan programs or to contracts awarded using proper procurement procedures.
- C. Pursuant to 2 CFR §200.450 and 2 CFR §200.454(e), the Recipient is hereby prohibited from using funds provided by this Agreement for membership dues to any entity or organization engaged in lobbying activities.

7. Increasing Seat Belt Use in the United States

Pursuant to Executive Order 13043, 62 FR 19217 (Apr. 18, 1997), Grantee is encouraged to adopt and enforce on-the-job seat belt policies and programs for its employees when operating company-owned, rented or personally owned vehicles.

8. Reducing Text Messaging While Driving

Pursuant to Executive Order 13513, 74 FR 51225 (Oct. 6, 2009), Grantee is encouraged to adopt and enforce policies that ban text messaging while driving and establish workplace safety policies to decrease accidents caused by distracted drivers.

9. Uniform Relocation Assistance and Real Property Acquisitions Act of 1970

Where applicable, 42 U.S.C. §§ 4601-4655 and implementing regulations apply to this Agreement.

COMPLIANCE WITH ASSURANCES

1. Assurances

Recipients shall comply with all applicable assurances made by the Department or the Recipient to the Federal Government during the Grant application process.

FEDERAL REPORTING REQUIREMENTS

1. FFATA

Grant Recipients awarded a new Federal grant greater than or equal to \$30,000 awarded on or after October 1, 2015, are subject to the FFATA the Federal Funding Accountability and Transparency Act ("FFATA") of 2006. The FFATA legislation requires that information on federal awards (federal financial assistance and expenditures) be made available to the public via a single, searchable website, which is www.USASpending.gov.

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The Grantee agrees to provide the information necessary, within one (1) month of execution, for the Department to comply with this requirement.

DEPARTMENT OF TREASURY-SPECIFIC

1. Civil Rights Compliance

Recipients of Federal financial assistance from the Treasury are required to meet legal requirements relating to nondiscrimination and nondiscriminatory use of Federal funds. Those requirements include ensuring that entities receiving Federal financial assistance from the Treasury do not deny benefits or services or otherwise discriminate on the basis of race, color, national origin, (including limited English proficiency), disability, age, or sex (including sexual orientation and gender identity), in accordance with the following: Title VI of Civil Rights Acts of 1973 (Section 504), Public Law 93-112, as amended by Public Law 93-516, 29 U.S.C. 794; Title IX of the Education Amendments of 1972 (Title IX), 20 U.S.C. 1681 et seq., and the Department's implementing regulations, 31 CFR 28; Age Discrimination Act of 1975, Public Law 94-135, 42 U.S.C. 6101 et seq., and the Department of Treasury implementing regulations at 31 CFR part 23.

The Department of Treasury will request information on recipients' compliance with Title VI of the Civil Rights Act of 1964, as applicable, on an annual basis. This information may include a narrative describing the recipient's compliance with Title VI, along with other questions and assurances.

SLFRF-SPECIFIC

1. Period of Performance

All funds from SLFRF must be obligated by December 31, 2024 and expended by December 31, 2026.

2. Equipment and Real Property Management

Any purchase of equipment or real property with SLFRF funds must be consistent with the Uniform Guidance at 2 CFR Part 200, Subpart D. Equipment and real property acquired under this program must be used for the originally authorized purpose. Consistent with 2 CFR 200.311 and 2 CFR 200.313, any equipment or real property acquired using SLFRF funds shall vest in the non-Federal entity. Any acquisition and maintenance of equipment or real property must also be in compliance with relevant laws and regulations.

SLFRF INFRASTRUCTURE PROJECTS

For all infrastructure projects, the Grantee shall provide the following project information on a quarterly basis to the Department:

- i. Projected/actual construction start date (month/year)
- ii. Projected/actual initiation of operation date (month/year)
- iii. Location details

SLFRF INFRASTRUCTURE PROJECTS OVER \$10 MILLION

For infrastructure projects over \$10 million, the following provisions apply:

1. Wage Certification

Grantees may provide a certification that all laborers and mechanics employed by Grantee in the performance of such project are paid wages at the rates not less than those prevailing, as determined by the U.S. Secretary of Labor in accordance with the Davis-Bacon Act, for the corresponding classes of laborers and mechanics employed projected of a character similar to the contract work in the civil subdivision of Florida in which the work is to be performed. If the Grantee does not provide such certification, the Grantee must provide a project employment and local impact report detailing:

- i. The number of employees of contractors and sub-contractors working on the project;
- ii. The number of employees on the project hired directly and hired through a third party;
- iii. The wages and benefits of workers on the project by classification; and
- iv. Whether those wages are at rates less than those prevailing.

Grantee must maintain sufficient records to substantiate this information upon request.

2. Project Labor Agreements

Grantees may provide a certification that the project includes a project labor agreement, meaning a pre-hire collective bargaining agreement consistent with the section 8(f) of the National Labor Relations Act (29 U.S.C. 158(f)). If the Grantee does not provide such certification, the Grantee must provide a project

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workforce continuity plan, detailing:

- i. How the Grantee will ensure the project has ready access to a sufficient supply of appropriately skilled and unskilled labor to ensure high-quality construction throughout the life of the project;
 - ii. How the Grantee will minimize risks of labor disputes and disruptions that would jeopardize timeliness and cost-effectiveness of the project;
 - iii. How the Grantee will provide a safe and healthy workplace that avoids delays and costs associated with workplace illnesses, injuries, and fatalities;
 - iv. Whether workers on the project will receive wages and benefits that will secure and appropriately skilled workforce in the context of the local or regional labor market; and
 - v. Whether the project has completed a labor agreement.
3. Other Reporting Requirements

Grantees must report whether the project prioritizes local hires and whether the project has Community Benefit Agreement, with a description of any such agreement, if applicable.

SLFRF WATER & SEWER PROJECTS

For water and sewer projects, Grantees shall provide the following information to the Department once the project starts, as applicable:

- i. National Pollutant Discharge Elimination System (NPDES) Permit Number, for projects aligned with the Clean Water State Revolving Fund
- ii. Public Water System (PWS) ID number, for projects aligned with the Drinking Water State Revolving Fund.

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
RESILIENT FLORIDA GRANT PROGRAM
EXHIBIT A
PROGRESS REPORT FORM**

The current **Exhibit A, Progress Report Form** for the Resilient Florida Program grant agreements can be found on the Department's website at the link below. Each payment request must be submitted on the current form. The Department will notify grantees of any substantial changes to Exhibit A that occur during the grant agreement period.

<https://floridadep.gov/Resilient-Florida-Program/Grants>

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
RESILIENT FLORIDA GRANT PROGRAM
EXHIBIT C
PAYMENT REQUEST SUMMARY FORM**

The current **Exhibit C, Payment Request Summary Form** for the Resilient Florida Program grant agreements can be found on the Department's website at the link below. Each payment request must be submitted on the current form. The Department will notify grantees of any substantial changes to Exhibit C that occur during the grant agreement period.

<https://floridadep.gov/Resilient-Florida-Program/Grants>

EXHIBIT F
DEP AGREEMENT NO. 22FRP40

TOWN OF GOLDEN BEACH PUMP STATION AT TWEEDLE PARK

Town of Golden Beach

Final Project Report



Insert Month & Year

This report is funded in part through a grant agreement from the Florida Department of Environmental Protection. The views, statements, findings, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida or any of its subagencies.

Part I. Executive Summary

Part II. Methodology

Part III. Outcome

Include the following: 1) evaluation of project's ability to meet goals and expected performance measures and provide explanation for why goals were not met, if applicable; 2) identify successful outcomes, areas for improvement, and quantifiable metrics (including the assigned metric in Exhibit A, if applicable) as a result of the project; and 3) final project photos, if an implementation construction project.

Part IV. Further Recommendations

Instructions for completing Exhibit F Final Project Report Form:

DEP AGREEMENT NO.: This is the number on your grant agreement.

GRANTEE NAME: Enter the name of the grantee's agency.

PROJECT TITLE: Enter the title shown on the first page of the grant agreement.

MONTH & YEAR: Enter month and year of publication

The final Project Report must contain the following sections: Executive Summary, Methodology, Outcome, and Further Recommendations. The Final Project Report must comply with the publication requirements in the grant agreement. Please limit the final project report to no more than five (5) pages. One electronic copy shall be submitted to the Department's Grant Manager for approval. Final payment will be held until receipt and approval of the Final Project Report.

Questions regarding completion of the Final Project Report should be directed to the Department's Grant Manager, identified in paragraph 18 of this agreement.



Florida Department of Environmental Protection

EXHIBIT G

PHOTOGRAPHER RELEASE FORM
FOR PHOTOGRAPHS, VIDEOS, AUDIO RECORDINGS AND ARTWORKS

DEP AGREEMENT NO: 22FRP40

RELEASE FORM FOR PHOTOGRAPHS, VIDEOS, AUDIO RECORDINGS AND ARTWORKS

Owner/Submitter's Name: TOWN OF GOLDEN BEACH

Address: 1 GOLDEN BEACH DRIVE

City: GOLDEN BEACH State: FL Zip: 33160

Phone Number: 305 932-0744 Email: LEONIRA@GOLDENBEACH.FL

License and Indemnification

I certify that I am the owner of the photograph(s), video(s), audio recording(s) and/or artwork(s) being submitted and am eighteen (18) years of age or older.

I hereby grant to the Florida Department of Environmental Protection the royalty-free and non-exclusive right to distribute, publish and use the photograph(s), video(s), audio recording(s) and art work(s) submitted herewith (the "Work") to promote the Florida Department of Environmental Protection. Uses may include, but are not limited to:

1. Promotion of FDEP (including, but limited to publications, websites, social media venues, advertisements, etc.); and
2. Distribution to the media; and
3. Use in commercial products.

The Florida Department of Environmental Protection reserves the right to use/not use any Work as deemed appropriate by the Florida Department of Environmental Protection. No Work will be returned once submitted.

I hereby acknowledge that the Florida Department of Environmental Protection shall bear no responsibility whatsoever for protecting the Work against third-party infringement of my copyright interest or other intellectual property rights or other rights I may hold in such Work, and in no way shall be responsible for any losses I may suffer as a result of any such infringement; and I hereby represent and warrant that the Work does not infringe the rights of any other individual or entity.

I hereby unconditionally release, hold harmless and indemnify the Florida Department of Environmental Protection, its employees, volunteers, and representatives of and from all claims, liabilities and losses arising out of or in connection with the Florida Department of Environmental Protection's use of the Work. This release and indemnification shall be binding upon me, and my heirs, executors, administrators and assigns.

I have read and understand the terms of this release.

Owner signature:

Date:

10/25/2023

Photo/video/audio/artwork/recording
file name(s):

Location of photo/video/audio
recording/artwork:

Name of person accepting Work submission

Exhibit G, DEP Agreement #: 22FRP40

Page 1 of 1

11/19/2021

**STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
RESILIENT FLORIDA GRANT PROGRAM
CONTRACTUAL SERVICES CERTIFICATION**

Exhibit H

Required for all grant agreements that include Contractual Services as an expenditure category.

DEP Agreement Number: 22FRP40

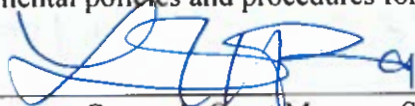
Project Title: Town of Golden Beach Pump Station at Tweedle Park

Grantee: Town of Golden Beach

Prior to making a request for payment of contractual services, the Grantee must provide the following to the Department Grant Manager then responsible for the Grantee's Resilient Florida Grant Program grant agreement:

1. Documentation of the Grantee's procurement process, as consistent with Attachment 1, Paragraph 9(c) and Attachment 2, Paragraph 11;
2. A list of all subcontractor quote and/or bid amounts (as applicable), including the company name and address for each subcontractor;
3. An explanation of how and why the Grantee made their determination(s) for the subcontractor(s) selected to perform certain task(s) under the Grantee's relevant grant agreement; and
4. This Exhibit H, signed and dated by the Grantee's own (non-Departmental) grant manager.

By signing below, I certify that, on behalf of the Grantee, I have provided all the information required by items 1. through 3. of this exhibit, as stated above, to the Department Grant Manager currently responsible for the Grantee's Resilient Florida Grant Program grant agreement. I also certify that the procurement process the Grantee utilized follows all of said Grantee's non-Departmental policies and procedures for subcontractors.



Grantee's Grant Manager Signature

LISSETT ROVIRA

Print Name

10/26/23

Date

**COMMON CARRIER OR CONTRACTED CARRIER ATTESTATION
FORM
(PUR 1808)**

Exhibit J

This form must be completed by a Common Carrier or contracted carrier and submitted to the Governmental Entity with which a Contract being is executed, amended, or renewed. Capitalized terms used herein have the definitions ascribed in section 908.111, F.S.

_____ is not willfully providing and will not willfully provide any service during the Contract term in furtherance of transporting a person into this state knowing that the person is an Unauthorized Alien, except to facilitate the detention, removal, or departure of the person from this state or the United States.

Under penalties of perjury, I declare that I have read the foregoing statement and that the facts stated in it are true.

Printed Name:

Title:

Signature:

Date:

SECTION 00890

PERMITS

PART 1 GENERAL

1.01 SUMMARY

- A. The Owner has been issued the following permits for Town of Golden Beach Tweddle Park Pump Station Retrofit Project - CAS Project No. 08-23-037
 - 1. Miami-Dade County RER Class II Permit No. (Pending)
- B. Copies of issued permits will be attached to this section as they become available as part of the contract and the Contractor must comply with applicable conditions of this permit. Contractor is responsible for any enforcement action and fines levied against the Town due to contractor's non-compliance.
- C. Prior to beginning work contact the Sunshine/One-Call utility mark out agency. Obtain from Sunshine a number and immediately report same to the Engineer, including the above referenced Permit Numbers.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 00931
CHANGE ORDER

DATE OF ISSUANCE: -

No. #

PROJECT: **TOWN OF GOLDEN BEACH
TWEDDLE PARK PUMP STATION RETROFIT PROJECT
CAS PROJECT No. 08-23-037**

OWNER:

CONTRACTOR:

ENGINEER: CRAIG A. SMITH & ASSOCIATES

CONTRACT FOR:

YOU ARE DIRECTED TO MAKE THE FOLLOWING CHANGES IN THE CONTRACT DOCUMENTS.

DESCRIPTION:

ATTACHMENTS:

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIME:
Original Contract Price	Original Contract Time
\$	Days
Previous Change Orders	Net change from previous Change Orders
Contract Price prior to this Change Order	Contract Time prior to this Change Order
\$	Days

Net increase/decrease of this Change Order	Net Increase/decrease of this Change Order
\$	Days
Contract Price with all approved Change Orders	Contract Time with all approved Change Orders
\$	Days

RECOMMENDED :

By _____
CRAIG A. SMITH & ASSOCIATES

ACCEPTED :

By _____
CONTRACTOR

APPROVED :

By _____
OWNER

END OF SECTION

SECTION 01110

SUMMARY OF THE WORK

PART 1 GENERAL

1.01 SUMMARY

- A. Detailed requirements and work extent are stated in applicable specification sections of these and as shown in the Drawings as prepared by Craig A. Smith and Associates of Florida, Inc., **TOWN OF GOLDEN BEACH – TWEDDKE PARK PUMP STATION RETROFIT PROJECT.**
- B. Provide and pay for labor, materials, equipment, tools, construction equipment, applicable taxes, other facilities, and services necessary for the execution, testing, and completion of the Work under this Contract.
- C. Perform work not mentioned in the Specifications but shown in the Drawings or Work not shown in the Drawings but included in the Specifications, or items not specifically called out in the Contract Documents, which are necessary or normally required to make each installation satisfactory and legally operable, as incidental work without extra cost to the OWNER and include this expense in the applicable bid items listed for the work.

1.02 CONTRACT DOCUMENTS

- A. Contract Documents include the Bidding Requirements, Contract Forms, Conditions of Contract, General Conditions, Supplemental General Conditions, Specifications, Drawings, Addenda, and requirements and provisions incorporated therein by specific reference thereto.
- B. Contract Documents are intended to be self explanatory and complimentary and to describe and provide for the complete work.
- C. Bidders are required to familiarize themselves with the provisions of the Contract Documents and make available to prospective suppliers and subcontractors appropriate information from the Contract Documents.

1.03 SPECIFICATIONS

- A. Specifications included in these Contract Documents establish the performance and quality requirements for materials and equipment and the minimum standards for the quality of workmanship and appearance.
- B. No attempt has been made to separate the Specification Sections into groups of work of separate subcontractors or for work to be performed by the various trades.

- C. Questions regarding the interpretation of a Specification should be directed to the ENGINEER prior to the submittal of a proposal for, or execution of, the work under this Contract.

1.04 DESCRIPTION OF WORK

- A. **Work to be performed under this Contract consists of furnishing materials, equipment, and labor necessary for the proposed retrofit of an existing stormwater pumping station and drainage improvements as shown in the Engineering Drawings and described in the Specifications.**
- B. The project shall consist of but is not limited to:
 - 1. **Coordination with pump manufacturer for the Installation of two new pumps, electrical work, connect all proposed forcemain pipe and fittings, pump station modifications, and drainage improvements with full restoration work at the pump station site.**
 - 2. Means and methods (construction, dewatering, dams, etc.) and managing the SWPPP is left up to the contractor.
 - 3. Provide for the ENGINEER's approval complete and accurate survey of constructed system
- C. Work under this Contract shall be constructed in accordance with the lines and grades shown on the Contract Drawings or as directed by the ENGINEER.
- C. Elevations of existing ground, structures, and appurtenances, size, and location of existing piping are believed to be reasonably correct but are not guaranteed to be absolute and therefore are presented only as an approximation.
- D. Errors or discrepancies in the data shown or omissions of data required for accurately accomplishing the stakeout survey shall be referred immediately to the ENGINEER for interpretation or correction.
- E. Survey work for construction control processes shall be made by the CONTRACTOR at his expense.

1.05 WORK BY OTHERS

- A. Conduct operations to cause a minimum of interference with the work of other CONTRACTORS.

PART 2 PRODUCTS

Town of Golden Beach
Tweddle Park Pump Station Retrofit
Project
CAS Project No. 08-23-037

01110 – 2

Summary of Work

2.01 AMERICAN IRON & STEEL

- A. For Projects funded under the State Revolving Fund (SRF), all domestic equipment and materials used in the construction of the project shall be in accordance with and comply with American Iron & Steel requirements.

PART 3 EXECUTION

3.01 TIME FOR COMPLETION

- A. Work shall be commenced at the time stipulated in the written Notice to Proceed and shall be completed within the time stipulated in the Notice to Proceed.

3.02 LIQUIDATED DAMAGES

- A. Liquidated damages for the work specified herein shall be as described in **Page 00500-2**.
- B. Work must be completed within the time specified in the Contract Documents.
 - 1. It is understood and agreed that deductions at the rates stipulated shall be made from the total contract price for each and every calendar day after and exclusive of the day within which completion was required, and up to and including the date of completion and acceptance by the OWNER.
 - 2. Completion of the work, as mentioned above, shall include startup and testing of portions of the project, unless explicitly excluded.
- C. The amount as set forth as liquidated damages is understood and agreed not to be a penalty; the said sum being specifically agreed upon in advance as the measure of damage to the OWNER resulting from the delay in completion of the work.
 - 1. The expiration of the time stipulated without the work having been completed shall in itself constitute a default without the necessity of any notice being given by the OWNER to the CONTRACTOR.
 - 2. The CONTRACTOR agrees and consents that the Contract price reduced by the aggregate of the entire damages so deducted shall be accepted by the CONTRACTOR in full satisfaction for work done under the Contract.

END OF SECTION

SECTION 01140

WORK RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Work under this contract shall not reduce utility services provided to the residents of the **Town of Golden Beach** nor dramatically impact the vehicular traffic in the area of this project.
- B. Submit to the OWNER and ENGINEER a construction schedule explaining shut down procedures in detail.
 - 1. Submit written notification 48 hours in advance of requested shut down.

1.02 CONNECTION TO EXISTING SYSTEMS

- A. Connections to existing systems shall be performed with no damage and no interruption to the existing installation.
 - 1. Damage caused to existing installations shall be repaired or replaced by the CONTRACTOR at no additional cost to the OWNER.
- B. CONTRACTOR must contain and properly dispose of wastewater and sludge drained from existing pipelines and structures during construction.

1.03 COORDINATION WITH UTILITY PERSONNEL

- A. Before commencing work involving removing or placing in operation existing or new facilities, notify the OWNER at least twenty (20) days in advance in writing.
 - 1. The OWNER shall be responsible for removing facilities from operation.

1.04 PROTECTION OF PROPERTY

- A. Protect property that may be affected by construction work or operations.
 - 1. The location and extent of underground and covered facilities are not guaranteed.
 - 2. Proceed with care in order to prevent the undermining or damage to existing structures, piping, or facilities.
- B. Protect new and existing mechanical equipment from dust and debris.

1. Protective measures shall be furnished, installed, lighted, maintained, and removed at the CONTRACTOR's own cost.
- C. When potable water is being used, the supply source shall be protected against contamination in accordance with existing codes and regulations.
- D. Repair property damaged during construction.

1.05 WEATHER CONDITIONS

- A. Work that may be affected by inclement weather shall be suspended until proper conditions prevail.
 1. In the event of impending storms, take necessary precautions to protect work, materials and equipment from exposure.
 2. The OWNER reserves the right, through the opinion of the ENGINEER, to order that additional protection measures over and beyond those proposed by the CONTRACTOR, be taken to safeguard components of the project.
 3. Do not claim compensation for precautionary measures so ordered, nor claim compensation from the OWNER for damage to the work from the elements of weather.
- B. Provide, within 15 days of contract signing, a hurricane preparedness plan to be enacted in the event of hurricane conditions during construction.**

1.06 FIRE PROTECTION

- A. Prevent fires at or adjacent to the Work.
- B. Provide adequate fire extinguishers and hose line stations.

1.07 SAFETY AND HEALTH REQUIREMENTS

- A. Comply with Federal, State, and Local safety and health regulations.
- B. Provide barricades and flashing lights or other devices to warn pedestrians and area traffic.
- C. Immunize personnel working in contact with sewage and sewage sludge.

1.08 WORK HOURS & RESTRICTIONS

- A. Normal work hours for this project are from 8:00 AM to 5:00 PM Monday through Friday. Any work done outside these hours will require permission from the OWNER. No work will be allowed on federally recognized holidays. Noises from construction activity, tools or equipment used and operated on a construction site between the hours mentioned, provided that all tools or motorized equipment used in such activity are equipped with all sound reducing features and equipment originally part of the tool or equipment, or other effective sound control devices similar to those provided or as effective as that installed as original equipment.

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01290

PAYMENT PROCEDURE

PART 1 GENERAL

1.01 SUMMARY

- A. Payments to the CONTRACTOR shall be made on the basis of the Proposal Bid Forms as full and complete payment for furnishing materials, labor, tools and equipment, and for performing operations necessary to complete the Work included in the Contract Documents.
 - 1. This compensation shall also include payments for loss or damages arising directly or indirectly from the work, or from discrepancies between the actual quantities of work and those shown in the Contract Documents, or from unforeseen difficulties, which may be encountered during the execution of the work until final acceptance by the OWNER.
- B. The prices stated in the Proposal include costs and expenses for taxes, labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, other costs and expenses for performing and completing the work as shown on the details and specified herein.
 - 1. The Basis of Payment for an item at the price shown in the Proposal Bid Form shall be in accordance with its description of the item in this Section and as related to the work specified.
 - 2. Unit prices will be applied to the actual quantities furnished and installed in conformance with the Contract Documents.
- C. Quotations for the various items of work are intended to establish a total price for completing the work in its entirety.
 - 1. Should the CONTRACTOR feel that the cost for an item of work has not been established in the Proposal Bid Form or this Section, the cost for that Work shall be included in some other applicable Bid Item, so that the Proposal for the project reflects the total price for completing the work in its entirety.

1.02 MEASUREMENT

- A. The quantities for payment under the Contract shall be full compensation determined by actual measurement of the completed items in place, ready for service and accepted by the OWNER, unless otherwise specified.

1. The OWNER will witness field measurements.
- B. When depth of cuts are indicated in the bid items, they shall be measured vertically from the existing grade, paved or unpaved, to the pipe invert.
- C. Linear measurements (such as pipe Items) and area measurements (such as surface restoration Items) shall be made in the horizontal plane, only.

1.03 LUMP SUM WORK

- A. Items for which quantities are indicated "Lump Sum", "L.S.", or "Job", shall be paid for at the price indicated in the Bid.
 1. This payment shall be full compensation for the items of work and work appurtenant thereto.
- B. When requested by the ENGINEER, submit to the ENGINEER, within 15 days after award of CONTRACTOR, a detailed schedule in triplicate, to be used only as a basis for determining progress payments on a lump sum contract or designated lump sum bid item.
 1. This schedule shall equal the lump sum bid and shall be in the form and sufficiently detailed as to satisfy the ENGINEER that it correctly represents a reasonable apportionment of the lump sum.

1.04 PAYMENT

- A. The quantities listed in the Bid schedule will not govern final payment.
 1. Payment to the CONTRACTOR will be made only for actual quantities of Contract items constructed in accordance with the Drawings and Specifications.
 2. Upon completion of construction, if the actual quantities show either an increase or decrease from the quantities given in the Bid schedule, an adjustment in payment will be made.
 3. This adjustment will be based upon the increase or decrease in quantity and the Contract Unit Price.
- B. Payment will not be made for excess material placed, materials wasted or disposed of in a manner not called for under the Contract.
 1. This includes rejected material not unloaded from vehicles, material rejected after it has been placed, and material placed outside of the plan or payment limit lines.

2. No compensation will be allowed for disposing of rejected or excess material.

PART 2 PRODUCTS

A. The OWNER will not provide space or place to store materials for this Project.

1. No payment will be made for stored materials.

B. It is intended that work required to complete this Contract will be included in the various bid items as described in the following paragraphs:

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01291

SCHEDULE OF VALUES

PART 1 GENERAL

1.01 SUMMARY

- A. Submit to the ENGINEER a Schedule of Values allocated to the various portions of the Work, within fifteen (15) workdays after Notice of Award.
- B. Upon request of the ENGINEER, support the values with data that will substantiate their correctness.
- C. The Schedule of Values shall be used as the basis for the CONTRACTOR's Applications for Payment.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract - Division 0.
- B. Applications and Certification for Payment - Division 1.

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Type schedule on an 8-1/2 inches by 11 inches or 8-1/2 inches by 14 inches white paper; CONTRACTOR's standard forms and automated printout will be considered for approval by the ENGINEER upon CONTRACTOR's request.
- B. Identify schedule with:
 - 1. Title of Project and location
 - 2. ENGINEER and Project number
 - 3. Name and Address of CONTRACTOR
 - 4. Contract designation
 - 5. Date of submission
- C. Schedule shall list the installed value of the component parts to include excavation, piping, paving, of the Work (as required) in sufficient detail to serve as a basis for computing values for progress payments during construction.

D. For the various portions of the Work:

1. Each item shall include a directly proportional amount of the CONTRACTOR's overhead and profit.

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

F. Schedules are subject to ENGINEER's approval wherein additional line item detail may be required.

G. Submit current revision of the Schedule of Values with Application for Payment.

PART 2 PRODUCTS (Not Used)

PART 3 PRODUCTS (Not Used)

END OF SECTION

SECTION 01293

APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1.01 SUMMARY

- A. Submit Applications for Payment to the ENGINEER in accordance with the schedule established by Conditions of the Contract and Agreement Between OWNER and CONTRACTOR.

1.02 RELATED REQUIREMENTS

- A. Agreement between OWNER and CONTRACTOR consisting of an approved payment schedule by the OWNER.
- B. Conditions of the Contract: Progress Payments, Retainages, Final Payment, schedule of values, and Record Documents.

1.03 FORMAT AND DATA REQUIRED

- A. Submit applications typed on forms provided by the OWNER, Application for Payment, with itemized data typed on 8½ inches by 14 inches white paper and continuation sheets.
- B. Payment forms shall show significant detail to substantiate request.
 - 1. Additional details may be required by the ENGINEER.

1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

- A. Application Form:
 - 1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
 - 2. Fill in summary of dollar value to agree with respective totals indicated on continuation sheets.
 - 3. Execute certification with signature of a responsible officer of CONTRACTOR's firm.
- B. Continuation Sheets:
 - 1. Fill in total list of scheduled component items of work, with item number and scheduled dollar value for each item.

2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.
 - a. Round off values to nearest dollar, or as specified.
3. List each Change Order Number, and description, as for an original component item or work.
 - a. List by Change Order Number, and description, as for an original component item or work.
4. Payment for Material and Equipment stored, but not yet incorporated into the Work, will not be allowed.

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the OWNER or the ENGINEER requires substantiating data, CONTRACTOR shall submit suitable information, with a cover letter identifying:
 1. Project
 2. Application number and date
 3. Detailed list of enclosures
- B. Submit one copy of data cover letter for each copy of application.
- C. As a prerequisite for payment, submit a "Surety Acknowledgment of Payment Request" letter showing amount of progress payment that the CONTRACTOR is requesting.
- D. Maintain an updated set of Project Drawings to be used as certified "As-Built" drawings in accordance with Division 1.
 1. As a prerequisite for monthly progress payments, submit the updated as-built drawings for review by the ENGINEER per Division 1.
- E. As a prerequisite for payment, submit monthly construction photographs in accordance with Division 1.
- F. As a prerequisite for payment, submit monthly Construction Schedule in accordance with Division 1.
- G. As a prerequisite for payment, submit monthly current Revision of the Schedule of Values in accordance with Division 1.

1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT

- A. Fill in Application form as specified for progress payments.
- B. Use continuation sheet for presenting the final statement of accounting as specified in Division 1 - Contract Closeout.
- C. Submit final record drawings.

1.07 SUBMITTAL PROCEDURE

- A. Submit Applications for Payment to the ENGINEER at the times stipulated in the Agreement.
- B. Number: Four (4) copies of each Application.
- C. When the ENGINEER finds Application properly completed and correct, he will transmit certificate of payment to OWNER, with copy to CONTRACTOR.

PART 2 PRODUCTS (Not Used).

PART 3 EXECUTION (Not Used).

END OF SECTION

SECTION 01312

PROJECT MEETINGS

PART 1 GENERAL

1.01 SUMMARY

- A. The ENGINEER shall schedule and administer pre-construction meetings, periodic progress meetings, and specially called meetings throughout the progress of work.
- B. For these meetings the ENGINEER shall:
 - 1. Prepare agenda for meetings.
 - 2. Make physical arrangements for meetings.
 - 3. Preside at meetings.
 - 4. Record the minutes; include significant proceedings and decisions.
 - 5. Reproduce and distribute copies of minutes within five (5) working days after each meeting.
 - a. To participants in the meeting.
 - b. To parties affected by decisions made at the meeting.
- C. Representatives of CONTRACTOR, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- D. The CONTRACTOR shall attend meetings to ascertain that work is executed consistent with Contract Documents and construction schedules.

1.02 RELATED SECTIONS

- A. Instructions to Bidders - Division 0.
- B. Scheduling of Construction - Division 1.
- C. Shop Drawings, Working Drawings, and Samples - Division 1.
- D. Project Record Documents - Division 1.

1.03 PRECONSTRUCTION MEETING

- A. Schedule a pre-construction meeting no later than fifteen (15) days after date of Notice of Award.
- B. Location: A central site, convenient for parties designated by the OWNER.
- C. Attendance:
 - 1. OWNER's Representative.
 - 2. ENGINEER and his Professional Consultants.
 - 3. Resident Project Representative.
 - 4. CONTRACTOR's Superintendent.
 - 5. Major Subcontractors.
 - 6. Major Suppliers.
 - 7. Utilities.
 - 8. Others as appropriate.
- D. Suggested Agenda:
 - 1. Distribution and discussion of:
 - a. List of major subcontractors and suppliers.
 - b. Projected Construction Schedule.
 - 2. Critical work sequencing/critical path scheduling.
 - 3. Major equipment deliveries and priorities.
 - 4. Project Coordination.
 - a. Designation of responsible personnel.
 - 5. Procedures and processing of:
 - a. Field decisions.
 - b. Proposal requests.

- c. Submittals.
- d. Change Orders.
- e. Applications for Payments.
- 6. Adequacy of Distribution of Contract Documents.
- 7. Procedures for maintaining Record Documents.
- 8. Use of Premises:
 - a. Office, Work, and Storage Areas.
 - b. OWNER's Requirements.
- 9. Construction facilities, controls, and construction aids.
- 10. Temporary Utilities.
- 11. Maintenance of Traffic (MOT)

1.04 PROGRESS MEETINGS

- A. Schedule regular periodic meetings.
- B. The progress meetings will be held as required by progress of the work.
- C. Hold called meetings as required by progress of the work.
- D. Location of the meetings: Project field office of the CONTRACTOR or ENGINEER.
- E. Attendance:
 - 1. ENGINEER, and his professional consultants as needed.
 - 2. CONTRACTOR's Superintendent.
 - 3. Subcontractors as appropriate to the agenda.
 - 4. Suppliers as appropriate to the agenda.
 - 5. Others as appropriate.
 - 6. OWNER's Representative

F. Suggested Agenda:

1. Review, approval of minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, conflicts.
4. Problems which impede Construction Schedule.
5. Review of off site fabrication, delivery schedule.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Progress, schedule, during succeeding work period.
9. Coordination of schedules.
10. Review submittal schedules; expedite as required.
11. Maintenance of quality standards.
12. Pending changes and substitutions.
13. Review proposed changes for:
 - a. Effect on Construction Schedule and on a completion date.
 - b. Effect on other contracts of the Project.
14. Other business.
15. Construction schedule.
16. Critical/long lead items.

G. The CONTRACTOR is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics such as deliveries of materials and equipment and progress of work.

H. The CONTRACTOR is to provide a current submittal log at each progress meeting in accordance with Division 1.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01321

CONSTRUCTION PHOTOGRAPHS AND VIDEO RECORDING

PART 1 GENERAL

1.01 SUMMARY

- A. Employ a competent photographer to take construction record photographs for preconstruction conditions, periodically during course of Work, and post-construction.
- B. Employ a competent video recording professional to take pre-construction, existing conditions video record.
- C. Employ a competent video recording professional to perform gravity sanitary pipe inspection video recording.
- D. Employ a competent independent contractor to prepare a thorough pre-construction survey of all surface areas and features, structures, etc.

1.02 RELATED SECTIONS

- A. Application for Payment - Division 1.
- B. Project Record Documents - Division 1.

1.03 PHOTOGRAPHY REQUIRED

- A. Provide photographs taken on cutoff date for each scheduled Application for Payment.
- B. View and Quantities Required:
 - 1. Take a minimum of twelve (12) exposures of the site and adjacent property at pre-construction, monthly, and post-construction.
 - 2. Aerial photography shall be acceptable.

1.04 COSTS OF PHOTOGRAPHER

- A. The CONTRACTOR to pay all costs for specified photography and prints.
 - 1. Parties requiring additional photography or prints will pay photographer directly.

1.05 VIDEO REQUIRED

- A. Prior to work commencement, provide continuous color audio-video tape recording taken along the entire length of the individual project work sites to serve as a record of pre-construction conditions.
1. The purpose of creating this record is to be able to fairly establish the prework condition that the CONTRACTOR must protect or restore after the facilities are installed.
 2. It is in the CONTRACTOR's interest that this record be as inclusive as possible, to protect the CONTRACTOR and the OWNER from spurious claims of private and public property damaged by the CONTRACTOR's operations.
 3. No construction shall begin prior to review and approval of the tapes covering the construction area by the ENGINEER.
 4. The ENGINEER shall have the authority to reject video tape not conforming to the specifications and order that it be redone at no additional charge.
 5. Reschedule unacceptable coverage within five (5) days after being notified.
 6. The ENGINEER shall designate those areas, if any, to be omitted from or added to the audio-video coverage.
 7. Tape recordings shall not be made more than thirty (30) days prior to construction in any area.
 8. Tapes and written records shall become the property of the OWNER.

1.06 PRE-CONSTRUCTION SURVEY REQUIRED

- A. Prior to work commencement, provide a detailed pre-construction survey that includes a thorough inspection. The survey must include existing structural documentation (i.e. color audio-video tape recording, photographs and measurements) taken within the interior and exterior of all structures located along the entire length of the individual project work sites to serve as a record of pre-construction conditions.
1. The purpose of creating this record is to be able to fairly establish the pre-work condition that the CONTRACTOR must protect or restore after the facilities are installed.

2. It is in the CONTRACTOR's interest that the pre-construction survey be as inclusive as possible, to protect the CONTRACTOR and the OWNER from spurious claims of private and public property damaged by the CONTRACTOR's operations.
3. It is the responsibility of the CONTRACTOR to take all precautions to protect existing conditions from the dynamic affect of construction vibrations. In cases where pile driving activities are within close proximity of existing structures, the use of vibration measurements may become necessary.
4. No construction shall begin prior to review of the pre-construction survey covering the construction area by the ENGINEER.
5. The ENGINEER shall have the authority to reject any documentation not conforming to the specifications and order that it be redone at no additional charge.
6. Reschedule unacceptable coverage within five (5) days after being notified.
7. The ENGINEER shall designate those areas, if any, to be omitted from or added to the pre-construction survey coverage.
8. All pre-construction survey documentation shall not be made more than thirty (30) days prior to construction in any area.
9. Tapes and written records shall become the property of the OWNER.

PART 2 PRODUCTS

2.01 PHOTOGRAPHIC PRINTS

A. Identify each 8.5" x 11" color print on back, listing:

1. Name of Project
2. Orientation of View
3. Date and time of exposure
4. Name and address of photographer
5. Photographer's numbered identification of exposure.

2.02 VIDEO EQUIPMENT

A. Furnish equipment, accessories, materials and labor to perform this service.

- B. Provide bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls or any other form of imperfection.
 - 1. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume, clarity and be free from distortion and interruptions.
- C. The color video camera used in the recording system shall be in DVD format with the ability to view the videoed site conditions directly by use of a conventional DVD player or computer.

2.03 VIDEO MEASUREMENT AND PAYMENT

- A. Payment for the work in this section shall be included as part of the appropriate lump sum bid prices stated in the Proposal Bid Form.

2.04 VIDEO (DVD)

- A. High quality DVD shall be used for all site condition taping.
 - 1. DVD shall become the property of the OWNER.

PART 3 EXECUTION

3.01 TECHNIQUE

- A. Factual presentation
- B. Correct exposure and focus
 - 1. High resolution and sharpness
 - 2. Maximum depth-of-field
 - 3. Minimum distortion

3.02 PHOTOGRAPHIC VIEWS REQUIRED

- A. Photograph from locations to adequately illustrate condition of construction and state of progress.
 - 1. At successive periods of photography, take at least one photograph from the same overall view as previously.

2. Consult with the ENGINEER at each period of photography for instructions concerning views required.

3.03 DELIVERY OF PRINTS

- A. Deliver two (2) sets of prints to the OWNER to accompany each Application for payment with digital files.

3.04 RECORDED INFORMATION - AUDIO

- A. The audio track shall consist of an original live recording of the narrative commentary of the person video taping the work sites.
 1. The tape shall begin with the current date, project name, and municipality and each section of the tape will have the general location, i.e. Construction Work Section, name of street, house address, viewing side, and direction of progress for each individual work site.

3.05 RECORDED INFORMATION - VIDEO

- A. The video track shall consist of taping the pre-construction surface conditions of each individual work site for the Piping System Improvements.
 1. The video taping shall show the full extents of the surface conditions from close-up and in the distance, both directly along the route of the work and the conditions to the sides of the work zones (i.e.; curbs, sidewalks, ditches and culverts, utility features, fences, bushes, trees and other landscaped features in and near yards, structures which could be impacted by the work).
 2. The person video taping the site conditions shall use good photographic procedures and practices, such as steady handling of the video recorder, taping with their back to the position of the sun, refraining from taping in poor lighting, rain or other adverse weather conditions or moving the video camera too quickly.

3.06 SUBMITTAL OF DVD

- A. Audio-visual tape recordings of the pre-construction surface conditions of each individual work site shall be submitted to the OWNER and ENGINEER.
 1. Acceptance of a video tape record by the ENGINEER will not relieve the CONTRACTOR of any liability he may incur by his failure to document a pre-work fault or defect that he may later be accused of causing.

END OF SECTION

SECTION 01327

SCHEDULING OF CONSTRUCTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit to the ENGINEER for approval, within fifteen (15) days after Notice of Award the estimated construction progress schedules for the work, with subschedules of related activities which are essential to its progress.**
- B. Submit revised progress schedules on a monthly basis.**
- C. No partial payments shall be approved by the ENGINEER until there is an approved construction progress schedule on hand.
- D. An authorized representative of the CONTRACTOR's firm shall be designate and responsible for development and maintenance of the schedule and of progress and payment reports.
 - 1. This representative of the CONTRACTOR shall have direct project control and complete authority to act on behalf of the CONTRACTOR's schedule.

1.02 RELATED REQUIREMENTS

- A. Existing Conditions - Division 0
- B. Summary of the Work - Division 1
- C. Project Meetings - Division 1
- D. Shop Drawings, Product Data, and Samples - Division 1
- E. Work Restrictions - Division 1

1.03 FORM OF SCHEDULES

- A. Prepare schedules in the form of a horizontal bar chart.
 - 1. Provide separate horizontal bar for each trade or operation within each structure or item.
 - 2. Horizontal time scale: In weeks from start of construction and identify the first workday of each month.

3. Scale and spacing: To allow space for notations and future revisions.
 4. Minimum sheet size: 11 inches x 17 inches.
- B. Format of listings: The chronological order of the start of each item of work.
- C. Identification of listings: By major specification section numbers as applicable and structure.
- D. Illustrate the expected progress payment for each month.

1.04 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity.
2. Show the dates for the beginning of, and completion of, each major element of construction in no more than a two week increment scale.
3. At a minimum, Specifically list:
 - a. Site Clearing
 - b. Demucking
 - c. Excavation
 - d. Pipeline Work
 - e. Structure Construction
 - f. Electrical Construction
 - g. Mechanical Construction
 - h. Testing
 - i. Start-up
 - j. Restoration
 - k. As-built Drawings
4. Show projected percentage of completion for each item, as of the first of each month.

5. Show projected dollar cash flow requirements for each month of construction.
- B. Submittals Schedule for Shop Drawings, and Samples in accordance Division 1.
 1. Show:
 - a. The dates for CONTRACTOR's submittals.
 - b. The dates submittals will be required for OWNER furnished products, if applicable.
 - c. The dates approved submittals will be required from the ENGINEER.
- C. Provide a list of long lead items (equipment and materials).

1.05 PROGRESS REVISIONS

- A. Indicate progress of each activity to date of submission.
- B. Show changes occurring since previous submission of schedule:
 1. Major changes in scope.
 2. Activities modified since previous submission.
 3. Revised projections of progress and completion.
 4. Other identifiable changes.
- C. Provide a narrative report as needed to define:
 1. Problem area, anticipated delays, and the impact on the schedule.
 2. Corrective action recommended, and its effect.
 3. The effect of changes on schedules of other prime CONTRACTORS.

1.06 SUBMISSIONS

- A. Submit initial schedules to the ENGINEER within fifteen (15) days after the effective date of the Agreement.**
 - 1. The ENGINEER will review schedules and return review copy within twenty-one (21) days after receipt.**
 - 2. If required, resubmit within seven (7) days after return of review copy.**

- B. Submit 4 copies of revised monthly progress schedules with that month's application for payment.

1.07 DISTRIBUTION

- A. Distribute copies of reviewed schedules to:

1. ENGINEER (Two Copies)
2. Job Site File
3. Subcontractors
4. Other Concerned Parties
5. OWNER (Two copies)

- B. Instruct recipients to report promptly to the CONTRACTOR, in writing, any problems anticipated by the projections shown in the schedule.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Prepare and submit documentation to support material, equipment, and work as required by the Contract Documents.
- B. Individual specification sections in these Contract Documents may contain additional and special submittal requirements.
 - 1. The OWNER reserves the right to direct and modify the procedures and requirements for submittals as necessary to accomplish the specific purpose of each submittal.
 - 2. Should the CONTRACTOR be in doubt as to the procedure, purpose, or extent of submittal, he should direct his inquiry to the ENGINEER.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 HEADWAY

- A. Unless otherwise specified or instructed, submittals under this contract shall be directed to the ENGINEER.

3.02 ADMINISTRATIVE SUBMITTALS

- A. Provide submittals specified in The Bid Documents, the General Conditions, as may be specifically required in other parts of the Contract Documents, and as requested by the ENGINEER.

3.03 TECHNICAL SUBMITTALS

A. Miscellaneous

- 1. Requirements in this section are in addition to specific requirements for submittals specified in other Divisions and Sections of these Contract Documents.

2. Submitted data shall be fully sufficient in detail for determination of compliance with the Contract Documents.
3. Review, acceptance of substitutions, schedules, shop drawings, lists of materials, and procedures submitted or requested by the CONTRACTOR shall not add to the contract amount and additional costs which may result therefrom shall be solely the obligation of the CONTRACTOR.
4. The OWNER is not precluded, by virtue of review, acceptance, or approval from obtaining a credit for construction savings resulting from allowed concessions in the work or supply of equipment and materials.
5. The OWNER shall have no responsibility for the provision of engineering or other services to protect the CONTRACTOR from additional costs accruing from approvals or submittals.
6. No equipment or material for which listings, drawings, or descriptive material is required shall be purchased, fabricated, or installed until the ENGINEER has, on hand, copies of approved lists, and the appropriately stamped final shop drawings.
7. Submittals will be acted upon by the ENGINEER as promptly as possible and returned to the CONTRACTOR not later than the time allowed for review in the Shop Drawing Submittal Procedure.
8. Delays caused by the need for resubmittals shall not constitute reason for extension of the contract time.

3.04 SHOP DRAWING SUBMITTAL PROCEDURE

- A. The Contract Documents outlines general guidelines regarding submittal and approval of shop drawings.
 1. This section is intended to furnish details of the contents, identification, and final record requirements of shop drawings.
- B. Shop Drawing Requirements
 1. Shop drawings as referred to herein, shall include shop drawings and other submittals for both shop and field-fabricated items.
 2. Submit, as applicable, the following for prefabricated or manufactured structural, mechanical, electrical, and plumbing equipment and materials:
 - a. Shop drawings or Equipment drawings including dimensions, size and location of connections and weight of equipment.

- b. Catalog information and cuts.
 - 1) Each separate catalog, brochure, or single page submitted shall have identification noted herein.
 - 2) Catalogs or brochures submitted containing multiple items for approval, need the identification only on the exterior.
 - 3) In these cases the identification shall include the page and catalog item numbers.
- c. Setting plans or installation drawings for equipment, drives, and bases.
- d. Supporting calculations for equipment and associated supports, or hangers required or specified to be designed by equipment manufacturers.
- e. Complete manufacturer's specifications, including materials description and paint system.
- f. List of materials and supplies furnished with the equipment.
- g. Special handling instructions.
- h. Requirements for storage and protection prior to installation.
- i. Requirements for routine maintenance required prior to start up.
- j. List of requested exceptions to the Contract Documents.

C. Identification Data:

- 1. Submittals for approval shall have the following identification data, as applicable, contained thereon or permanently adhered thereto:
 - a. Project name and location.
 - b. Job number.
 - c. Subcontractor's vendor's and/or manufacturer's name and address.
 - d. Product identification.
 - e. Shop drawing title, drawing number, revision number, date of drawing and revision.

- f. Applicable contract drawings and specification section numbers.
 - g. Vacant space 6 inches by 4 inches shall be provided to receive the ENGINEER's review stamp.
2. Catalog data ("cut sheets")
- a. Each separate catalog, brochure, or single page submitted shall have the identification required hereinbefore.
 - b. Catalogs or brochures submitted containing multiple items for approval needs the identification only on the exterior.
 - c. In these instances the identification shall include page and catalog item numbers.

D. CONTRACTOR's Responsibility

- 1. Submittal of shop drawing or catalog data, bearing the CONTRACTOR's approval stamp, represents that the CONTRACTOR has determined and verified field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, or will do so, and that he has checked and coordinated each item with other applicable approved shop drawings and the contract requirements.
 - a. Shop drawings and catalog data submitted without the CONTRACTOR's stamp of approval will be returned to the CONTRACTOR without review.
- 2. Approval of shop drawings, samples, or catalog data by the ENGINEER shall not authorize deviation from the requirement of the Contract Documents nor shall this approval relieve the CONTRACTOR from responsibility for errors or omissions therein.

E. Shop Drawing Review

- 1. **The ENGINEER shall have ten (10) working days to review shop drawings.**
 - a. In this case, working days shall be defined as days in which the ENGINEER's office is open for regular business.

3.05 FINAL SHOP DRAWINGS TO BE SUBMITTED TO OWNER

- A. Complete sets of reproducible final shop drawings shall be submitted to the ENGINEER before, or at the time of, delivery of equipment to the site.

3.06 RECORD DRAWINGS

- A. The CONTRACTOR will prepare a set of record drawings for the project, which will include the changes made in materials, equipment locations, and dimensions of the work.**
- 1. Each month, or as otherwise agreed, submit to the ENGINEER a current listing and description of each change incorporated into the work since the preceding submittal.**
 - 2. At the end of the project, submit to the ENGINEER as-built information and deviations from the Drawings and Specifications as required per Section 001785 of the contract documents.**

END OF SECTION

SECTION 01334

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 GENERAL

1.01 SUMMARY

- A. Submit to the ENGINEER for review, such working drawings, shop drawings, test reports and data on materials and equipment (hereinafter in this article called data), and material samples (hereinafter in this article called samples) as are required for the proper control of work, including but not limited to those working drawings, shop drawings, data and samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.
- B. Submit two (2) copies of shop drawings or other data to the ENGINEER.**
- C. Submit to the ENGINEER a complete list of preliminary data for which shop drawings are to be submitted.
 - 1. Submit within thirty (30) calendar days after the effective date of the Notice to Proceed.**
 - 2. Included in this list shall be the names of proposed manufacturers furnishing specific items.
- D. Review of this list by the ENGINEER shall in no way expressed or implied relieve the CONTRACTOR from submitting complete shop drawings and providing materials, equipment, fully in accordance with the Specifications.
- E. Maintain an accurate updated submittal log and bring this log to each scheduled progress meeting with the OWNER and ENGINEER.
 - 1. This log should include the following items:
 - a. Submittal-Description and Number assigned.
 - b. Date to ENGINEER.
 - c. Date returned to CONTRACTOR (from ENGINEER).
 - d. Status of Submittal (Approved/Resubmit/Rejected).
 - e. Date of Re-submittal and Return (as applicable).

- f. Date material released (for fabrication).
 - g. Projected date of fabrication.
 - h. Projected date of delivery to site.
 - i. Status of O & M submittal.
- F. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that reviewed shop drawings, Working Drawings and Samples will be needed.
- G. For Projects funded under the State Revolving Fund (SRF), all domestic equipment and materials used in the construction of the project shall be in accordance with and comply with American Iron & Steel requirements.
- H. Product and Shop Drawing submittals (for water utilities) should be consistent with City standards and approved products / materials lists.

1.02 RELATED SECTIONS

- 1. Standard General Conditions of the Construction Contract - Division 0.
- 2. Scheduling of Construction - Division 1.
- 3. Equipment and Material - Division 1.
- 4. Project Record Documents - Division 1.

1.03 CONTRACTOR'S RESPONSIBILITY

- A. Check drawings, data and samples prepared by or for him before submitting them to the ENGINEER for review.
 - 1. The drawings and data sheets shall bear CONTRACTOR's stamp.
 - a. The CONTRACTOR's un-stamped or improperly stamped drawings and data sheets will be returned to the CONTRACTOR for conformance with this requirement.
 - 2. Shop drawings shall indicate deviations in the submittal from requirements of the Contract Documents.
- B. Determine and verify:
 - 1. Field measurements

2. Field construction criteria
 3. Catalog numbers and similar data
 4. Conformance and Specifications
- C. Furnish the ENGINEER 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.
1. This schedule shall indicate those that are critical to the progress schedule.
- D. Begin no 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 ENGINEER approved.
- E. Submit to the ENGINEER 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 ENGINEER receives them.
- F. Submit five (5) copies of descriptive or product data submittals to complement shop drawings for the ENGINEER plus the number of copies which the CONTRACTOR requires.
1. Blueprint shop drawings shall be submitted with one (1) set of reproducible and four (4) sets of print.
 2. The ENGINEER will review the drawings and return to the CONTRACTOR the set of marked-up drawings with appropriate review comments.
- G. Accept responsibility for and bear cost of damages, which may result from the ordering of material or from proceeding with part of work prior to the review by ENGINEER of the necessary shop drawings.

1.04 ENGINEER'S REVIEW OF SHOP DRAWINGS

- A. The ENGINEER's review of drawings, data and samples submitted by the CONTRACTOR will cover only general conformity to the Specifications, external connections, and dimensions that affect the installation.
1. The ENGINEER's review will not constitute an approval of dimensions, quantities, and details of the material, equipment, device, or item shown.
- B. The review of drawings and schedules will be general, and shall not be construed:

1. As permitting departure from the Contract requirements.
 2. As relieving the CONTRACTOR of responsibility for errors, including details, dimensions, and materials.
 3. As approving departures from details furnished by the ENGINEER, except as otherwise provided herein.
- C. If the drawings or schedule as submitted describe variations and show a departure from the Contract requirements, in which the ENGINEER finds to be in the interest of the OWNER and to be minor as not to involve a change in the Contract Price or time for performance, the ENGINEER may return the reviewed drawings without noting an exception.
- D. When reviewed by the ENGINEER, each of the shop drawings will be identified as having received such review being so stamped and dated.
1. Shop drawings stamped "REJECTED" and with required corrections shown will be returned to the CONTRACTOR for correction and re-submittal.
- E. Resubmittals will be handled in the same manner as the first submittals.
1. On resubmittals, direct specific attention, in writing or on resubmitted shop drawings, to revisions other than the corrections requested by the ENGINEER on previous submissions.
 2. Make corrections required by the ENGINEER.
- F. If the CONTRACTOR considers correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, give written notice thereof to the ENGINEER.
- G. The ENGINEER will review a submittal/re-submittal a maximum of three (3) times after which cost of review will be borne by the CONTRACTOR.
1. The cost of engineering shall be equal to the ENGINEER's charges to the OWNER under the terms of the ENGINEER's agreement with the OWNER.
- H. When the shop drawings have been approved, carry out the construction in accordance therewith and make no further changes therein except upon written instructions from the ENGINEER.
- I. No partial submittals will be reviewed.
1. Submittals not complete will be returned to the CONTRACTOR and will not be considered "Rejected" 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.
 - 1. These drawings shall be complete and detailed.
 - 2. Shop drawings shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams.
 - 3. Cuts, catalogs, pamphlets, descriptive literature, and performance and test data, shall be considered only as supportive to required Shop.
- B. Drawings and schedules shall be checked and coordinated with work of trades involved, before they are submitted for review by the ENGINEER and shall bear the CONTRACTOR's stamp of approval as evidence of such checking and coordination.
 - 1. Drawings or schedules submitted without this stamp of approval shall be returned to the CONTRACTOR for resubmission.
- C. Each shop drawing, shall have a blank area 4 inches by 4 inches, located adjacent to the title block.
 - 1. The title block shall display the following:
 - a. Number and title of the drawing.
 - b. Date of drawing or revision.
 - c. Name of project building or facility.
 - d. Name of CONTRACTOR and subcontractor submitting drawing.
 - e. Clear identification of contents and location of work.
 - f. Specification title and number.
- D. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, describe such variations in his letter of transmittal.
 - 1. If acceptable, proper adjustment in the Contract shall be implemented where appropriate.

2. If the CONTRACTOR fails to describe such variations he shall not be relieved of the responsibility for executing the work in accordance with the Contract, even though such drawings have been reviewed.
- E. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material.
1. 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 other pertinent data.
- F. For mechanical and electrical equipment furnished, provide a list including the equipment name, address and telephone number of the manufacturer's representative and service company so that service and spare parts can be readily obtained.
1. Submit along with each shop drawing submittal a maintenance and lubrication schedule for each piece of equipment.
- G. Manufacturers or equipment supplier who propose to furnish equipment or products under Divisions 1, 12, 13, 14, 15 and 16 shall submit an installation list to the ENGINEER along with the required shop drawings.
1. The installation list shall include at least five installations where identical equipment has been installed and has been in operation for a period of at least one (1) year.
- H. Only the ENGINEER will utilize the color "red" in marking shop drawing submittals.
- I. Before final payment is made, furnish to ENGINEER two (2) sets of record shop drawings clearly revised, complete and up to date showing the permanent construction as actually made for reinforcing and structural steel, miscellaneous metals, process and mechanical equipment, yard piping, electrical system and instrumentation system.

1.06 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "working drawings" shall be considered to mean the CONTRACTOR's plans for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and false-work; for underpinning; and for such other work as may be required for construction, but does not become an integral part of the project.

- B. Submit copies of working drawings to the ENGINEER where required by the Contract Documents or requested by the ENGINEER.
 - 1. Submit at least thirty (30) calendar days (unless otherwise specified by the ENGINEER) 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.
 - 1. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the ENGINEER, which review will be for general conformance and will not relieve the CONTRACTOR in way from his responsibility with regard to the fulfillment of the terms of the Contract.
 - 2. Risks of error are assumed by the CONTRACTOR; the OWNER and ENGINEER shall have no responsibility therefore.

1.07 SAMPLES

- A. Furnish, for the approval of the ENGINEER, samples required by the Contract Documents or requested by the ENGINEER.
 - 1. Samples shall be delivered to the ENGINEER as specified or directed.
 - 2. Prepay shipping charges on samples.
 - 3. Materials or equipment for which samples are required shall not be used in work until approved by the ENGINEER.
- 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 Project
 - 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
 7. Samples of finished materials shall have additional marking that will identify them under the finished schedules.
- D. Prepare a transmittal letter in triplicate for each shipment of samples.
1. Enclose a copy of the transmittal letter with the shipment and send a copy of this letter to the ENGINEER.
 2. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify Contract requirements.
- E. Approved samples not destroyed in testing shall be sent to the ENGINEER or stored at the site of the work.
1. Approved samples of the hardware in good condition will be marked for identification and may be used in the work.
 2. Materials and equipment incorporated in work shall match the approved samples.
 3. Samples, which failed testing or were not approved samples, will be returned to the CONTRACTOR at his expense, if so requested at time of submission.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used).

END OF SECTION

SECTION 01437

CONTRACTOR'S QUALIFICATIONS

PART 1 GENERAL

1.01 SUMMARY

- A. This section defines the minimum qualifications necessary for a contractor to bid the project as defined in Section 01110.
- B. Provide Form 00451 Contractor's Qualification Form, signed and notarized, as part of the bid documentation.

1.02 RELATED SECTIONS

- A. General Conditions
- B. Supplemental General Conditions
- C. Summary of Work - Section 01110

1.03 Quality Assurance

- A. CONTRACTOR attests and swears that the Underground Contractor for this project is:
 - 1. A Florida Licensed Underground Contractor
 - 2. In full compliance with Florida regulations governing Underground Contractors.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01450
QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. This section defines the CONTRACTOR's responsibilities regarding inspection of the work by the ENGINEER and/or third parties, tests on materials supplied for the work and completed portions of the work, schedules to be submitted by the CONTRACTOR including specific instructions covering the beginning and completion of each portion of the work and monthly reports to be submitted by the CONTRACTOR regarding progress to date and adjustments to previously submitted work schedules.
- B. The work and reports set forth in this section shall not be taken to exclude other requirements as specified in other sections of the Contract Documents, as instructed by the ENGINEER or other incidentals necessary to complete the work in accordance with the plans and schedules.

1.02 RELATED SECTIONS

- A. General Conditions
- B. Supplemental General Conditions
- C. Technical Specifications.
- D. Submittal Procedure - division 1.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 INSPECTIONS

- A. Provide continuous safe access to the work for the OWNER, ENGINEER, and their authorized representatives.

- B. If the specifications, the ENGINEER's instructions, laws, ordinances, or public authority require work to be specially tested or approved, give timely notice of its readiness for inspection.
 - 1. Inspections to be conducted by the ENGINEER will be made promptly and where practicable, at the source of supply.
 - 2. If work should be covered up without approval or consent of the ENGINEER, it shall if required by the ENGINEER, be uncovered for examination at the CONTRACTOR's expense.
- C. Reexamination of questioned work may be ordered by the ENGINEER, and if so ordered, the work shall be uncovered by the CONTRACTOR.
 - 1. If this work is found to be in accordance with the Contract Documents, the OWNER will pay the cost of reexamination and replacement.
 - 2. If this work is found not to be in accordance with the Contract Documents, correct the defective work and the cost of reexamination and correction of the defective work shall be paid by the CONTRACTOR.
- D. When the CONTRACTOR's work requires inspection or test, notify the ENGINEER twenty-four (24) hours in advance of required tests or inspections.**
 - 1. Cooperate with the testing laboratory's representatives by giving ample notice of time, location and extent of work to be inspected or tested, by performing concrete slump tests, preparing concrete and other samples as instructed and by providing necessary facilities at the project site or in the shop for the testing agency.

3.02 TESTS

- A. Furnish, without extra charge, the necessary test pieces and samples, including facilities and labor for obtaining the same, as requested by the ENGINEER.
 - 1. When required, Furnish certificates of tests of materials and equipment made at the point of manufacture by a recognized testing laboratory.
- B. Give the ENGINEER ample advance notice of appropriate times for tests.
 - 1. Specified tests will be approved and supervised by the ENGINEER.
 - 2. When specific inspections or tests are required, the work involved shall not proceed beyond that point until the ENGINEER has made or waived inspections or tests.

3.03 EXECUTION

- A. Time is of the essence for the time of beginning, rate of progress, and time of completion of the work within this Contract.
 - 1. The work shall be executed as may be required to complete the project as contemplated in the Contract Documents and the approved construction schedule.
- B. Within thirty (30) days after the award of the Contract, submit to the ENGINEER, in triplicate, a listing of subcontractors, manufacturers, and suppliers who will be participating in the construction or who will be supplying materials and/or equipment for the project.
 - 1. The address of each firm shall be listed and type of material furnished or work performed.

END OF SECTION

SECTION 01451

CONTRACTOR'S QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish personnel and equipment, which will be efficient appropriate and of sufficient quantity to secure a satisfactory quality of work and a rate of progress that will insure the completion of the work within the time stipulated in the Proposal.
 - 1. If at any time such personnel appear to the ENGINEER to be inefficient, inappropriate or insufficient for securing the quality of work required or 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.
 - 2. Failure of the ENGINEER 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

- A. Do not enter or occupy private land outside of easements, except by written permission of the OWNER.

1.03 PIPE LOCATIONS

- A. Locate pipeline substantially as indicated on the Drawings, but the ENGINEER 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. Safeguard open excavation by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons and damage to property.
 - 1. Provide safe temporary bridges accommodating travel by pedestrians and workmen.
 - 2. Remove temporary bridges when no longer required.

3. The length of open trench will be controlled by the particular surrounding conditions, but shall always be confined to the limits prescribed by the ENGINEER.
 4. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the ENGINEER 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. Take precautions to prevent injury to the public due to open trenches.
1. Trenches, excavated material, equipment, or other obstacles, which could be dangerous to the public, shall be well lighted at night.

1.05 TEST PITS

- A. Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled with no additional cost to OWNER and at the direction of the ENGINEER.
1. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the ENGINEER.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 COOPERATION WITHIN THIS CONTRACT

- A. Firms or persons 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 ENGINEER.

3.02 PROTECTION OF CONSTRUCTION AND EQUIPMENT

- A. Protect newly constructed work from damage.
1. Reconstruct damaged work at no additional cost to OWNER.

2. No wheeling, walking, or placing of heavy loads on it shall be allowed.
- B. Protect structures in a manner approved by the ENGINEER.
1. 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 ENGINEER.
 2. Special attention is directed to substructure bracing requirements described in Division 2.
 3. 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.
 4. Assume responsibility for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the contract.
- C. Take necessary precaution 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 OWNER.

END OF SECTION

SECTION 01458

TESTING AND TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SUMMARY

- A. The CONTRACTOR shall retain the services of an Independent Testing Laboratory to perform materials testing specifically indicated in the Contract Documents and the ENGINEER may at any time elect to have materials and equipment tested for conformity with the Contract Documents.
 - 1. Cooperate with the laboratory to facilitate the execution of its required services.
 - 2. Employment of the laboratory shall in no way relieve CONTRACTOR's obligations to perform the Work of the Contract.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- B. Respective sections of specifications: Certification of products.
- C. Each specification section listed: Laboratory tests required and standards for testing.
- D. Testing laboratory inspection, sampling and testing is required for, but not limited to concrete work, rebar, asphalt mix, soil densities and compaction tests.

1.03 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

1.04 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel, and provide access to Work and 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 materials 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.
 - 1. Standard specifications for quality and workmanship are indicated in the Contract Documents.
 - 2. The ENGINEER 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 CONTRACTOR Documents.
 - 3. Costs of this testing and providing statements and certificates shall be a subsidiary obligation of the CONTRACTOR, and no extra charge to the OWNER 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 after such notice, the CONTRACTOR shall reimburse the laboratory personnel for travel time incurred due to the CONTRACTOR's negligence.
- G. Employ and pay for the services of a qualified independent testing laboratory to perform inspections, sampling, and testing required.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. The CONTRACTOR shall furnish labor, materials, and equipment and perform functions required for the complete installation and maintenance of the Work covered by this section.
 - 1. This Work shall include but not be limited to project field offices, sanitary facilities, construction utilities, construction consumable, safety and protection devices, storage facilities, security, traffic control and other construction aids and incidentals required for the completion of the Contract in accordance with the Contract Documents.
- B. Construction operations including storage of materials, location of field offices, construction parking and delivery routing shall be limited to the limits of construction indicated or as directed by the Owner.

1.02 RELATED SECTIONS

- A. General Conditions - Division 0.
- B. Supplementary General Conditions - Division 0
- C. Technical Specifications - Divisions 1 through 16
- D. Submittals - Division 1

1.03 REFERENCES

- A. Applicable Standards
 - 1 National Electric Code.
 - 2 Occupational Safety and Health Administration.
 - 3 Florida State Department of Transportation's "Standard Specifications For Road And Bridge Construction" - latest edition.

B. Governmental Agencies

1. Work shall comply with the applicable standards of the appropriate governing body.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SANITATION FACILITIES

- A. Provide and maintain, for the duration of the Work on the Project, toilet facilities for persons engaged in Work on the Project and provide said toilet facilities with adequate means of locking when workmen are not engaged on the Project.
 1. Temporary toilets shall be chemical or other portable type approved by local health authorities and shall be removed upon completion of construction.

3.02 SAFETY AND PROTECTIVE DEVICES

- A. Protect persons from injury and to avoid property damage.
 1. Adequate barricades, construction signs, torches, red lanterns and guards as required shall be placed and maintained during the progress of the construction work for the protection of the public in compliance with federal, OSHA and local ordinances.
- B. Repair or replace damages to the property or adjacent properties caused in the execution of this Contract.
- C. Take necessary precautions for the safety of his employees on the job and shall comply with applicable provisions of Federal, State, County and Municipal safety laws and regulations to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.
 1. The Owner reserves the right to seek restitution from the Contractor for fines incurred by the Owner as a result of the Contractor's non-compliance with said regulations.
- D. In the event the Contractor's tools or materials delivered to the premises are stolen or damaged, the Contractor is responsible for such theft.

1. When the Work has been declared Substantially Complete and has been accepted by the Owner, the Owner will assume the responsibility for theft or damage.
2. Replace or repair stolen or damaged materials as soon as possible as directed by the Owner.

3.03 STORAGE FACILITIES

- A. Maintain this storage facilities on the Project site as necessary for the proper execution of the Work.
 1. These facilities shall be located so as to cause no interference to Work to be performed on the site.
 2. Propose location and other requirements for approval by Owner.
- B. Storage facilities shall provide protection from physical damage due to construction procedures, dampness, water, and excessive temperatures, and shall provide reasonable protection from loss due to fire or theft.
- C. Storage facilities constructed for that sole purpose shall remain the property of the Contractor and shall be removed by him when they are no longer required or when so directed.

END OF SECTION

SECTION 01510
TEMPORARY UTILITIES

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish, install, and maintain temporary utilities required for construction, remove on completion of work.

1.02 RELATED SECTIONS

- A. Summary of Work - Division 1.
- B. Field Offices - Division 1.

1.03 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 and Environmental Regulations.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

- A. Arrange with utility company, provide service required for power and lighting, and pay costs for service and for power used in the construction, testing and trial operation prior to final acceptance of the work by the OWNER.
- B. Install circuit and branch wiring, with the area distribution boxes located so that power and lighting is available throughout the construction by the use of construction type power cords.
- C. Provide adequate artificial lighting for areas of work when natural light is not adequate to work, and areas accessible to the public.

2.03 TEMPORARY WATER

- A. Arrange with the OWNER, as described in the Supplemental Conditions to provide water for construction purposes.
- B. Install branch piping with taps located so that water is available throughout the construction by the use of hoses.
- C. Install at each and every connection to the OWNER water supply a backflow preventer meeting the requirements of ANSI A40.6, latest revision. CONTRACTOR shall be required to meter and pay for water used.

2.04 TEMPORARY SANITARY FACILITIES

- A. Provide sanitary facilities in compliance with laws and regulations.
- B. Service, clean and maintain facilities and enclosures.

2.05 TEMPORARY VENTILATION

- A. Provide temporary ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.
- B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases.
- C. Pay costs of installation, maintenance, operation and removal, and for fuel consumed.
- D. Provide connections to existing facilities, extend and supplement with temporary units as required to comply with requirements. Pay costs of installation, maintenance, operation and removal. OWNER will pay costs of fuel used from the existing system.

2.06 TEMPORARY TELEPHONE SERVICE (N/A)

- A. Arrange with local telephone service company, provide direct line telephone service at the construction site for the use of personnel and employees. Service required:
 - 1. One direct line instrument in CONTRACTOR's Field Office.
 - 2. One direct line instrument in Field Office of ENGINEER.

3. One direct line facsimile (FAX) machine in CONTRACTOR's Field Office.
 4. Other instruments at the option of the CONTRACTOR, or as required by regulations.
- B. Pay costs for installation, maintenance and removal, and service charges for local calls. Toll charges shall be paid by the party who places the call.

PART 3 EXECUTION

3.01 GENERAL

- A. Comply with applicable requirements specified in Division 15 -Mechanical and in Division 16 - Electrical.
- B. Maintain and operate systems to assure continuous service.
- C. Modify and extend systems as work progress requires.

3.02 REMOVAL

- A. Completely remove temporary materials and equipment when their use is no longer required.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.
- C. Restore permanent facilities used for temporary services to specified condition.

END OF SECTION

SECTION 01540
CONSTRUCTION AIDS

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish, install, and maintain required construction aids, remove on completion of Work.

1.02 RELATED SECTIONS

- A. Summary of Work - Division 1

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

2.02 CONSTRUCTION AIDS

- A. Provide construction aids and equipment required by personnel and to facilitate execution of the Work.
 - 1. Scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes, and other facilities and equipment.
 - 2. Refer to respective sections for particular requirements for each trade.
- B. Maintain facilities and equipment in first-class condition.

2.03 TEMPORARY ENCLOSURES

- A. Provide temporary weather-tight enclosure of exterior walls for storage of materials as work progresses, as necessary to, provide weather protection for materials, and to prevent entry of unauthorized persons.
 - 1. Provide temporary exterior doors with self-closing hardware and padlocks.

2. Other enclosures shall be removable as necessary for work and for handling of materials.

PART 3 EXECUTION

3.01 PREPARATION

- A. Consult with the ENGINEER, review site conditions and factors that affect construction procedures and construction aids. Including adjacent properties and public facilities, which may be affected by execution of the Work.

3.02 GENERAL

- A. Comply with applicable requirements specified in sections of Divisions 2 through 16.
- B. Relocate construction aids as required by progress of construction, by storage or work requirements, and to accommodate legitimate requirements of OWNER and other CONTRACTOR's employed at the site.

3.03 REMOVAL

- A. Completely remove temporary materials, equipment and services:
 1. When construction needs can be met by use of permanent construction.
 2. At completion of Work.
- B. Clean and repair damage caused by installations for construction aids.
 1. Remove foundations and underground installations for construction aids.
 2. Grade areas of site affected by temporary installations to required elevations and slopes, and clean the area.
- C. Restore permanent facilities used for temporary purposes to specified condition or in kind if not specified.

END OF SECTION

SECTION 01550

TRAFFIC CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. The CONTRACTOR shall maintain traffic on existing roads affected by the construction and protect the traveling public from damage to person and property for the duration of the contract.
 - 1. Abide by applicable laws, regulations, and codes thereof pertaining to Maintenance of Traffic (MOT) on public streets, detour of traffic, traffic control and other provisions as may be required for this Project.
 - 2. Comply fully with the MOT provisions contained in the permits.
 - 3. Work shall be in accordance with Florida Department of Transportation (FDOT) "Standard Specifications for Road and Bridge Construction", latest edition, and the "Roadway and Traffic Design Standards" Index Nos. 600 to 651, latest edition, including preparation of a proposed Maintenance of Traffic Plan.
- B. The CONTRACTOR shall assume responsibility for MOT on public streets, detour of traffic (including furnishing and maintaining regulatory and informative signs along the detour route), traffic control, and other provisions, throughout the Project, as required by the local Department of Public Works, Roads Department, or FDOT, as applicable.
 - 1. Maintain traffic over a reasonably smooth traveled way which shall be so marked by signs, delineators, guiding devices, and other methods that a person who has no knowledge of conditions may safely and with a minimum of discomfort and inconvenience ride, drive, or walk, day or night, over the roadway where traffic is to be maintained.
 - 2. Work shall conform to the drawings and to the requirements of the local Department of Public Works, Roads Department, or FDOT, as applicable.

1.02 RELATED SECTIONS

- A. General Conditions
- B. Supplementary General Conditions

C. Technical Specifications.

D. Submittals - Division 1

E. Permits - Division 1

1.03 STANDARDS AND REGULATIONS

A. Applicable Standards

1. Occupational Safety and Health Administration.
2. FDOT "Standard Specifications for Road and Bridge Construction", latest edition, and the "Roadway and Traffic Design Standards" Index Nos. 600 to 651, latest edition, including preparation of a proposed Maintenance of Traffic Plan.

B. Governmental Agencies

1. Work shall comply with the applicable standards of the appropriate governing body.

1.04 Roadway Physical Conditions

A. Surface

1. Maintain the surface condition of the traveled way so it is consistent with the appropriate speed limits.

B. Drainage

1. Maintain the drainage facilities and other highway elements, old or new including detours.

C. Temporary Roads

1. Provide temporary relocated roads to maintain the required right-of-way.

D. Intersecting Roads

1. Provide ingress and egress to and from intersecting roads, buildings, and other facilities.

E. Haul Roads

1. Repair damage from CONTRACTOR's hauling operations along existing roads, and such operations shall be conducted with minimum interference to public traffic, as directed by the local Department of Public Works, Roads Department, or FDOT, as applicable.

F. Dust Control and Spillage

1. Control dust and keep the traveled way free from material spilled from hauling equipment.
2. This shall also apply to dust control and spilled material resulting from the CONTRACTOR's operations in the areas outside the contract limits.

G. Flagmen

1. Provide the necessary repairs to existing pavement and Flagmen for adequate traffic control on the traveled way.
2. Sign paddles are required.

H. Delineation and Guiding Devices

1. Provide and maintain delineation and guiding devices which shall include delineators, drums, cones, railing, temporary curb and other similar materials or methods indicated or directed.
2. The installation or moving of delineators or guiding devices together with removal of existing pavement markings shall be included in the work.

I. Project Site Patrol

1. Provide personnel to patrol the contract area as necessary to ensure that conditions on the site are adequate for public safety and convenience.

J. Construction Sign Barriers, Construction Barricades, and Lighting for Construction Barricades

1. Furnish, install, move, and maintain construction signs, barriers, construction barricades with warning lights, necessary arrow boards and signs, to warn motorists of the work throughout the Project.
2. Erected and maintained adequate approved devices to detour traffic away from the project during work.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. Notify the local Department of Public Works, Roads Department, or FDOT, as applicable, 48 hours in advance of the construction date.
- B. Pavement markings damaged during construction shall be remarked promptly by the CONTRACTOR as required by the local Department of Public Works, Roads Department, or FDOT, as applicable.

3.01 DRAINAGE

- A. Keep drainage facilities fully operative.
 - 1. Provide ditches to adequately drain the traveled way and the remainder of the right-of-way.

3.02 INGRESS AND EGRESS

- A. Provide and maintain safe and adequate ingress and egress for intersecting points.

3.03 EXISTING PAVEMENT MARKINGS

- A. Remove, as soon as practical, existing pavement markings, as required by local Department of Public Works, Roads Department, or FDOT, as applicable.

3.04 QUALITY CONTROL

- A. Establish and maintain quality control for operations under this section to assure compliance with contract requirements and maintain records of his quality control for materials, equipment, and construction operations, including but not limited to the following:
 - 1. Scheduling and traffic control.
 - 2. Temporary pavement and drainage provisions.
 - 3. Traffic control devices.
 - 4. Maintaining traveled way.
 - 5. Maintaining drainage.

END OF SECTION

SECTION 01560

TREE AND PLANT PROTECTION

PART 1 GENERAL

1.01 SUMMARY

- A. Remove trees as noted in the Drawings.
- B. Abide by requirements and conditions of the governing authority.
- C. Assume full responsible for maintaining, in good condition, cultivated grass plots, trees, and shrubs.
 - 1. Where maintained shrubbery, grass strips or area must be removed or destroyed incident to the construction operation, replace or restore to the original condition destroyed or damaged shrubbery or grass areas.
 - 2. Tree limbs, which interfere with equipment operation and are approved for pruning, shall be neatly trimmed and the tree cut coated with a tree paint.
- D. Grass areas shall be solid sodded with sod to match the existing grass and shall first be leveled, and debris, rocks and other matter removed.
- E. The sod shall be placed with closely abutting joints, and shall completely cover the areas shown in the Drawings to be grassed.
 - 1. The top of the new sod shall coincide with the top of pavement and sidewalk, both existing and proposed.
 - 2. The sod shall be covered with a light top dressing of topsoil and shall then be thoroughly watered.
- F. Weeded areas need not be replaced with grass sod, but shall be restored to a "green" area by dressing the area with a layer of top soil, and sowing a variety of permanent type grass seed, over the area as approved by the ENGINEER.
 - 1. Water and maintain the seeded area until the ENGINEER is assured a good grass growth has developed, but not to exceed a maximum period of 60 days.

1.02 STANDARDS AND REGULATIONS

A. Work shall conform to the applicable standard.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01568
SECURITY MEASURES

PART 1 GENERAL

1.01 SUMMARY

- A. Security Program
- B. Entry Control
- C. Personnel Identification
- D. Miscellaneous Restrictions

1.02 RELATED SECTIONS

- A. Summary of Work - Division 1
- B. Temporary Utilities - Division 1

1.03 SECURITY PROGRAM

- A. Protect Work, existing premises and OWNER's operations from theft, vandalism and unauthorized entry.
- B. Initiate program in coordination with OWNER's existing security system at job mobilization.
- C. Maintain program throughout construction period until OWNER occupancy as directed by ENGINEER.

1.04 ENTRY CONTROL

- A. Restrict entrance of persons and vehicles into project site and existing facilities.
- B. Allow entrance only to authorized persons with proper identification.
- C. Maintain log of workmen and visitors, make available to OWNER on request.
- D. Coordinate access of OWNER's personnel to site in coordination with OWNER's security forces.

1.05 PERSONNEL IDENTIFICATION

A. Become familiar with OWNER and ENGINEER representatives.

B. Restrict access to job site to these representatives.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01600

EQUIPMENT AND MATERIALS

PART 1 GENERAL

1.01 SUMMARY

- A. Incorporate new and unused equipment, materials, instruments, or devices in this project, unless indicated otherwise in the Contract Documents.
- B. Deliver equipment and materials to be incorporated in the work sufficiently in advance of their installation and use to prevent delay in the execution of the work, and in order as required for reasonable executing the work.
- C. Prevent deterioration and damage to equipment and materials.
 - 1. Prevent warping, twisting, bending, breaking, chipping, rusting, damage, or theft of the equipment and materials handled and stored by the manufacturer, fabricator supplier, and CONTRACTOR before, during, and after shipment.
 - 2. Removed and replaced warped, twisted, bent, broken, chipped, rusted, damaged equipment at the CONTRACTOR's expense for both labor and materials.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01610

BASIC PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Material and equipment incorporated into the Work:

1. Conform to applicable specifications and standards.
2. Comply with size, make, type and quality specified, or as specifically approved in writing by the ENGINEER.
3. Manufactured and Fabricated products:
 - a. Design, fabricate and assemble in accord with the best engineering and shop practices.
 - b. Manufacture like part of duplicate units to standard sizes and gauges, to be interchangeable.
 - c. Two or more items of the same kind shall be identical, by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
4. Do not use material or equipment for purposes other than that for which it is designed or is specified.

1.02 RELATED REQUIREMENTS

- A. General Conditions - Division 0
- B. Summary of Work - Division 1
- C. Special Project Procedures - Division 1
- D. Shop Drawings, Working Drawings and Samples - Division 1
- E. Project Record Documents - Division 1

F. Operating & Maintenance Data - Division 1

G. Warranties and Bonds - Division 1

H. Installation - Division 1

I. Product Delivery Requirements - Division 1

J. Product Storage and Handling - Division 1

K. Product Substitution Requirements - Division 1

1.03 APPROVAL OF MATERIALS

A. Only new materials and equipment shall be incorporated in the work.

1. Materials and equipment furnished are subject to the inspection and approval of the ENGINEER.
2. No material shall be delivered to the work without prior approval of the ENGINEER.

B. Within 30 days after the effective date of the Agreement, submit to the ENGINEER, data relating to materials and equipment he proposes to furnish for the work.

1. Data shall be in sufficient detail to enable the ENGINEER to identify the particular product and to form an opinion as to its conformity to the specifications.
2. The data shall comply with product submittals.

C. Furnish facilities and labor for handling and inspection of materials and equipment.

1. Prior to beginning or during progress of the work, submit samples of materials for such special tests as required by the ENGINEER to demonstrate that they conform to the specifications.
2. Samples shall be furnished, stored, packed, and shipped as directed at the CONTRACTOR's expense.
3. Except as otherwise noted, the OWNER will make arrangements for and pay for the tests.

D. Submit data and samples sufficiently early to permit consideration and approval before materials are necessary for incorporation in the work.

1. Delay of approval resulting from the CONTRACTOR's failure to submit samples or data promptly shall not be used as a basis of claim against the OWNER or the ENGINEER.
- E. Provide samples of workmanship or finish as may be required.
- F. The materials and equipment used on the work shall correspond to the approved samples or other data.

1.04 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

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

1.05 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of products in accord with construction schedules. Coordinate to avoid conflict with work and conditions at the site.
- B. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 1. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.06 STORAGE AND PROTECTION

- A. Furnish a covered, weather-protected storage structure providing a clean, dry, non-corrosive environment for mechanical equipment, valves, electrical and instrumentation equipment, and special equipment to be incorporated into this project.
 - 1. Storage of equipment shall be performed to allow easy access and be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including weather/humidity protection, connection of heaters, placing of storage lubricants in equipment, blocking, or skid storage.
 - 2. Replace corroded, damaged, or deteriorated equipment and parts before acceptance of the project.
- B. Store products in accord with manufacturer's instructions, with seals and labels intact and legible.
 - 1. Store products subject to damage by the elements in weather-tight enclosures.
 - 2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
 - 3. Store fabricated products above the ground on blocking or skids to prevent soiling or staining.
 - 4. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.
 - 5. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- C. Materials and equipment to be incorporated in the work shall be handled and stored by the CONTRACTOR before, during, and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and injury, theft or damage to the material or equipment.
- D. Store cement, sand, and lime under a roof and off the ground and keep completely dry.
- E. Store structural and miscellaneous steel, and reinforcing steel off the ground or otherwise to prevent accumulations of dirt or grease, and to minimize rusting.
- F. Store and handle brick, block, and similar masonry products in a manner to reduce breakage, chipping, and cracking.

- G. Moving parts shall be rotated, no less than weekly, to insure proper lubrications and to avoid metal-to-metal "welding".
- H. Upon installation of the equipment, start the equipment, at least half load, weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.
- I. Materials, which in the opinion of the ENGINEER have become so damaged as to be unfit for the use intended or specified, shall be promptly removed from the site of the work, and receive no compensation for the damaged material or its removal.
- J. Arrange storage in a manner to provide easy access for inspection.
 - 1. Make periodic inspections of stored products to assure that products are maintained under specific conditions, and free from damage or deterioration.
- K. Protection After Installation:
 - 1. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations.
 - 2. Remove on completion.
- I. Assume responsibility for materials, equipment, and supplies sold and delivered to the OWNER under this Contract until final inspection of the work and acceptance thereof by the OWNER.
 - 1. In the event material, equipment, and supplies are lost, stolen, damaged, or destroyed prior to final inspection and acceptance, replace same without additional cost to the OWNER.
- M. Should the CONTRACTOR fail to take proper action on storage and handling of equipment supplied under this Contract within seven days after written notice to do so has been given, the OWNER retains the right to correct deficiencies noted in previously transmitted written notice and deduct the cost associated with these corrections from the CONTRACTOR's Contract.
 - 1. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering, and other costs associated with making the necessary corrections.

1.07 SPECIAL TOOLS

- A. Furnish special tools (including grease guns or other lubricating devices) required for normal adjustment, operations and maintenance, together with instructions for their use.

- B. Preserve and deliver to the OWNER these tools and instructions in good order no later than upon completion of the Contract.

1.08 WARRANTY

- A. For major pieces of equipment, submit a warranty from the equipment manufacturer.

1.09 SPARE PARTS

- A. Spare parts for certain equipment provided under Division 11 through 16 have been specified in the pertinent sections of the Specifications.
 - 1. Collect and store spare parts as recommended by the manufacturer in a safe location.
 - 2. Provide an inventory listing spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item.
 - 3. Provide copies of actual invoices for each item furnished to substantiate the delivered cost.

1.10 GREASE, OIL, AND FUEL

- A. Furnish grease, oil, and fuel required for testing of equipment with the respective equipment.
 - 1. Furnish the OWNER a one (1) year supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of the equipment supplied under Division 11 through 16.
- B. Assume responsibility for changing the oil in drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event shall be longer than three weeks of operation.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01630

PRODUCT SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Materials or equipment specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular manufacturer, fabricator, supplier, or distributor; the naming of the item is intended to establish the type, function and quality of the item.
- B. Materials or equipment of other manufacturers, fabricators, suppliers, or distributors may be accepted by the ENGINEER, provided that sufficient information is submitted by the CONTRACTOR to allow the ENGINEER to determine its equivalency.
- C. No substitution is permitted if specifically identified that no substitution is permitted for that product or item.

1.02 CONDITIONS FOR REVIEW OF ALTERNATES

- A. Requests for review of substitute items of material and equipment will not be accepted by the ENGINEER from anyone other than the CONTRACTOR.
 - 1. If the CONTRACTOR wishes to furnish or use a substitute item of material or equipment, make a written application to the ENGINEER for acceptance thereof, certifying that the proposed substitute will adequately perform the functions and achieve the results required and be suitable for the same use as the material or equipment specified.
 - 2. The application shall state that the evaluation and acceptance of the proposed substitute will not affect the CONTRACTOR's time of completion, whether or not acceptance of the substitute for use in the work required a change in the Contract Documents to adapt the substitute into the design or whether or not substitution in connection with the work is subject to payment of royalty or licensing fee.
- B. Variations of the proposed substitute from that specified shall be identified in the application. Available maintenance, repair and replacement services shall be included.

1. The application shall also contain a statement that the CONTRACTOR agrees to pay direct and indirect costs, resulting from acceptance of the substitute, including redesign and claims of other CONTRACTORS affected by the resulting change.
 2. The ENGINEER may require additional data, at the CONTRACTOR's expense for proper evaluation of the proposed substitute.
- C. The ENGINEER will be allowed reasonable time for the evaluation of proposed substitution and the Engineer's decision regarding acceptability will be final.
1. No substitute shall be ordered or installed prior to the Engineer's written acceptance.
- D. The OWNER may require the CONTRACTOR, at the CONTRACTOR's expense, to supply a specific performance guarantee or other surety covering the substitution.
- E. The ENGINEER will record time required by the ENGINEER or required Consultants in evaluating proposed substitutes by the CONTRACTOR as well as costs required for modification of the Contract Documents as a result thereof.
1. Reimburse the OWNER for costs of ENGINEER services associated with evaluating proposed substitute that does not meet the requirements of the Contract Documents.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 SUBSTITUTIONS

- A. Submit requests for substitution in writing, to the ENGINEER for review, and within thirty (30) days from the date of issue of the contract Notice To Proceed.**
1. Requests submitted after the specified period may be rejected, at the Engineer's option, without review.
- B. Each request for substitution shall be submitted separately in five (5) copies and shall contain complete data substantiating compliance of the proposed substitution with the Contract Documents.**

3.02 CONTRACTORS OPTIONS

A. Requests for substitution can be classified into two general categories, products or construction methods.

1. Products (Materials or Equipment)

- a. Provide products, to the maximum extent possible, of the same generic kind meeting the quality and performance of the referenced standard and from a single source.
- b. Products specified by naming several products or manufacturers, select one of the products or manufacturers named which complies with the Contract Documents.
- c. Products specified by naming one or more products or manufacturers and stating "or equal", submit a request for substitution for product or manufacturer not specifically named.
- d. Products specified by naming one product or manufacturer and followed by words indicating no substitution, there is no option and no request for substitution will be considered.
- e. Where more than one choice is available, as a CONTRACTOR's option, select a product that is compatible with other products specified or selected.
- f. Requests for substitution for products or manufacturers shall contain product identification including: manufacturer's name and address; manufacturer's literature with model or catalog number; product description; test data; utility consumption (if applicable); justification for the proposed substitution; samples (if appropriate); name and address of similar projects on which product was used and date of installation; other data as requested by the ENGINEER to establish that the proposed substitution is equal to or better than that specified.

2. Construction Method

- a. Detailed description of the proposed method(s) including name and address of projects where the method was used; drawings illustrating method(s) and reason or justification for the proposed substitution; other data as deemed necessary or as requested by the ENGINEER to establish that the proposed substitution is equal or superior to that specified.

3. Justification For Request For Substitution

- a. In making a request for substitution, the CONTRACTOR represents that CONTRACTOR has investigated the proposed substitution and has determined that it is equal or superior to that specified; that the CONTRACTOR will provide equal to or better warranties or bonds for the proposed substitution as for the product or method specified, that the CONTRACTOR waives claims for additional costs or extension of time related to the proposed substitution that may subsequently become apparent.

3.03 ENGINEER'S OPTIONS

- A. Requests for substitutions may be rejected by the ENGINEER without further review if the request:
 1. Is received more than thirty (30) days after the date of the Notice To Proceed.
 2. Effects the project completion date.
 3. Jeopardizes the performance or the intent of the project.
 4. Requires substantial revision of the Contract Documents.
- B. Requests will not be accepted that are indicated or implied on shop drawings, and are not accompanied by a formal request for substitution by the CONTRACTOR.
- C. If the ENGINEER determines that a proposed substitute meets the requirements of the Contract Documents and is suitable for the purpose intended, it may be accepted and if accepted, reimbursement to the OWNER for the Engineer's review will not be required.
- D. If the ENGINEER determines that a proposed substitute does not meet the requirements of the Contract Documents and is not acceptable, furnish the specified product, manufacturer or method at no additional cost to the OWNER and shall reimburse the OWNER for the cost of the Engineer's review.
- E. If the ENGINEER determines that a proposed substitute does not meet the requirements of the Contract Documents as specified but is suitable as a substitute for the purpose intended:
 1. Reimburse the OWNER for the Engineer's review.

2. Furnish the product, manufacturer or method specified at no additional cost to the OWNER.
 3. Request that the ENGINEER issue a change order in which case provide accurate cost data on the proposed substitution and comparison with the product or method specified, provide the OWNER with the benefit of savings in cost and reimburse the OWNER for the Engineer's cost of preparation and negotiation of the change order.
- F. In the event an agreement cannot be reached, furnish the product or method specified at no additional cost to the OWNER and shall reimburse the OWNER for the Engineer's preparation and negotiation of the change order.

3.04 SHOP DRAWINGS

- A. Acceptance of a substitution will not relieve the CONTRACTOR from the requirement for submission of Shop Drawings as set forth in the Contract Documents.

END OF SECTION

SECTION 01660

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. STORAGE

1. Store equipment and materials at the jobsite in accordance with the manufacturer's recommendations and directed by the OWNER.
2. Do not store unnecessary materials or equipment on the jobsite.
3. Prevent any structure from being overloaded and endanger the safety of his personnel or others.
4. Enforce the instructions of the OWNER and ENGINEER regarding the posting of regulatory signs for loadings on structures, fire safety and smoking area.

B. HANDLING AND MAINTENANCE

1. Follow manufacturer's storage instructions or approved written deviations.
 - a. Forward a copy of manufacturer's approved written deviations to the ENGINEER.
2. Equipment with moving parts shall be rotated per the manufacturer's recommendations while in storage and during the period between installation and acceptance.
3. Equipment shall be stored fully lubricated unless otherwise instructed by the manufacturer.
4. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance.
5. New lubricants shall be put into the equipment at the time of acceptance.
6. Equipment having moving parts such as gears, and electric motors and instruments, control panels, and switchgear shall be stored in a temperature and humidity controlled building until such time as the equipment is to be installed.

7. Shafts shall be rotated as required per manufacturer's recommendations for storage.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01723

PROTECTION OF ADJACENT CONSTRUCTION

PART 1 GENERAL

1.01 SUMMARY

- A. The underground utilities, structures, and other facilities shown in the Drawings are located according to the best information available, but may vary by several feet from both the location and elevation shown.
 - 1. Explore far enough in advance of his main trench to determine the exact location and condition of utilities, structures, or facilities so that, before the pipe is installed, the ENGINEER may change the line or grade of the pipe, should that become necessary to avoid a conflict.
- B. Cost for changing the grade of the proposed main downward or upward in order to clear obstructions located differently than shown in the Drawings, or not shown in the Drawings, shall be included in the price established in the Proposal for the new depth of cut range that the main is installed in.
- C. Where the main is deflected either horizontally or vertically, and the ENGINEER requires additional work and items such as paving, air release valve assemblies, and similar items for which a pay item was established in the proposal, additional work and items will be paid for at the price bid.
- D. Determine the locations of recent additions to the systems and not shown in the Drawings.
 - 1. Exercise extreme to prevent damage to utilities resulting from contract activities.
 - 2. The location of the overhead utilities shall be verified and the ENGINEER shall be notified of conflict that might occur.
 - 3. Comply with the requirements of the utility companies and the ENGINEER for determining which poles will need shoring during excavation and shall provide shoring and support as required.
- E. Where it is necessary to temporarily interrupt house or building services, notify the house or building owner or occupant, both before the interruption and again immediately before service is resumed.
 - 1. Before disconnecting pipes or cables, obtain permission from the OWNER, or shall make suitable arrangements for their disconnection by the OWNER.

- F. Assume responsibility for damage to pipes, conduits, or cables, and restore damaged items to service promptly.
- G. Various drainage culverts and drainage ditches may be encountered along the route of the work.
 - 1. Repair, restore, or reinstall culverts that are disturbed, damaged, or removed.
 - 2. Drainage ditches shall be restored to the original cross sections existing prior to construction of this work.
 - 3. Ditches shall be left clean and free of excavated materials or other materials deposited in them as a result of this construction.
 - 4. Existing headwalls and slabs for drainage ditches, removed or damaged as a result of this construction, shall be restored.
 - 5. This work shall be performed as directed by the ENGINEER, and the work shall be considered an incidental item and the cost included in the items listed in the Proposal.

1.03 REFERENCES

A. Governmental Agencies

- 1. Work shall conform to the applicable standards of local government engineering departments.

1.04 RELOCATE OF EXISTING UTILITIES

A. Relocate existing utilities, as noted in the Drawings, or for the convenience of construction.

- 1. This work shall be completed by either the forces of the existing utility or the CONTRACTOR's forces at the discretion of the responsible utility.
- 2. Perform work in accordance with the utility company's requirements.

B. Coordinate existing utility relocations with the appropriate utilities.

- 1. Provide temporary supports or protective encasements are required during the construction, at no additional cost.

C. Conflicts between the field investigation and the information shown in the Drawings shall be brought to the immediate attention of the ENGINEER.

1. There shall be no additional payment for adjustments in grades or location resulting from locations of existing utilities.
- D. Representatives of the utility companies shall be notified in accordance with the provisions set forth in the relevant sections of the Specifications and the permitting documents.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01740

CLEANING

PART 1 GENERAL

1.01 SUMMARY

- A. Execute cleaning, during progress of the Work, and at completion of the Work, as required by General Conditions.

1.02 RELATED SECTIONS

- A. Conditions of the Contract.
- B. Each Specification Section: Cleaning for specific Products or work.

1.03 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute periodic cleaning to keep the Work, the site and adjacent properties, free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.

- B. Provide on-site containers for the collection of waste materials, debris, and rubbish.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.02 DUST CONTROL

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

3.03 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Wash and shine glazing and mirrors.
- D. Polish glossy surfaces to a clear shine.
- E. Ventilating Systems:
 - 1. Clean permanent filters and replace disposable filters if units were operated during construction.
 - 2. Clean ducts, blowers and coils if units were operated without filters during construction.
- F. Broom clean exterior paved surfaces and rake clean other surfaces of the grounds.
- G. Prior to final completion, or OWNER occupancy, CONTRACTOR shall conduct an inspection of sight-exposed interior and exterior surfaces, and work areas to verify that the entire work is clean.

END OF SECTION

SECTION 01741

FINAL CLEANING

PART 1 GENERAL

1.01 SUMMARY

- A. The CONTRACTOR shall provide equipment, tools, materials, and labor required to maintain the project site in a clean and orderly manner throughout the duration of construction and for final cleaning and touch up at end of construction. This work shall include but not be limited to, sweeping, brushing, dust control, washing, waxing and polishing, debris removal, removal of excess materials, tools, equipment and scaffolding and final cleaning of installed work.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cleaning materials and equipment used shall be selected and employed with care to avoid scratching, marring, defacing, staining, or discoloring the surfaces cleaned. Cleaning materials shall be as recommended by the manufacturer of products and materials being cleaning.

PART 3 EXECUTION

3.01 CLEAN-UP DURING CONSTRUCTION

- A. Clean-up shall be performed as required to prevent accidents to personnel, protect work in place, and to affect the progress of the work in a timely and orderly manner.
- B. Construction clean-up shall consists of, but not be limited to, the removal of mud, oil, grease, sand, gravel, dirt, trash, scrap, debris, and excess materials from the work site on a continuous basis. Small scrap and debris may be collected in containers and large materials may be stockpiled in an area to be removed from the site periodically at the Contractor's cost.
- C. Immediately prior to the Contractors request for final inspection of the project or portion thereof, final cleanup shall be performed. Pavement damaged shall be repaired in a manner approved by the Engineer. Final grade in the area of the pipe installation shall be returned to the pre-construction elevation and condition.

END OF SECTION

SECTION 01770

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

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

1.02 RELATED SECTIONS

- A. Conditions of the Contract.
 - 1. Fiscal provisions, legal submittals, and additional administrative requirements.
- B. Project Record Documents - Division 1.
- C. Closeout Submittals - Division 1.

1.03 BENEFICIAL OCCUPANCY

- A. When the OWNER considers work is substantially complete for beneficial use, he will submit a letter to the CONTRACTOR informing intent to take early possession of the facility for partial use.
 - 1. The written notice shall describe the OWNER's reason for early beneficial occupancy.
- B. Adjust construction work schedule to accommodate the OWNER's plan to utilize the facility.
 - 1. Continue the work while allowing the OWNER full access and use of the facility.
- C. Requests for time extension or additional costs based upon the OWNER's early occupancy of the site and use of the facilities shall not be considered.
 - 1. Additional costs associated with the OWNER's early occupancy of the site shall be borne by the CONTRACTOR.

1.04 SUBSTANTIAL COMPLETION

- A. When the CONTRACTOR considers the work is substantially complete, he shall submit to the Engineer:

1. A written notice that the work, or designated portion thereof, is substantially complete.
 2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, the ENGINEER will make an inspection to determine the status of completion.
- C. Should the ENGINEER determine that the work is not substantially complete:
1. The ENGINEER will promptly notify the CONTRACTOR in writing, giving the reasons therefore.
 2. The CONTRACTOR shall remedy the deficiencies in the work and send a second written notice of substantial completion to the Engineer.
 3. The ENGINEER will reinspect the work.
- D. When the ENGINEER finds that the work is substantially complete, he will:
1. Prepare and deliver to the OWNER a tentative Certificate of Substantial Completion with a tentative list of items to be completed or corrected before final payment.
 2. After consideration of any objections made by the OWNER as provided by Conditions of the Contract, and when the ENGINEER considers the work substantially complete, he will execute and deliver to the OWNER and the CONTRACTOR a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

1.05 RE-INSPECTION FEES

- A. Should the ENGINEER perform re-inspections due to failure of the Work to comply with the claims of status of completion made by the CONTRACTOR:
1. The OWNER will compensate the ENGINEER for such additional services.
 2. The OWNER will deduct the amount of such compensation from the final payment to the CONTRACTOR.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SUMMARY

- A. Upon final inspection and before acceptance and final payment, the CONTRACTOR shall deliver to the OWNER guarantees and warranties, affidavits of payments of claims and Record Drawings.
- B. Required guarantees shall be bound in booklet form with covers properly labeled to identify the project and content.
- C. Maintain a complete set of Contract Documents at the project site and on which maintain a complete record of actual construction, which differs from what is shown in the Contract Documents.
 - 1. Show actual installed locations of buried pipe and conduit and other matters or equipment, which is indicated diagrammatically.
 - 2. Make markings in a neat, legible manner and full identified and/or explained by notes.

1.02 RELATED SECTIONS

- A. Conditions of the Contract: Fiscal provisions, legal submittals and additional administrative requirements.
- B. Project Record Documents - Division 1.
- C. Closeout Procedures - Division 1.

1.03 FINAL INSPECTION

- A. When the CONTRACTOR considers the work is complete, he shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been inspected for compliance with Contract Documents.
 - 3. Work has been completed in accordance with Contract Documents.

4. Equipment and systems have been tested in the presence of the OWNER's representative and are operational.
 5. Work is completed and ready for final inspection.
- B. The ENGINEER will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should the ENGINEER consider that the work is incomplete or defective:
1. The ENGINEER will promptly notify the CONTRACTOR in writing, listing the incomplete or defective work.
 2. Remedy the stated deficiencies and send a second written certificate to the ENGINEER that the work is complete.
 3. The ENGINEER will re-inspect the work.
- D. When the ENGINEER finds that the work is acceptable under the Contract Documents, he shall request the CONTRACTOR to make closeout submittals.

1.04 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

- A. Evidence of compliance with requirements of governing authorities.
- B. Project Record Documents: To requirements of Division 1.
- C. Spare Parts and Maintenance Materials: Division 1.
- D. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.

1.05 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the Engineer.
- B. Statement shall reflect all adjustment to the Contract Sum:
 1. The original Contract Sum.
 2. Additions and deductions resulting from:
 - a. Previous Change Orders
 - b. Allowances
 - c. Unit Prices

- d. Deductions for uncorrected work
- e. Penalties and Bonuses
- f. Deductions for liquidated damages
- g. Deductions for re-inspection payments
- h. Other adjustments

3. Total Contract Sum, as adjusted.

4. Previous payments.

5. Sum remaining due.

C. ENGINEER will prepare a final Change Order, reflecting approved adjustments to the Contract Sum where not previously made by Change Orders.

1.06 FINAL APPLICATION FOR PAYMENT

A. 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 01785

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Maintain at the site for the OWNER one record copy of:

1. Contract Drawings
2. Contract Specifications
3. Record Drawings
4. Addenda
5. Change Orders and other Modifications to the Contract
6. ENGINEER'S Field Orders or Written Instructions
7. Approved Shop Drawings, Working Drawings, and Samples
8. Field Test Reports
9. Construction Photographs

1.02 RELATED SECTIONS

- A. Construction Photographs and Video Recordings – Section 01321
- B. Shop Drawings, Product Data, and Samples – Section 01334
- C. Closeout Procedure – Section 01770

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in CONTRACTOR's field office apart from documents used for construction.
- B. File documents and samples in accordance with Construction Specifications Institute (CSI) Master Format number system.
- C. Maintain documents in a clean, dry, legible condition and in good order
1. Do not use record documents for construction purposes.

- D. Make documents and samples available at all times for inspection by the ENGINEER.
- E. As a prerequisite for monthly progress payments, the CONTRACTOR is to exhibit the currently updated "record documents" for review by the ENGINEER and the OWNER.

1.04 RECORD DOCUMENTS

- A. Label each document "RECORD" in neat large printed letters.
- B. Record information concurrently with construction progress.
- C. Drawings; Prepared a Certified Survey, by Professional Surveyor and Mapper (PSM) registered in the State of Florida, including elevations and stationing at increments specified by the ENGINEER, with the following information:
 - 1. Depths of various elements of foundation in relation to datum.
 - 2. Underground utilities.
 - a. Record horizontal and vertical locations of existing underground utilities (water, sewer, gas, electricity, signal cables, and drainage) impacted by the work, with ties from permanent features to manholes, valves, forcemain elbows, service lateral plugged ends, and connections to sewer mains and final surface grades, wherever it varies from existing grades and appurtenances uncovered during construction referenced to permanent surface improvements.
 - b. Record horizontal and vertical locations of new underground utilities and appurtenances: manholes, valves, elbows, fittings, service lateral plugged ends, connections to sewer mains, and final surface grades, referenced to permanent surface improvements.
 - 3. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
 - 4. Field changes of dimensions and details.
 - 5. Changes made by Field Order or by Change Order.
 - 6. Details not in original Contract Drawings.
 - 7. Equipment and piping relocations.
 - 8. Building and tank locations.

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. One set of record shop drawings for each process equipment, piping, (including casings) electrical system and instrumentation system.

1.05 SUBMITTAL

A. At the completion of work, the CONTRACTOR must deliver complete "As-Built" drawings to the ENGINEER for the OWNER. They shall consist of one (1) 24" x 36" reproducible set, six (6) 24" x 36" blackline sets, and one (1) CD consisting of the electronic CADD files, in the software version mentioned in Section 00800, Par. 10.

- 1. These "As-Built" drawings are to be signed and sealed by a Professional Surveyor and Mapper (PSM), currently registered and licensed in the state of Florida.**
- 2. The ENGINEER will supply the electronic CADD files to the CONTRACTOR in the software version mentioned in Section 00800, Par. 10.**
- 3. The "As-Built" electronic CADD files shall be generated in .dgn, .dwg, or .dxf file format, as specified by the ENGINEER.**

B. Accompany submittal with transmittal letter in duplicate, 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

C. Submittal of "As-Built" drawings shall be in accordance with Division 1.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SECTION 01787

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SUMMARY

- A. Compile product data and related information appropriate for OWNER's maintenance and operation of products furnished under Contract.
 - 1. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.
- B. Instruct OWNER's personnel in maintenance of products and in operation of equipment and systems.

1.02 RELATED SECTIONS

- A. Closeout Procedures - Division 1
- B. Shop Drawings, Product Data, and Samples - Division 1
- C. Closeout Submittals- Division 1
- D. Project Record Documents - Division 1

1.03 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel:
 - 1. Trained and experienced in maintenance and operation of described products.
 - 2. Familiar with requirements of this Section.
 - 3. Skilled as technical writers to the extent required to communicate essential data.
 - 4. Skilled as draftsman competent to prepare required drawings.

1.04 FORM OF SUBMITTALS

- A. Prepare data in form of an instructional manual for use by OWNER's personnel.

B. Format:

1. Size: 8 1/2 inches x 11 inches
2. Paper: 20 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. Reduce larger drawings and fold to size of text pages, but not larger than 11 inches x 17 inches.
5. Provide fly-leaf for each separate product, or each piece of operating equipment.
 - a. Provide types description of product, and major component parts of equipment.
 - b. Provide indexed tabs.
6. Cover:
 - a. Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS".
 - b. List:
 - 1) Title of Project
 - 2) Identity of separate structure as applicable.
 - 3) Identity of general subject matter covered in this manual.

C. Binders:

1. Commercial quality three-post binders with durable and cleanable plastic covers.
2. Maximum post width: 2 inches
3. When multiple binders are used, correlate the data into related consistent groupings.

1.05 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in systematic order.

1. Contractor, name of responsible principal, address and telephone number.
2. A list of each product required to be included, indexed to content of the volume.
3. List, with each product, name, address and telephone number of:
 - a. Subcontractor of installer
 - b. Maintenance CONTRACTOR, as appropriate
 - c. Identify area of responsibility of each
 - d. Local source of supply for parts and replacement.
4. Identify each product name and other identifying symbols as set forth in Contract Documents.

B. Product Data:

1. Include only those sheets that are pertinent to the specific product.
2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed.
 - b. Clearly identify data applicable to installation.
 - c. Delete references to inapplicable information.

C. Drawings:

1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams.
2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.

3. Do not use Project Record Documents as maintenance drawing.
- D. Written text, as required to supplement product data for the particular installation:
1. Organize in consistent format under separate headings for different procedures.
 2. Provide logical sequence of instructions of each procedure.
- E. Copy of each warranty, bond and service contract issued:
1. Provide information sheet for OWNER's personnel, give:
 - a. Proper procedures in event of failure.
 - b. Instances that might affect validity of warranties or bonds

1.06 MANUAL FOR MATERIALS AND FINISHES

- A. Submit five copies of complete manual in final form.
- B. Content; for architectural products, applied materials and finishes:
1. Manufacturer's data, giving full information on products.
 - a. Catalog number, size, and composition.
 - b. Color and texture designations.
 - c. Information required for re-ordering special-manufactured products.
 2. Instructions for care and maintenance.
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods, which are detrimental to product.
 - c. Recommended schedule for cleaning and maintenance.
- C. Content, for moisture-protection and weather-exposed products:
1. Manufacturer's data, giving full information on products:

- a. Applicable standards.
- b. Chemical composition.
- c. Details of installation.
- 2. Instructions for inspection, maintenance and repair.
- D. Additional requirements for maintenance data: Respective sections of Specifications.
- E. Provide complete information for products specified.

1.07 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit five 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 lubrication 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. Predicted list of 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. Contents, 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 panel-boards
 - a. Electrical service
 - b. Controls
 3. As-installed color coded wiring diagrams
 4. Operating procedures:

- a. Routine and normal operating instructions
 - b. Sequences required
 - c. Special operating instructions
- 5. Maintenance procedures:
 - a. Routine operations
 - b. Guide to "trouble-shooting"
 - c. Disassembly, repair and reassembly
 - d. Adjustment and checking
- 6. Manufacturer's printed operating and maintenance instructions
- 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
- 8. Other data as required under pertinent sections of specifications
- D. Prepare and include additional data when the need for such data becomes apparent during instruction of OWNER's personnel.
- E. Additional requirements for operating and maintenance data: Respective sections of Specifications.
- F. Provide complete information for product specified.

1.08 SUBMITTAL SCHEDULE

- A. Submit two copies of preliminary draft of proposed formats and outlines of contents of Operation and Maintenance Manuals within thirty (30) days after Notice to Proceed.
 - 1. The ENGINEER will review the preliminary draft and return one copy with comments.
- B. Submit two copies of completed data in final form no later than 30 days following the ENGINEER's review of the last shop drawing and submittal.
 - 1. One copy will be returned with comments to be incorporated into final copies.

- C. Submit specified number of copies of approved data in final form directly to the offices of the ENGINEER, Craig A. Smith & Associates, within 30 calendar days of product shipment to the project site and preferably within 30 days after the reviewed copy is received.
- D. Submit six copies of addendum to the operation and maintenance manuals as applicable and certificates as specified in Division 1 within 30 days after final inspection and plant start-up test.
- E. Final Operation and Maintenance submittals shall be in large three ring binders organized by specification Section and plainly marked.

1.09 INSTRUCTION OF OWNER'S PERSONNEL

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

1.10 ENGINEER'S O & M CHECKLIST

- A. The ENGINEER will review Operation and Maintenance Manuals submittals on operating equipment for conformance with the requirements of this Section.
 - 1. The review will generally be based upon the checklist presented on the following pages (Form 01780) for the benefit of the CONTRACTOR and his suppliers.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

FORM 01780
OPERATION AND MAINTENANCE DATA
REVIEW CHECKLIST

EQUIPMENT		SUBMITTAL DATE	
MANUFACTURER		APPROVAL TYPE	
SECTION NUMBER		DRAWING NUMBER	

- ☐ Does shop drawing and submittal match for model/series/configuration?
- ☐ Is color & printing correct on binder?
- ☐ Is submittal properly indexed?
- ☐ Does submittal pertain only to equipment being submitted?
- ☐ Is submittal easily understood and instructively arranged?
- ☐ Does submittal include start-up, shut-down, and trouble-shooting procedures?
- ☐ Are sufficient drawings and schematics included to supplement written description?
- ☐ For each piece of equipment supplied, is listing of name plate data provided and attached?
- ☐ Are drawings provided printed on paper eleven inches high and folded to eight and one half inches wide?
- ☐ Is proper and complete instruction for servicing included?
- ☐ Is there a suggested operating log sheet for equipment?
- ☐ Is a schedule for lubrication provided?
- ☐ Is there a recommended preventative maintenance schedule?
- ☐ Are necessary safety precautions clearly indicated where they relate to equipment?
- ☐ Is area representative information provided (Name, Address, Phone Number)?
- ☐ Are specified spare parts indicated and listed?

The following are points of rejection necessitating resubmittal by CONTRACTOR:

END OF SECTION

SECTION 02200

SITE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

- A. Provide equipment, materials, and labor and performing functions necessary to move personnel and equipment on site, set up offices, trailers, facilities, construction utilities, obtain permits, and prepare the sites for construction.
- B. Remove personnel, equipment, temporary facilities, and provide final clean up of the sites when construction is complete.

1.02 WORK SPECIFIED ELSEWHERE

- A. Contract Documents
- B. General Requirements - Division 1
- C. Temporary Utilities - Division 1
- D. Earthwork - Division 2
- E. Bituminous Concrete Pavement - Division 2
- F. Clearing and Grubbing - Division 2
- G. Construction Facilities - Division 1

PART 2 PRODUCTS

2.01 TEMPORARY FACILITIES

- A. Provide temporary facilities required for performing the work.

2.02 PARKING FACILITIES

- A. Provide parking facilities for personnel working on the project.
 - 1. No employee or equipment parking will be permitted on the OWNER's property except as specifically designated for CONTRACTOR's use.

2.03 PROJECT SIGNS

- A. Construction and installation of project sign is required and must be done in accordance with the OWNER'S requirements (Ref. Sec 00800).**

2.04 CONTRACTOR'S STAGING AREA

- A. At no expense to the OWNER, arrange for and provide staging area to base CONTRACTORS' office and for material and equipment storage.
 - 1. The OWNER will not provide any land for this purpose.

PART 3 EXECUTION

3.01 LAYOUT

- A. Set up construction facilities in a neat and orderly manner within a designated area at the location of his choice as approved by the OWNER and the ENGINEER.
- B. Accomplish required work in accordance with applicable sections of these specifications or as approved.
- C. Provide the services of a Professional Land Surveyor, currently licensed and registered in Florida, to provide necessary horizontal and vertical survey lines and control, based upon principal control points and bench marks provided by the OWNER, as required by the General Conditions.

3.02 OBSTRUCTIONS

- A. Some obstructions may not be shown.
 - 1. Bidders are advised to carefully inspect the existing facilities before preparing their proposals.
 - 2. The removal and replacement of minor obstructions such as electrical conduits, air, water, waste piping, and similar items shall be anticipated and accomplished, even though not shown or specifically mentioned.
- B. Major obstructions encountered that are not shown in the Drawings or could not have been foreseen by visual inspection of the site prior to bidding should immediately be brought to the attention of the ENGINEER.
 - 1. The ENGINEER will make a determination for proceeding with the work.

2. If the ENGINEER finds that the obstruction adversely affects the CONTRACTOR's costs or schedule for completion, a proper adjustment to the Contract will be made in accordance with the General Conditions.

3.03 HOUSEKEEPING

- A. Maintain the work site and the temporary facilities in a clean and orderly manner.
 1. The OWNER reserves the right to maintain the property in a neat and orderly state at the CONTRACTOR's expense if the CONTRACTOR fails to respond to notices by the OWNER within reasonable time.

3.04 DEMOBILIZATION

- A. At the completion of work on each phase or portion of the project, remove construction personnel, equipment, and temporary facilities from the site.
- B. Transporting unused materials belonging to the OWNER to a place of storage designated by the ENGINEER.
- C. Remove and dispose of other materials and debris resulting from the construction, to an approved site.
- D. Return areas to their original condition.

3.05 PROJECT SIGNS

- A. If the CONTRACTOR is required to erect project signs, the ENGINEER will direct where the signs are to be placed.
 1. Maintain signs in good condition until final completion of the project.
 2. Remove the signs and restore the sites when directed.

3.06 RECORDS

- A. Keep one record copy of Specifications, Drawings, Addenda, Modifications, and Shop Drawings at the site in good order and annotated to show changes made during the construction process.

END OF SECTION

SECTION 02220
SITE DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

- A. This section includes furnishing labor, materials, equipment and incidentals required for the demolition, relocation and/or disposal of building materials and equipment to be removed from the project.
- B. This section provides for the complete or partial removal and disposal of specified existing structures, foundations, slabs, piping, mechanical, electrical, existing (to be abandoned) piping and miscellaneous appurtenances encountered during construction operations.
- C. This Section calls attention to certain activities necessary to maintain and facilitate operation during and immediately following construction and do not purport to cover of the activities necessary.
 - 1. Diligently direct activities toward maintaining continuous operation of the existing facilities and minimizing operation inconvenience.
 - 2. Develop a Demolition and Removal Plan in accordance with Paragraph 1.06 of this Section.
- D. Demolition includes:
 - 1. Demolition, partial removal and cutting of existing masonry as required for the new construction.
 - 2. Distribution of salvageable and excess unacceptable material as specified below.
 - 3. Off-site disposal of excess and unacceptable materials.
- E. Examine the drawings regarding the existing system, visit the site and determine the extent of the work and operational conditions under which the work is to be perform.

1.02 PERMITS AND NOTICES

- A. Permits and Licenses:

1. Obtain necessary permits and licenses for performing the work and furnish a copy to the ENGINEER prior to commencing the work.
2. Comply with the requirements of the permits.

B. Notices:

1. Issue written notices of planned demolition to companies or local authorities owning utility conduit, wires or pipes running to or through the project site.
2. Submit copies of the notices to the ENGINEER.

C. Utility Services:

1. Notify utility companies or local authorities furnishing gas, water, electrical, telephone, or sewer service to remove equipment owned by them in structures to be demolished and to remove, disconnect, cap, or plug their services to facilitate demolition.

1.03 CONDITIONS OF STRUCTURES

- A. The OWNER and the ENGINEER assume no responsibility for the actual condition of the structures to be demolished or modified.
- B. Conditions existing at the time of inspection for bidding purposes will be maintained by the OWNER insofar as practicable.
 1. However, variations within the structure may occur prior to the start of demolition work.

1.04 RULES AND REGULATIONS

- A. The Standard Building Codes shall control the demolition, modification or alteration of the existing buildings or structures.
- B. No blasting shall be done on site.
 1. Do not bring to or store explosives on the project site.

1.05 DISPOSAL OF MATERIAL

- A. Salvageable or specifically requested material is the property of the OWNER.
 1. Dismantle material to such a size that it can be readily handled, and deliver the salvageable material requested by the OWNER to a storage area designated by the OWNER.

- B. Materials that the OWNER rejects shall become the CONTRACTOR's property and must be removed from the site.
- C. Haul concrete, concrete block, and unsalvageable brick to a waste disposal site.
- D. Haul other material to a waste disposal site.
- E. On site storage or sale of removed items is not allowed.

1.06 SUBMITTALS

- A. Submit to the ENGINEER for approval, six (6) copies of the proposed Demolition and Removal Plan for the structures and modifications specified below prior to the start of work.
 - 1. Include in the coordination of shutoff, capping and continuation of utility service as required.
 - 2. Include in the Demolition and Removal Plan, the following:
 - a. A detailed sequence of demolition and removal work to ensure the uninterrupted progress of the OWNER's operations, and the expeditious completion of the CONTRACTOR's work.
 - b. Evidence (by signature) of approval of the OWNER of the work plan.
- B. Before commencing demolition work, modifications necessary to bypass the affected structure will be completed.
 - 1. Actual work will not begin until the ENGINEER has inspected and approved the modifications, and authorized commencement of the demolition work.
- C. The above procedure must be followed for each individual demolition operation.

1.07 TRAFFIC AND ACCESS

- A. Conduct demolition and modification operations, and the removal of equipment and debris to ensure minimum interference with roads, streets, walks both on-site and off-site and to ensure minimum interference with occupied or used facilities.
- B. Special attention is directed towards maintaining safe and convenient access to the existing facilities by plant personnel and plant associated vehicles.**
 - 1. Relocation of the CONTRACTOR's materials, labor, or equipment due to uncoordinated interruption will be at the CONTRACTOR's expense.**

- C. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the ENGINEER and Plant Supervisor.

- 1. Provide alternate routes around closed or obstructed traffic in access ways.

1.08 DAMAGE

- A. Promptly repair damage caused to adjacent facilities by demolition operations as directed by the ENGINEER and at no cost to the OWNER.

1.09 UTILITIES

- A. Maintain existing utilities to remain in service and protect against damage during demolition operations.

- B. Do not interrupt existing utilities serving occupied or used facilities, except when authorized by the ENGINEER.

- 1. Provide temporary services during interruptions to existing utilities as acceptable to the ENGINEER.

- C. Cooperate with the OWNER to shut off utilities serving structures of the existing facilities as required by demolition operations.

- D. Assume responsibility for making necessary arrangements and performing work involved in connections with the discontinuance or interruption of public and private utilities or services under the jurisdiction of the utility companies.

- E. At the service mains disconnect and terminate utilities being abandoned

- 1. Maintain conformance with the requirement of the utility companies or the municipality owning or controlling them.

1.10 POLLUTION CONTROL

- A. For pollution control, use water sprinkling, temporary enclosures, and other suitable methods as necessary to limit the amount of dust and dirt rising and scattering in the air to the lowest level of air pollution practical for the conditions of work.

- 1. Comply with the governing regulations.

- B. Clean structures and improvements of dust, dirt and debris caused by demolition operations as directed by the ENGINEER.

- 1. Return areas to conditions existing prior to the start of work.

1.11 QUALITY CONTROL

- A. Protect existing materials and equipment to be salvaged or reused from damage.
- B. Cap or plug pipelines to be abandoned.
 - 1. Place covers and label junction boxes, conduits and wire as abandoned.
- C. Leave exposed ends of pipe and conduit or junction boxes covered and safe.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SEQUENCE OF WORK

- A. The sequence of demolition and renovation of existing facilities will be in accordance with the approved Demolition and Removal Plan as specified in Paragraph 1.06 of this Section.
- B. Reduce the out of service time for the equipment to be removed, refurbished, and relocated.

3.02 REMOVAL OF EXISTING PROCESS EQUIPMENT, PIPING, AND APPURTENANCES

- A. Clean, flush, and drain equipment, piping, and appurtenances.
 - 1. Equipment to be retained by the OWNER as specified in Paragraph 1.05 above shall be dismantled sufficiently to permit thorough cleaning and draining.
 - 2. Leave valves open.
 - 3. Cap and sleeve abandoned piping.
 - 4. Plug and seal openings remaining after removal of the existing equipment, piping, and appurtenances, as directed by the ENGINEER.

3.03 STRUCTURES TO BE COMPLETELY DEMOLISHED

A. Demolish existing structures as shown in the Drawings.

- 1. Demolish above ground structures to make room for construction or new facilities, unless otherwise shown in the Drawings.**

- 2. Remove demolished material and equipment from site.**
 - 3. Remove mechanical, electrical, instrumentation, piping, and miscellaneous appurtenances before commencing structural demolition.**
- B. Removal of existing structures by blasting will not be acceptable.

END OF SECTION

SECTION 02231

CLEARING AND GRUBBING

PART 1 GENERAL

1.01 SUMMARY

- A. Supply equipment, materials, and labor and performing functions required for clearing and grubbing the work site in preparation for the Construction.
- B. Clear and grubbing the area within the limits of construction as required, including utility easements.

1.02 WORK SPECIFIED ELSEWHERE

- A. General Conditions
- B. General Requirements - Division 1
- C. Site Preparation - Division 2
- D. Earthwork - Division 2

1.03 STANDARDS AND REGULATIONS

- A. Comply with regulations and ordinances of the State of Florida, County, and City regarding burning and disposal of debris resulting from the clearing and grubbing operation.

1.04 SUBMITTALS

- A. Submit for approval, the location of sites to be used for disposal of debris resulting from the clearing and grubbing operation.

1.05 MEASUREMENT AND PAYMENT

- A. Measurement and payment will be included in the lump sum prices bid for each Construction Work Section, as shown on the Bid Schedule, for which price and payment shall constitute full compensation for furnishing materials, equipment and performing work in connection therewith.

PART 3 EXECUTION

3.01 CONSTRUCTION

- A. The work of clearing and grubbing shall include the removal and satisfactory disposal of structures and of other obstructions, including underground obstructions, except for work, which might be specifically included for removal under other items of work.
- B. Deposits of muck, peat, bark, trash, or other debris occurring within the limits of clearing and grubbing or where directed by the ENGINEER shall be removed to their full depth and backfilled with native sand.
- C. Protect from injury property obstructions that are to remain in place, such as buildings, sewers, drains, water, or gas pipes, except for unusual cases when so directed by the ENGINEER.
- D. Areas of the right-of-way outside of the limits of construction may be shown in the Drawings or designated by the ENGINEER to be landscaped.
- E. Clearing and grubbing shall include removal of undesirable trees, stumps, undergrowth, and vegetation within the areas of work.
- F. Save natural growth and trees for landscaping as the ENGINEER directs.
- G. Standard clearing and grubbing shall consist of the complete removal and disposal of sidewalks, drives, trees, shrubs, walls, timber, brush, stumps, roots, grass, weeds, sawdust, rubbish, and other obstructions resting on or protruding through the surface of the existing ground and the excavated areas.
- H. Remove stumps, roots, and other debris from excavation for construction of roadway embankment, roadway base, or building pads, to a depth of at least one (1) foot below the ground surface.
- I. Plow the surface to a depth of not less than six (6) inches and remove stumps and roots thereby exposed to a depth of at least one (1) foot.
- J. Remove stumps and roots protruding through or appearing on the sides and surface of the completed excavation to a depth of at least one (1) foot.

3.02 DISPOSAL OF MATERIALS

- A. Timber, stumps, brush, roots, rubbish and other objectionable material resulting from clearing and grubbing shall be disposed of by the CONTRACTOR in locations and by methods approved by the ENGINEER.
- B. Burning shall be subject to applicable laws, ordinances, and regulations and shall be done at locations where trees and shrubs adjacent to the cleared area will not be harmed.
 - 1. Obtain necessary permits for on-site burning.
- C. Where burning is prohibited by law, ordinance, or regulation, dispose of the materials within approved areas or hauled to the county landfill in accordance with local laws and regulations.
- D. Applicable landfill or dumping fees will be paid by the CONTRACTOR.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish equipment, materials, and labor and performing functions required for earthwork as specified in the Drawings and Specifications as well as unspecified earthwork necessary to complete the work as specified, including demucking, excavating, filling, grading, compaction, and disposal of excess material.
- B. Any list of equipment and/or materials set forth in this section shall not be taken to exclude other incidentals necessary to complete the work in accordance with the Drawings and Specifications for the intended use.

1.02 RELATED SECTIONS

- A. General Conditions - Bidding and Contract Requirement
- B. General Requirements - Division 1
- C. Site Conditions - Division 1
- D. Payment Procedures - Division 1
- E. Site Preparation - Division 2
- F. Pipe and Tubes - Division 2

1.03 STANDARDS AND REGULATIONS

- A. Florida Department of Transportation - Standard Specifications for Road and Bridge Construction - Latest Edition.
- B. American Association of State Highway and Transportation Officials (AASHTO).

1.04 SUBMITTALS

- A. Submit a schedule of earthwork activities together with an estimated list of equipment to be used.
- B. The schedule shall be subject to approval by the ENGINEER and shall be updated periodically as requested by the ENGINEER.

1.05 MEASUREMENT AND PAYMENT

- A. Measurement and payment will be compensated on a unit and/or lump sum price as delineated in the Proposal Bid Form for which price and payment shall constitute full compensation for furnishing labor, equipment, and materials to perform work in connection therewith.

1.06 GUARANTEES

- A. Guarantee materials and work performed for a period of one (1) year from the date of substantial completion.
- B. Take corrective action to eliminate defective materials or workmanship for the guarantee period.

1.07 TESTS AND CERTIFICATES

- A. Perform compaction tests as specified, as requested by the ENGINEER, and in accordance with AASHTO.

1.08 EXISTING CONDITIONS

- A. Project borings and soils report are presented in Division 1.

PART 2 PRODUCTS

2.01. BEDDING AND BACKFILL:

- A. Refer to Division 2 Excavation and Fill and as shown in the Drawings.

B. UNSATISFACTORY MATERIALS

- 1. Unsatisfactory materials, as are identified below.
 - a. Materials that cannot be satisfactorily placed and compacted to a stable and durable condition.
 - b. Soil that contains excessive moisture or moisture that will limit the degree of compaction.
 - 1) At the CONTRACTORS option and expense, material may be dried and used for backfill.
 - 2) New material shall be at CONTRACTORS expense.

- c. Materials including, but not limited to, materials containing roots, loam, wood, or other organic matter, trash, debris, muck, sod, peat, or other objectionable materials which may be compressible or cannot be properly compacted.
- d. Man-made fills, refuse, or backfills from previous construction.

B. UNYIELDING MATERIALS

- 1. Shall consist of rock and gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

D. SATISFACTORY MATERIALS

- 1. Refer to the details shown in the Drawings for specific requirements.

E. ROCK BEDDING, HAUNCHING, AND INITIAL BACKFILL MATERIAL

- 1. Rock bedding shall meet the Florida Department of Transportation Standard Specification for No. 57 stone.
- 2. Pipe haunching shall contain good clean structural type fill.
- 3. Initial backfill material shall be common fill as described above.

F. BACKFILL MATERIALS

- 1. Shall consist of satisfactory material consisting of natural, predominantly well graded materials with no more than 40 percent by weight passing the No. 200 sieve and at a moisture content that will facilitate compaction, free from stones of such size as recommended by the pipe manufacturer, or larger than 2 inches in any dimension, whichever is smaller.
- 2. The backfill material shall be free of stones larger than 1 inch in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, when pipe is coated or wrapped for protection against corrosion.
- 3. Shall be clean earth fill, composed of sand, sand and clay, sand and rock, or crushed rock.
- 4. Where concrete or other encasement of pipe or other utilities is indicated, the backfill shall begin after the encasement has been inspected and approved and has attained 3/4 of its designed strength.

5. Material for the first layers of backfill shall be lowered to within 2 feet above the top of pipes before it is allowed to fall on the pipes, unless the material is placed with approved chutes or other devices that protect the pipes from the impact of stones conveyed from greater height.

G. FINE MATERIALS

1. Shall be carefully placed and tamped around the lower half of the utility; backfilling shall be carefully continued in layers not exceeding 6-inches above the top of the utility, using the best available material from the excavation, if approved, and excluding stones or rock fragments larger than:

3 inches	On concrete, cast-iron or steel pipe
1 1/2 inches	On clay pipe
1 inch	On plastic pipe
1/2 inch	On fiber and asbestos cement pipe

H. BORROW MATERIALS

1. Shall be used if suitable material from the excavation is not available.

2.02 PLASTIC WARNING TAPE:

- A. Plastic marking tape shall be acid and alkali resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch.
- B. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise.
- C. The tape shall be manufactured with integral wires, foil backing, or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep.
- D. The tape shall be of a type specifically manufactured for marking and locating underground utilities.
- E. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion.
- F. Tape color shall be as specified in Table 1 and shall bear a continuous printed inscription describing the specific utility.

TABLE 1. Tape Color

Red:	Electric
Orange:	Telephone, Alarm, and Communications
Blue:	Water Systems
Green:	Sewer Force Mains, Sewer Service Laterals

2.03 GEOTEXTILE FILTER FABRIC:

- A. Filter fabric for mats and liners shall be a pervious sheet of polyester, nylon, or polypropylene filaments woven or otherwise formed into a uniform pattern with distinct and measurable openings.
- B. The filter fabric shall provide an Equivalent Opening Size (EOS) no finer than the US Standard Sieve No. 100 and no coarser than the US Standard Sieve No. 50.
 - 1. EOS is defined as the number of the US Standard Sieve having openings closest in size to the filter fabric openings.
- C. The filaments shall consist of a long-chain synthetic polymer composed of at least 85 percent, by weight, of propylene, ethylene, or vinylidene-chloride.
- D. The filaments shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistant to deterioration due to ultraviolet and heat exposure.
- E. The fabric shall have a minimum physical strength of 50 pounds per inch in direction when tested in accordance with ASTM D 1682, using the Grab Test Method with one square inch jaws and a constant rate of travel of 12 inches per minute.
- F. Elongation at failure shall be between 30 and 70 percent.
- G. The fabric shall be constructed so that the filaments will retain their relative position with respect to each other.
- H. The edges of the fabric shall be selvaged or otherwise finished to prevent the outer material from pulling away from the fabric.
- I. The fabric shall be woven into a width such that it may be installed without longitudinal seams.

PART 3 EXECUTION

3.01 DEMUCKING

- A. Muck, organic matter, or other unsuitable material within the limits of the worksite, shall be excavated and removed.
- B. Depth of removal shall be that required to reach suitable material.
- C. The muck hole shall be dewatered to provide visual inspection by the ENGINEER.
- D. The muck shall be removed in such a manner as to prevent the unsuitable materials from mixing with suitable material to be used for backfilling.
- E. Where muck is encountered at the boundary of the site; sheeting shall be installed and left in place to preclude future damage to the installed fill by adjacent muck.
- F. Suitable material shall be placed and compacted where muck or other unsuitable material has been removed and as required to elevate the site to finish grade as specified in this section.
- G. Muck and other unsuitable material shall be disposed of at locations secured by the CONTRACTOR and approved by the ENGINEER.
- H. Furnish to the ENGINEER, a written release from the OWNER of the property on which the excess material is disposed, stating that the agreements have satisfactorily been fulfilled.
- I. Material shall be spread in a manner to drain properly and not disturb existing drainage conditions.
- J. Where approved by the ENGINEER muck may be stockpiled and used for top dressing on areas to be grassed.
 - 1. The muck to be used for top dressing shall be free from appreciable quantities of hard clods, stiff clay, hard pan, gravel, brush, large roots, or other deleterious materials, and of reasonably uniform quality.
 - 2. The organic content shall be at least 5 percent and the pH shall be in the range of 5.0 to 7.0.

3.02 UTILITIES

- A. Furnish equipment, materials, and labor required to complete excavating, trenching and backfilling for utilities, including dewatering, shoring, bracing, utility bed compacting, protecting slabs, restoration of surfaces, and disposing of surplus materials as identified in the Drawings and/or Specifications.

- B. Length of trench to be excavated ahead of pipelaying shall be limited to sufficient trench for one day's pipe laying operation.
- C. Where existing utilities are indicated, or their presence is suspected, employ appropriate detection methods to locate the utilities.
- D. Excavation in the vicinity of utilities shall be carefully carried out to prevent damage to the existing utilities.
- E. Excavation within 12-inches of existing utility shall be by hand.

3.03 TRENCH EXCAVATION

- A. Where trenches are to be cut in pavement, the pavement cut shall be made ahead of the excavation, leaving a uniform edge with minimum disturbance of the remaining pavement.
- B. Pavement pieces 6-inches and larger are not to be mixed with other excavated material, but are to be disposed of away from the work site before the remainder of the excavation is made.
- C. Minimum width of the trench shall be equal to the outside diameter of the pipe at the joint plus 12-inches on each side.
- D. Maximum trench width shall not exceed the nominal diameter plus 2-feet.
- E. Trench walls shall be vertical, however, for large diameter piping, or where deep trenching is required, sloped sides may be permitted subject to the approval of the ENGINEER.

3.04 BEDDING

- A. The pipe bed shall be adequately graded and shaped such that the pipe will be in continuous contact for its full length and the bottom 1/3 of its circumference, spaces for joints, fittings, manholes and pump stations shall be excavated with space to install joint couplings and other connecting devices.
- B. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing.
- C. Stones of one inch or greater in dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.
- D. Filter material and bedding shall be provided under utility lines, where indicated or specified.

- E. Trench grade for utilities or structures not requiring special bedding material are to be defined as the grade of the bottom surface of the utility or structure to be considered to be part of this work.
- F. Trench grade for utilities in rock shall be defined as 4-inches below the outside of the bottom of the utility or structure, which 4-inches shall be backfilled with suitable bedding material.
- G. Overexcavation made in error shall be backfilled to trench grade with suitable compacted fill at the CONTRACTOR's expense.

3.05 GRAVITY PIPE AND STRUCTURES

- A. Where the Drawings indicate a force main paralleling a gravity sewer, the CONTRACTOR may utilize a common trench, subject to the ENGINEER's approval.
- B. Where a common trench is used, the force main shall be founded on a shelf of undistributed soil.
- C. Excavation for manholes and wetwells, or similar structures, shall be of sufficient size to permit the installation of precast structures or the placement and removal of forms for the full length and width of cast-in-place structure footings and foundations, as shown.
- D. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation.
- E. Excavation to the final grade level shall be verified before the concrete or masonry is to be placed.

3.06 ROCK

- A. Rock shall be cleaned of loose debris and cut to a firm surface, either level, stepped or serrated, as shown or as directed.
- B. Loose disintegrated rock and thin strata shall be removed.

3.07 SHEETING

- A. Sheet piling and bracing shall be provided and continuously maintained where required to prevent damage to property, injury to persons, or erosion and cave-ins.
- B. Where practical sheet piling shall be driven prior to excavation to avoid loss of material to be retained.

- C. When excavating below the sheeting, care shall be taken to avoid trimming that will cause voids in the banks to be retained.
- D. Sheeting and bracing shall be removed as backfilling progresses and shall be completely removed when the trench has been backfilled to at least 1/2 its depth or when removal will not endanger construction or adjacent structures.
- E. Voids caused by removal shall be backfilled immediately with sand or other approved fine material and compacted by ramming or by watering.
- F. When required and directed in writing, by the ENGINEER, sheeting, bracing, or shoring shall be left in place and the top shall be cut off neatly at an approved elevation below finished grade.

3.08 SEQUENCE OF EXCAVATION

- A. Excavation in a given area shall proceed from the deepest excavation to the shallowest excavation to avoid undermining completed roadways, utilities or structures.

3.09 DEWATERING

- A. Utilities are to be laid "in the dry."

- 1. Trench excavations may be dewatered by using one or more of the following methods:

- a. Well point systems:

- 1) Shall be efficient enough to lower the water level in advance of the excavation and maintain the level continuously to keep the trench bottom and sides firm and dry
- 2) Shall designed especially for this type of service, and the pumping unit used is to be capable of maintaining a high vacuum and at the same time of handling large volumes of air as well as water.
- 3) Shall be operated in such a manner as to prevent damage to other property.

- b. Gravity underdrain systems

- 1) Shall have adequate capacity to lower the water level in the trench such that the main utility may be laid "in the dry."

- c. Sumps

- 1) Shall be provided at various points along the route of the underdrain system for the use of pumps to remove the water.
 - 2) If the material encountered at trench grade is suitable for passage of water without destroying the sides or bottom of the trench sumps may be provided at intervals at the at the side of the main trench excavation and pumps may be used to lower the water level by taking their suction from these sumps.
 - 3) Care shall be exercised to prevent the movement of utility foundation material and a bed of crushed stone may be required.
- B. Grading shall be done, as may be necessary to prevent surface water from flowing into the excavation, and water accumulating therein shall be removed so that the stability of the bottom and sides of the excavation is maintained.
- C. The excavation shall be dewatered by appropriate methods where and when necessary to maintain a dry and stable excavation bottom, and keep free from water during construction.
- D. Obtain required dewatering permits from applicable agency having jurisdiction.
1. Costs of complying with such permit requirements shall be borne solely by the CONTRACTOR.
- E. Water from trench dewatering operations shall be disposed of without causing damage or inconvenience to the work, the surrounding area or general public.

3.10 OBSTRUCTIONS

- A. The exact location of pipes, conduits, wires, mains, footings and other underground structures and obstructions encountered in trenching or excavating shall be determined.
- B. The obstructions shall be protected adequately from damage or displacement.
- C. Damage thereto shall be promptly and properly repaired, and displacements shall be corrected.
- D. Survey monuments or benchmarks, which are to be disturbed by this work, shall be carefully witnessed before removal and replaced upon completion of the work by a Registered Land Surveyor.

3.11 BEDDING, BACKFILL, AND COMPACTION

- A. Bedding shall be of the type and thickness shown.

- B. Maximum stone size shall not exceed 3/4-inch, or the maximum size recommended by the pipe manufacturer, whichever is smaller.
- C. Initial backfill material shall be placed in layers of a maximum of 6 inches loose thickness and compacted with approved tampers to 95 percent maximum density and to a height of at least 1-foot above the utility pipe or conduit.
- D. The first layers of the backfill shall be thoroughly compacted and be completed before the remainder of the trench is backfilled.
 - 1. Compaction shall be equal to 98 percent of maximum density, as determined by AASHTO Specification T-99.
- E. Compaction by water flooding or jetting will not be permitted.
- F. Density tests for determination of the above-specified compaction shall be made by a testing laboratory designated by the ENGINEER and at the expense of the CONTRACTOR.
- G. Test locations will be determined by the ENGINEER, but shall be spaced not more than 300 feet apart where the trench cut is continuous in pavements or areas to be paved.
- H. Tests shall also be made where a trench crosses a paved roadway or future paved roadway.
- I. If test results are unsatisfactory, re-excavate and re-compact the backfill at his expense until the desired compaction is obtained.
- J. For continuous trenches, additional compaction tests shall be made on each side of an unsatisfactory test to determine the extent of re-excavation and re-compaction necessary.
- K. Spacing of the additional tests will be determined by the ENGINEER.
- L. Backfilling operations for excavations for utilities within buildings that have soil-bearing floor slabs shall be conducted in a manner resulting in densities comparable to the densities of the soil adjacent to the excavation.
- M. Excavation within buildings shall be maintained free of water until the backfilling is completed.
- N. Flooding or puddling with water to consolidate backfill may be done in unpaved areas, only when approved by the ENGINEER.
- O. Where approved, the flooding or puddling operation shall be repeated with each 2 feet of backfill placed.

- P. Mechanical compaction shall be accomplished using pneumatic or gasoline-powered tampers and/or flat plate vibrators, except in close proximity to the utility in the first layers of the backfill where compaction is to be obtained with hand-operated tamping devices.

3.12 BACKFILL ON SIDES OF PIPE

- A. The backfill shall be brought up evenly on both sides of pipe for the full length of the pipe.
- B. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe.

3.13 BACKFILL ABOVE THE PIPE

- A. The remainder of the trench shall be backfilled in layers not exceeding 9-inches.
- B. Maximum dimension of a stone or rock fragment shall be 6-inches.
- C. Backfill shall be suitably compacted by rolling, tamping, or other settlement.
- D. When trenches are cut in pavements or areas to be paved, compaction, as determined by AASHTO Specification T-99, shall be equal to 98 percent of maximum density; in other areas compaction shall not be less than 98 percent of maximum density.
- E. Backfill for sidewalks, turned, or seeded area and miscellaneous areas not specifically designated above shall be deposited in layers of a maximum of 10 inches loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils.
- F. Plastic warning tape shall be placed directly over the pipes and conduits at a depth of 18 inches below finished grade for the sewage force main, sewer service laterals, water lines, electric lines, alarm and communications lines.

3.14 SLAB

- A. Where insufficient cover, excessive loads or local jurisdiction require, a protective concrete slab 6 inches thick, as indicated in the Drawings or as required by local authority, whichever is of greatest depth, shall be provided.
- B. The trench shall be properly stepped back, as required, but the width of the slab shall not be less than the width of the trench plus 2 feet.
- C. Concrete shall be ready-mixed and have twenty-eight (28) day compressive strength of 3,000 psi.

1. Finished top surface shall be screened.
- D. Minimum reinforcement shall be welded wire fabric, 6 inches by 6 inches - w2.9 by w2.9.
- E. Top of slab shall be 1-inch minimum below finished grade of the final surface course.

3.15 EXISTING OBSTRUCTIONS

- A. Pavement cut or damaged in connection with the work under this section shall be rebuilt or repaired.
- B. Restored pavement shall be at least equal in every respect to the pavement that was cut or damaged, including the base course, surface treatment and grade.
- C. Temporary sand seal coat pavement surface shall be applied to the cut or damaged areas.
- D. This temporary surfacing shall be replaced by the final restored pavement.
- E. Sand seal coat temporary surfacing shall not be removed until fifteen (15) days after it has been constructed.
- F. Existing pavement shall be cut back a minimum of 1 foot beyond each edge of the pavement that was cut when the trenching was done or 1 foot beyond each edge of the trench, whichever is greater.
- G. Temporary surfacing, backfill, existing pavement and its base course shall be removed to a depth of 7 inches or to the depth indicated.

3.16 STOCKPILING OF SUITABLE EXCESS MATERIAL

- A. During excavation, excess material from one trench area that is satisfactory for backfilling shall be stockpiled for use in other areas of the work in an orderly manner, at a distance from the banks of the trench sufficient to avoid overloading and to prevent slides or cave-ins.
- B. Failure to protect the stockpiles and allowing material to become unsatisfactory as a result, such material, if directed, shall be removed and replaced with satisfactory on-site or imported material from approved sources at no additional cost to the OWNER.
- C. Excavated material not required or not satisfactory for backfill shall be removed from the site and shall be disposed of in designated areas.

- D. Excess suitable material shall be carefully stockpiled for use in other portions of the work, as specified below.
- E. Debris and excess material shall be disposed of off site, as approved by the ENGINEER.

END OF SECTION

SECTION 02310

GRADING

PART 1 GENERAL

1.01 SUMMARY

- A. Perform grading work within the limits, elevations and grades indicated in the Drawings and as specified herein.
- B. This Section specifies material and placement of fill above existing grades that is not to be located under roads or under structures.

1.02 QUALITY CONTROL

- A. Grade the site to the required elevations.
- B. Spot elevations are shown in the Drawings and uniformly slope the finished surfaces between these locations.
- C. Excavated material meeting the requirements noted in the paragraph "Fill" may be used in the formation of embankments as shown in the Drawings.
- D. Provide from off-site sources additional fill material required to complete the embankments.

PART 2 PRODUCTS

2.01 FILL

- A. Fill material shall meet the requirements as described in Division 2 - "Earthwork".
- B. Fill material shall be reviewed by the Engineer prior to use.
- C. Determine the volume of material required for the site.

PART 3 EXECUTION

3.01 GRADING AND COMPACTION

- A. Place fill material in lifts not to exceed 12-inches and compacted to a density of not less than 95 percent of maximum dry density at optimum moisture as determined by ASTM D1557 method D.

- B. Place fill material with a moisture content within plus or minus 2 percentage points of optimum.

3.02 FINE GRADING

- A. Fine grade disturbed areas after structures, bases, and pavements are completed and the yard piping trenches backfilled.
- B. Remove lumber, undesirable materials and rocks larger than the 3-inch size from the surface.
- C. Shaped and sloped the completed surface to drain away from the structures.
- D. Completed surface elevations shall be within 0.1 foot of the elevation shown in the Drawings, unless directed by the ENGINEER.
- E. Minor adjustments to line and grade may be required as the work progresses in order to satisfy field conditions.

END OF SECTION

SECTION 02315

EXCAVATION AND FILL

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish labor, materials, equipment, and incidentals necessary to perform excavation, backfill, grading, and slope protection required to complete the piping work, as shown in the Drawings and Specifications.
- B. The work shall include, but not necessarily be limited to: manholes, pits and pipe, bedding, backfilling, fill and required borrow; grading and disposal of surplus and unsuitable materials; and related work such as sheeting, bracing, and water handling.
- C. Provide trench safety systems such as sheeting and bracing in accordance with state and local regulations.
- D. No claims for additional monies will be allowed or considered based on substrata or ground water conditions.
- E. Prior to commencing the excavation, submit a plan of CONTRACTORS proposed operations to the ENGINEER for review.

1.02 RELATED SECTIONS

- A. Site Preparation - Division 2
- B. Earthwork - Division 2
- C. CONTRACTOR's Quality Control - Division 1

1.03 REFERENCES

- A. Florida Chapter 90-96 "Trench Safety Act".

1.04 TRENCH PROTECTION

- A. Construct and maintain sheeting and bracing as required to support the sides of excavations, to prevent movement which could diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing piping and foundation material from disturbance, undermining, or other damage.

- B. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed they shall be immediately filled and compacted.
- C. For pipe trench sheeting, no sheeting is to be withdrawn if driven below mid-diameter of pipe, and no wood sheeting shall be cut off at a level lower than 1 foot above the top of pipe unless otherwise directed by the ENGINEER.
- D. If during the progress of the work the ENGINEER decides that additional wood sheeting should be left in place, he may direct the CONTRACTOR in writing.
- E. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given by the ENGINEER for an alternate method of removal.
- F. 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.
- G. Voids left or caused by withdrawal of sheeting shall immediately be refilled with sand or ramming with tools especially adapted to that purpose, by watering or otherwise as may be directed.
- H. The right of the ENGINEER to order sheeting and bracing left in place shall not be construed as creating obligation on his part to issue these orders, and his failure to exercise his right to do so shall not relieve the CONTRACTOR from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the CONTRACTOR to leave in place sufficient sheeting and bracing to prevent caving or moving of the ground.

1.05 JOB CONDITIONS

- A. Examine the site and review the available test borings or undertake soil borings prior to submitting bid, taking into consideration conditions that may affect work.
- B. Assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the investigation was made.
- C. Existing Utilities: Locate existing underground utilities in the areas of work.
 - 1. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
 - 2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the ENGINEER and the OWNER of such piping or utility immediately for directions.

3. Cooperate with OWNER and utility companies in keeping respective services and facilities in operation.
 4. Repair damaged utilities to satisfaction of utility OWNER.
 5. Demolish and completely remove from site existing underground utilities indicated in the Drawings to be removed.
- D. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
1. Operate warning lights as recommended by authorities having jurisdiction.
- E. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

1.06 SUBMITTALS

- A. Furnish the ENGINEER, for approval, laboratory test report of a representative sample of fill material obtained from on site sources weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of this material.
- B. For each material obtained from other than on site sources, notify the ENGINEER of the source of the material and shall furnish the ENGINEER, for approval, laboratory test reports of a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of this material.

PART 2 PRODUCTS

2.01 MATERIALS

A. Description:

1. Materials for use as base, fill and backfill shall be described below:
 - a. Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M-145, soil classification Groups A-1, A-2-4, A-2-5, and A-3.
 - b. Unsatisfactory soil materials are those defined in AASHTO M-145 soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 along with peat and other highly organic soils.

B. Structural Fill:

1. Structural fill material shall be a well graded, suitable soil material consisting of a minimum of 60 percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressible percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressed material.
2. Rock in excess of 2 1/2-inches in diameter shall not be used in the fill material.
3. Structural fill shall not contain hardpan, stones, rocks, cobbles, or other similar materials.

C. Common Fill:

1. Common fill material shall be satisfactory soil material containing no more than 20 percent by weight finer than No. 200 mesh sieve.
2. It shall be free from organic matter, muck, marl, and rock exceeding 2 1/2-inches in diameter.
3. Common fill shall not contain broken concrete, masonry, rubble or other similar materials.
4. Materials falling within the above Specifications, encountered during the excavation, may be stored in segregated stockpiles for reuse.
5. Material, which in the opinion of the ENGINEER is not suitable for reuse, shall be spoiled as specified herein for disposal of unsuitable materials by the CONTRACTOR.

D. Rock Bedding:

1. Rock bedding shall be 3/8-inch to 3/4-inch washed and graded limerock.
2. This rock shall be graded so that 99 percent will pass a 3/4-inch screen and 80 percent will be retained on a No. 8 screen.
3. Material meeting the Florida Department of Transportation Standard Specification for No. 57 stone shall be acceptable.

PART 3 EXECUTION

3.01 GENERAL

- A. Excavation, backfill, and grading necessary to complete the work shall be made by the CONTRACTOR and this cost shall be included in the Contract price.

- B. Material shall be furnished as required from off site sources and hauled to site.
- C. Take necessary precautions to maintain the work area in a safe and workable condition.
- D. Protect work by flagging, marking, lighting and barricading.
- E. Preserve and protect existing above and underground structures, pipelines, conduits, cables, drains, or utilities.
- F. Failure of the Drawings to show the existence of these obstructions shall not relieve the CONTRACTOR from this responsibility.
- G. The cost of repair from damage, which occurs to these obstructions during or as a result of construction, shall be borne by the CONTRACTOR without additional cost to the OWNER.
- H. Trench Boxes, Drag Boxes, or Drag Shields made of steel may be used.

3.02 TRENCH EXCAVATION

- A. Excavation for trenches required for the installation of pipes shall be made to the depths indicated in the Drawings.
- B. Excavate trench to provide minimum of 36-inch clear cover over the pipe bell unless otherwise noted in the Drawings.
- C. Excavate in a manner and to a width that will give suitable room for laying the pipe within the trenches, for bracing and supporting and for pumping and drainage facilities.
- D. The trench width at the top of the pipe shall not exceed the allowable as determined by the depth of cut and indicated in the Drawings.
- E. Rock shall be removed to a minimum 8-inches clearance around the bottom and sides of the pipe or ducts being laid.
- F. Where pipe is to be laid in limerock bedding or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench remains undisturbed.
- G. Where the pipes or ducts are to be laid directly on the trench bottom the lower part of the trenches shall not be excavated to the trench bottom by machinery.

- H. The last of the material being excavated shall be done manually in such a manner that will give a flat bottom true to grade so that pipe can evenly and uniformly supported along its entire length on undisturbed material or bedding rock.
- I. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barred only.
- J. The bottom of the excavations shall be firm and dry and acceptable to the ENGINEER.
- K. Excavate organic soil material from the bottom of the trench and replace with rock bedding, at least 6 inches thick.

3.03 PIPE INTERFERENCES AND ENCASEMENT

- A. Abide by the following schedule of criteria concerning interferences with other utilities.
 - 1. In no case shall there be less than 0.3-feet between two pipelines and structures.
 - 2. Class I Concrete Encasement: Wherever there is clearance between water mains or water services, then a concrete encasement shall be provided in accordance with the typical detail as shown in the Drawings.
 - 3. Class II Concrete Encasement: Wherever there is more than 0.3 foot, but less than 1.0 foot clearance between two pipe lines, or between pipe lines and structures, then a concrete encasement shall be provided in accordance with the typical detail as shown in the Drawings.
- B. The ENGINEER shall have full authority to direct the placement of the various pipes and structures in order to facilitate construction, expedite completion and to avoid conflicts.

3.04 BACKFILLING

- A. Backfilling over pipes shall begin as soon as practical after the pipe has been laid, jointed, and inspected and the trench filled with suitable compacted material to the mid-diameter of the pipe.
- B. Backfilling over ducts shall begin not less than three days after placing concrete encasement.
- C. Backfilling shall be prosecuted expeditiously as detailed in the Drawings.

- D. Space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth, from stones having a diameter no greater than 2-inches and thoroughly compacted by non-mechanical methods, as fast as materials are placed, up to a level of one foot above the crown of pipe.
- E. Compact to 98 percent maximum density in layers not to exceed 4-inches up to the centerline of the pipe from the trench bottom and in layers not to exceed 6-inches from the pipe centerline to 12-inches above the pipe.
- F. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.
- G. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted with common fill by rolling, ramming, or puddling, as the ENGINEER may direct.
- H. Compact common fill in 12-inch layers to 98 percent maximum density.
- I. The bedding rock in muck areas shall consist of the at least 10-inches of washed and grade limerock placed in the trench to the proposed elevation of the centerline of the pipe prior to pipelaying.
- J. This bedding shall not be used as a drain for ground water.
- K. Take precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed.
- L. In locations where pipes pass through building walls, take the following precautions to consolidate the refill up to an elevation of at least 1-foot above the bottom of the pipes:
 - 1. Place structural fill in these areas for a distance of not less than 3-feet either side of the centerline 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.

3.05 GRADING

- A. Grading shall be performed at places indicated in the Drawings, to the lines, grades and elevations shown or as directed by the ENGINEER and shall be made in a manner that the requirements for formation of embankments can be followed.
- B. Unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as directed.

- C. During the process of excavation, the grade shall be maintained in a well-drained condition.
 - 1. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water, which may affect the prosecution or condition of the work.
- D. If at the time of excavation it is not possible to place material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use.
- E. No extras will be considered for the stockpiling or double handling of excavated material.
- F. The right is reserved to make minute adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies in the Drawings or in order to obtain satisfactory construction.
- G. Stones or rock fragments larger than 2 1/2-inches in their greatest dimensions will not be permitted in the top 6-inches of the subgrade line of fills or embankments.
- H. Fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown in the Drawings, or as directed by the ENGINEER.
- I. In cut, loose, or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope.
- J. Cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown in the Drawings or as specified by the ENGINEER.
- K. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until these lines which must be maintained are relocated, or where lines are to be abandoned, required valves are closed and drains plugged at manholes.
- L. Replace pavement cut or otherwise damaged during the progress of the work as specified elsewhere herein or as shown in the Drawings.

3.06 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

- A. Surplus and unsuitable excavated material shall be disposed of at the CONTRACTOR's cost in one of the following ways as directed by the ENGINEER.
 - 1. Transport to soil storage area on OWNER's property and stockpile or spread as directed by the ENGINEER.

2. Transport from OWNER's property and legally dispose of.
3. Permits required for the hauling and disposing of this material beyond OWNER's property shall be obtained prior to commencing hauling operations.
4. Copies of required permits shall be provided to the ENGINEER.
5. Suitable excavated material may be used for fill if it meets the Specifications for common fill and is approved by the ENGINEER.
6. Excavated material so approved may be neatly stockpiled at the site where designated by the ENGINEER provided there is an area available where it will not interfere with the operation of the facility nor inconvenience traffic or adjoining property owners.

3.07 FIELD QUALITY CONTROL

- A. Retain a certified laboratory and make arrangements for testing necessary to comply with these Specifications, in accordance with Division 1.
- B. Provide copies of laboratory test results to the ENGINEER.
- C. Conduct one test per lift for each 500 linear feet of pipeline, or a minimum of two compaction tests per lift for projects with less than 1,000 linear feet of pipeline, at locations directed by the ENGINEER.
- D. Provide, at CONTRACTOR expense, additional compaction tests requested by the ENGINEER to insure that proper compaction is provided.

END OF SECTION

SECTION 02319

TRENCHING

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish labor, materials, equipment, and incidentals necessary to perform excavation, backfill, grading, and slope protection required to complete the piping work, as shown in the Drawings and Specifications.
- B. The work shall include, but not necessarily be limited to: manholes, pits and pipe, bedding, backfilling, fill and required borrow; grading and disposal of surplus and unsuitable materials; and related work such as sheeting, bracing and water handling.
- C. Provide trench safety systems such as sheeting and bracing in accordance with state and local regulations.

1.02 RELATED WORK

- A. Site Preparation - Division 2
- B. Earthwork - Division 2
- C. Excavation and Fill - Division 2

1.03 TRENCH PROTECTION

- A. Structural Excavation Backfill & Compaction
 - 1. Construct and maintain sheeting and bracing as required to support the sides of excavations, to prevent movement which could diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures, existing piping and foundation material from disturbance, undermining, or other damage.
 - 2. Prevent voids outside of the sheeting, but if voids are formed they shall be immediately filled and compacted.
 - 3. For pipe trench sheeting, no sheeting is to be withdrawn if driven below mid-diameter of pipe, and no wood sheeting shall be cut off at a level lower than 1 foot above the top of pipe unless otherwise directed by the ENGINEER.

4. If during the progress of the work the ENGINEER decides that additional wood sheeting should be left in place, he may direct the CONTRACTOR in writing.
5. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given by the ENGINEER for an alternate method of removal.
6. Sheeting and bracing, not left in place, shall be carefully removed not to endanger the construction or other structures, utilities, existing piping.
7. Voids left or caused by withdrawal of sheeting shall immediately be refilled with sand or ramming with tools especially adapted to that purpose, by watering or otherwise as may be directed.
8. The right of the ENGINEER to order sheeting and bracing left in place shall not be construed as creating obligation on the ENGINEER to issue an order, and the ENGINEER's failure to exercise the ENGINEER's right to do so shall not relieve the CONTRACTOR from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise, growing out of a failure on the part of the CONTRACTOR to leave in place sufficient sheeting and bracing to prevent caving or moving of the ground.

1.04 JOB CONDITIONS

- A. Examine the site and review the available test borings or undertake his own soil borings prior to submitting his bid, taking into consideration conditions that may affect Construction work.
- B. The OWNER and ENGINEER will not assume responsibility for variations of sub-soil quality or conditions at locations other than places shown and at the time the investigation was made.
- C. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
 1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the ENGINEER and the OWNER of this piping or utility immediately for directions.
 2. Cooperate with OWNER and utility companies in keeping respective services and facilities in operation.
 3. Repair damaged utilities to satisfaction of utility OWNER.

4. Demolish and completely remove from site existing underground utilities indicated in the Drawings to be removed.
- C. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
- D. Operate warning lights as recommended by authorities having jurisdiction.
 1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

1.05 SUBMITTALS

- A. Furnish the ENGINEER, for approval, a representative sample of fill material obtained from on site sources weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of this material.
- B. For each material obtained from other than on site sources, notify the ENGINEER of the source of the material and shall furnish the ENGINEER, for approval, a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of this material.

PART 2 PRODUCTS

2.01 MATERIALS

A. General:

1. Materials for use as base, fill, and backfill is described below:
 - a. Satisfactory soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M-145, soil classification Groups A-1, A-2-4, A-2-5, and A-3.
 - b. Unsatisfactory soil materials are those defined in AASHTO M-145 soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 along with peat and other highly organic soils.

B. Structural Fill:

1. Structural fill material shall be a well graded, suitable soil material consisting of a minimum of 60 percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressible percent clean medium fine grain sized quartz sand, free of organic, deleterious and/or compressed material. Rock in excess of 2 1/2 inches in diameter shall not be used in the fill material.

2. Structural fill shall not contain hardpan, stones, rocks, cobbles, or other similar materials.

C. Common Fill:

1. Common fill material shall be satisfactory soil material containing no more than 20 percent by weight finer than No. 200 mesh sieve. It shall be free from organic matter, muck, marl, and rock exceeding 2 1/2 inches in diameter.
2. Common fill shall not contain broken concrete, masonry, rubble, or other similar materials.
3. Materials falling within the above Specifications, encountered during the excavation, may be stored in segregated stockpiles for reuse.
4. Material, which in the opinion of the ENGINEER is not suitable for reuse, shall be spoiled as specified herein for disposal of unsuitable materials.

D. Rock Bedding:

1. Rock bedding shall be 3/8-inch to 3/4-inch washed and graded limerock.
2. This rock shall be graded so that 99 percent will pass a 3/4-inch screen and 80 percent will be retained on a No. 8 screen.
3. Material meeting the Florida Department of Transportation Standard Specification for No. 57 stone shall be acceptable.

PART 3 EXECUTION

3.01 GENERAL

- A. Excavation, backfill and grading necessary to complete the work shall be made by the CONTRACTOR and the cost thereof shall be included in the Contract price.
- B. Material shall be furnished as required from off site sources and hauled to site.
- C. Take necessary precautions to maintain the work area in a safe and workable condition.
- D. Protect work by flagging, marking, lighting and barricading.
- E. Preserve and protect above and underground structures, pipe lines, conduits, cables, drains, or utilities which are existing at the time the CONTRACTOR encounters them.

- F. Failure of the Drawings to show the existence of these obstructions shall not relieve the CONTRACTOR from this responsibility.
- G. The cost of repair of damage, which occurs to these obstructions during or as a result of construction, shall be borne by the CONTRACTOR without additional cost to the OWNER.

3.02 TRENCH EXCAVATION

- A. Excavation for trenches required for the installation of pipes shall be made to the depths indicated in the Drawings.
- B. Excavate trench to provide minimum of 36-inch clear cover over the pipe bell, unless otherwise noted in the Drawings.
- C. Excavate in a manner and to a width that will give suitable room for laying the pipe within the trenches, for bracing and supporting, and for pumping and drainage facilities.
- D. The trench width at the top of the pipe shall not exceed the allowable as determined by the depth of cut and indicated in the Drawings.
- E. Rock shall be removed to a minimum 8-inches clearance around the bottom and sides of the pipe or ducts being laid.
- F. Where pipe is to be laid in limerock bedding or encased in concrete, the trench may be excavated by machinery to or just below the designated subgrade provided that the material remaining in the bottom of the trench remains undisturbed.
- G. Where the pipes or ducts are to be laid directly on the trench bottom the lower part of the trenches shall not be excavated to the trench bottom by machinery.
- H. The last of the material being excavated shall be done manually in a manner that will give a flat bottom true to grade so that pipe can evenly and uniformly supported along its entire length on undisturbed material or bedding rock.
- I. Bell holes shall be made as required manually so that there is no bearing surface on the bells and pipes are supported along the barred only.
- J. The bottom of the excavations shall be firm, dry, and acceptable to the ENGINEER.
- K. Excavate organic soil material from the bottom of the trench and replace with rock bedding, at least 6 inches thick.

3.03 PIPE INTERFERENCES AND ENCASEMENT

- A. Abide by the following schedule of criteria concerning interferences with other utilities.
 - 1. In no case shall there be less than 0.3-feet between two pipelines and structures.
 - 2. Class I Concrete Encasement: Wherever there is clearance between water mains or water services, then a concrete encasement shall be provided in accordance with the typical detail as shown in the Drawings.
 - 3. Class II Concrete Encasement: Wherever there is more than 0.3-foot, but less than 1.0-foot clearance between two pipe lines, or between pipe lines and structures, then a concrete encasement shall be provided in accordance with the typical detail as shown in the Drawings.
- B. The ENGINEER shall have full authority to direct the placement of the various pipes and structures in order to facilitate construction, expedite completion, and to avoid conflicts.

3.04 BACKFILLING

- A. Backfilling over pipes shall begin as soon as practical after the pipe has been laid, jointed, and inspected and the trench filled with suitable compacted material to the mid-diameter of the pipe.
- B. Backfilling over ducts shall begin not less than three days after placing concrete encasement.
- C. Backfilling shall be prosecuted expeditiously as detailed in the Drawings.
- D. Space remaining between the pipe and sides of the trench shall be packed full by hand shovel with selected earth, from stones having a diameter greater than 2-inches and thoroughly compacted with a tamper as fast as placed, up to a level of one foot above the top of pipe.
 - 1. Compact to 95 percent maximum density in layers not to exceed 4 inches up to the centerline of the pipe from the trench bottom and in layers not to exceed 6 inches from the pipe centerline to 12 inches above the pipe.
- E. The filling shall be carried up evenly on both sides with at least one man tamping for each man shoveling material into the trench.

- F. The remainder of the trench above the compacted backfill, as just described above, shall be filled and thoroughly compacted with common fill by rolling, ramming, or puddling, as the ENGINEER may direct. Compact common fill in 12-inch layers to 95 percent maximum density.
- G. The bedding rock in muck areas shall consist of the at least 10 inches of washed and grade limerock placed in the trench to the proposed elevation of the centerline of the pipe prior to pipe laying.
 - 1. This bedding shall not be used as a drain for ground water.
 - 2. Take precautions necessary to maintain the bedding in a compacted state and to prevent washing, erosion or loosening of this bed.
- H. In locations where pipes pass through building walls, take the following precautions to consolidate the refill up to an elevation of at least 1 foot above the bottom of the pipes:
 - 1. Place structural fill in these areas for a distance of not less than 3 feet either side of the centerline 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.

3.05 GRADING

- A. Grading shall be performed at these places as are indicated in the Drawings, to the lines, grades and elevations shown or as directed by the ENGINEER and shall be made in a manner that the requirements for formation of embankments can be followed.
 - 1. Unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as directed.
 - 2. During the process of excavation, the grade shall be maintained in a well-drained condition.
 - 3. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water, which may affect the prosecution or condition of the work.
- B. If at the time of excavation it is not possible to place material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use.
 - 1. No extras will be considered for the stockpiling or double handling of excavated material.

- C. The right is reserved to make minute adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies in the Drawings or in order to obtain satisfactory construction.
- D. Stones or rock fragments larger than 2 1/2 inches in their greatest dimensions will not be permitted in the top 6 inches of the subgrade line of fills or embankments.
- E. Fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown in the Drawings, or as directed by the ENGINEER.
- F. In cut, loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope.
 - 1. Cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown in the Drawings or as specified by the ENGINEER.
- G. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until the lines which must be maintained are relocated, or where lines are to be abandoned, required valves are closed and drains plugged at manholes.
- H. Replace pavement cut or otherwise damaged during the progress of the work as specified elsewhere herein or as shown in the Drawings.

3.06 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

- A. Surplus and unsuitable excavated material shall be disposed of at the CONTRACTOR's cost in one of the following ways as directed by the ENGINEER.
 - 1. Transport to soil storage area on OWNER's property and stockpile or spread as directed by the ENGINEER.
 - 2. Transport from OWNER's property and legally dispose of surplus and unsuitable materials.
 - a. Any permit required for the hauling and disposing of this material beyond OWNER's property shall be obtained prior to commencing hauling operations.
 - b. Provide copies of required permits to the ENGINEER.
 - 3. Suitable excavated material may be used for fill if it meets the Specifications for common fill and is approved by the ENGINEER.

- a. Excavated material so approved may be neatly stockpiled at the site where designated by the ENGINEER provided there is an area available where it will not interfere with the operation of the facility nor inconvenience traffic or adjoining property owners.

4. Removal as described in Division 2.

3.07 FIELD QUALITY CONTROL

A. The CONTRACTOR shall retain a certified laboratory and make arrangements for testing necessary to comply with these Specifications, in accordance with Division 1.

1. One copy of the laboratory test results will be sent to the ENGINEER.

B. Conduct one test per lift for each 300 linear feet of pipeline, or a minimum of two compaction tests per lift for projects with less than 300 linear feet of pipeline, at locations directed by the ENGINEER.

END OF SECTION

SECTION 02455

WOOD TIMBER PILING

PART 1 GENERAL

1.01 SUMMARY

- A. This Section specifies the treating, furnishing, installation, and testing of wood timber piles for structures.

1.02 STANDARDS AND REGULATIONS

- A. Florida Department of Transportation-Supplemental Specifications for Road and Bridge Construction, Section 953 and 955.
- B. American Society for Testing and Materials (ASTM) designation D 25-79 Appendix B-1, D9 for definitions of terms relating to timber and D 2555 establishing clear wood strength values. The method of treatment for timber materials shall be in accordance with ASTM D1760.
- C. American Wood Preservers Institute, 1981 Treated Timber Pile, AWPI technical guidelines.

1.03 QUALITY ASSURANCE

- A. Installation tolerances: Deviation shall be not more than $\frac{1}{4}$ inch per foot from the vertical or batter line, with a total deviation of the head pile not more than three inches.
 - 1. Finished elevation to be no more than 1- $\frac{1}{2}$ inches above or below the elevation indicated.

1.04 SUBMITTALS

- A. In accordance with SECTION 01334, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES, submit the following:
- B. Experience: Submit evidence to the Engineer that the wood timber pile contractor has been engaged in the successful installation of wood timber piles for at least five years and that his crane operators or "keymen" who give directions to the crane operators have at least two years of experience in the successful installation of wood timber piles.

C. Shop Drawings:

1. Indicate methods of preservation treatment for the wood timber.
2. Indicate the size, number, and the installation sequence for each of the scheduled piles.

D. Equipment Review and Working Drawings:

1. Complete list of the equipment proposed for use, including the manufacturer's description of the characteristics of each piece of equipment.
2. Working drawings of accessories showing compatibility with the size, configuration, handling, and requirements of the type of pile indicated.

1.05 SOIL BORINGS:

A. Soil borings have been taken at the site.

1. The location of, log each boring, and core samples are available for information only.

1.06 INSPECTION OF PILING PLACEMENT:

A. The Engineer of record shall be present during pile driving operations.

1. Notify the Engineer at least three days prior to starting pile-driving operations.

B. The soils engineer shall verify the procedures used on production piles.

1. The soils engineer will keep a record for each pile placed.
2. The record will give the pay length, location, type, calculated safe load and results of tests.
3. Cooperate with the soils engineer to facilitate the keeping of these records.

PART 2 PRODUCT TREATMENT

2.01 TREATING WOOD TIMBER PILES

- A. Preservative: The treating of round timber piles (SYP) shall be with chromated copper arsenate (CCA). Ammoniacal copper arsenate (ACA) may be substituted to treat Pacific Coast Douglas Fir if Southern Yellow Pine can not be purchased.
- B. Process: For round timber piling, the treatment shall be by the full cell process.
- C. Salt Preservative: The salt preservative shall be chromated copper arsenate of the following compositions:

	Minimum (%)	Maximum (%)
Hexavalent Chromium, as CrO_3	33.0	50.5
Copper, as CuO	17.0	22.0
Arsenic, as As_2O_5	30.0	48.0

The active ingredients in the solution shall be in proportions within the range required for the salt itself.

The pH of the treating solution shall be between 1.6 and 3.2. Tests to determine conformance with the foregoing requirements shall be made in accordance with the standard methods of the American Wood Preserver's Association, Standard A2.

When Douglas Fir is used, ammoniacal copper arsenate shall be used as the salt preservative in lieu of chromated copper arsenate. Ammoniacal copper arsenate shall meet the requirements of ASTM D1325. Tests to determine conformance shall be in accordance with AWWA Standard A-2.

D. Requirements for Retainment

1. Piling: A minimum of 2.50 lb/ft^3 of CCA oxides shall be retained in zone 1 outer 0.50 inch and 1.5 lb/ft^3 in zone 2, outer 0.50 to 2 inches.

If ACA is used, a minimum of 2.50 lb/ft^3 shall be retained in the 0.0 to 1 inch zone.

2. Determination of Retention: Retention shall be determined by assay performed and certified by the treating company.

E. Penetration Requirements.

1. For Round Piles: Any round pile which does not show complete sapwood penetration will be rejected or shall be re-treated to meet such penetration requirement.
2. Determination of Penetration: Sapwood penetration shall be determined by taking at least one increment boring core from each pile and cap, and other pieces of similar dimensions and, for other sizes of material, at least one boring from the charge for each 1,000 FBM in the charge. All bored holes shall be immediately plugged, with tight fitting treated plugs.

F. Handling Salt Treated Piling.

In handling of piles which have been treated with chromated copper arsenate or ammoniacal copper arsenate, cable slings shall be used. Mechanical grabbers or pointed tools shall not be permitted. Rough or careless handling shall be avoided at all times.

G. Identification of Treating Plants for Round Piling.

The treating plant shall brand, or place a distinctive permanent mark, on each round pile, approximately 6 feet from the butt end, such that the plant responsible for the treatment can be readily determined at any time during the service life of the piling.

PART 3 PRODUCT MATERIALS

3.01 SPECIES OF WOOD

- A. Piles shall be of any species of wood for which clear wood strength values are given in ASTM methods D2555.
- B. Piles shall be of timber which will stand the driving for which they are intended.
- C. Cypress piles used for purposes other than as foundation piling shall have, at the butt, a diameter of red or black heart of at least 12 inches.
- D. Douglas fir used for timber piling shall be Pacific Coast Douglas Fir.
- E. Piles shall be cut above the ground swell, shall have a form taper, and shall not vary more than ± 6 inches from the specified length.

3.02 DIAMETER OF BUTT AND TIP

- A. For round piles the minimum butt diameter shall be 12 inches measured at a section 3 feet from the end.
- B. No piles shall have tips less than 8 inches in diameter.

3.03 TIMBER PILING

- A. Timber piling shall consist of round timber of the kind and dimensions called for in the plans, driven at the locations and to the elevations shown in the plans, or as directed by the Engineer; all in conformity with these specifications.

3.04 QUALITY ASSURANCE (ALL PILES)

- A. Piles shall be of sound wood, free of decay and insect attack, except as herein allowed.
- B. Piles shall be cut above the ground swell and have a taper from butt to tip.
- C. All circumference measurements must be taken under the bark.

3.05 PILE LENGTHS AND SIZES

- A. All piles shall be furnished in lengths of forty (40) feet.

3.06 STRAIGHTNESS REQUIREMENTS

- A. A straight line drawn from the center of the butt to the center of the tip shall not, at any point, fall further away from the center of the pile than a distance equal to 1 % of the length of the pile.
- B. The surface of the pile shall not contain kinks greater than 1 inch in 5 feet, as measured by a straightedge.
- C. Piles shall be free from short crooks that deviate more than 2 ½ inches from straightness in any 5 foot length.

3.07 PEELING AND TRIMMING

- A. The pile shall be peeled soon after cutting. In the operation of removing the bark from the pile, not more than three annual rings of the solid wood shall be removed. All knots shall be trimmed close to the body of the pile.

3.08 PERMISSIBLE KNOTS AND OTHER DEFECTS

- A. The diameter of sound knots shall not exceed one-third of the diameter of the pile at the point where the knot occurs.
- B. In these specifications, a sound knot shall be defined as a knot which is solid across its face, is as hard as the surrounding wood and shows no indication of decay. It may vary in color from red to black and may contain a pith hole not more than $\frac{1}{4}$ inch in diameter. Cluster knots shall be considered as a single knot and the entire cluster cannot be greater in size than permitted for a single knot. The sum of knot diameters in any 1-foot length of pile shall not exceed one third of the circumference at the point where they occur. Knots shall be measured in accordance with Definitions D9, and at right angle to the length of the pile.
- C. An unsound knot may or may not be as hard as the surrounding wood, but contains decay, and will be allowed only in accordance with the restrictions in ASTM D25. Piles may have unsound knots not exceeding half the permitted size of a sound knot provided that the unsoundness extends to not more than a $1\frac{1}{2}$ inch depth and that the adjacent areas of the trunk are not affected.
- D. Any defect, or combination of defects, which would be more injurious than the maximum allowable knot will not be acceptable.
- E. Turpentine cuts will be allowed on all timber piles provided that no single cut shall exceed one-half of the circumference of the pile, and that the length of the cut shall not be more than 15% of the length of the pile. Piles to be used as outside piles in timber bents shall not have more than one turpentine cut.

3.09 HOLES AND SCARS

- A. Holes less than $\frac{1}{2}$ inch in average diameter shall be permitted in piles, provided the sum of the average diameters of all holes in any square foot of pile surface does not exceed $1\frac{1}{2}$ inches.
- B. Piles having sound turpentine scars undamaged by insects shall be permitted.

3.10 CHECKS, SHAKES AND SPLITS

- A. A check shall not extend any deeper than to the pith. There shall not be any two or more checks extending to the pith which become contiguous at the pith, except as modified by Section 3.08C. A check is defined as a lengthwise separation of the wood across the rings of normal growth, extending from the surface toward the pith but not extending through the piece.

- B. The length of any shake or combination of shakes in the outer one half of the radius of the butt of the pile, when measured along the curve of the annual ring, shall not exceed one third of the circumference of the butt of the pile. A shake is defined as a circumferential separation of the rings of normal growth.
- C. Splits shall not be longer than the butt diameter. A split is defined as a lengthwise separation of the wood across the rings of normal growth extending from one surface through the piece to the opposite surface.

3.11 PREPARATION FOR DRIVING

- A. Caps: The heads of timber piles shall be protected during driving by a cap of approved type, which will distribute the hammer blow over the entire cross section of the pile. The head of the pile shall be cut square when necessary before driving begins.
- B. Collars: Collars or bands to protect piles against splitting and brooming shall be provided by the Contractor at his expense.
- C. Shoes: The piles shall be shod with metal shoes, of a design satisfactory to the Engineer, provided by the Contractor at his expense. Pile tips shall be shaped to receive the shoe and installation shall be in accordance with the manufacturer's directions.

3.12 STORAGE AND HANDLING

The method of storage and handling shall be that necessary to avoid damage to the piling. Special care shall be taken to avoid breaking the surface of treated piles. Cant dogs, hooks or pike holes shall not be used when handling and storing the piling. Cuts or breaks in the surface of the treated piles shall be given three brush coats of hot creosole oil of approved quality, and hot creosole oil shall be poured into all bolt holes.

3.13 CUTTING OFF

The tops of all timber piles shall be sawed off at the elevation indicated in the plans. Piles which support timber caps shall be sawed to the exact plane of the superimposed structure and shall exactly fit it. Broken, split, or misplaced piles shall be withdrawn and replaced.

3.14 BUILD-UPS

No splices or build-ups will be permitted for timber piles. Piles driven below plan elevation will be extracted and a longer pile driven.

END OF SECTION

SECTION 02630

STORM DRAINAGE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 Specification Sections, apply to work specified in this section.

1.02 SCOPE

- A. The work specified in this section consists of furnishing drainage pipe, conforming to these specifications and of the particular types, sizes and dimensions shown in the plans. This work shall include the installation of the pipe at locations called for, in conformity with the lines and grades given, and the furnishing and construction of such catch basins, inlets, manholes, walls, joints, connections, etc., to new and existing pipes as may be required to complete the work as indicated in the plans.

1.03 WORK SPECIFIED ELSEWHERE

- A. Cast-in-Place Concrete – Section 03300

1.04 STANDARDS AND REGULATIONS

- A. Applicable Standards:

1. American Association of State Highway and Transportation Officials (AASHTO).
2. American Society for Testing and Materials (ASTM).
3. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction – latest edition.

- B. Governmental Agencies: All work shall conform to the applicable standards of the FDOT.

1.05 SUBMITTALS

- A. The CONTRACTOR shall submit five (5) copies of shop drawings of all pipe, pipe joints, pipe connecting bands, drainage structures, structure frames and grates and any other materials used for construction of the storm drainage.

1.06 GUARANTEE

- A. The CONTRACTOR shall guarantee all materials and equipment furnished and installed and all work performed for a period of one (1) year from the date of substantial completion. The guarantee shall stipulate that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects, including the repairs of any damage to other parts of the system resulting from such defects.

PART 2 - PRODUCTS

2.01 PIPE MATERIALS

- A. Reinforced Concrete Pipe: Concrete pipe shall be of first quality and manufactured conforming to ASTM Designation C 76, latest revision, minimum design requirements shall be for Class III Reinforced Concrete Pipe, as modified by Section 941 Concrete Pipe, Section 942 Pipe Gaskets, and Section 430-7 Requirements for Concrete Pipe, FDOT, Standard Specifications for Road and Bridge Construction.
- B. Reinforced Concrete Box Culvert: shall conform to the requirements of Section 400, FDOT Standard Specifications for Road and Bridge Construction, Index No. 290 FDOT Roadway and Traffic Design Standards, and Section 02640 – Precast Concrete Box Culverts.
- C. Corrugated Aluminum Pipe: Corrugated Aluminum Pipe shall conform to the requirements of AASHTO M 196 (circular corrugated pipe) or AASHTO M 211 (helically corrugated pipe), and Section 945 FDOT, Standard Specifications.
- D. Corrugated Steel Pipe: Corrugated Steel Pipe shall conform to the requirements of AASHTO M36 and Section 943, FDOT Standard Specifications and shall be bituminous coated.
- E. Corrugated High Density Stormwater Polyethylene Pipe: shall conform to the requirements of ASTM D3212 and AASHTO M294 and FDOT Section 948-2 as manufactured by Advanced Drainage Systems, Inc. (ADS). The corrugated HDPE stormwater pipe shall have corrugated exterior and smooth interior walls.
- F. Polyvinyl Chloride Pipe: Polyvinyl Chloride Pipe shall conform to the requirements of ASTM D-3034, SDR 35.
- G. High Density Polyethylene Forcemain Pipe: shall conform to AWWA C906, ductile iron pipe with fusion welded but joints. Refer to section pipes and tubes for a complete specification for HDPE pipe.

- H. Contech A-2000 perforated PVC drainage pipe corrugated pipe with a smooth interior shall conform to the requirements of ASTM Designation F949 & F794 Dual Wall Corrugated Profile (DWCP) Pipe. Pipe and fittings shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. Pipe shall be manufactured to 46 psi stiffness when tested in accordance with ASTM Test Method D2412. There shall be no evidence of splitting, cracking or breaking when the pipe is tested per ASTM Test Method D2412 and F949 section 7.5. The pipe shall be made of PVC compound having a minimum cell classification of 12454B as defined in ASTM Specification D1784.

2.02 JOINTS (pipes shall be wrapped at joints)

- A. Concrete Pipe Joints: Except where otherwise specified, rubber gaskets for use in concrete pipe joints shall meet with the requirements of Article 6.9 of ASTM C361, with the additional requirements that the gasket used shall be of such cross sectional area and perimeter as to properly fit the space provided in the pipe joint in which it is to be used, and shall be the sole element relied on to maintain a tight joint. Prior to use, the gasket shall be stored in as cool a place as practicable. The concrete joints shall conform to FDOT Standards Section 941 Concrete Pipe, Section 942 Pipe Gaskets, Section 430-7 Requirements for Concrete Pipe, and ASTM C443.
- B. Reinforced Concrete Box Culvert Joints: Reinforced Concrete Box Culvert: shall conform to the requirements of Section 400, FDOT Standard Specifications for Road and Bridge Construction, Index No. 290 FDOT Roadway and Traffic Design Standards, and Section 02640 – Precast Concrete Box Culverts.
- C. Corrugated Steel Pipe Joints: Field joints for steel pipe shall be made with bands fabricated of the same alloy as the culvert sheeting and shall meet the requirements of AASHTO M36. The banded joints shall be gasketed with a neoprene gasket of a design shown to secure a soil-tight or watertight joint.
- D. Corrugated Polyethylene Pipe Joints: series 65 Pro Link WT watertight joining system with O-ring gaskets as manufactured by Advanced Drainage Systems, Inc. (ADS). Performance specifications ASTM D3212 and AASHTO M294.
- E. Polyvinyl Chloride Pipe Joints: Rubber sealing rings for pipe joints shall conform to ASTM D-3212.
- F. Contech A-2000 perforated PVC drainage pipe fittings for corrugated sewer pipe with a smooth interior shall conform to ASTM F949, Section 5.2.3 or F794, Section 7.2.4. To insure compatibility, the pipe manufacturer shall provide all fittings.

- G. Contech A-2000 perforated PVC drainage pipe joints shall be made with integrally-formed bell and spigot gasketed connections. Elastomeric seals (gaskets) shall meet the requirements of ASTM Designation F477.

2.03 FRENCH DRAINS

- A. French drains shall conform to the requirements of Section 443 FDOT Standard Specifications.
- B. Filter fabric shall conform to the requirements of Sections 514 and 985, FDOT Standard Specifications.
- C. Contech A-2000 slotted, standard perforated pipe, the perforation dimensions shall be in accordance with ASTM F949 table 5 and section 7.9. Instead of slots, round holes (min. 1/4" Ø) may be used for 15"-36" diameter pipe.

2.04 INLETS MANHOLES AND JUNCTION BOXES

- A. All drainage inlets, manholes, and junction boxes shall be precast concrete conforming to ASTM C-478 and 64T. All concrete shall have not less than 4000-psi compressive strength at 28 days.
- B. Structure sections shall be joined with a mastic sealing compound. The remaining space shall be filled with the cement mortar and finished so as to produce a smooth continuous surface inside and outside the wall sections.
- C. All openings in precast structures shall be cast at the time of manufacture. Holes for piping shall be six inches larger than the outside diameter of the proposed pipe. All spaces between the manhole and the pipe shall be completely filled with mortar and finished smooth.
- D. Mortar used for concrete structures shall conform to M C-270. Mortar material shall be mixed one part Type 2 Portland cement to two parts aggregate by volume. Portland cement shall conform to ASTM C-144 and aggregate shall conform to ASTM C-144.
- E. The CONTRACTOR shall furnish the ENGINEER with shop drawings of all precast structures for his approval prior to fabrication. Shop drawings shall show all dimension, reinforcing steel and specifications.
- F. Handling and Storing: Pipe shall be protected during shipping, storage and handling against impact shocks, free fall or other damage. Any damaged pipe shall be removed from the job site immediately.
- G. A-2000 PVC pipe Manhole flexible connections like rubber boots, A-Loks, etc. are recommended. Rubber boot manhole connectors, install either a standard A-2000/A-2026 double gasket (8"-10") or an A-2000 manhole gasket (12'-36")

on the pipe spigot under the stainless steel strap A-Lok: where manholes are manufactured with A-Lok connections, use a CONTECH PVC manhole sleeve A-Lok manhole sleeve are available already attached to the pipe. If the manhole sleeves are not attached and the need arises in the field, follow the procedure below.

- A. Place a standard gasket on the pipe about 6" from the end. Lube the gasket and the manhole sleeve and slide the manhole sleeve onto the pipe end. Restrict the coupling from sliding and push the unit (pipe and coupling) into the A-Lok connection (lube the A-Lok).
- B. Non-flexible (waterstop type) Flexible manhole connections are recommended. For cast-in-place concrete bottoms, precast bottoms with "mouse hole" or similar pipe-to-manhole entry that does not incorporate a flexible connection, use two standard A-2000/A-2026 double gaskets for 8"-and 10"-diameter pipe, positioned on the pipe in the center of the manhole wall with the leading (the lower) edge of the gaskets in adjacent corrugations, then concrete grout or seal the pipe/manhole connections as required. For pipe with diameters of 12"-36" inches, use one standard A-2000 double gasket, positioned on the pipe in the center of the manhole wall, with the leading (lower) edge of the gasket closest to the inside of the manhole.

2.05 GRATINGS

- A. Iron frames, grates, and lids shall conform to ASTM A48 and shall be Class 30. The castings shall be true to design, dimension, weight, and detail as shown on the contract drawings.

2.06 FORMS

- A. Forms for cast in place headwalls or other concrete structures shall be wood or metal, so designed and constructed that they may be removed without injury to the concrete. They shall be built true to line and grade and braced in a substantial and unyielding manner, and shall be approved by the ENGINEER before being filled with concrete.

2.07 CONCRETE

- A. Class I, concrete shall be used for headwalls, pipe, end walls, and other miscellaneous concrete items. Except as may be modified in the plans or special provisions the required minimum 28-day compressive strength for Class I concrete shall be 2500 psi.

2.08 CONCRETE REINFORCEMENT

- A. Concrete reinforcement in sizes No. 3 (3/8-inch) and larger shall be deformed steel bars of the shapes and sizes indicated on the drawings.
- B. The steel shall be newly rolled stock, substantially free from mill scale, rust, dirt, grease, or other foreign matter. Bars shall be domestic billet steel.
- C. Reinforcing bars shall be Grade 60, in conformance with ASTM Specifications for Concrete Reinforcement, Designation A615, except stirrups and ties shall be Grade 40.
- D. Deformations on bars for concrete reinforcement shall conform to the ASTM Specifications for concrete reinforcement, Designation A615.
- E. Tie Wire - The tie wire shall be 16 gauge or heavier, black annealed wire.
- F. Metal Accessories - metal accessories shall be galvanized and sufficient in size and number to rigidly support the reinforcing steel under all conditions.
- G. Clean loose rust, grease, or any other coating that could interfere with bond. Where there is delay in depositing concrete after reinforcement is in place, bars shall be reinspected and cleaned when necessary.
- H. All steel reinforcing shall be placed in the exact positions and with the spacing shown on the plans or as ordered, during the placing of the concrete. The clear distance between parallel bars shall not be less than one and one half times the bar diameter, and shall in no case be less than one inch, nor less than one and one-third times the maximum size of coarse aggregate. Unless shown otherwise on the drawings, bars shall be lapped not less than 24 diameters nor less than 12 inches.
- I. Minimum concrete coverings over reinforcement shall be as follows:
 - 1. For footings and slabs deposited against earth -three inches.
 - 2. For formed surfaces to be exposed to weather, dampness, or in contact with ground after removal of forms - two inches.

2.09 RIP RAP HEADWALLS

- A. Portland cement shall be from an approved source and the product of an established and reputable manufacturer.
- B. Fine aggregate shall meet the requirements of Section 902-2.3 of FDOT Standard Specifications.
- C. Sacks shall be jute sacks, or any suitable sacks of any material which will hold the sand-cement mixture without leakage when handled and which are

permeable or absorptive enough to permit the passage of water when wetted. The sacks shall be of uniform size and dimensions, in order to provide uniformity of lines in the completed work. They shall be free from holes and strong enough to stand handling without ripping or splitting. Only one type and size of sack shall be used at any one structure.

2.10 DOWNSTREAM DEFENDER

PART 1 - GENERAL

1.01 SCOPE

- A. Work described in this section includes furnishing all labor, equipment, materials, tools and incidentals required for a complete and operable installation of the Downstream Defender® stormwater treatment system (treatment system, system, Advanced Hydrodynamic Vortex Separator, or AHVS) as shown on the drawings and specified herein.
- B. The manufacturer shall design and supply the equipment listed herein and the Contractor shall install the equipment in accordance with the manufacturer's Handling, Storage, and Installation Instructions.

1.02 GENERAL REQUIREMENTS

- A. The treatment system shall use an induced vortex to separate pollutants from stormwater runoff. The system shall be self-activating with no mechanical parts or external power requirements.
- B. The treatment system shall be supplied by a manufacturer regularly engaged in such work who has furnished similar installations that have been in successful and continuous operation for a minimum period of fifteen years.
- C. Upon request, independently certified performance data and references shall be made available to the Engineer of Record for use in determining that the treatment system meets the design criteria and performance requirements stated herein.

1.03 SUBMITTALS

- A. Submittals shall be provided and shall include the following:
 - 1. General arrangement and dimensional drawings of the treatment system.
 - 2. Plan and elevation drawings of the treatment system as it shall be incorporated into the stormwater drainage system. The elevation drawing shall indicate the top of water level both upstream and downstream of the treatment system at the flow conditions specified herein.
 - 3. Handling, Storage and Installation Instructions.

4. Operation and Maintenance Instructions and a Maintenance video.

1.04 QUALITY ASSURANCE

- A. The stormwater treatment system shall be manufactured under the direction of an ISO 9001 Certified Company.

- B. Inspection

The stormwater treatment system shall be subject to inspection by the Engineer of Record or the owner's representative at either the place of manufacture or the project site. Any and all observed defects shall be repaired to the satisfaction of the owner or owner's representative or replacement shall be made available.

- C. Warranty

The manufacturer shall guarantee the treatment system from defects in materials and workmanship for a period of two years following installation. If during the warranty period defects in materials or workmanship are noted, then the manufacturer shall be promptly notified. The decision to repair or replace affected units shall be made at the discretion of the manufacturer.

- D. Patent Indemnity

Upon request, the manufacturer shall warrant that the treatment system does not infringe upon or violate any patent, copyright, trade secret or any other proprietary right of any third party and shall indemnify the Owner against any loss, cost, expense or liability arising out of such claim whether or not such claim is successful.

- E. Certificate of Compliance

Upon request, the manufacturer shall provide a "Letter of Certification" to certify that the stormwater treatment system adheres to the specifications required herein and complies with the project's stormwater management permit.

1.05 MANUFACTURER

- A. The stormwater treatment system shall be the Downstream Defender[®] as designed by Hydro International located at 94 Hutchins Drive, Portland, Maine 04102. Telephone (207) 756-6200. Fax (207) 756-6212.

- B. Alternate stormwater treatment systems must demonstrate compliance with the specifications herein and be approved by the Engineer of Record. Request for alternative systems shall include:

- i. Revised site plan showing location and orientation of proposed alternative, pipe sizes, connections and excavation limits.
 - ii. Product installation drawings showing plan and elevation views

with water elevations for the flow conditions specified herein.

- iii. Performance data as required in Part 2.
 - iv. Maintenance manual including inspection and clean out costs, maintenance video and three references for verifying successful completion of the procedures and associated costs.
- C. Costs for reviewing submittals for alternative treatment system shall be the Contractor's or Manufacturer's responsibility.

PART 2 – STORMWATER TREATMENT SYSTEM

2.01 General

- A. The stormwater treatment system shall be an Advanced Hydrodynamic Vortex Separator (AHVS) with flow-modifying internal components that minimize turbulence and prevent any flow from internally bypassing the separation region within the vortex chamber.
- B. A tangential inlet pipe shall be used to establish rotational flow within a cylindrical vortex chamber. All polluted flow entering the vortex chamber through the inlet pipe shall follow a controlled three-dimensional flow path. Internal baffles will prevent flow entering the vortex chamber from discharging directly to the outlet pipe.
- C. The tangential inlet pipe shall be positioned to convey flow into the vortex chamber beneath the internal water elevation. The AHVS shall not exceed the pressure drop (headloss) for the design flow rates specified herein as determined by ASTM C1745 / C1745M – 11.
- D. The AHVS shall fit within the limits of excavation (area and depth) as shown in the project plans and will not exceed the dimensions for the design flow rates specified herein.
- E. The AHVS shall provide separate and protected storage regions for captured pollutants that float and for those that settle and shall prevent re-suspension and washout of stored pollutants for the specified flow rates. The AHVS shall not release captured floating pollutants during surcharge conditions.
- F. The storage capacities for pollutants that settle (sediment) and float (oil) shall not be less than the volumes listed in Table 1. The AHVS shall operate as intended and perform as specified herein as pollutants accumulate. The storage capacity for pollutants that settle shall not reduce the volume required in the vortex chamber for separation and for preventing re-suspension and washout, or reduce the floatables storage volume capacity.
- G. Minimum 24-inch openings shall provide access to the sediment storage volumes from the surface for inspection and maintenance. Two access openings shall be provided for systems larger than 4 feet in diameter. Removal of pollutants from the treatment system shall be possible without requiring confined space entry.

2.02 Performance

- A. Performance of the AHVS shall be based on independent full-scale laboratory

and/or field testing and shall adhere to the Performance Specifications listed in Table 1. The laboratory testing used as the basis of product performance shall be undertaken in accordance with testing protocols approved or endorsed by the Stormwater Equipment Manufacturers Association (SWEMA) or acceptable State agency, such as a State Department of Environmental Protection (DEP) or recognized verification agency (e.g. ETV, NJCAT, NETE).

- B. Performance of the AHVS shall be based on treating the Water Quality Flow rate (WQF) without internally bypassing and without re-suspension and washout of captured pollutants (scour). The Maximum Treatment Flow Rate(s) (MTFR-50 and/or MTFR-100) shall be greater than or equal to the WQF. The AHVS shall remove greater than or equal to 80% of TSS based on the Target Particle Size (TPS) of 50 microns and/or 100 microns at MTFR-50 and MTFR-100, respectively.
- C. The AHVS shall treat all flows without internally bypassing up to the Peak Treatment Flow Rate (PTFR). Full-scale independent laboratory scour testing shall demonstrate effluent control of less than or equal to 20 mg/L for all flows up to 150% of MTFR-100 without internal or external bypass.
- D. The AHVS shall be capable of capturing and retaining fine silt and sand size particles. Analysis of captured sediment from full-scale field installations shall demonstrate particle sizes predominately in the 20-micron range.
- E. The AHVS shall capture and retain 100% of all floating trash and debris and remove greater than 80% of hydrocarbons up to its rated storage capacities under conditions of a catastrophic spill such as might be experienced in an automobile or truck accident spill like conditions.

Table 1.

Downstream Defender® Performance Specifications								
Model	Depth¹	MTFR-50²	MTFR-100²	Scour Flow Rate³	PTFR⁴	Headloss⁵	Oil Storage Capacity⁶	Sediment Storage Capacity⁶
(feet)	(feet)	(cfs)	(cfs)	(cfs)	(cfs)	(feet)	(gal.)	(gal.)
4	4.1	1.2	1.6	2.4	3	0.68	70	141
6	5.9	3.4	4.3	6.5	8	0.95	216	424
8	7.7	6.9	8.8	13.3	15	1.1	540	939
10	9.4	12	15	23.3	25	1.2	1,050	1,757
12	11.2	19	24	38	38	1.4	1,770	2,970

Notes:

- 1. Depth measurement is from the outlet invert to top of the bottom slab.
- 2. MTFR-50 and MTFR-100 are the Maximum Treatment Flow Rates for removing target particle sizes of 50 microns and 100 microns, respectively.
- 3. Scour Flow Rates are based on testing that demonstrates retention of captured sediment having a D50 of 100. Effluent concentrations shall not exceed 20 mg/L.
- 4. PTFR or Peak Treatment Flow Rate is based on the treatment system maintaining positive removal efficiencies and headlosses no greater than those listed above for each model.
- 5. Headlosses are the difference in water elevations upstream and downstream of the AHVS as determined by ASTM C1745 / C1745M – 11. The headlosses listed above for any particular model are for that treatment system operating at the Peak Treatment Flow Rate.

PART 3 – EQUIPMENT

- A. The Downstream Defender shall consist of a hollow, cylindrical vessel with internal components.

- (i) The internal components to be supplied by Hydro International shall include the center shaft and cone, dip plate, benching skirt, floatables lid and component support frame.

Materials of construction for the above components excluding the support frame shall be cross-linked polyethylene (XLPE). The component support frame members and all metal parts shall be Type 304 stainless steel or carbon steel powder coated in accordance with ASTM 775/ ASTM A775M with a resulting thickness of 8-12 mils. All components shall be designed to withstand all normal loadings associated with fabrication, shipping, site installation, and normal operation of the equipment. The component support frame shall withstand a live load of 500 pounds.

- (ii) The hollow cylindrical vessel shall be a precast concrete structure manufactured with concrete that has attained a compressive strength of 4,000 psi after 28 days. The structure shall be reinforced to withstand an HS20-44 loading. Shiplap joints shall be sealed with butyl rubber mastic sealant conforming to ASTM C990. Slab tops shall be suitably reinforced and provided with manhole openings and covers as required. The cast iron manhole frames and covers shall be sized as per the manufacturer's drawings and shall be in accordance with ASTM A48, CL.35B and AASHTO M105. The masonry fixing bolts shall be Type 304 stainless steel.

- (iii) All piping connections and ancillary items not listed herein shall be provided by the Contractor.

PART 4 - EQUIPMENT DELIVERY

- A. The Downstream Defender components shall be delivered within six weeks of date of approved technical submittal.
- B. The Downstream Defender components shall be delivered to the site fully fabricated or shall be ready for the final assembly of the support frames within the host manhole structure.
- C. Off-loading, storage, and installation shall be by the Contractor.
- D. The Contractor shall inspect and provide signed acceptance of equipment prior to unloading, or notify Hydro International of any damage to equipment to effect proper remedial action. Failure to notify Hydro International of damage to equipment prior to unloading will void all warranties pertaining to subject

equipment.

PART 5 - EQUIPMENT INSTALLATION

- A. The system shall be installed in strict accordance with the site plans, and the manufacturer's general arrangement drawings and Handling, Storage and Installation Instructions. The Contractor shall be responsible for installing the equipment and all necessary site connections.
- B. The Manufacturer shall be notified immediately of any equipment which is damaged during unloading, storage, or installation. The damaged equipment shall be repaired or replaced at the discretion of Hydro International and entirely at the Contractor's expense.
- C. The precast concrete structure shall be set on a granular or compacted sand sub-base in accordance with local requirements for standard manhole installation. In no instances shall the compacted sub-base material have a thickness of less than 12 inches.
- D. The precast concrete structure shall be set level and plumb to within 0.5%.
- E. Non-shrink grout or hydraulic cement conforming to ASTM C 595 shall be used to provide a water tight seal in the lift holes, any drain holes and around the concrete knock-outs for the inlet and outlet pipes.
- F. The Contractor shall, at the discretion of the owner or owner's representative, test the concrete structure for water tightness before backfilling.

PART 3 – EXECUTION

3.01 EXCAVATION

- A. Requirements for all Excavation: Foundation pits shall be excavated to permit the placing of the full widths and lengths of footings shown in the plans with full horizontal beds. Corners or edges of footings shall not be rounded or undercut. All excavation shall be carried to foundation materials satisfactory to the ENGINEER regardless of the elevation shown on the plans. Unless a firm footing can be established on solid rock before such depths is reached, it shall be carried to such additional depth as may be necessary to eliminate any danger of undermining. Wherever rock bottom is secured, the excavation shall be done in such manner as to allow the solid rock to be exposed and prepared in horizontal beds for receiving the masonry. All loose and disintegrated rock or thin strata shall be removed. All foundation excavations shall be inspected and approved by the ENGINEER prior to the placing of masonry.
- B. Earth Excavation - Foundation Material other than Rock:

1. When masonry is to rest on an excavated surface other than rock, special care shall be taken to avoid disturbing the bottom of the excavation, and the final removal of the foundation material to grade shall not be made until just before the masonry is to be placed. In case the foundation material is soft or mucky the ENGINEER may require the CONTRACTOR to excavate to a greater depth and to backfill to grade with approved material.

C. Removal of Obstructions:

1. The CONTRACTOR shall perform all excavation of whatever substances encountered to the depths indicated on the drawings or as necessary. Excavation shall be unclassified regardless of material encountered. This shall include necessary clearing and grubbing of any foreign substance encountered within the structure or trench area.
2. Boulders, logs, or any unforeseen obstacles encountered in excavating shall be removed and no additional compensation will be allowed because of difficulties met in driving through or removing such obstructions.
3. No separate payment for excavation as such will be made. The cost thereof shall be included in the prices for the pipe installation. Excavation material suitable for backfill shall be piled in an orderly manner at a sufficient distance from the trench to avoid overloading and to prevent slides or cave-ins.

D. Rock Excavation:

1. All rock and other hard foundation material shall be freed of all loose material, cleaned, and cut to a firm surface; either level, stepped vertically and horizontally, or serrated, as may be directed by the ENGINEER. All seams shall be cleaned out and filled with concrete or mortar.

E. Removal of Unstable Material:

1. It is the intent of this specification that all pipe and other structures shall be provided with a stable foundation, and that any material, which by reason of kind or condition is not and cannot be made stable by drainage or compaction, shall be removed or replaced. Therefore, any material encountered at the elevation shown on the drawings or specified for pipe that will not or cannot be improved to provide a stable foundation for the pipe, shall be removed and replaced. All unstable material below the grade line of the pipe shall be removed for the full width of the trench and replaced with suitable selected material, compacted as specified elsewhere in these specifications. For the purpose of this specification, muck, peat and other highly organic soils shall be considered to be unstable materials. Also, any soil which is or might become wet to such a degree that its moisture content is equal to or greater than 90 percent of its liquid limit will have to be

specifically approved by the ENGINEER with regard to stability, or shall be considered to be an unstable material requiring removal and replacement.

3.02 PIPE TRENCH EXCAVATION

- A. Trenches for pipe culverts and for storm sewers shall be excavated to the required depth and to a width sufficient to provide adequate working room. For pipe lines placed above the natural ground line the embankment shall be placed and compacted, prior to excavation of the trench, to an elevation at least two feet above the top of the pipe and to a width equal to four pipe diameters, and the trench then excavated to the required grade. Where the soils permit, the trench sides shall be vertical up to at least the mid-point of the pipe.
- B. Work shall be performed in compliance with applicable Trench Safety Standards identified in the Occupational Safety and Health Administration's Excavation Safety Standards (OSHA), 29 C.F.R.S. 1926.650 Subpart P will be adhered to during trench excavation in accordance with Florida Statutes 553.60 through 553.64 inclusive (1990), "Trench Safety Act".
- C. For all pipe culverts and storm sewers 24 inches or over in diameter (except side drain), the bedding shall be shaped to conform to the outside of the pipe, for a depth of not less than 10 percent of its total height (outside dimensions) and recesses provided to receive the bell.
- D. Where wet conditions are such that dewatering by normal pumping methods, including wellpointing, would not be effective, then this requirement may be modified by the ENGINEER. No payment will be allowed for select bedding material, which might be utilized by the CONTRACTOR for his own convenience in lieu of dewatering.
- E. For all side drains, and for pipe culverts less than 24 inches in diameter, the trench bottom may be either flat, or shaped to fit the bottom of the pipe, except as provided for trenches, cut below grade and for areas of unsuitable foundation material. Regardless of the shape of the trench bottom, excavation shall be made for the hubs as required to allow the pipe barrel to rest firmly on the trench bottom. The bottom of the trench shall be rounded so that the bottom quadrant of the pipe will rest firmly on undisturbed soil for as nearly the full length of the barrel as proper jointing operations will permit. This part of the excavation shall be done manually only a few feet in advance of the pipelaying by men skilled in this type of work. Unauthorized overdepths shall be backfilled with loose, granular, moist earth, thoroughly tamped. Whenever the presence of incipient slides is noted during excavation, the trench walls shall be restrained with adequate sheeting, shoring and bracing. Trench excavation in the proximity of certain existing sanitary sewers and other utility lines shall be protected by either steel or wood sheeting. Used sheet piling in good condition, which has been inspected and approved by the ENGINEER, may be used in place of new sheet piling.

- F. The CONTRACTOR shall provide adequate equipment for the removal of storm or subsurface waters, which may accumulate in the excavated areas. If subsurface water is encountered, the CONTRACTOR shall utilize approved means to adequately dewater the excavation so that it will be dry for working and pipelaying. A wellpoint system or other approved dewatering method shall be utilized, if necessary, to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying.
- G. Contractor shall, wherever necessary, provide temporary sidewalks and driveway entrances at his own expense, including safe bridges over trench and fencing around excavations for pedestrian protection.
- H. Contractor to adhere to the construction pollution prevention plan prior to any activities.

3.03 UNSUITABLE MATERIAL

- A. When rock, boulders, or other hard, lumpy or unyielding materials are encountered in the trench bottom they shall be removed to a depth at least 12 inches below the bottom of the pipe. Muck or other soft material considered by the ENGINEER to be unsuitable as foundation for the pipe shall be removed to a depth as where sand or other acceptable material is encountered, and to the width of the trench as directed by ENGINEER.

3.04 PIPE BEDDING

- B. When undercutting is required in order to remove unsuitable material (either hard or soft), the trench shall be backfilled to a point six inches above the bottom of the pipe, with suitable granular material which will form a firm bed for the pipe, and the bottom shall be shaped to fit the pipe to a point six inches above the bottom of the pipe. Such bedding material shall be coarse sand, washed limerock or other suitable granular material. Where bell and spigot pipe is used, the bell holes shall be deep enough to ensure that the bell does not bear on the bottom of the excavation, and shall not be excessively wide in the longitudinal direction of the culvert or storm drain.

Contech PVC A-2000 pipe bedding materials can be 4-inch to 6-inch compacted thickness, Class I, II, or III accordance with ASTM D2321. See blow for material specification.

- A. Class IA materials if used for bedding, must be used as haunching material to the spring line in a dry trench. To minimize the potential for migration, Class IA materials should be used to the top of the pipe in wet trenches or in trenches that will fall below the water table.

- B. Class IB Install in 6-inch maximum lifts and compact to minimum 85% Standard Proctor Density.
- C. Class II Install in 6-inch maximum lifts and compact to 85% Standard Proctor Density.
- D. Class III materials are suitable only in dry conditions. Install in 6-inch maximum lifts and compact to 90% Standard Proctor Density.
- E. Class IV and V materials are **not allowed** as bedding.

3.04A Embedment Materials

Embedment materials are those used for bedding, haunching, and initial backfill. All materials should be installed and compacted in 6-inch maximum lifts. ASTM D2321 classifies soil materials as:

- A. Class IA Manufactured aggregates: Open graded clean, angular, crushed stone or rock, crushed gravel, broken coral, crushed slag, cinders or shells, large void content, with little or no fines. These materials compact with little or no mechanical effort.
- B. Class IB Manufactured, processed aggregates: Dense, graded clean, angular, crushed stone (or other Class IA materials) and stone/sand mixtures with gradations selected to minimize migration of adjacent soils, containing little or no fines. Compact to 85% Standard Proctor Density with hand tampers or vibratory compaction.
- C. Class II Clean, coarse-grained materials, such as gravel, coarse sands, and gravel/sand mixtures (1 1/2 inches maximum size). These materials are classified by the USC System as GW, GP, SW, SP, and GW-GC or SP-SM. Hand tamping or mechanical vibration is required to provide the necessary 85% Standard Proctor Density.
- D. Class III Coarse-grained materials with fines including silty or clayey gravels or sands. Gravel or sand must comprise more than 50 percent of Class III materials (1 1/2 inches maximum size). Soils classified as GM,GC,SM, or SC meet these requirements. Hand tamping or mechanical vibration is required to provide the necessary 90% Standard Proctor Density.
- E. Class IV Fine-grained materials, such as fine sands and soils, containing 50 percent or more clay or silt. Soils classified as Class IVA (ML or CL) have medium to low plasticity and the restrictive installation requirements may make their use prohibitive in the embedment zone. Soils classified as Class IVB (MH or CH) have high plasticity and are not allowed as embedment materials.

- F. Class V These materials include organic silts and clays, peat, and other organic materials. They are not allowed as embedment materials.

3.04B Haunching

Proper haunching provides a major portion of the pipe's strength and stability. Poor workmanship will lead to excessive pipe deflection and grade and alignment problems. Haunching materials can be Class I, II, or III.

- A. Class I Materials

Where the pipe will be below existing or future ground water levels or where the trench will be inundated, Class IA materials, when used, must be placed to the top of the pipe.

Where conditions are dry and will remain dry, Class I materials need only be placed to the springline allowing Class II, III, or low plasticity Class IVA materials to be used as initial backfill. Class IA materials require less compactive effort than other haunching materials.

- B. Class IB materials should be placed in 6-inch maximum lifts and compacted to 85% Standard Proctor Density by hand tampers or vibratory compaction.
- C. Where Class I materials are used for bedding. Class I materials must be used for haunching materials to the springline in dry conditions and to the top of the pipe in wet conditions.
- D. Class II Materials Need to be compacted to a minimum 85% Standard Proctor Density by hand tamping, mechanical vibrations, or where trench conditions allow, by flooding or puddling. Compaction by tamping or vibration must be done in 6-inch maximum lift thicknesses. Flooding or puddling requires a trench foundation capable of absorbing the water quickly so water movement down into the foundation consolidates the haunching materials.
- E. Class III materials used as haunching materials must be compacted by hand or mechanical tamping. Place material under the lower haunch area of the pipe and compact to 90% Standard Proctor Density

All Class IV and Class V materials should not be used as haunching material. They are difficult to compact and often don't supply continuing support.

3.05 COMPACTION

- A. When a pipe trench is undercut in order to remove unsuitable material or for other reasons, it shall be brought to required grade using suitable materials, after which the bottom shall be compacted to match approximately the density of the soil in which the trench was cut.

3.06 PIPELAYING

- A. As pipe laying progresses, the interior of the pipe shall be cleaned of all dirt and superfluous materials. The CONTRACTOR shall, at all times, take whatever measures are necessary to prevent the entrance of dirt and other foreign matter into the storm sewer system. In the event that it is necessary to clean the pipe before final acceptance, the CONTRACTOR shall do so without additional compensation.
- B. Open Trench - No more than 200 linear feet, or the length of trench between consecutive drainage structures, shall be left open behind pipe laying, whichever distance is greater. In no instance shall any trench be left open for more than 24 hours before backfilling in accordance with these specifications.

3.07 DEWATERING

- A. The CONTRACTOR shall provide adequate equipment for the removal of storm or subsurface waters that may accumulate in the excavation. If subsurface water is encountered, the CONTRACTOR shall utilize suitable equipment to adequately dewater the excavation so that it will be dry for work and pipelaying. A wellpoint system or other ENGINEER approved dewatering method shall be utilized, if necessary, to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying. Dewatering by trench pumping will not be permitted if migration of fine-grained natural material from bottom, sidewalls or bedding material will occur. In the event that satisfactory dewatering cannot be accomplished due to subsurface conditions or where dewatering could damage existing structures, the CONTRACTOR shall obtain the ENGINEER's approval of wet trench construction procedure before commencing construction. Dewatering shall cease in a manner to allow the subsurface water to slowly return to normal levels.
- B. Water pumped from the trench or other excavation shall be disposed of in storm sewers having adequate capacity, canals or suitable disposal pits. CONTRACTOR is responsible for acquiring all permits required to discharge the water, and shall protect waterways from turbidity during the dewatering operation. In areas where adequate disposal sites are not available, partially backfilled trenches may be used for water disposal only when the ENGINEER approves the CONTRACTOR's plan for trench disposal in writing. The CONTRACTOR's plan shall include temporary culverts, barricades and other protective measures to prevent damage to property or injury to any person or persons. No flooding of streets, roadways, driveways or private property will be permitted. Engines driving dewatering pumps shall be equipped with residential type mufflers.

3.08 PUMPING

- A. Pumping from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of any portion of the concrete materials being carried away. No pumping shall be done while concrete is being placed, or for a period of at least 24 hours thereafter, unless it is done from a suitable pump separated from the concrete work by a watertight wall.

3.09 BACKFILLING

A. Backfill Materials:

1. Backfilling to the original ground surface or subgrade surface of openings made for structures, with a sufficient allowance for settlement, shall be a part of the work of excavation, although the ENGINEER may require that the material used in making the backfill be obtained from a source entirely apart from the structure. All material used for backfill shall be of a quality acceptable to the ENGINEER, and shall be free from large lumps, wood, or other extraneous material.
2. Heavy construction equipment will not be permitted to cross over culvert or storm sewer pipes until backfill material has been placed and compacted to the finished earthwork grade or to an elevation at least 2-1/2 feet above the crown of the pipe.

B. Compaction Under Wet Conditions:

1. Where wet conditions do not permit the use of mechanical tampers, compaction of the backfill shall be done with hand tampers. Only A-3 material will be allowed for use in 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 practicable, the mechanical tamping shall be done in such a manner and to such extent as to transfer the compaction force into the sections previously tamped by hand.

C. Compaction Requirements for Pipe Culverts and Storm Sewers:

1. The backfilling of pipe trenches shall be done in three stages as follows:
 - a. In the first stage the CONTRACTOR shall provide adequate compacted fill beneath the haunches of the pipe, using mechanical tampers suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe.
 - b. In the second stage the CONTRACTOR shall obtain a well-compacted bed and fill along the sides of the pipe and to a point at least one foot above the top of the pipe. The width of backfill and compaction to be done under this second stage shall be the width of the portion of the trench having vertical sides, or, when no portion of the trench having

vertical sides, it shall be to a width at least equal to twice the outside diameter of the pipe.

- c. In the third stage the remainder of the trench shall be backfilled with suitable material, which shall be compacted in accordance with the requirements below.

2. Compaction:

- a. The backfill for the first and second stages shall be placed in six-inch layers (compacted thickness) and shall be compacted to 98% of maximum density as determined by AASHTO T180. Where the backfill lies within the roadway embankment or subgrade, it shall be compacted to the densities specified for these areas.
- b. When pavement is to be constructed over the pipe, the backfill for the third stage shall be placed in the manner and compacted to the degree required for the first and second stages. Where no pavement is to be constructed and vehicular traffic is not to pass over the pipe, the third stage backfill shall be compacted to a firmness approximately equal to that of the soil adjacent to the pipe trench.

D. Backfill Under Wet Conditions:

1. 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 and noted in the job diary. In such specifically authorized cases the backfill material used below the elevation at which mechanical tampers would be effective shall be of the A-3 soil classification (based on AASHTO Designation M145-49). After the pipe is bedded properly, the A-3 material shall be placed, and rammed and compacted under the pipe haunches by the use of timbers or hand tampers, and hand-tamping continued during the placing of the backfill 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, normally acceptable backfill material may be used and compaction shall be obtained by the use of mechanical tampers. The mechanical tamping shall be done in such manner and to such extent as to transfer the compacting force into the previously hand-tamped fill.

E. Requirements for Thick Lift Compaction in Granular Materials:

1. If the CONTRACTOR has compaction equipment with which the required density can be obtained in thicker lifts than permitted above and upon satisfactory evidence that the proposed equipment will produce work equal in quality to that produced by the specified methods, the ENGINEER may permit placement of granular material of soil groups A-1, A-2, or A-3 in lifts

up to a maximum of three foot compacted thickness. The CONTRACTOR will be required to furnish equipment and labor to excavate and backfill test pits to be dug for the performance of density tests.

2. Use of thick lift compaction procedures will not be allowed for first stage backfilling (beneath the haunches) of pipe culverts and storm sewers.

3.10 CONSTRUCTION METHODS FOR RIP RAP HEADWALLS

- A. The sand and cement shall be mixed dry, in the proportions of five cubic feet of sand to one bag of cement, until the mixture is of uniform color.
- B. The mixed material shall be accurately measured into each sack, with care being taken to place the same amount of material in each sack, and at least the top six inches of the sacks shall remain unfilled to allow for properly tying or folding and to insure against breakage of the sack during placing.
- C. The filled sacks shall be placed with their tied or folded ends all in the same direction unless otherwise shown on the plans. The sacks shall be laid with broken joints, in a regular pattern. The sacks shall be rammed or backed against each other so as to form a close and molded contact after the sand and cement mixture has set up. Sacks ripped with sound, unbroken sacks. Reinforcing rods shall be added as shown on the plans. All sacks shall then be thoroughly saturated with water.
- D. Immediately after watering, all openings between sacks shall be filled with dry grout composed of one part Portland cement and five parts sand.
- E. After the bags have been set up, a concrete cap shall be formed and poured on the headwall as shown on the plans.

3.11 TESTING

- A. The Contractor is required to perform lamping and infiltration/exfiltration tests on the gravity stormwater pipe system to verify that the pipe system is soil tight.
- B. Upon completion of placement of concrete pavement or structural asphalt pavement, but prior to final friction course the Contractor will be required to video the gravity stormwater pipe system after completion to verify that the pipe system is soil tight.
- C. Upon completion of placing concrete pavement or structural asphalt pavement, but prior to final friction course, for flexible (metal, HDPE, and PVC), the Contractor shall test for deflection using a mandrel. Pipe deflected 5 percent or greater shall be removed and replaced at no additional cost to the Owner. Reshaping of deflected pipe shall not be allowed.

3.12 REPLACING PAVEMENT

- A. Where existing pavement, curb, curb and gutter, sidewalk or valley gutter is removed only for the purpose of constructing or removing box culverts, pipe culverts, storm sewers, inlets, manholes, etc., such pavement, etc., shall be replaced and restored to as good condition as determined by the ENGINEER, as before removal, and without direct compensation therefore. The replaced pavement shall be of the same or similar type as that removed.

3.13 CLEANING UP

- A. Upon completion of the work, the CONTRACTOR shall leave the structure and all adjacent areas affected by his operations in a neat and presentable condition, and shall remove and clean up all rubbish and surplus material at locations and methods approved by the ENGINEER.

3.14 SUBMITTALS

- A. As-Built Drawings - During the progress of work of the storm drain system, the Contractor shall record on a spare set of site drawings the exact locations, as installed, of all underground and otherwise concealed piping and other storm drainage system items not installed in locations shown on the Contract Drawings.
- B. These drawings shall be submitted to the Owner prior to request for final payment.

END OF SECTION

SECTION 02743

BITUMINOUS CONCRETE PAVEMENT

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish labor, equipment, and material required for cutting, removing, protecting, replacing or stabilizing existing roadways, driveways and pavement of the various types encountered, removed or damaged under this Contract.
- B. Existing utility castings, including valve boxes, manholes, handholes, pull boxes, inlets and similar structures in the areas of trench restoration, pavement replacement and pavement overlay shall be adjusted to be flush with the surface of the finished work, at no additional cost to the OWNER.
- C. Protection for pavements, limerock base courses and asphaltic surface courses, within the work area.
 - 1. Payment for pavement restoration will be made only where such limerock base courses or surface courses are encountered within the limits defined in the pavement repair details shown in the Drawings and/or in the Standard Details.
 - 2. Base course or surface course beyond those limits, damaged as a result of the CONTRACTOR's operation, shall be restored in accordance with the applicable requirements of these Specifications, at no additional cost to the OWNER.
 - 3. In writing, notify the authority having jurisdiction over the street, of existing damaged pavement prior to proceeding with work in the vicinity.
 - 4. Forward a copy of these notices to the ENGINEER.
- D. Permanent pavement repair shall be in accordance with the details shown in the Drawings and/or in the FDOT Standard Details herein with edges straight and parallel and patches rectangular in plan.
 - 1. Paving replacement required beyond the limits shown in the details, and as called for in the Specifications, shall be at the CONTRACTOR's expense.
 - 2. Where trenches are located out of the existing pavement and damage occurs to the pavement, it shall also be replaced at no expense to the OWNER.
- E. Promptly replace pavement markings removed or obliterated, using like materials and without expense to the OWNER.

PART 2 PRODUCTS

2.01 MATERIALS

- A. The percentages of maximum density for subgrade and limerock base specified herein are minimum.

1. Greater percentages of maximum density shall be obtained, if so required by the governing authority having jurisdiction over the work location.
- B. Asphaltic concrete mixtures shall be obtained only from plants, which comply with the requirements of D.O.T. Specifications, Section 320 as applicable, using materials specified herein, and producing the specified mixture.
 1. General construction requirements for hot bituminous mixtures specified herein shall conform to D.O.T. Specifications, Section 330, as applicable.
- C. Equipment necessary for construction shall be on the job site in first class working condition.
 1. Spilling or dropping of petroleum products is prohibited and defective equipment shall be removed or replaced immediately.
 2. Comply with clean up requirements.
- D. Asphaltic concrete shall be laid only where the surface to be covered is intact, firm, cured and dry, and only when weather conditions are suitable.
 1. The temperature of the mixture at the time of spreading shall be within 25 °F of the temperature set by the ENGINEER.
 2. No mixture shall be spread when the air temperature is less than forty (40°) degrees F, nor when the spreading cannot be finished and compacted during daylight hours.
- E. Mixture caught in transit by a sudden rain may be laid at the CONTRACTOR's risk, if the base is in suitable condition.
 1. Under no circumstances shall asphalt material be placed while rain is falling, or when there is water on the area to be covered.

PART 3 EXECUTION

3.01 TEMPORARY PAVING

- A. Prior to commencing excavation, the asphalt surface shall be saw cut within the limits of the allowable trench width.
 1. Temporary paving will be required along the entire route where the original paved surface is removed.
 2. Temporary paving shall be placed the same day the trench is backfilled.
 3. The trench shall be backfilled as required in Trenching - Section 02319, up to one (1) inch below the existing pavement surface and a temporary, cold mixed sand/asphalt pavement shall be constructed up to the level of the existing pavement surface.
 4. The liquid asphalt shall be Grade RC-70 conforming to the requirements of D.O.T. Specifications, Section 916-2.

5. The sand shall conform to the requirements of D.O.T. Specifications, Section 902 for fine aggregate.
- B. The cold mix shall be installed one block at a time not crossing intersections to a maximum unpaved ditch length of 1,200 feet.
 1. When either of these limits are reached, complete the installation of paving prior to continuing with his excavation work.
 2. Backfill, compaction and temporary paving is to keep pace with the pipe installation.
 3. Written permission must be obtained from the Department and the municipal agency permitting the work to allow greater lengths than 1,200 feet.
 4. Permitting agencies may reduce the allowable limits in their permit, or for other unforeseen right-of-way conditions.
- C. Prior to completion of the work remove the one (1) inch of cold mix and surplus backfill.
 1. Replace one (1) inch of cold mix and surplus backfill with the specified compacted limerock base course and asphalt within the approved working limits.
 2. Municipal agencies permitting this work may accelerate the time for removal of the cold mix, at their discretion.
- D. Maintain the temporary pavement in a condition satisfactory to the ENGINEER until its removal.
 1. Removal shall include surplus backfill material.
 2. Replacement shall be made within thirty (30) days with the permanent pavement.
 3. In replacing the temporary paving with permanent pavement, work shall be completed in sections compatible with specified traffic maintenance procedures.
- E. No payment shall be made for temporary paving work and the cost for such work shall be included in the prices bid for other applicable items of work.
- F. Should the CONTRACTOR elect to install temporary hot mix asphalt, to be left in place, in lieu of cold mix asphalt, a suitable credit for cold mix will be provided to the OWNER when the hot mix temporary asphalt is left in place and installed over properly compacted Limerock base course and shall be incorporated into the specified permanent pavement restoration as part of Type I paving replacement.
- G. Sand seal on the limerock base course will not be permitted in lieu of temporary paving.

3.02 TYPE I PAVING REPAIRS (LIMEROCK BASE AND ASPHALTIC CONCRETE SURFACE)

- A. Type I paving repairs shall be made with an eight (8) inch thick compacted limerock base and a minimum one and one-half (1-1/2) inches thick Asphaltic concrete surface.

- B. Limerock for pavement base shall be obtained from local sources where the overburden was removed from the pits prior to mining operations.
 - 1. The limerock shall comply with the requirements of D.O.T. Specifications, Section 911.
- C. The backfill previously placed and compacted shall be excavated to the required depth below the existing road surface and the existing paving shall be cut back beyond excavations, using an abrasive disc saw to trim the edges to straight and true lines.
 - 1. Eight (8) inches of limerock base shall be placed in two layers, each layer compacted to not less than 98 percent standard density.
 - 2. During rolling, it shall be wet down as necessary to secure the greatest possible compaction.
 - 3. After rolling, the entire surface shall be thoroughly scarified to a depth of not less than three (3) inches and shaped to conform to the existing surface, then watered and rolled again.
 - 4. Rolling and watering shall continue until the entire depth of the base is bonded and compacted into an unyielding mass.
- D. If the subgrade material becomes churned up and mixed with the limerock base course materials, without additional compensation, dig out and remove the mixture, reshape and compact the subgrade and replace the materials removed with clean rock which shall be watered and rolled until satisfactorily compacted.
- E. After the limerock base course has been properly prepared and is dry and ready to receive the wearing surface, a prime coat of emulsified asphalt (Grade RS 2) shall be applied at a rate of 0.10 gallon per square yard, or as approved by the ENGINEER, immediately followed by the asphaltic concrete.
 - 1. The prime coat shall be applied to the entire limerock base course uniformly, and shall thoroughly coat surfaces.
 - 2. Care shall be taken to tack coat and bond the edges of surrounding pavement.
 - 3. The tack coat shall not advance ahead of the paving by more than three hundred (300) feet in business or residential areas unless otherwise approved by the ENGINEER.
- F. The Asphaltic concrete shall be plant mixed, using the best grade of local aggregates of approved size and gradation and mixed with an approved binder and conforming to either the State of Florida Department of Transportation Specifications, Type S-1 Asphaltic Concrete, Section 331-1 through 331-5, or as ordered by the ENGINEER.
 - 1. Where the width of the repair permits, the material shall be placed by means of an approved mechanical spreader and finisher.
 - 2. The mixture shall be compacted to true grade and cross section by means of a tandem roller weighing not less than eight (8) tons.

3. The compacted asphaltic concrete mixture shall not be less than one and one-half (1½) inches in thickness.
4. Rolling shall proceed as closely behind the spreader as possible and material shall be completely compacted the same day it is placed.

3.03 TYPE II PAVING REPAIR (SPECIAL LIME ROCK BASE AND ASPHALTIC CONCRETE SURFACE)

- A. Type II repairs will be used only when the restoration work falls within the limits of a State Road and shall be performed in accordance with the latest Florida Department of Transportation Standard Specifications for Road and bridge Construction, current edition.

3.04 TYPE V PAVING REPAIRS (ASPHALTIC CONCRETE WEARING SURFACE OVERLAY)

- A. Since the quantity of Type V repairs that may be required is usually unknown until Contract pavement restoration work begins, Type V based on pricing listed in the Bid Summary Sheet.
 1. A Contingent Item may or may not be used at the option of the OWNER, and provisions contained within the Contract Documents for quantity overruns will not be applicable.
- B. Type V paving repairs shall consist of a machine-laid asphaltic concrete wearing surface overlay which shall be nominal one-inch thick asphaltic concrete meeting the material requirements of Type I repairs as specified.
 1. As used herein, "overlay" shall mean Type V paving repairs.
 2. A special wearing surface may be substituted if required.
- C. In general, the overlay will be applied in a full lane width or widths, after the permanent paving repairs over the trench have been made.
- D. Longitudinal and transverse asphalt replacement overlay wearing surfaces shall butt into adjacent existing asphalt wearing surfaces in full lane asphalt restoration.
 1. The finish elevation of the new full lane overlay shall meet existing elevations adjacent to the new work.
- E. The existing asphaltic concrete surface shall be saw cut for its full depth or one and one-half (1½) inch minimum, and then stripped back for at least two (2) feet into the area to be overlaid to a second cut which shall also be in clean straight lines.
 1. The second, or interior, cut edge shall be rolled with a tandem roller weighing not less than eight (8) tons before the overlay is applied.
 2. The stripped area shall be used to provide a smooth transition between the overlay and the existing pavement.
 3. Before placing the overlay, cut edges and the stripped area shall be tack coated with specified emulsified asphalt.

- F. If the CONTRACTOR requests in writing to "feather" the longitudinal edge, and if written permission is granted to "feather" the asphalt by the Department and the local municipality, a sanded mix of 70-30 type shall be used.
1. "Feathering" shall begin eighteen (18) inches from the tapered edge.
- G. Prior to installing a full lane width overlay over existing asphalt the trench and shoulders over the pipe shall be saw cut and filled with asphalt to the required depth and terminating flush with the existing adjacent asphalt in accordance with the municipality having jurisdiction over the work for Types I, II.
1. Type V overlay will be installed as detailed above.
- H. When a minor amount of asphalt surface will remain, generally with large pipe installations, after the pipe is installed and the required longitudinal saw cutting the asphalt, the CONTRACTOR may request permission to remove the asphalt in the lane, at his expense, by saw cutting the asphalt adjacent to the existing lane, then placing the Type V overlay flush with the adjacent asphalt.
1. This would require that the Type I, II finish elevation be lowered one (1) inch to allow for the Type V overlay.
- I. Before the overlay is applied, existing surfaces shall be swept clean of dirt and debris, using a power driven broom if warranted by the size of the location to be overlaid and/or as ordered by the ENGINEER.
1. Pavement edges shall be cleared of encroaching vegetation, loose sand, rock and other foreign matter.
 2. When the existing surface is thoroughly clean, a tack coat of Emulsified asphalt, Grade RS-2 (anionic) shall be applied at the rate of approximately 0.10 gallon per square yard, immediately followed by the asphaltic concrete overlay.
 3. The tack coat shall not advance ahead of the paving by more than three hundred (300) feet in business or residential areas unless otherwise approved by the ENGINEER.
- J. Machine-laid overlay shall be place by means of an approved mechanical spreader, and the mixture shall be compacted to true grade and cross section by means of a tandem roller weighing not less than eight (8) tons.
- K. The compacted overlay shall be thicker as required to produce a smooth uniform surface free of irregularities, but shall not be less than one (1) inch in thickness.
1. Existing depressed areas in the asphalt collecting water after a rainfall shall be corrected before placing the asphalt overlay.
 2. Rolling after proceed as close behind the spreading of the asphalt as possible, and materials shall be completely compacted the same day it is placed.

3.05 STATE ROAD PAVEMENT RESTORATION (1:10 CONCRETE BACKFILL AND ASPHALTIC CONCRETE SURFACE)

- A. State Road pavement Restoration, where required, shall be made with a backfill/base of 1:10 cement/s concrete mix.
 - 1. In cases, regardless of water table, the 1:10 mix shall be placed from twelve (12) inches above the top of the pipe to an elevation three (30) inches below the adjacent asphalt surface.
 - 2. A three (3) inch thick asphaltic concrete course, machine-laid in two (2) equal layers, cold-milled removal of one and one-half (1½) inches of pavement (for full lane width), one (1) inch thick asphaltic concrete wearing surface where shown in the Drawings.
- B. After the base surface has been properly prepared and is dry and ready to receive the wearing surface, a tack coat of emulsified asphalt (Grade RS-2) shall be applied at a rate of 0.10 gallon per square yard, immediately followed by the asphaltic concrete.
 - 1. The tack coat shall be applied to the entire base uniformly, and shall thoroughly coat surfaces.
 - 2. Care shall be taken to tack coat and bond the edges of surrounding pavement.
- C. The three (3) inch asphaltic concrete course, two (2) lifts/layers of one and one-half (1½) inches each, shall be plant mixed, using the best grade of local aggregates of approved size and gradation and mixed with an approved binder and conforming to either the State of Florida Department of Transportation Specifications, Type S-1 Asphaltic Concrete, Section 331-1 through 331-5, or as ordered by the ENGINEER.
 - 1. Where the width of the repair permits, the material shall be placed by means of an approved mechanical spreader and finisher.
 - 2. The mixture shall be compacted to true grade and cross section by means of a tandem roller weighting not less than eight (8) tons.
 - 3. The compacted asphaltic concrete mixture shall not be less than three (3) inches in thickness.
 - 4. Rolling shall proceed as closely behind the spreader as possible and material shall be completely compacted the same day it is placed.

3.06 COLD MILLING

- A. Cold milling of the existing pavement for one and one-half (1½) inches deep shall be done by using an automated pavement planer capable of maintaining an accurate depth of one and one-half (1½) inches.
 - 1. Cold milling equipment shall meet the approval of the Florida Department of Transportation, or other municipality having jurisdiction, before work is started.
- B. After the pavement has been milled and mechanically cleaned, a tack coat shall be applied as specified above.
- C. A full lane of one and one-half inches (1½) inches thick asphaltic concrete wearing surface Type S-1 Asphalt Concrete (per Florida Department of Transportation

Specifications, Sections 331 and 337, respectively) shall then be applied in accordance with the above specifications.

3.07 PAVEMENT MARKINGS

A. Traffic Paint

1. Traffic paint used for this work shall conform with the requirements of Section 971-12 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, or, at the CONTRACTOR's option, fast dry traffic paint, as specified in D.O.T. Specifications, Section 971-13 may be used.
2. The colors of the paint shall be yellow or white as existed before the repair.
3. Equipment shall be of a type and design, which will readily obtain the required uniformity of application of the stripes, both as to thickness of coating and as to alignment.
 - a. The paint machine shall be of the spray type and shall be capable of spraying the paint to the required spread without thinning of the paint.
 - b. The paint tank shall be equipped with a mechanical agitator.
 - c. The nozzle shall have cut-off valves, which will apply broken or skip lines automatically.
 - d. Each nozzle shall also be provided with suitable line guides, either metallic shrouds or air blasts.
4. Painting shall be done only during daylight hours and, as far as practicable, shall be terminated in time to permit sufficient drying by sunset.
 - a. No paint shall be applied when moisture is present on the surface to be painted or when the air temperature is below forty (40) degrees °F.
 - b. Painting shall not be done when winds are sufficient to cause spray dust.
5. The surface, which is to be painted, shall be cleaned, by compressed air or other effective means, immediately before the start of painting, and shall be clean and dry when the paint is applied.
 - a. Vegetation or soil shall be removed from the pavement before edge stripping is begun.
6. The paint shall be thoroughly mixed before it is poured into the painting machine and no thinning of the paint will be allowed.
 - a. Before the start of each day's work the paint container, the connections, and the spray nozzles on the machine shall be thoroughly cleaned with paint thinner or other suitable cleaner.

7. The traffic stripe shall be of the specified width with clean, true edges and without sharp breaks in the alignment.
 - a. A uniform coating of paint shall be obtained and the finished stripe shall contain no light spots or paint skips.
 - b. Stripes, which do not have a uniform, satisfactory appearance, both day and night, shall be corrected.
8. Newly painted stripes, including edge stripes, shall be protected until the paint is sufficiently dry to permit vehicles to cross stripe without damage from the tires.
 - a. While the center line stripes are being painting, traffic shall be routed to the right side of the painting operations and the newly painted stripe.
 - b. When necessary, a pilot car shall be used to protect the painting operations from traffic interference.
9. Portions of the stripes damaged by passing traffic or from other cause shall be repainted at the CONTRACTOR's expense.

B. Thermoplastic Traffic Stripes and Markings

1. Thermoplastic pavement markings, including stripes, pavement messages, stop bars, directional arrows, reflective pavement markers and other miscellaneous items, will be replaced as existed before the repair was made.
 - a. The thermoplastic compound shall be as specified in Section 711 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
 - b. The thermoplastic compound shall be extruded or sprayed onto the pavement surface in a molten state by mechanical means, with surface application of glass spheres; when required, and upon cooling to ambient pavement temperature shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation.
2. The colors of the compound shall be white or yellow as existed before the repair.
3. Reflective Pavement Markers and their installation shall conform to the D.O.T. Specifications, Section 706.
4. Where thermoplastic is to be applied to cement concrete pavement, a sealing primer as specified in D.O.T. Specifications, Sections 711-2.2, shall be applied in advance of the placing of the stripes.
5. The thermoplastic shall be applied to the pavement utilizing extrusion or spray application equipment.
 - a. The application equipment shall be so constructed as to provide continuous mixing and agitation of the material.

- b. Conveying parts of the equipment between the main material reservoir and the shaping die or gun shall be so constructed as to prevent accumulation and clogging.
 - c. The equipment shall be constructed so that mixing and conveying parts up to and including the shaping die or gun, maintain the material at the plastic temperature with heat transfer oil or electrical element control led heat.
 - d. Direct fire heat transfer will not be allowed.
- 6. The application equipment shall be so constructed as to insure continuous uniformity in the dimensions of the stripe.
 - a. The applicator shall provide a means for cleanly cutting of square stripe ends and shall provide a method of applying "skip" lines.
 - b. The use of pans, aprons, or similar appliances, which the die overruns, will not be permitted.
- 7. Glass spheres applied to the surface of the completed stripe shall be applied by an automatic bead dispenser attached to the striping machine in such a manner that the beads are dispensed almost instantaneously upon the installed line.
- 8. Special kettle(s) shall be provided for melting and heating the thermoplastic material.
 - a. The kettle(s) shall be equipped with automatic thermostatic control devices in order to provide uniform temperature control and prevent overheating of the material.
 - b. The applicator and kettle(s) must be so equipped and arranged as to satisfy the requirements of the National Fire Underwriters, the State of Florida and Okeechobee County.
- 9. Applicators shall be mobile and maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc.
 - a. The applicator equipment to be used on roadway installations shall consist of either hand equipment or truck mounted units depending on the type of marking required.
- 10. The hand applicator equipment shall be insulated and shall have sufficient capacity to hold one hundred and fifty (150) pounds of molten material and shall be sufficiently maneuverable to install crosswalks; lane, edge and center lines; arrows and legends.
 - a. The truck mounted unit for lane, edge, and center lines shall consist of a mobile self contained unit carrying its own material capable of operating at a minimum speed of five (5) miles per hour while installing striping.
- 11. Application time, weather limitations and surface preparation shall be in accordance with D.O.T. Specifications, Sections 710-4, 710-5 and 710-8.

12. The material, when formed into traffic stripes or other markings must be readily renewable by placing an overlay of new material directly over an old line of compatible material in such a manner that no splitting or separation takes place.
13. The application temperature shall be within the range specified by the manufacturer of the thermoplastic compound being used.
14. All pavement edge lines, gore, island and diagonal strip markings, bike lane symbols and messages, wherever located, shall have a minimum thickness of 0.060 inch at the edges and a maximum thickness of 0.120 inch at the center.
 - a. A minimum average film thickness of 0.060 inch shall be maintained.
 - b. Lane lines, center lines, transverse markings (except shoulder markings), and pavement markings within traffic wearing area (such as dotted turning guide lines) shall have a minimum thickness of 0.090 inch at the edges and a maximum thickness of 0.188 inch at the center.
 - c. A minimum average film thickness of 0.090 shall be maintained.
 - d. Thickness measurements shall be an average in over a three (3) foot length.
15. The glass sphere top coating shall be applied by a type of glass sphere dispenser or gun, which will embed the spheres into the line surface to at least one-half their diameter.
 - a. The glass sphere top coating shall not incur more than a ten (10) percent loss during the first thirty (30) days of traffic exposure.

END OF SECTION

SECTION 02769

REFLECTIVE PAVEMENT MARKERS

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish labor, equipment, and material for installation of reflectorized pavement markers and removing pavement markers at locations designated in the Drawings.
- B. The work shall be done in accordance with the contract Specifications and Drawings.

1.02 DEFINITIONS

- A. Type 1 Markers shall have amber bi-directional reflective faces.
- B. Type 2 Markers shall have bi-directional reflective faces with one face colorless and the other face colored red.
- C. Type 3 Markers shall have bi-directional reflective faces with one face colored red and the other face colored amber.
- D. Type 4 Markers shall have an amber mono-directional reflective face.
- E. Type 5 Markers shall have a colorless mono-directional reflective face.
- F. Class A Markers shall meet the specific intensity requirements of 706-2.3.2. without the reflective face treatment.
- G. Class B Markers shall meet the specific intensity requirements, 706-2.3.2, after the reflective face has been treated as specified in 706-2.3.3(a).
- H. Horizontal entrance angle - the angle in the horizontal plane between the direction of incident light and the normal to the leading edge of the marker.
- I. Observation angle - the angle at the reflector between the observer's line of sight and the direction of the light incident on the reflector.
- J. Specific intensity - candlepower of the returned light at the chosen observation and entrance angles for each foot-candle of illumination at the reflector on a plane perpendicular to the incident light.

1.03 METHOD OF MEASUREMENT

- A. The contract unit price for markers furnished and installed shall include equipment, labor, and material necessary to make a complete and accepted installation.
- B. The contract unit price for marker removal shall consist of equipment, material, and labor necessary to remove, pick up and dispose of the marker.

1.04 BASIS OF PAYMENT

- A. The contract unit price each for Reflective Pavement Marker and the contract unit price each for Removal of Existing Pavement Markers shall be full compensation for work specified under these items.

1.05 RELATED SECTIONS

- A. Submittals - Division 1

PART 2 PRODUCTS

2.01 MATERIALS

A. REFLECTIVE MARKERS

1. The marker shall consist of a molded methyl methacrylate or an acrylonitrile butadiene styrene (ABS) shell filled with a mixture of an inert thermostating compound and filler material.
 - a. Methyl methacrylate shall conform to the requirements of Federal Specification L-P380C, Type 1, Class 3.
2. The marker shall have a maximum width of five (5) inches and a maximum height of three quarters of an (0.75) inch.
3. The minimum area of each reflective face shall be one and a half (1.50) square inches.
4. The outer surface shall be smooth and corners and edges exposed to traffic shall be rounded.
5. The base shall be substantially free of glass or substances that may reduce their bond to adhesive.
6. Strength Requirements:
 - a. Marker General Strength
 - 1) The marker shall support a minimum load of 2,000 pounds when tested in accordance with a manufacturer-developed test approved by the Department.
 - 2) Failure shall constitute either breakage or significant deformation of the marker at loads less than or equal to 2,000 pounds.
 - 3) Should the marker fail, four (4) additional markers shall be tested.
 - 4) The failure of one of the four (4) markers shall be cause for rejection of the entire lot.

- 5) Only Class B Markers shall be subjected to the face strength test.
- 6) The red reflective face of Type 2 and Type 3 Class B Markers shall not be subjected to the face strength test.

b. Reflective Face Strength:

- 1) The marker shall be placed in a convection oven at 130°F for one hour.
- 2) While at the elevated temperature, the face shall be impacted by a 0.2-pound dart fitted with a 0.25-inch radius spherical head falling perpendicularly onto the surface from a height of six (6) inches.
- 3) The impact area shall exhibit only concentric cracks.
- 4) Failure shall constitute radial cracks along the area.

7. Optical Requirements:

a. Specific Intensity:

- 1) The specific intensity of each colorless reflective face of the marker at 0.2 degree observation angle shall not be less than the following when:
 - a) The incident light is parallel to the base of the marker,
 - b) The reflective face has been subjected to the optical testing procedure specified

Horizontal Entrance Angle	Specific Intensity
0 Degree	3.0
20 Degree	1.2

- 2) The specific intensity of amber reflective faces shall be equal to or greater than sixty (60) percent of the value for colorless faces.
- 3) The specific intensity of red reflective faces shall be equal to or greater than twenty (20) percent of the value for colorless faces.
- 4) The specific intensity of blue reflective faces shall be equal to or greater than Ten (10) percent of the value for colorless faces.

c. Optical Testing Procedure:

- 1) Reflective Face Treatment for Class B Markers:
 - a) The reflective face of Class B Markers shall be prepared in accordance with the following procedure prior to measuring the specific intensity.

- (1) A pad one (1) inch in diameter shall be formed from No. 3 coarse steel wool, which conforms with Federal Specification FF-W-1825.
 - (2) The steel wool pad shall be placed on the reflective face.
 - (3) The entire reflective face shall be rubbed 100 times with an applied load of 50 pounds.
 - b) For Type 2 and 3 Markers, the red reflective faces shall not be subjected to the testing preparation procedure.
- d. Optical Measurements:
 - 1) The markers to be tested shall be located with the center of the reflecting face at a distance of five feet from a uniformly bright source having an effective diameter of 0.2 inch.
 - 2) The photocell width shall be 0.5 inch.
 - 3) It shall be shielded to eliminate stray light.
 - 4) The distance from light source center to the photocell center shall be 0.21 inch.
 - 5) If a test distance other than five (5) feet is used, the source and receiver dimensions and the distance between source and receiver shall be modified in the same proportion as the test distance.
 - 6) A random sample of five (5) markers will constitute a representative sample for a lot.
 - 7) If more than one marker fails the initial test, a new sample (five (5) markers) may be tested.
 - 8) Failure of more than one marker in the retest shall be cause for rejection of the entire lot.

B. ADHESIVE

1. General Requirements:
 - a. Bituminous adhesive as recommended by the marker manufacturer shall be used for bonding the markers to the pavement.
 - b. The adhesive used shall be one of the products included on the Qualified Products List, current at the time of the adhesive proposal for use.
2. Specific Requirements for Bituminous Adhesive:

- a. The adhesive shall be material suitable for bonding pavement markers to portland cement concrete pavement, not to be used with bituminous pavement and chip-sealed surfaces when the road surface and marker temperatures are in the range of 50°F to 160°F.
- b. The composition of the adhesive must not deteriorate when heated to and applied at temperatures up to 425°F using either air or oil-jacketed melters.
- c. The adhesive shall be packaged in self-releasing cardboard containers with essentially flat and parallel top and bottom surfaces allowing the packages to be stack properly.
- d. Each package shall have a net weight of either fifty (50) or sixty (60) pounds and shall weigh within two (2) pounds of the stated quantity.
- e. Self-releasing cardboard dividers which will separate each package into sections weighing no more than fifteen (15) pounds each shall be part of the packaging.
- f. Each package shall show the manufacturer's name, net weight, and lot or batch number and shall be printed with "Bituminous Adhesive for Pavement Markers" or similar wording identifying the contents.
- g. The adhesive will be tentatively accepted by a manufacturer's certified test report.
- h. The certified test report shall show the test results and shall state that the adhesive represented by the test results meets the requirements of the specifications and has the properties and characteristics as herein specified.
- i. Furnish six copies of the test report to the State Materials ENGINEER.
- j. Each certification shall also contain a Material Safety Data Sheet.
- k. Standard Type:
 - 1) The asphaltic material and mineral filler shall comply with the following requirements:
 - 2) Adhesive Properties:

	Minimum	Maximum	Method
Softening Point, °F	200	-	ASTM D 36
Penetration	10	20	ASTM D 5
Flow, inches	-	0.2	ASTM D 3407
Viscosity, 400°F, Poises	-	75	ASTM D 2669
Flash Point, C. O. C., °F	550	-	ASTM D 92

- 3) Asphalt properties determined on the filler-free material derived from the extraction and Abson recovery process as explained in Test Methods.

	Minimum	Maximum	Method Penetration, 100 g
5 Second, 77°F	25	-	ASTM D 5
Viscosity, 275°F, Poises	12	-	ASTM D 2171

- 4) Filler properties determined using the filler separation technique described in test methods.

	Minimum	Maximum	Method
Filler Content, Percent by Weight	50	75	5)
Filler Fineness Percent passing:			ASTM C430
Sieve No.100	100		
Sieve No.200	95		
Sieve No.325	75		

- 5) Filler material:

- a) Shall be separated from the asphalt to determine filler content and filler fineness.
- b) The portion of the adhesive insoluble in 1,1,1-trichloroethane shall be considered the filler content.
- c) Filler content shall be determined by weighing 10.00 ± 0.01 grams of solid adhesive into centrifuge flask with approximately one hundred (100) ml volume as specified in ASTM D 1796.
- d) Add fifty (50) ml of 1,1,1-trichloroethane to the adhesive, which should be broken up into small pieces in order to speed the dissolution process.
- e) Swirl or stir with a fine rod, taking care not to lose solids.
- f) Place the sample flask in a balanced centrifuge and spin using a minimum relative centrifugal force of one hundred and fifty (150) (as determined in Section 6 of ASTM D 1796) for ten (10) minutes.
- g) Remove the sample flask and decant the solvent, taking care not to lose solids.
- h) Repeat the application of solvent and centrifuging until the solvent becomes clear and the filler is visually free of asphalt.

- i) Dry the filler at $160 \pm 5^{\circ}\text{F}$ to remove solvent and weigh the resulting filler.
- j) Filtration of the decanted solvent may be performed to verify there is no loss of filler.
- k) Percent filler content is calculated as follows:

$$\text{FILLER CONTENT (Percent by Weight)} = \frac{\text{FILLER WEIGHT (grams)} * 100}{\text{ORIGINAL ADHESIVE WEIGHT (grams)}}$$

3. Flexible Adhesive:

- a. The hot applied flexible pavement marker adhesive shall be a hot melt thermoplastic material capable of bonding the marker without excessive marker movement at hot summer temperatures and remain flexible at winter temperatures.
- b. The adhesive shall comply with the following physical requirements when melted in accordance with ASTM D 3407 and poured into suitable test molds:

Penetration, 77°F (ASTM D 5)	25 Max.
Softening Point (ASTM D 2398).	200°F Min.
Brookfield Viscosity, 400°F (ASTM D 3236)	10,000 cp Max.
Ductility at 77°F, 5 cm/min (ASTM D 113)	15 cm Min.
Ductility at 39.2°F, 1 cm/min (ASTM D 3407)	5 cm Min.
Asphalt Compatibility (ASTM D 3407)	Pass

- c. Thermoplastic striping materials are not suitable for this specification.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Placement of the markers shall be in accordance with the Traffic Operations Standards unless otherwise specified.
- B. The portion of the pavement surface or thermoplastic marking to which the marker is attached by the adhesive shall be cleaned of dirt, curing compound, grease, oil, moisture, loose or unsound pavement and other material which would adversely affect the adhesive.
- C. Reflective markers shall be installed in a manner that the reflective face of the marker is perpendicular to a line parallel to the roadway centerline.
- D. No markers shall be installed over longitudinal or transverse joints of the pavement surface.
- E. The adhesive shall be spread on the bonding surface (not the marker) so that 100 percent of the bonding area of the marker will be covered.

- F. The adhesive application shall be of sufficient thickness so that when the marker is pressed into the adhesive, excess adhesive shall be forced out around the entire perimeter of the marker.
- G. Excessive adhesive shall be removed from in front of the reflective faces.
- H. If adhesive or foreign matter adheres to the reflective face of the marker, the marker shall be replaced.
- I. The marker shall be protected against impact until the adhesive has hardened.
- J. The ENGINEER shall determine the minimum time necessary to cure the adhesive for sufficient set to bear traffic.
- K. Specific Installation Requirements Utilizing Bituminous Adhesive:
 - 1. The markers may be cemented to the pavement with a bituminous adhesive conforming to this specification.
 - 2. The markers shall be installed when the pavement is dry and the pavement temperature is no less than fifty (50°) F, and no more than one hundred and sixty (160°) F.
 - 3. The portion of the highway surface to which the marker is to be bonded by the adhesive shall be free of dirt, curing compound, grease, oil, moisture, loose or unsound layers, paint or other material which would adversely affect the bond of the adhesive.
 - 4. Cleaning shall be done by blast cleaning on portland cement concrete and old bituminous pavements.
 - 5. New bituminous pavement that is clean need not be blast-cleaned unless the surface contains an abnormal amount of asphalt or the surface is contaminated with dirt, grease, paint, oil or other material which would adversely affect the bond of the adhesive.
 - 6. The bituminous adhesive shall be melted and heated in either thermostatically controlled double boiler type units utilizing heat transfer oil or thermostatically controlled electric heating pots.
 - 7. Direct flame melting units shall not be used with flexible adhesives, but may be used with standard adhesive in accordance with manufacturer's recommendations.
 - 8. The melter/applicator unit shall be suited for both melting and pumping application through heated applicator hoses.
 - 9. The adhesive shall be heated to between 375 and 425°F and applied directly to the pavement surface from the melter/applicator by either pumping or pouring.

10. It is important that application temperature be maintained between 375 and 425°F as lower temperatures may result in decreased adhesion while higher temperatures may damage the adhesive.
11. Sufficient adhesive shall be used to insure total contact with the bottom of the marker.
12. Markers shall be applied to the adhesive immediately (within ten (10) seconds) to assure bonding.
13. The marker shall be placed in position by applying downward pressure until the marker is firmly seated with the required adhesive thickness and squeeze out.
14. Excessive adhesive squeeze out shall be removed from the pavement and adhesive on the exposed surfaces of the markers shall be immediately removed.
15. Soft rags moistened with mineral spirits conforming to Federal Specifications TT-T-291 or kerosene may be used if necessary, to remove adhesive from exposed faces of pavement markers.
16. No other solvent may be used.
17. The adhesive may be reheated and reused.
18. The pot life at application temperatures shall not exceed manufacturer's recommendations.
19. Clean out of equipment and tanks may be performed using petroleum solvents as diesel fuel or similar materials.
20. Solvent must be removed from the equipment tanks and lines before the next use of the melter.

3.02 FIELD QUALITY CONTROL

- A. In the event that more than two (2%) percent of the markers fail in adhesion within the first forty-five (45) days under the traffic, replace failed markers at CONTRACTOR'S expense.
- B. If more than five percent of the markers fail in adhesion during the initial forty-five (45) day period, the replacement period shall be extended an additional forty-five (45) days from the date that replacement markers have been installed.
- C. If, at the end of the additional forty-five (45) day period, more than two percent of markers (initial installation and forty-five (45) day replacements combined) fail in adhesion, replace failed markers at CONTRACTOR'S expense.

END OF SECTION

SECTION 02773

CEMENT CONCRETE GUTTERS AND CURBS

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish labor, equipment, and material required for cutting, removing, protecting, and replacing existing concrete curb and gutter of the various types encountered, removed or damaged under this Contract.
- B. Provide damage protection for adjacent concrete driveways, sidewalks and curb and gutter within the work area.

1.02 PAYMENT

- A. If payment items have not been established in the Proposal for the removal and replacement of concrete curb and gutter, the cost for this work shall be included in the overall Project cost bid.
- B. No other compensation will be provided.

1.03 RELATED SECTIONS

- A. Concrete Division - 3
- B. Reinforced Cement Concrete Pavement Division - 2

PART 2 PRODUCTS

2.01 CONCRETE

- A. Concrete shall conform to the applicable provisions specified in Division 3 of these Contract Documents.

PART 3 EXECUTION

3.01 CURB AND GUTTER

- A. Restore curb and gutter in lengths equal to trench width plus two (2) feet (shoulders), or ten (10) feet, whichever is greater, unless otherwise permitted or ordered by the ENGINEER.
- B. Removal of existing curb and gutter, installation of forms, preparation of subgrade, and perform the final finish as specified for driveways.
- C. Match the shape and final finish of the existing curb and gutter.

END OF SECTION

SECTION 02916

MULCHING

PART 1 GENERAL

1.01 SUMMARY

- A. Furnishing labor, equipment, and material needed to provide finished grass ground cover by the placing and spreading of mulching.

1.02 RELATED SECTIONS

- A. Clearing and Grubbing - Division 2.
- B. Topsoil - Division 2.
- C. Earthwork - Division 2.
- D. Seeding and Supplements - Division 2.

1.03 REFERENCES

- A. Standards - Federal Specifications (FS) 0-F-241C.
- B. Testing Agency - Independent testing laboratory.
- C. Requirements of Regulating Agencies - Comply with requirements of the State Department of Agriculture.
- D. Source Quality Control - Producer's tests for purity and germination of seed, dated within nine months of sowing.
- E. Cost of Testing - The testing is at expense of the CONTRACTOR.

1.04 SUBMITTALS

- A. Test Report - Results of seed purity and germination tests.
- B. Certificates - Manufacturer's certification that materials meet specification requirements.

1.05 MEASUREMENT AND PAYMENT

- A. Payment for mulching shall be for areas of completed grass cover that have been accepted by the ENGINEER as field measured.
- B. Payment will be made at the unit price bid for mulching, which price and payment shall constitute full compensation for furnishing materials and performing work in connection therewith and incidental thereto.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 CONDITIONS

- A. Check that preceding work affecting ground surface is completed.
- B. Do not start work until conditions are satisfactory.

3.02 APPLICATION

- A. See seeding and soil supplements - Division 2.

END OF SECTION

SECTION 02919

TOPSOIL

PART 1 GENERAL

1.01 SUMMARY

- A. The work covered by this section consists of furnishing labor, equipment, and material needed to provide finished grass ground cover by the placing and spreading of topsoil.

1.02 RELATED SECTIONS

- A. Clearing and Grubbing - Division 2.
- B. Mulching - Division 2.
- C. Earthwork - Division 2.
- D. Seeding and Soil Supplements - Division 2.

1.03 REFERENCES

- A. Standards - Federal Specifications (FS) 0-F-241C.
- B. Testing Agency - Independent testing laboratory.
- C. Requirements of Regulating Agencies - Comply with requirements of the State Department of Agriculture.
- D. Cost of Testing - The testing is at expense of the CONTRACTOR.

1.04 SUBMITTALS

- A. Test Report - Results of seed purity and germination tests.
- B. Certificates - Manufacturer's certification that materials meet specification requirements.

1.05 MEASUREMENT AND PAYMENT

- A. Payment will be made at the unit price bid for topsoil, which price and payment shall constitute full compensation for furnishing materials and performing work in connection therewith and incidental thereto.

PART 2 PRODUCTS

2.01 WATER

- A. Free or matter harmful to plant growth.

2.02 TOPSOIL

- A. Material used for topsoil shall be material supplied by CONTRACTOR from off-site sources or from excavated pond bottom area if suitable for this use.
- B. Topsoil mixture shall be suitable for plant growth and free from hard clods, stiff clay, hardpan, gravel, brush, large roots, refuse or other deleterious material, and shall be of reasonably uniform quality.
- C. Rocks larger than 1 inch in diameter shall be removed.
- D. Organic content as determined in accordance with AASHTOT 194 shall be at least five percent (5%) and the pH shall be between 5.0 and 7.0.

PART 3 EXECUTION

3.01 CONDITIONS

- A. Check that preceding work affecting ground surface is completed.
- B. Do not start work until conditions are satisfactory.

3.02 PREPARATION

- A. Stockpiled topsoil shall be spread to a thickness of two (2) inches over areas to be seeded.
 - 1. The resulting ground elevation shall be the proposed finished grade shown in the Drawing.
- B. Till fertilizer into top two (2) inches of soil at rate of 12-lbs/1000 sq. ft.
- C. Water dry topsoil to depth of five (5) inches at least forty eight (48) hours prior to seeding to obtain a loose friable seed bed.

END OF SECTION

SECTION 02923

SEEDING AND SOIL SUPPLEMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Furnishing labor, equipment, and material needed to provide finished grass ground cover by the placing and spreading of seeding.

1.02 RELATED SECTIONS

- A. Clearing and Grubbing - Division 2.
- B. Mulching - Division 2.
- C. Earthwork - Section 2.
- D. Top Soil - Division 2.

1.03 REFERENCES

- A. Standards - Federal Specifications (FS) 0-F-241C.
- B. Testing Agency - Independent testing laboratory.
- C. Requirements of Regulating Agencies - Comply with requirements of the State Department of Agriculture.
- D. Source Quality Control - Producer's tests for purity and germination of seed, dated within nine months of sowing.
- E. Cost of Testing - The testing is at expense of the CONTRACTOR.
- F. Fertilizers - Mixed, Commercial.

1.04 SUBMITTALS

- A. Test Report - Results of seed purity and germination tests.
- B. Certificates - Manufacturer's certification that materials meet specification requirements.

1.05 MEASUREMENT AND PAYMENT

- A. Payment for seeding shall be for areas of completed grass cover that have been accepted by the ENGINEER as field measured.
- B. Payment will be made at the unit price bid for seeding, which price and payment shall constitute full compensation for furnishing materials and performing work in connection therewith and incidental thereto.

PART 2 PRODUCTS

2.01 SEED

- A. Species - Equal parts of Pensacola Bahia and Gulf improved rye.
- B. Clean, dry, new crop seed, dry remixed immediately prior to sowing.

2.02 WATER

- A. Free of matter harmful to plant growth.

2.03 SOIL STERILIZERS

- A. As recommended by State and Local Agricultural Agencies.

2.04 FERTILIZER

- A. FS O-F-241, Type 1, Grade A or B.
- B. The chemical designation shall be 12-8-8, with at least fifty percent (50%) of the nitrogen from a non-water soluble organic source.

PART 3 EXECUTION

3.01 CONDITIONS

- A. Check that preceding work affecting ground surface is completed.
- B. Do not start work until conditions are satisfactory.
- C. Do not perform seeding when wind exceeds fifteen (15) mph.
- D. Seed during times acceptable to the ENGINEER.

3.02 PREPARATION

- A. Apply a soil sterilizer to topsoil per manufacturer's direction.
 - 1. Seeding shall not commence until after the proper time recommended by the manufacturer.
- B. Till fertilizer into top two (2) inches of soil at rate of 12-lbs/1000 sq. ft.
- C. Water dry topsoil to depth of five (5) inches at least forty eight (48) hours prior to seeding to obtain a loose friable seed bed.

3.03 APPLICATION

- A. Broadcast half of seed with mechanical seeder.
- B. Broadcast remaining half of seed at right angles to first seeding pattern, using same broadcast method.
- C. Apply seed at 10-lbs./1000 sq. ft.
- D. Cover seed to depth of one-eighth (1/8) inch by racking, harrowing, and cultivating.
- E. Roll seeded area with roller weighing maximum of 150 lbs./ft. of width.
 - 1. Make two (2) passes.
- F. Spread mulch uniformly to completely cover seeded area.
- G. Water seeded areas to depth of six (6) inches immediately after seeding/rolling operations.

3.04 PROTECTION

- A. Immediately after seeding, erect barricades and warning signs as necessary to protect seeded areas from foot and vehicular traffic until grass is established.

3.05 ESTABLISHMENT

- A. Watering
 - 1. Keep soil moist during seed germination period.
 - 2. Supplement rainfall to produce total of two (2) inches per week after germination.

- B. Reseed and mulch spots larger than one (1) sq. ft. not having uniform stand of grass.
- C. Establishment period to extend until acceptance by the OWNER.

3.06 CLEAN-UP

- A. Remove trash and excess materials from project site.
- B. Maintain paved areas in clean condition.
- C. Remove barriers and signs from project site at termination of establishment period.

3.07 FINAL INSPECTION AND ACCEPTANCE

- A. Request final inspection as the area is completed and grass is established.
- B. Reseed rejected grass area within two (2) weeks after the inspection or as otherwise directed by the ENGINEER.

END OF SECTION

SECTION 02924

SODDING

PART 1 GENERAL

1.01 SUMMARY

- A. Repair lawns and grassed rights of way damaged or removed during the construction of the pump station.

1.02 RELATED WORK

- A. Clearing and Grubbing - Division 2.
- B. Earthwork - Section 2.
- C. Top Soil - Division 2.

1.03 REFERENCES

- A. Federal Specification (FS) 0-F-241q (1), Fertilizer Mixed, Commercial.
- B. Materials shall conform to the requirements established by the State Department of Agriculture.

1.04 SUBMITTALS

- A. Growers Certification:
 - 1. Grass species.
 - 2. Compliance with State and Federal quarantine restrictions.
- B. Manufacturer's certification of fertilizer and herbicide composition and application rates.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver sod on pallets.
- B. Protect roots from exposure to wind and sun.
- C. Protect sod against dehydration, contamination and heating during transportation and delivery.

- D. Do not deliver more sod than can be installed within twenty-four (24) hours.
- E. Keep stored sod moist and under shade or covered with moistened burlap.
- F. Do not stack sod more than two (2) feet deep.
- G. Do not tear, stretch, or drop sod.

1.07 WARRANTY

- A. Guarantee sod for period of three (3) months after date of substantial completion.
- B. Repair damage to other plants during sod replacement at no cost to the OWNER.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod

1. Grass Species is to be Stenotaphrum secundatum - St. Augustine "Floritam", or approved equal.
2. American Sod Producers Association (ASPA) Grade
 - a. Use nursery grown or approved equal sod.
3. Furnish sod in pads of the following dimensions:
 - a. Length: twenty-four (24) inches plus or minus five (5) percent
 - b. Width: sixteen (16) inches plus or minus five (5) percent
 - c. Thickness: 1-1/2 inches excluding top growth and thatch.
4. Grow sod in organic "muck" soil, with minimum 1-inch soil intact on roots.
5. Mow sod to a uniform height of 2- 1/2 inches, when harvested.
6. Thatch: Maximum 1/2-inches uncompressed.
7. Use diseases free sod: entomologist of the State Department of Agriculture must inspect for nematodes, pests, and pest larvae.
8. Weeds: Free of Bermuda grass, nut grass, and other objectionable plant and material.

9. Uniform in color, leaf texture and density.

B. WATER

1. Free of substances harmful to plant growth. Free from chemicals or minerals that stain or discolor.

C. FERTILIZER

1. Federal Specification (FS) O-F-241 c (1), Grade A or 8.
2. The chemical designation shall be 16-4-8, with at least fifty (50) percent of the nitrogen from a non-water-soluble organic source.

D. HERBICIDES

1. As approved by the State of Department of Agriculture.

E. TOPSOIL

1. Topsoil mixture shall be suitable for plant growth.
2. Topsoil mixture shall be free from hard clods, stiff clay, hardpan, gravel, brush, large roots, refuse, or other deleterious material and of reasonable uniform quality.
3. Maximum Soluble Salts: 550 ppm
4. Top soil mixture shall be free of weeds, plants, seeds, insects, and undesirable materials, before delivery to the site.
 - a. Sterilization of topsoil shall not affect viability of new plant growth in treated topsoil.

PART 3 EXECUTION

3.01 SURFACE PREPARATION

- A. Wet surface to a uniform depth of two (2) to three (3) inches or until upper surface is reasonable wet and compacted before installing sod.
- B. Roll soil with 100 lb. roller; make two (2) passes.

3.02 INSTALLATION

- A. Verify topsoil placement.
- B. Install sod species as specified herein.
- C. Locate trees and palms and paint a forty-eight (48) inch diameter circle on the soil around the trunk of each species planted in sodded areas.
 - 1. Do not install sod within painted circle.
- D. Begin sodding at bottom of slopes and install parallel to contours.
- E. Lay first row of sod in straight line with long dimension of pads parallel to slope contours; continue laying sod accordingly.
- F. Butt side and end joints flush and tight.
 - 1. Do not allow ends to curl or break.
- G. Stagger end joints in adjacent rows.
 - 1. Do not stretch or overlap sod.
- H. Peg sod on slopes with a ratio of 1:3 (rise:run) or greater using a minimum of two stakes per square yard, using six (6) inches minimum nursery grade bamboo stakes.
- I. Sod installed adjacent to planting beds should be a minimum distance from the first row of shrubs, equal half the spacing of the shrubs (Example: shrubs spaced eighteen (18) inches on center - sod should be nine (9) inches from center of shrub).
- J. Trim sod to provide clean edges for trees and planting beds; sod should follow planting beds to provide clean, smooth, and flowing lines.
- K. Water sod immediately after transplanting.
- L. Roll sod, except on pegged areas, with roller weighing not more than 100 lbs. per foot of roller width; make two (2) passes.
- M. Water sod and soil to depth of six (6) inches within four (4) hours after rolling.
- N. Cut a forty-eight (48) inch diameter, clean round saucer around each tree or palm planted in sodded areas to provide for mulch.
 - 1. Do not injure root ball or cut sprinkler or utility lines.

3.03 SOD ESTABLISHMENT

A. Watering:

1. Keep sod moist during first week after planting.
2. After first week, supplement rainfall to produce total of one (1) inch per day until sod has acclimated.

B. Weed Eradication: maintain grass in a weed free condition until OWNER acceptance.

C. Fertilizer: Apply fertilizer uniformly at manufacturer's recommended rate, two weeks after sod installation.

1. Fertilizer should be dispensed using lightweight spreaders.

D. Maintenance period to extend until acceptance of the OWNER.

3.04 CLEANING

A. Immediately clean spills from paved and finished surface areas.

B. Remove debris and excess materials from project site.

3.05 FINAL INSPECTIONS

A. Project final payment approval determines OWNER acceptance.

B. Replace rejected sod areas with acceptable sod within two weeks after the inspection.

END OF SECTION

SECTION 03100

CONCRETE FORMWORK AND ACCESSORIES

Part 1 GENERAL

1.01 SUMMARY

- A. Furnish equipment, materials, and labor required for construction and removal of forms for the containment of concrete to be cast in place, as shown in the Drawings or as required for the completion of the project.
- B. Provide equipment, materials, and labor required for joints in concrete, chamfer strips, and accessories as required for a complete installation as indicated in the Drawings and Specifications.

1.02 RELATED SECTION

- A. General Conditions - Bidding and Contract Requirement
- B. Site Work - Division 2.
- C. Submittals - Division 2.

1.03 REFERENCES

- A. The following codes and standards shall govern workmanship and materials unless modified more stringently in the Drawings and Specifications.
 - 1. The Florida Building Code (latest edition).
 - 2. ACI - 301 "Specifications for Structural Concrete for Buildings" (latest edition) is part of these specifications.

PART 2 PRODUCTS

2.01 WOOD FORM MATERIAL

- A. Formwork shall conform to standards of ACI 301 and 347, unless otherwise noted.
- B. Lumber shall have a minimum moisture content of nineteen (19%) percent.
- C. Members that have bows, twists, knots, or other defects, which make it unsuitable for the intended purpose, shall be rejected.

1. Plywood shall be exterior DFPA, three-quarter (3/4) inch minimum thickness, with faces in good condition.
2. Lumber shall be #2 short leaf Southern Pine.
 - a. Beam bottom forms shall be one and one-half (1-1/2) inch minimum thickness.
3. Rough hardware shall be galvanized including bolts, anchors, nails, plates, and inserts.
 - a. Bolts shall be of this size and length as detailed and shall be three quarter (3/4) inch minimum diameter where not detailed.
 - b. Bolts shall be provided with washers.
4. Ties shall be "snap" type, or threaded end, completely removable or other approved type.

2.02 FORM ACCESSORIES

A. Form accessories shall be of a commercially manufactured type.

1. Form ties shall be so constructed that the ends, or end fasteners, can be removed without causing appreciable spalling at the faces of the concrete.
2. After ends, or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than 2 inches from the formed face of the concrete that is exposed to wastewater or closed surfaces above the wastewater and not less than 3/4 inch from the formed face of other concrete.
3. Form ties in walls designed to retain liquids shall be provided with a water seal at mid-thickness of the wall.

2.03 CHAMFER STRIPS

A. Chamfer strips shall be polyvinyl strips designed to be nailed in the forms to provide a 3/4-inch chamfer at exposed edges of beams and interior rectilinear structural columns.

1. Chamfer strips shall not be used at corners of walls.

2.04 EXPANSION JOINT MATERIAL

- A. Expansion joint filler shall be of closed cell Neoprene type, conforming to ASTM 1056, Type 1040 as manufactured by Williams Products, Inc., Troy, Michigan, or equal.

2.05 FORM COATING

- A. Form coating shall be a coating that will effectively prevent absorption of moisture and prevent bond with concrete and will not stain concrete surfaces and shall be compatible with paint systems specified in Paint - Division 9.

2.06 WATERSTOPS

- A. All joints subject to, or likely to be subject to internal or external liquid pressure shall have waterstops installed.
 - 1. Plastic waterstops shall be manufactured from virgin polyvinyl chloride and shall not contain scrap or reclaimed material.
 - 2. Properties of the PVC used shall conform to U.S. Army Corps of Engineers Specification CRD C572.
 - 3. Waterstops shall be serrated type with a center hollow bulb.

PART 3 EXECUTION

3.01 WORKMANSHIP

- A. Forms shall be installed true to line and dimensions with snap ties and supports to maintain them in position, without bows or bulging during pouring, vibrating, and curing the concrete.
- B. Dimensional tolerances of formwork shall be designed and installed assuring that the finished concrete will comply with dimensional tolerances of ACI 301 and the required tolerances to properly accommodate the equipment installation as verified from the manufacturer's shop drawings.
 - 1. Embedded or cast-in anchors or inserts required for the performance of the work shall be furnished and the location carefully supervised.
 - 2. No lumber shall be stored closer than four (4) inches to grade of floors.
 - a. Lumber stored outside shall be covered with visqueen or other suitable protection on top and sides.
 - b. Stack so as to allow proper air circulation.

3. Brace, plumb, and level members and secure with sufficient nails, spikes, and bolts to insure rigidity and safety under concrete placement.
 - a. No metal to remain within one (1) inch of the surface of the concrete after removal.
 - b. Wire ties are not permitted.
4. Unless otherwise indicated in the Drawings, exposed foundation sides and grade beams shall be formed.
 - a. Forms shall be properly constructed, correctly aligned and of sufficient strength to retain wet concrete without excessive leaking, deflection or distortion.
 - b. Temporary openings shall be provided for cleaning and inspection of the base of vertical forms and other places where necessary.
 - c. Where required wood inserts, nailing blocks or other wood to be set in the forms shall be installed in an approved manner.
 - d. The inside of the forms shall be coated with an approved form oil, and dampened before the concrete is poured.
5. Wood or metal forms will be required on sides of foundations, walls, and walks.
 - a. Joist forms shall be accurately laid out and securely anchored, and shall be carefully handled to insure continued true and accurate pours.
6. Provide and maintain forms and shoring, and apply all applicable safety practices required for their proper use and removal.
7. Concrete on which forms have given way will be replaced or repaired at the discretion of the ENGINEER as soon as forms are removed.
8. The ENGINEER shall be notified at least twenty four (24) hours prior to placing concrete in order that forms and reinforcing steel may be inspected.
9. Masonry installed after concrete - Anchor exterior wall masonry, which is installed after concrete is poured, in one of the two following methods:
 - a. Provide one (1) inch deep by three (3) inch wide concrete lugs around perimeter.

- b. Provide continuous perimeter dovetail anchor slots for example H + B #305 galvanized steel with matching #303 by five and one-half (5-1/2) inch crimped twelve (12) gauge galvanized steel brick anchors.
 - 1) Anchors shall be spaced not over sixteen (16) inch on-center vertically and forty-eight (48) inch on-center horizontally.
 - 2) These dovetail anchors shall also be used wherever masonry passes in front of concrete columns or beams (interior and exterior).
 - 3) Nail-on anchors will not be accepted.
 - 4) No anchors are required where concrete is poured after masonry.
10. Remove forms and shoring in a manner as to insure the safety of the structure and personnel.
- a. No forms or shoring shall be removed until members supported have acquired sufficient strength to support their weights and loads to be imposed thereon, and in no case earlier than seven (7) days
 - b. Removal of forms - Pinch bars, wrecking bars or other metal tools shall not be placed against as cast concrete finish surfaces to wedge forms loose, only wooden wedges shall be used.
 - 1) Wedging shall be done carefully and gradually.
 - 2) Driving accomplished only by light tapping.

3.02 WATERSTOPS

- A. Waterstops shall be continuous PVC waterstops and shall be joined by heating the ends with a thermostatically controlled electric splicing iron as recommended by the manufacturer.
- B. The position and shape of the waterstop shall be maintained unchanged before, during, and after the concrete placing operation.

3.03 CONSTRUCTION JOINT

- A. The placing of concrete shall be carried on continuous between construction joints and the work shall be executed so that these joints will occur in the locations designed in the Drawings.

1. If the CONTRACTOR proposes different locations, or additional intermediate construction joints, the CONTRACTOR shall submit to the ENGINEER marked up prints of the CONTRACTOR Drawings showing location, extent, and type of joints proposed.
2. These submittals shall be made well in advance of construction, and the proposed joints shall be incorporated in the work only if the changes are acceptable to the ENGINEER.
3. Submit drawings in accordance with the Special Conditions.
4. Installation of additional intermediate joints shall not relieve the CONTRACTOR of the CONTRACTOR's responsibilities to produce a watertight and/or structurally adequate component.

3.04 EXPANSION JOINTS

- A. Reinforcement or other fixed items embedded or bonded into the concrete shall not be run continuously through expansion joints.
 1. A neat chamfered edging shall be provided to finish edges around expansion joints.
- B. Thoroughly clean expansion joints shall be located a minimum distance of five feet from the corner of intersecting walls, including corners, unless specific requests are formally made and accepted by the ENGINEER.

END OF SECTION

SECTION 03210
REINFORCING STEEL

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish equipment, materials, and labor required for the supply, forming, and placement of reinforcing steel as specified in the Drawings or as required for the project.

1.02 RELATED SECTIONS

- A. General Conditions - Bidding and Contract Requirement
- B. General Requirements - Division 1
- C. Site Conditions - Division 1
- D. Submittals - Division 1
- E. Concrete Form Work and Accessories - Division 3
- F. Cast in Place Concrete - Division 3

1.03 REFERENCES

- A. The following codes and standards shall govern workmanship and materials unless modified more stringently in the Drawings and Specifications.
 - 1. The Florida Building Code (latest edition).
 - 2. ACI - 301 "Specifications for Structural Concrete for Buildings" (latest edition) is part of these specifications.
 - 3. Reinforcing shall conform to the requirements of ACI - 301, 315, 80, and 318 (latest editions).
 - 4. Welding certificate conforming to AWS D1.4 - 79.

1.04 SUBMITTALS

- A. Submit reinforcing steel shop drawings to the ENGINEER for approval.

1. Check and approve steel shop drawings prior to submittal to the ENGINEER.
2. The CONTRACTOR's stamp and signature is required on shop drawings prior to submittal.

1.05 MEASUREMENT AND PAYMENT

- A. Measurement and payment will be included in the lump sum prices for the appropriate work items, as shown in the Bid Schedule, as required for those items which price and payment shall constitute full compensation for furnishing materials and performing work in connection herewith and as specified in the scope of work under this section.

1.06 TESTS AND CERTIFICATES

- A. The cost of the initial steel testing and subsequent tests during the progress of the work ordered by the ENGINEER shall be paid for by the CONTRACTOR, including retesting of rejected material.

PART 2 PRODUCTS

- A. Reinforcing steel shall conform to ASTM A-615 New Domestic Billet, Grade 60.
- B. Steel shall have a 305 deformation.
- C. Provide clean steel free from loose scale of flake rust or coating that destroys or reduces the bond to the concrete.
 1. Keep steel clean until used or wire brushed before placing.
- D. Welded Wire Mesh Reinforcement shall be ASTM Specification A-185 and A-82 hot dipped galvanized wire.
- E. Metal Accessories - Spacers, ties, chairs, and devices necessary for proper placing, spacing, supporting, and fastening or reinforcement shall be supplied and placed as required by the Manual of Standard Practice for Detailing Concrete Structures (ACI 315-80).
 1. Provide plastic coated feet on chairs, spacers, and bolsters.

PART 3 EXECUTION

3.01 WORKMANSHIP

- A. Bars shall be accurately fabricated, carefully placed as indicated in the Drawings, securely supported and fastened to prevent movement or displacement during the pouring of the concrete.
- B. Placement of reinforcing shall conform to the requirements of "CRSI Recommended Practice for Placing of Reinforcing Bars".
- C. Splices shall be in accordance with ACI Code, except liquid retention structures shall conform to requirements shown in the Drawings.
 - 1. Securely wire wall dowels at foundations to the footing steel.
 - 2. Where stub columns are poured (as in the case of stem walls) the dowels shall be of a length sufficient to satisfy requirements of ACI Code and to provide a minimum distance of 36-diameter lap where the main column is joined to the stub column.
 - 3. Place and support mesh by means of chairs or other approved devices, so that it maintains its proper position in the slab during the pouring operations.
- D. Size stirrups and column ties for bars designated in the Drawings and fabricate to provide a clearance of 1 1/2 inches between the outside of the tie and the surface of the concrete.
- E. Unless shown otherwise in the Drawings, maintain the following minimum concrete cover:
 - 1. Bottom of suspended slabs: 3/4-inch
 - 2. Top of slabs: 1-inch
 - 3. Walls, beams and columns: 2-inches
 - 4. Formed concrete contacting soil: 2-inches
 - 5. Concrete placed against soil: 3-inches
- F. See Drawings for special requirements for liquid retention structures.
- G. Support column and beam reinforcing from formwork with plastic accessories.

H. Support slab reinforcing on non-metallic slab bolsters.

3.02 INSPECTION

A. Notify the ENGINEER of the time when steel will be ready for inspection at least 24 hours in advance.

1. Allow sufficient time for necessary correction before scheduled pour.

B. Correct incorrect or improperly placed steel and re-inspect by the ENGINEER prior to placing concrete.

C. Place no concrete except where the ENGINEER has inspected and approved the reinforcing steel.

1. Cost of reinspection shall be paid by the CONTRACTOR.

END OF SECTION

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish equipment, materials, and labor required for the supply, casting, finishing, curing, and testing of cast-in-place concrete, as specified in the Drawings and Specifications, or as required for the complete project.

1.02 RELATED SECTIONS

- A. General Conditions - Bidding and Contract Requirement
- B. Summary of Work - Division 1
- C. Site Conditions - Division 2
- D. Concrete Formwork and Accessories - Division 3
- E. Reinforcing Steel - Division 3
- F. Submittals - Division 1
- G. Guarantees - Division 1

1.03 REFERENCES

- A. The latest edition of the following codes and standards shall govern workmanship and materials, unless modified more stringently herein.
 - 1. The Florida Building Code.
 - 2. ACI 301 "Specifications for Structural Concrete for Buildings" is part of these specifications, except as modified here in or in the Drawings.
 - a. Construct concrete decks with a maximum of 1/8-inch deviation using a 10-foot long straightedge placed in any direction on the surface.
 - 3. ACI 211.1, 308, 309, 318, and 347.
 - a. The Florida Building Code shall govern where provisions of the ACI conflict.
 - 4. ASTM C33, C94, C143, C150, D544 and D1190-52T.

1.04 MEASUREMENT AND PAYMENT

- A. Measurement and payment will be included in the lump sum prices for the appropriate work items, as shown in the Bid Schedule, as required for those items which price and payment shall constitute full compensation for furnishing materials and performing work in connection herewith and as specified in the scope of work under this section.

1.05 TESTS AND CERTIFICATES

A. TESTS

1. Make tests in accordance with the recommendations of ASTM.
 - a. Do not exceed maximum concrete slumps as specified above.
 - b. Make five cylinders for each test required.
 - c. Take samples for the test from the mixer at the 1/4 and 3/4 points in the load.
2. The ENGINEER may order core borings or other special tests during the progress of the work.
3. Removed and replaced at no cost to the CITY concrete failing indicated tests.
4. CONTRACTOR to pay the cost of testing.
 - a. Propose a testing agency for approval by the ENGINEER.

B. SLUMP TESTS

1. Perform slump tests in accordance with ASTM C143 (latest edition) by testing agency.
 - a. Make tests for each 10 cubic yards, or fraction thereof, of each batch.
 - b. In the event the slump exceeds the specified requirements, the batch shall be rejected.

C. AIR TESTS

1. Testing agency shall test the air content of the freshly mixed concrete in accordance with ASTM C231 or C173 (latest edition) for each 10 cubic yards, or fraction thereof, of each batch.

- a. In the event the percentage of air content is not within the limits in the specifications for entrained air content, the batch shall be rejected.

D. STRENGTH TESTS

1. Testing agency shall mold 5 specimens for each increment of 50 yards or less of each day's concrete placement, or as directed by the ENGINEER.
 - a. Maintain records for each specimen as to location, batch, and date.
 - b. Test specimens - one at 3 days, one at 7 days, two at 28 days, and one at 45 days, if the 28-day tests fail to meet the specified strengths.
2. Cooperate with the ENGINEER or persons employed by the testing agency for testing in making, storing and curing of the test cylinders.

PART 2 PRODUCTS

2.01 CEMENT

- A. Use Domestic Portland cement conforming to ASTM C150 (latest edition), Type I, except Type II shall be used for liquid retention structures.
 1. Only one domestic brand shall be used throughout the duration of the project.

2.02 AGGREGATES

- A. Aggregates shall meet the requirements of ASTM C33.
 1. Do not use aggregates taken from salt water.
- B. Provide clean, hard, sharp, natural sand having a fineness modulus between 2.5 and 3.0 as fine aggregate.
- C. Provide clean gravel of crushed stone, gradation no. 57 as coarse aggregates.

2.03 WATER

- A. Provide potable water, free from deleterious amounts of oils, acids, alkalis, organic matter, or other harmful matter.

2.04 EXPANSION MATERIALS

- A. Pre-molded joint fillers shall conform to ASTM D544 Type V, equal to Celeste 2 "Flexcell", 1/2 inch thick (or as shown in the Drawings), by width as indicated in the details.
- B. Cast-in-place expansion materials shall conform to ASTM D1190-52T, equal to Serviced Products Corp., hot-poured Para-Plastic.

2.05 SLEEVES, HANGERS AND INSERTS

- A. Inserts, hangers, sleeves, anchors, ties, bolts, dowels, thimbles, nailers, ground, or other devices required for the attachment or passage of other work shall be located by the CONTRACTOR from the Drawings in confirmation with the shop drawings or as approved by the ENGINEER.

B. BOLTS

- 1. Install stainless steel bolts of size and length specified as indicated in the Drawings.
- 2. Use 3/4-inch minimum size, with washers on both ends, where not indicated.

C. CHASES

- 1. Form chases with wood or metal forms or sleeves.
- 2. Remove wood.
- 3. Provide galvanized metal sleeves, if sleeves will not be removed.
- 4. Provide cast iron caulking sleeves where plumbing sleeves passes through exterior walls, slabs, or foundations.

D. OTHERS

- 1. Anchor bolts, ringlets, and inserts shall be of type, size, and spacing as required by the trades involved.
- 2. Use stainless steel on submerged applications and/or where corrosive environments exist as determined by the ENGINEER.

2.06 CURING COMPOUNDS

- A. Do not use compound, which will interfere with adhesion or cause other deleterious reaction with indicated finish.
- B. Provide curing compounds containing fugitive dye, fading not sooner than 7 days.
- C. Use Castle Chemical Corp., Demicon Cure-Hard, Clear-Spread at 400 square feet per gallon or approved equal for slabs not receiving additional topping or finish.
- D. Other Concrete - Use Lambert Corp. #64 Resin Base Clear; Master Builders Co. "Masterkure"; Sonneborn Chemical and Refining Corp., "Hydrocide Curing Compound Resin X Clear"; Guardian Chemical Co. "Clear Bond"; Karl E. Reynolds Curing Compound for curing, hardening, and sealing.

2.07 CONCRETE ADMIXTURES

- A. Admixtures for concrete structures with liquid retention are listed below:
 - 1. Air entrainment per ASTM C-260 6, plus or minus 1 percent.
 - 2. Retarder per ASTM C-494 type D.

2.08 MISCELLANEOUS

- A. Provide 0.006-inch polyethylene film vapor barrier.
- B. Provide Wheeling galvanized Tensilform, or equal, by Granco or U.S. Steel for Metal decking.

PART 3 EXECUTION

3.01 PROPORTIONING AND MIXING

- A. Use "ready-mixed" concrete in accordance with ASTM C-94.
- B. Submit the proposed mix, as a shop drawing, together with slump and cylinder tests for approval.
- C. Mix tests shall be by an independent testing laboratory.
- D. Clearly indicate the proposed location in the project for each mix submitted.
 - 1. See Submittals Division - 1.

- E. Mixes for liquid retention structures shall have a minimum 28-day strength of 4,000 psi.
 - 1. Other mixes shall be 3,000 psi, unless otherwise noted.
 - 2. Minimum cement content shall be 5.5 sacks per cubic yard for 4,000 psi and 5.0 sacks per cubic yard for 3,000 psi.
 - 3. Maximum slumps shall be:
 - a. Footings: 3 inches
 - b. Slabs, Beams: 4 inches
 - c. Columns, Walls: 4 inches
 - 4. Concrete placements that involve two specified slumps shall be governed by the lesser slump.
 - 5. Maximum water/cement ratio for liquid retention structures shall be 0.41.
 - 6. Place concrete within 1-1/2 hours after introduction of water to the mix. Under no conditions may additional water be added.

3.02 PLACING

- A. Place concrete expeditiously in clean, damp forms that are not oily to the touch.
- B. Spray forms with water immediately prior to placing concrete.
- C. Secure reinforcement in position, have it inspected, and obtain approval before placing concrete.
- D. Do not rest runways for transporting concrete on reinforcing steel.
- E. Concrete placement time shall be in strict accordance with ACI standards, latest edition.
- F. Do not place concrete under water
- G. Place concrete during the daylight hours, unless approved by the ENGINEER.
- H. After the concrete placement is completed, remove any excess or spilled concrete on all adjacent reinforcing steel that is located above the freshly placed concrete.
- I. SPECIAL

1. Flat, true surfaces are essential on concrete pours for floors.
2. A ten foot (10') straight edge placed in any position on the floor shall contact the floor in its entire length with a tolerance of 1/8 inch.
3. Provide smooth finished floor throughout with no discernible waves.
4. Grind down concrete not meeting these requirements, until they are acceptable.
5. Existing conditions do not relieve the CONTRACTOR from meeting these requirements.

J RECESSES

1. Lay out and form, as required, recesses for door operators, closer hardware, sensor plates, mats, and equipment.

K. BONDING AGENTS

1. A two-part epoxy bonding agent, approved by the ENGINEER, shall be used wherever a topping or other concrete placement of less than 1-1/2 inches thickness is required.
2. Do not use bonding agents for liquid retention structures slabs where grout is to be the "topping."
3. Clean existing slabs prior to the topping concrete to assure a proper bond.
4. Use steam and/or solvents if required.
5. This requirement also applies to grout addition in liquid retention structures.

L. COMPACTION

1. Place concrete, except for footings, in layers not over 12 inches deep until compacted by internal vibrating equipment, supplemented by hand rodding and tamping as required.
 - a. Do not use vibrators to move concrete laterally inside the forms.
 - b. Internal vibrators shall maintain a speed of at least 5,000 impulses per minute when submerged in concrete.
 - c. Maintain at least one spare vibrator, in working condition, at the site.
 - d. Limit the duration of vibration to the time necessary to produce satisfactory consolidation without causing segregation but in no case less

than 20 seconds per square foot of exposed surface.

- e. Move the vibrator constantly and place in each specific spot only once.
- f. Provide consolidation methods and equipment conforming to ACI-309.

M. COLUMNS/WALLS

- 1. Place concrete in columns forms before the beam and slab steel is in place.
- 2. Place column/wall concrete without dropping more than 8 feet.

N. SLABS AND BEAMS

- 1. Clean slab and beam forms after placing wall concrete.
- 2. Do not place concrete in roof and wall beams, or slabs, until concrete in walls has been in place a minimum of four hours.
- 3. Place concrete for slabs and beams continuously and arrange work to assure joints will be located at the points specified.
- 4. Slope floor slabs with floor drains uniformly to the floor drain.
- 5. Place slabs on fill carefully to avoid damage to vapor barriers.

O. CONSTRUCTION JOINTS

- 1. Locate keyed construction joints, as shown, or near points of maximum potential movement and shear, subject to approval by the ENGINEER.
- 2. Locate construction joints at the underside of floor and roof members, tops of foundations and near the quarter point or third point of the span in slabs, beams or girders.
- 3. Locate construction joints for liquid retention structures as shown in the Drawings.
- 4. Install keyed construction joints, straight and smooth, in slabs on fill, at wall centerlines.
- 5. Cure keyed construction joints a minimum of 24 hours before fresh concrete is deposited.
- 6. Expansion joints in walkways on grade shall not exceed 20 feet on centers, unless otherwise noted, and at changes in directions.

7. Mark walks in 5'-0" sections, unless otherwise shown in the Drawings.
8. Mark and tool the walks before concrete has become set.
9. Make minimum walk thickness 4 inches.

3.03 FINISHING

A. Provide finishes for concrete surfaces as indicated below:

1. Smooth, double trowel floors and bottom slabs of liquid retention structures.
2. Broom finish exterior slabs and walkways, edges and joints tooled.
3. Smooth rub finish walls, columns, and beams of liquid retention structures

3.04 CURING

A. Water cure liquid retention structures in accordance with ACI-308 for a period of 14 days after concrete placement.

B. Cure other concrete by application of curing compounds as specified herein, applied in strict accordance with the manufacturer's recommendations.

1. Curing shall start as soon as possible after concrete placement.

3.05 TIME BETWEEN PLACING CONCRETE

A. At least two hours shall elapse after placing concrete in long or high columns, heavy walls, beams, girders, or slabs supported thereon.

1. For short columns and low height walls, 10 feet or less, waiting time shall be at least 45 minutes prior to placing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.
2. Consider beams, girders, brackets, column capitals, and haunches as part of the floor or roof system and place concrete monolithically.

3.06 VAPOR BARRIER

A. Use vapor barriers under slabs on grade utilizing maximum reasonable widths.

1. Lap joints a minimum of 6 inches and seal penetrations with pressure sensitive tape.
2. Do not apply vapor barriers under liquid retention structures.

3.07 INSPECTION

- A. Obtain approval from the ENGINEER for each day's concrete placement limits, prior to starting the work.
- B. Do not cover reinforcing steel with concrete until the ENGINEER has given approval to start concrete placement for the limits of the day.

3.08 CONSTRUCTION AND EXPANSION JOINTS

- A. Locate joints where shown in the Drawings.
 - 1. Make column joints horizontal and true.
 - 2. Form beam joints with plywood and slope from the vertical 12 inches to 1 inches away from the beam center at the top.
- B. Make expansion joints straight and true and to details shown in the Drawings.
 - 1. Securely place and located moisture stops and inserts for cover plates.
- C. When construction joints become necessary at locations other than those shown in the Drawings, the ENGINEER's approval shall be obtained prior to installation of the joints or concrete placement.
- D. For walls of liquid retention structures, 14 days shall elapse prior to placing concrete adjacent to existing hardened concrete at vertical construction joints, so initial drying shrinkage can occur with minimal restraint.

END OF SECTION

SECTION 03480

PRECAST CONCRETE MANHOLES, VAULTS, AND CHAMBERS

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish materials and precast concrete manholes as shown in the Drawings and as required for a complete installation.
- B. Wet wells shall be precast concrete manholes with water-stops, sleeves and openings as noted in the Drawings.
- C. Box outs for wall pipes shall conform accurately to the sizes and elevations of the adjoining pipes.
- D. The structures shall be watertight.

1.02 RELATED SECTIONS

- A. Paints and Coatings - Division 9.

PART 2 PRODUCTS

2.01 Precast Wet Wells

- A. Precast wetwells shall conform to the requirements of ASTM C 478 with reinforcement of ASTM A 615, Grade 60 bars and the following modifications thereto:
 - 1. The minimum wall thickness shall be 8 inches.
 - 2. Cement to be used in precast manholes and grout shall be ASTM C 150, Type II.
 - 3. The date and name of manufacturer shall be marked inside each precast sections.
 - 4. No more than 2 lift holes may be cast or drilled in each section.

PART 3 EXECUTION

3.01 SETTING PRECAST SECTIONS

- A. Precast reinforced concrete sections shall be set so as to be vertical and with sections in true alignment.
- B. Holes in sections; used for their handling, shall be thoroughly plugged with mortar. The mortar shall be one (1) part cement to one and one-half (1 1/2) parts sand; mixed slightly damp to the touch (just short of "balling"); hammered into the holes until it is dense and an excess of paste appears on the surface; and then finished smooth and flush with the adjoining surfaces.

3.02 FINISH

- A. The inside and the outside-of the manholes and wetwells shall be finished as shown and noted in the Contract Drawings.

END OF SECTION

SECTION 04070

MASONRY GROUT

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope of Work: The work included in this Section consists of grouting the various items listed hereinafter and indicated in the Drawings.
- B. Related Work Described Elsewhere:
 - 1. Sanitary Sewer System, Division 2
 - 2. Precast Concrete Manholes, Division 3

1.02 SUBMITTALS

- A. Materials and shop drawings:
 - 1. See Division 1 for submittal requirements.
- B. Submit manufacturer's literature for review on non-shrink grout data including grout properties, mixing, surface preparation, and installation instructions.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver grouting materials and store in unbroken containers with seals and labels intact as packaged by the manufacturer.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Non-shrink, Non-metallic Grout: Sauereisen F-100 Level Fill, Master Builders Masterflow 713, Burke Non-Ferrous, Non-Shrink Grout or equal pre-mixed type.
- B. Non-shrink Metallic Grout: Master Builders Embeco 636 Grout pre-mixed type.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean bonding surfaces of dust and oil.

3.02 INSTALLATION

- A. Non-shrink Grout:

1. Use non-shrink, non-metallic grout for grouting column base plates, anchor bolts, reinforcing bars, pipe sleeves, machinery supports, and pump base plates.
2. Mix and place non-shrink grout as recommended by the manufacturer.
3. Mix grout as close to the work area as possible and transported quickly to its final position in a manner that will not permit segregation of materials.
4. Cure non-shrink grout with water saturated burlap for at least 3 days.
5. Do not operate machinery set on grout pads until the grout has cured for at least 36 hours.

3.03 MEASUREMENT AND PAYMENT

- A. No additional payment shall be made for the work previously specified.
- B. The CONTRACTOR's Lump Sum Bid as set forth in the Proposal shall continue full compensation for the work involved in this section.

END SECTION

SECTION 07920
JOINT SEALANTS

PART 1 GENERAL

1.01 SUMMARY

- A. Provide labor, materials, and installation required to complete the Project.

1.02 RELATED SECTIONS

- A. General Conditions
- B. Supplementary Conditions
- C. Special Conditions

1.03 STANDARDS AND REGULATIONS

- A. The following codes and standards shall govern workmanship and materials unless modified more stringently hereinafter.
 - 1. Standard Building Code (SBC).

1.04 MEASUREMENT AND PAYMENT

- A. Measurement and payment will be included in the lump sum and unit cost prices for the appropriate work items, as shown in the Bid Schedule as required for those items for the completion of the work which price and payment shall constitute full compensation for furnishing materials and performing work in connection herewith and as specified in the scope of work under this section.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Caulking Compounds - Silicone, polysulfide, and acrylic polymer sealants are optional, except where use of one or the other is specifically called for in these documents or where one or the other is not recommended for use by the manufacturer.
 - 1. Silicone: Dow Corning 780, G.E. 1200 or 1300.
 - 2. Polysulfide: Thiokol, Pecora, U.S. TT-S-00230.

- 3. Acrylic: Tremco, Pecora, U.S. TT-S-00230.
- B. Sealant Backup - Polyethylene Foam - Dow Ethafoam S.B., Tremco, and Pecora.
- C. Acoustical Caulking - Tremco "Acoustical Sealant", Presstite 57964, "miracle" sound control sealant #21.

PART 3 EXECUTION

3.01 WORKMANSHIP AND INSTALLATION

- A. Provide application conforming to the manufacturers recommendations.
 - 1. Use sealant manufacturers primers, solvents, and thinners.
 - 2. Clean and prepare surfaces as recommended.
 - 3. Tool joints with OWNER selected color and remove excess sealant.
- B. Provide caulking where indicated in the Drawings, Specifications, and as listed below:
 - 1. Joints subject to weather and/or air infiltration.
 - 2. At perimeter of items set in exterior walls.
 - 3. At exposed surface joints of dissimilar materials and manufactured items permanently incorporated into the work.
 - a. This includes, but is not limited to, hollow metal frames, windows, stools, casework, plumbing fixtures, corner guards, and thresholds.
 - 4. Where required for fire rating, such as the perimeter of partitions, and around pipe and duct penetrations in same.
 - 5. Where required for sound control to maintain code required S.T.C. rating.
 - 6. At building expansion joints.
 - 7. At metal flashing.
 - 8. At juncture between dissimilar materials, except concrete poured against block.

END OF SECTION

SECTION 08110

HOLLOW METAL DOORS AND FRAMES

PART I: GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including general and supplemental conditions and Division 1 specification sections, apply to this section.

1.02 SUMMARY

- A. This section includes the following products manufactured in accordance with SDI recommended standards:
 - 1. Doors: Seamless, hollow or composite construction standard steel doors for interior and exterior locations.
 - 2. Frames: Pressed steel frames for doors, transoms, sidelights, mullions, interior glazed panels, and other interior and exterior open
 - 3. Assemblies: Provide standard steel door and frame assemblies as required for the following:
 - a. Labeled and fire rated.
 - b. Sound resistant.
 - 4. Provide factory primed doors and frames to be field painted.
- B. Related work specified elsewhere:
 - 1. Finish hardware
 - 2. Painting

1.03 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Shop drawings show fabrication and installation of standard steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation

requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on the contract drawings.
- C. Label Construction Certificate: For door and frame assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

1.04 QUALITY ASSURANCE

- A. Provide doors and frames complying with Steel Door Instituted "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.
- B. Fire Rated Door Assemblies: Unit that comply with NFPA 80, are identical to door frame assemblies whose fire resistance characteristics have been determined per ASTM E 152 and which are labeled and listed by Underwriters Laboratories, Factory Mutual, Warnock Hersey, or other testing and inspecting organization acceptable to authorities having jurisdiction.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver doors cardboard wrapped or created to provide protection during transit and jobsite storage. Provide additional protection to prevent damage to finish of factory finished doors and frames. Mark all doors and frames with opening number as shown on the contract drawings and shop drawings.
- B. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inch high wood blocking. Avoid use of non-vented plastic or canvas shelters, which could create a humidity chamber. If cardboard wrapper on doors becomes wet, remove carton immediately. Provide 1/4-inch spaces between stacked doors to promote air circulation.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements provide standard steel doors and frames by one of the following:
 - 1. Ceco Corporation
 - 2. Curries Manufacturing Company
 - 3. Fenestra Corporation
 - 4. Steelcraft Company
- B. No other manufacturers shall be accepted.

2.02 MATERIALS

- A. Cold rolled steel sheets: Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.
- B. Supports and anchors: Fabricate of not less than 18 gauge sheet steel, galvanized where galvanized frames are used.
- C. Inserts, bolts, and fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot dip galvanize in compliance with ASTM A 153, Class CONTRACTOR or D as applicable.
- D. Primer: Rust inhibitive enamel or paint, either air drying or baking, suitable as a base for specified finish paints comply with ANSI A224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames".

2.03 DOORS

- A. Provide metal doors of SDI 100 dated 1998 grades and models specified below or as indicated on drawings or schedules:
 - 1. Interior Doors: Grade III Model 2 A-60 Galv.
 - 2. Exterior Doors: Grade IV Model 2, G-90 Galv., continuously welded edges.

2.04 FRAMES

- A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, of types and styles as shown on drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 14-gauge sheet steel, G-90 galvanized at exterior openings.
- B. Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single door frames and 2 silencers on heads of double door frames.

2.05 FABRICATION

- A. Fabricate steel door and frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment to assure proper assembly at project site. Comply with ANSI/SDI-100 requirements.
 - 1. Clearances: Not more than 1/8 inch at jams and heads except between non fire rated pairs of doors not more than 1/4 inch. Not more than 3/4 inch at bottom of door.
- B. Fabricate exposed faces of doors and panels, including stiles and rails of non-flush units, from only galvanized steel.
- C. Tolerances: Comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames".
- D. Fabricate frames, concealed stiffeners, reinforcements, edge channels, louvers and moldings from either cold rolled or hot rolled steel.
- E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- F. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware in accordance with approved Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.
- G. Reinforce doors and frames to receive surface applied hardware. Drilling and tapping for surface applied hardware may be done at project site. Provide internal reinforcements for all doors to receive door closers and exit devices.
- H. Shop Painting: Clean, treat, and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
- I. Glazing Stops: Minimum 20 gauge steel or .040 inch thick aluminum.

1. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.
2. Provide screw applied removable glazing beads on inside of glass, louvers, and other panels in doors.

PART 3: EXECUTION

3.01 INSTALLATION

- A. General: Install standard steel doors, frames, and accessories in accordance with approved shop drawings, manufacturer's data and as herein specified.
- B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instruction for Steel Frames", unless otherwise indicated.
 1. Except for frames located at existing concrete, masonry, or drywall, installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
 2. In masonry construction, locate 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry tee anchors.
 3. At existing concrete or masonry construction, provide 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb, set frames and secure to adjacent construction with bolts and masonry anchorage devices.
 4. Install fire rated frames in accordance with NFPA 80
 5. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with screws.
- C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI / SDI-100.
 1. Install fire rated doors with clearances as specified in NFPA 80

3.02 ADJUST AND CLEAN

- A. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted to

damaged areas of prime coat and apply touch up of compatible air drying primer.

- B. Protection Removal: Immediately prior to final inspection, remove protective plastic wrappings from pre-finished doors.
- C. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 09900

PAINTS AND COATINGS

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish labor, equipment, materials, and appurtenances for preparing, priming, painting, and cleaning surfaces of structures, equipment, and exposed piping as shown in the Drawings and Specifications.

1.02 RELATED SECTIONS

- A. Submittals Procedure - Division 1.
- B. Quality Control - Division 1.
- C. Cleaning - Division 1.
- D. Shop Drawings, Product Data, and Samples - Division 1

1.03 REFERENCES

- A. Applicable Standards
 - 1. Steel Structures Painting Council (SSPC).
 - 2. American National Standards Institute (ANSI).
 - 3. American Society of Testing and Materials (ASTM).
 - 4. National Association of Corrosion Engineers (NACE).
- B. Provide paint materials for surfaces in contact with water conforming to Local and State Health Department and U.S. Environmental Protection Agency standards for potable water supplies.

1.04 SUBMITTALS

- A. Submit to the ENGINEER for approval complete lists of the paints proposed for parts of the work, including their generic type and the manufacturer's catalog description of each.
 - 1. Accompany this list with other pertinent descriptive literature relative to each coating proposed to be used and a sample panel of the colors chosen.

B. Provide minimum 1-year guarantee on materials and workmanship.

1.05 MEASUREMENT AND PAYMENT

A. Measurement and payment will be included in the LUMP SUM prices for the appropriate work items as shown in the Bid Schedule, as required for those items which price and payment shall constitute full compensation for furnishing materials and performing work in connection herewith and as specified in the scope of work under this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. The paints and paint products manufactured by Tnemec Company, Inc. are used in these specifications as standard of quality, and to indicate coating system to be used for each class of work.

1. Provide products of the Xypex Chemical Corporation, or Chemprobe Technologies, Inc. as alternate materials.

2.02 DELIVERY AND STORAGE

A. Deliver materials to the jobsite in original unbroken containers as packaged and labeled by the approved Manufacturer.

B. Suitably stored painting materials at the site and store together only paint or ingredients that are to be used on this work.

1. Keep the storage space clean and take every precaution to avoid fire hazards and spillage.
2. Provide a paint storage area with an impervious bottom preventing paint accidentally spilled from leaking onto the ground
3. Provide a containment area with sufficient volume to prevent spillage if the largest container is spilled.

PART 3 EXECUTION

3.01 PAINTING PROCEDURES

A. Paint Application

1. Apply paint in conformance to the Manufacturers instructions and recommendation and as received from the Manufacturer without addition of a drier or thinner except as specified or as approved by the ENGINEER.
2. Wherever possible, successive coats of paint shall be of sufficiently different color to facilitate inspection of the same as a safeguard against "holidays" and pinholes.
3. Clean surfaces to be given protective coatings, refinish scratches and abrasions on equipment that has been shop coated.
 - a. Perform painting as a continuous and orderly operation to facilitate adequate inspection, prime coat materials subject to weathering or corrosion as quickly as practicable.
 - b. At no cost to the OWNER: remove, clean, prepare, prime, and paint surfaces of exposed inaccessible members, and replace to the original position and condition.
4. Protect areas under and adjacent to painted work with drop cloths or other approved means, and dripped or spattered paint shall be promptly removed.
5. Apply no paint until the undercoat has cured as specified by the paint manufacturer.
6. Paint the tops and bottoms of doors after they have been fitted and before permanent installation with the same paint as door surface.
7. Remove switch plates finish hardware, and the like before painting and replace after painting.
 - a. Remove name and date plates on equipment or kept free from paint by suitable means.
8. Apply no paint to sliding contacts, and the like of operating units.
 - a. Paint access doors, plates, panel boxes, and the like with the adjoining surfaces paint on which they occur, using the same kind of paint, number of coats, color, and finish.
9. Protect from damage mechanical equipment, including but not limited to; pumps, motors, gear drives, and the like due to sandblasting and painting operations.
 - a. Assume responsibility for equipment, which is damaged due to these operations.

10. Employ whatever means are necessary to prevent drift of sandblast dust and paint to the adjacent treatment units and filters remaining in service.
 - a. Do not sand blast or paint on days, which are windy enough to cause dust, or over spray problems.
11. Painting inspection will be performed by the ENGINEER and is required.
 - a. Inspections will be required after surface preparation has been completed, prior to the application of the first coat of primer or paint, and after each coat thereafter, prior to the application of the following coat.
 - b. Notify the ENGINEER at least 48 hours before beginning painting and at least 24 hours before requiring inspection on each and every phase.
12. Apply no paint when the following conditions exist or are expected within 18 hours:
 - a. The ambient shaded air temperature is below 40° F.
 - b. The receiving surface temperature is below 35° F.
 - c. The receiving surface is wet or damp.
 - d. During rain, fog, mist, or when the relative humidity exceeds 85 percent.

B. Field Painting of Shop Primed Metal

1. Clean surfaces of foreign matter as described and spot prime where marred.
2. Smooth rough surfaces with sand paper.

3.02 SURFACE PREPARATION

- A. The surface shall be cleaned as specified for the paint system being used. All cleaning shall be outlined in the Steel Structures Painting Council's Surface Preparation Specification (SSPC), unless otherwise noted. If surfaces are subject to contamination, other than mill scale or normal atmospheric rusting, the surfaces shall be pressure washed, and acid or caustic pH residues neutralized, in addition to the specified surface preparation.
- B. Standards for Surface Preparation

1. SSPC-SP1, Chemical and/or Solvent Cleaning
 - a. Remove all grease, oil, salt, acid, alkali, dirt, dust, wax, fat, foreign matter, and contaminants, etc. by one of the following methods: steam cleaning, alkaline cleaning, or volatile solvent cleaning.
2. SSPC-SP2, Hand Tool Cleaning
 - a. Removal of loose rust, loose mill scale, and loose paint to a clean sound substrate by hand chipping, scraping, sanding, and wire brushing.
3. SSPC-SP3, Power Tool Cleaning
 - a. Removal of loose rust, loose mill scale, and loose paint to a clean sound substrate by power tool chipping, descaling, sanding, wire brushing, and grinding.
4. SSPC-SP4, Flame Cleaning
 - a. Dehydrating and removal of rust, loose mill scale, and some light mill scale by use of flame, followed by wire brushing.
5. SSPC-SP5 (NACE-1), White Metal Blast Cleaning
 - a. Complete removal of all mill scale, rust, rust scale, previous coating, etc., leaving the surface a uniform gray-white color.
6. SSPC-SP6 (NACE-3), Commercial Grade Blast Cleaning
 - a. Complete removal of all dirt, rust scale, mill scale, foreign matter, and previous coatings, etc., leaving only shadows and/or streaks caused by rust stain and mill scale oxides. At least 66% of each square inch of surface area is to be free of all visible residues, except slight discoloration.
7. SSPC-SP7 (NACE-4), Brush-Off Blast Cleaning
 - a. Removal of rust scale, loose mill scale, loose rust, and loose coatings, leaving tightly-bonded mill scale, rust and previous coatings. On concrete surfaces, brush-off blast cleaning shall remove all laitance, form oils, and solid contaminants. Blasting should be performed sufficiently close to the surface so as to open up surface voids, bug holes, air pockets, and other subsurface irregularities, but so as not to expose underlying aggregate.
8. SSPC-SP8, Pickling

- a. Complete removal of rust and mill scale by acid pickling, duplex pickling or electrolytic pickling (may reduce the resistance of the surface to corrosion, if not to be primed immediately).

9. SSPC-SP10 (NACE-2), Near-White Blast Cleaning

- a. Removal of all rust scale, mill scale, previous coating, etc., leaving only light stains from rust, mill scale, and small specks of previous coating. At least 95% of each square inch of surface area is to be free of all visible residues and the remainder shall be limited to slight discoloration.

10. SSPC-SP11-87, Power Tool Cleaning to Bare Metal

- a. Complete removal of rust, rust scale, mill scale, foreign matter, and previous coatings, etc., to a standard as specified on a Commercial Grade Blast Cleaning (SSPC-SP6, NACE-3) by means of power tools that will provide the proper degree of cleaning and surface profile.

C. SSPC-VIS-1, Visual Standards

- 1. (Swedish SIS OS 5900), "Pictorial Surface Preparation Standards for Painting Steel Surfaces," and the National Association of Corrosion Engineers, "Blasting Cleaning Visual Standards" TM-01-70 and TM-01-75 shall be considered as standards for proper surface preparation.
- D. Oil, grease, soil, dust, etc., deposited on the surface preparation that has been completed shall be removed prior to painting according to SSPC-SP1 Solvent Cleaning.
- E. Weld flux, weld spatter and excessive rust scale shall be removed by Power Tool Cleaning, as per SSPC-SP11-87T.
- F. All weld seams, sharp protrusions, and edges shall be ground smooth prior to surface preparation or application of any coatings.
- G. All areas requiring field welding shall be masked off prior to shop coating, unless waived by the Engineer.
- H. All areas that require field touch-up after erection, such as welds, burnbacks, and mechanically damaged areas, shall be cleaned by thorough Power Tool as specified in SSPC-SP11-87T.

- I. "Touch-up systems will be the same as original specification except that approved manufacturer's organic zinc-rich shall be used in lieu of inorganic zinc where this system was originally used. Also, strict adherence to manufacturer's complete touch-up recommendations shall be followed. Any questions relative to compatibility of products shall be brought to the Engineer's attention; otherwise, Contractor assumes full responsibility.

3.03 PRETREATMENTS

- A. When specified, the surface shall be pretreated in accordance with the specified pretreatment prior to application of the prime coat of paint.

3.04 STORAGE

- A. Materials shall be delivered to the job site in the original packages with seals unbroken and with legible labels attached. Packages shall not be opened until they are inspected by the Engineer and required for use. All painting materials shall be stored in a clean, dry, well-ventilated place, protected from sparks, flame, the direct rays of the sun, or from excessive heat. Paint susceptible to damage from low temperatures shall be kept in a heated storage space when necessary. The Contractor shall be solely responsible for the protection of the materials stored by him at the job site. Empty coating cans shall be required to be neatly stacked in an areas designated by the Engineer and removed from the job site on a schedule determined by the Engineer. Engineer may request a notarized statement from contractor detailing all materials used on the project.

3.05 PREPARATION OF MATERIALS

- A. Mechanical mixers, capable of thoroughly mixing the pigment and vehicle together, shall mix the paint prior to use where required by manufacturer's instructions; thorough hand-mixing will be allowed for small amounts up to one gallon. Pressure pots shall be equipped with mechanical mixers to keep the pigment in suspension, when required by manufacturer's instructions. Otherwise, intermittent hand mixing shall be done to assure that no separation occurs. All mixing shall be done in accordance with SSPC Vol. 1, Chapter 4, "Practical Aspects, Use and Application of Paints" and/or with manufacturer's recommendations.
- B. Catalysts or thinners shall be as recommended by the manufacturer and shall be added or discarded strictly in accordance with the manufacturer's instruction.

3.06 APPLICATION

- A. Paint shall be applied only on thoroughly dry surfaces and during periods of favorable weather, unless otherwise allowed by the paint manufacturer. Except as provided below, painting shall not be permitted when the atmospheric temperature is below 50° F, or when freshly painted surfaces may be damaged by rain, fog, dust, or condensation, and/or when it can be anticipated that these conditions will prevail during the drying period.
- B. No coatings shall be applied unless surface temperature is a minimum of 5° above dew point; temperature must be maintained during curing.

3.07 DEW POINT CALCULATION CHART

DEW POINT CALCULATION CHART

Ambient Air Temperature – Fahrenheit

Relative Humidity	20	30	40	50	60	70	80	90	100	110	120
90%	18	28	37	47	57	67	77	87	97	107	117
85%	17	26	36	45	55	65	76	84	95	103	113
80%	16	25	34	44	54	63	73	82	93	102	108
75%	15	24	33	42	52	62	71	80	91	100	108
70%	13	22	31	40	50	60	68	78	88	96	105
65%	12	20	29	38	47	57	66	76	85	93	103
60%	11	20	27	36	45	55	64	73	83	92	101
55%	9	17	25	34	43	53	61	70	80	89	98
50%	6	15	23	31	40	50	59	67	77	86	94
45%	4	13	21	29	37	47	56	64	73	82	91
40%	1	11	18	26	35	43	52	61	69	78	87
35%	-2	8	16	23	31	40	48	57	65	74	83
30%	-6	4	13	20	28	36	44	52	61	69	77

SURFACE TEMPERATURE AT WHICH CONDENSATION OCCURS

3.08 DEW POINT

- A. Temperature at which moisture will condense on surface. No coatings should be applied unless surface temperature is a minimum of 5° above this point. Temperature must be maintained during curing.

3.09 EXAMPLE

- A. If air temperature is 70° F and relative humidity is 65%, the dew point is 57° F. No coating should be applied unless surface temperature is 62° F minimum.
- B. No coatings shall be applied unless the relative humidity is below 85%.
- C. Suitable enclosures to permit painting during inclement weather may be used if provisions are made to control atmospheric conditions artificially inside the enclosure, within limits suitable for painting throughout the painting operations.
- D. Field Painting in the immediate vicinity of, or on, energized electrical and rotating equipment, and equipment and/or pipes in service shall not be performed without the approval of the Engineer.
- E. Extreme care shall be exercised in the painting of all operable equipment, such as valves, electric motors, etc., so that the proper functioning of the equipment will not be affected.
- F. The Contractor's scaffolding shall be erected, maintained, and dismantled without damage to structures, machinery, equipment or pipe. Drop cloths shall be used where required to protect buildings and equipment. All surfaces required to be clear for visual observations shall be cleaned immediately after paint application
- G. Painting shall not be performed on insulated pipe within three (3) feet of insulation operations or on insulation who's covering and surface coat have not had time to set and dry. Painting shall not be performed on uninsulated pipe within one (1) foot of any type of connection until the connection has been made, except as directed by the Engineer.
- H. The prime coat shall be applied immediately following surface preparation and in no case later than the same working day. All paint shall be applied by brushing, paint mitt and roller, conventional spraying, or airless spraying, using equipment approved by the paint manufacturer.
- I. Each coat of paint shall be recoated as per manufacturer's instructions. Paint shall be considered recoatable when an additional coat can be applied without any detrimental film irregularities such as lifting or loss of adhesion.

- J. Surfaces that will be inaccessible after assembly shall receive either the full specified paint system or three shop coats of the specified primer before assembly.
- K. Finish colors shall be in accordance with the COLOR SCHEDULE and shall be factory mixed (i.e., there shall be no tinting by the Contractor, unless authorized by the Engineer).
- L. All edges and weld seams in immersion service shall receive a “stripe coat” (applied by brush) of the 1st coat prior to application of the full 1st coat.
- M. All open seams in the roof area of tanks shall be filled after application of the topcoat with a flexible caulking such as Sika Flex 1A.

3.10 WORKMANSHIP

- A. The Contractor must show proof that all employees associated with this project shall have been employed by the Contractor for a period not less than six (6) months.
- B. Painting shall be performed by experienced painters in accordance with the recommendations of the paint manufacturer. All paint shall be uniformly applied without sags, runs, spots, or other blemishes. Work that shows carelessness, lack of skill, or is defective in the opinion of the Engineer, shall be corrected at the expense of the Contractor.
- C. The Contractor shall provide the names of at least 6 other projects of similar size and scope that they have successfully completed under their current company name.

3.11 APPLICATION OF PAINT

A. BRUSH AND/OR ROLLERS

- 1. Top quality, properly styled brushes and rollers shall be used. Rollers with a baked phenol core shall be utilized.
- 2. The brushing or rolling shall be done so that a smooth coat as nearly uniform in thickness as possible is obtained. Brush or roller strokes shall be made to smooth the film without leaving deep or detrimental marks.
- 3. Surfaces not accessible to brushes or rollers may be painted by spray, by dauber or sheepskins, and paint mitt.
- 4. It may require 2 coats to achieve the specified dry film thickness if application is by brush and roller.

B. AIR, AIRLESS, OR HOT SPRAY

1. The equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the paint to be applied and shall be equipped with suitable pressure regulators and gauges.
2. Paint shall be applied in a uniform layer, with a 50% overlap pattern. All runs and sags should be brushed out immediately or the paint shall be removed and the surface resprayed.
3. High build coatings should be applied by a crosshatch method of spray application to ensure proper film thickness of the coating.
4. Areas inaccessible to spray shall be brushed; if also inaccessible to brush, daubs or sheepskins shall be used, as authorized by the manufacturer.
5. Special care shall be taken with thinners and paint temperatures so that paint of the correct formula reaches the receiving surface.
6. Nozzles, tips, etc., shall be of sizes and designs as recommended by the manufacturer of the paint being sprayed.
7. The first coat on concrete surfaces in immersion service should be sprayed and backrolled.

3.12 PROTECTION AND CLEAN-UP

- A. It shall be the responsibility of the Contractor to protect at all times, in areas where painting is being done, floors, materials of other crafts, equipment, vehicles, fixtures, and finished surfaces adjacent to paint work. The Contractor shall cover all electric plates, surface hardware, nameplates, gauge glasses, etc., before starting painting work.
- B. At the option of the Engineer during the course of this project, the Contractor will contain all pent abrasives, old paint chips, paint overspray and debris by means suitable to the Engineer, including but not limited to, full shrouding of the area.
- C. If shrouding is required, the Contractor must provide a complete design of the intended shroud or cover. Care must be taken not to modify or damage the structure during the use of the shroud. If damage should occur, the Contractor is held responsible for all repairs.
- D. At completion of the work, remove all paint where spilled, splashed, splattered, sprayed or smeared on all surfaces, including glass, light fixtures, hardware, equipment, painted, and unpainted surfaces.

- E. After completion of all painting, the Contractor shall remove from job site all painting equipment, surplus materials, and debris resulting from this work.
- F. The Contractor is responsible for the removal and proper disposal of all hazardous materials from the jobsite in accordance with Local, State, and Federal requirements as outlined by the Environmental Protection Agency.
- G. A notarized statement shall be presented to the Engineer that all hazardous materials have been disposed of properly including but not limited to: name of disposal company, disposal site, listing of hazardous materials, weights of all materials, cost per pound and EPA registration number.

3.13 TOUCH-UP MATERIALS

- A. The Contractor shall provide at the end of the project at least one (1) gallon of each topcoat in each color as specified by the Engineer for future touch-up. Two gallons may be required for (2) component materials.

3.14 ON-SITE INSPECTION

- A. During the course of this project the Engineer will reserve the option of incorporating the services of a qualified inspection service. The inspection service will be responsible for assuring the proper execution of this specification by the successful contractor.

3.15 COATING SYSTEM SCHEDULE

3.15.1 STEEL – STRUCTURAL, TANKS, PIPES, AND EQUIPMENT

A. EXTERIOR EXPOSURE (NON-IMMERSION)

A.1 System No. 73-1 Epoxy/High Build Urethane

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 66-1255 Epoxoline Primer	3.0 – 4.0
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	2.0 – 3.0
<u>3rd Coat:</u> 73-Endura-Shield III	<u>2.0 – 3.0</u>
	7.0 -10.0
	Minimum 8.0 Mils

NOTE: This system is highly resistant to abrasion, wet conditions, corrosive fumes, and chemical contact. Provides 2-3 times the color and gloss retention of conventional paints. Second coat to be same color or close to finish color. Specify Series 74 Endura-Shield for a gloss finish. Specify Series 161 in lieu of the 66 for faster recoats.

A.2 System No. 73-2 High Build Urethane For Marginally Cleaned Surfaces or Top coating Existing Systems.

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning or SSPC-SP3 Power Tool Cleaning

	<u>Dry Film-Mils</u>
<u>Shop Coat:</u> Manufacturer Standard Primer (or existing coating)	1.5 – 2.0
<u>2nd Coat:</u> N27 S.T. Typoxy	3.0 – 5.0
<u>3rd Coat:</u> 73-Color Endura-Shield	<u>2.0 – 3.0</u> 6.5-10.0 Minimum 7.5 Mils

NOTE: This system can be used over factory finish paint or over non-sandblasted steel and offer the high performance of a urethane coating. Specify Series 74 Endura-Shield for gloss finish. A test patch is always recommended to insure proper application.

A.3 System No. 23-1 Alkyd Enamel – Semi-Gloss

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 37H-77 Chem-Prime H.S.	2.0 – 3.5
<u>2nd Coat:</u> 23-Color Enduratone	1.5 – 2.5
<u>3rd Coat:</u> 23-Color Enduratone	<u>1.5 – 2.5</u> 5.0 – 8.5 Minimum 6.0 Mils

A.4 System 90-97 Zinc/Epoxy/Urethane

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

	<u>Dry Film-Mils</u>
<u>Primer:</u> 90-97 Tneme-Zinc	2.5 – 3.5
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	2.0 – 3.0
<u>3rd Coat:</u> 73 Endura-Shield III	<u>2.0 – 3.0</u> 6.5 – 9.5 Minimum 8.0 Mils

NOTE: This system offers the added corrosion protection of a zinc rich primer. Series 90-97 Tneme-Zinc is an organic zinc-rich primer that can be used for field touch up of a zinc primer or for touch up of galvanized surfaces that are damaged. You can substitute Series 91-H₂O Hydrozinc for the 90-97. You can substitute Series 74 for the Series 73 if a gloss finish is desired.

A.5 System No. 30-1 DTM Acrylic Overcoat System

Surface Preparation: Pressure Clean @ 3500 PSI Spot SP2, 3, 7, or 6

	<u>Dry Film-Mils</u>
<u>Spot Primer:</u> 30 Spra-Saf EN	2.0 – 4.0
<u>2nd Coat:</u> 30 Spra-Saf EN	2.0 – 4.0
<u>3rd Coat:</u> 30 Spra-Saf EN	2.0 – 4.0
	6.0 – 12.0
	Minimum 9.0 Mils

NOTE: This is an excellent coating system to overcoat existing unknown coating systems with limited surface preparation, using a non-stressful coating with excellent color and gloss retention. This coating should be spray applied and has excellent dry fall properties.

B. INTERIOR EXPOSURE (NON-IMMERSION)

B.1 System No. 69-1 High Solids Epoxy

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 69-1211 Epoxoline Primer II	4.0 – 6.0
<u>2nd Coat:</u> 69-Color Hi-Build Epoxoline II	4.0 – 6.0
	8.0 – 12.0
	Minimum 10.0 Mils

NOTE: This coating will provide maximum protection. It offers chemical and corrosion resistance for long-term protection against salt spray, moisture, corrosive fumes, and chemical attack. Series 69 is a polyamidoamine-cured epoxy. Primer coat must be touched-up before 2nd coat is applied.

B.2 System No. 66-2 High Build Epoxy

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

	<u>Dry Film-Mils</u>
<u>Shop Coat:</u> 66-1211 Epoxoline Primer	3.0 – 5.0
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	4.0 – 6.0
	7.0 – 11.0
	Minimum 9.0 Mils

NOTE: This system will provide chemical and corrosion resistance against abrasion, moisture, corrosion fumes, chemical contact, and immersion in non-potable water. Primer coat must be touched-up before 2nd coat is applied. Substitute Series 161 for low temperature cure or quick recoats.

B.3 System No. 66-6 High Build Epoxy (Over OEM Finishes)

Surface Preparation: Spot SSPC-SP6 Commercial Blast Cleaning or SSPC-SP11 Power Tool Cleaning To Bare Metal

	<u>Dry Film-Mils</u>
<u>Shop Coat:</u> Manufacturer's Standard (or existing coating)	1.0 – 2.0
<u>2nd Coat:</u> 27 S.T. Typoxy	3.0 – 5.0
<u>3rd Coat:</u> 66-Color Hi-Build Epoxoline	<u>3.0 – 5.0</u> 6.0–10.0 Minimum 7.0 Mils

NOTE: This system is to be used over standard manufacturer's primer to offer a high performance epoxy finish. Excellent for areas of rust not able to be completely cleaned.

C. IMMERSION

C.1 System No. 69-2 High Solids Epoxy (Non-Potable Water)

Surface Preparation: SSPC-SP10 Near White Blast Cleaning

	<u>Dry Film-Mils</u>
<u>Shop Coat:</u> 69-1211 Hi-Build Epoxoline II	5.0 – 7.0
<u>2nd Coat:</u> 69-Color Hi-Build Epoxoline II	<u>6.0 – 8.0</u> 11.0 -15.0 Minimum 12.0 Mils

NOTE: This system provides maximum protection in immersion service. Scarify the surface before top coating if the Series 69 has been exterior-exposed for 90 days or longer. If primer coat is damaged, it must be touched-up before 2nd coat if applied.

C.2 System No. 66-2 High Build Epoxy (Non-Potable Water)

Surface Preparation: SSPC-SP10 Near White Blast Cleaning

	<u>Dry Film-Mils</u>
<u>Shop Coat:</u> 66-1211 Epoxoline Primer	3.0 – 5.0
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	3.0 – 5.0
<u>3rd Coat:</u> 66-Color Hi-Build Epoxoline	<u>3.0 – 5.0</u> 1.0 –15.0 Minimum 11.0 Mils

NOTE: This system will provide chemical and corrosion resistance for protection against abrasion, moisture, corrosive fumes, chemical contact, and immersion. Primer coat must be touched-up before 2nd coat is applied. Scarify the surface before top coating if the Series 66 has been exterior-exposed for 60 days or longer. Substitute Series 161 for low temperature cure or quick recoats.

C.3 System No. 20-1 Epoxy-Polyamide (Potable Water)

Surface Preparation: SSPC-SP10 Near White Blast Cleaning

		<u>Dry Film-Mils</u>
<u>Shop Coat or</u>		
<u>1st Coat:</u>	20-WH02 Pota-Pox (Tank White)	3.0 – 5.0
<u>2nd Coat:</u>	20-1255 Pota-Pox (Beige)	4.0 – 6.0
<u>3rd Coat:</u>	20-WH02 Pota-Pox (Tank White)	<u>4.0 – 6.0</u>
		11.0–17.0
		Minimum 12.0 Mils

NOTE: This system meets American Water Works Association AWWA D 102 Inside Paint System Number 1. Series 20 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61.

C.4 System No. 140 High Solids Epoxy (Potable Water)

Surface Preparation: SSPC-SP10 Near White Blast Cleaning

		<u>Dry Film-Mils</u>
<u>Shop Coat or</u>		
<u>1st Coat:</u>	140-1255 Pota-Pox II (Beige)	6.0 – 8.0
<u>2nd Coat:</u>	140-WH02 Pota-Pox II (Tank White)	<u>6.0 – 8.0</u>
		12.0-16.0
		Minimum 14.0 Mils

NOTE: Series 140 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61.

C.5 System No. 46-30 Coal Tar-Epoxy (Non-Potable Water)

Surface Preparation: SSPC-SP10 Near White Blast Cleaning*

	<u>Dry Film-Mils</u>
<u>One Coat:</u> 46H-413 Hi-Build Tneme-Tar	14.0 – 20.0

NOTE: May be applied in a two-coat application. Review critical recoat time if utilized.

*SSPC-SP6 Commercial Blast Cleaning may be used for non-immersion service.

C.6 System No. 91-H₂O Zinc/Epoxy (Potable Water)

Surface Preparation: SSPC-SP10 Near White Metal Blast

Dry Film-Mils

<u>1st Coat:</u>	91- H ₂ O Hydrozinc	2.5 – 3.5
<u>2nd Coat:</u>	20-1255 Pota-Pox (Beige)	4.0 – 6.0
<u>3rd Coat:</u>	20-WH02 Pota-Pox (Tank White)	<u>4.0 – 6.0</u>
		10.5-15.5
		Minimum 12.0 Mils

NOTE: Can substitute Series 40, 140, or FC20 for Series 20 if preferred. Meets AWWA D102-97 Inside Coating System No. 3.

3.15.2 OVERHEAD METAL DECKING, JOIST

A. INTERIOR EXPOSURE

A.1 System No. 15-1 Uni-Bond

Surface Preparation: Surfaces must be dry, clean, and free of oil, grease, and other contaminants. Allow concrete to cure 28 days.

<u>Coating:</u>	15-Color Uni-Bond	<u>Dry Film-Mils</u> 2.5 – 3.5

NOTE: This system should be used on ceiling areas where a one-coat system is desired. Can be applied over steel, galvanized, and aluminum decking, joist, beams, conduits, and concrete.

B. EXTERIOR EXPOSURE

B.1 System No. N27 S.T. Typoxy

Surface Preparation: Pressure clean to remove all dirt, oil, grease, chemicals, and foreign contaminants. Remove loose paint and all rust by hand and power tool cleaning (SSPC-SP 2 & 3),

<u>Coating:</u>	N27-Color S.T. Typoxy	<u>Dry Film-Mils</u> 3.0 – 5.0

NOTE: This system can be applied over a wide variety of coatings and factory finishes. It can also be applied direct to galvanized aluminum decking, joists, conduits, and tight rust.

3.15.3 MILL COATED STEEL PIPE

A. EXTERIOR/INTERIOR EXPOSURE (NON-IMMERSION)

A.1 System No. 66-3 Epoxy-Polyamide

Surface Preparation: Surface shall be clean and dry. Scarify by Brush Blasting if surface is hard and glossy.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 66-1211 Epoxoline Primer	3.0 – 4.0
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	4.0 – 6.0
<u>3rd Coat:</u> (If required)	<u>(4.0 – 6.0)</u>
	(11.0 – 16.0)
	Minimum 11.0 Mils

NOTE: This system can be applied directly to mill coated steel pipe without sandblasting for use in non-immersion. There may be some bleed through with the 1st coat. Do not apply over glossy varnish type mill coatings.

3.15.4 GALVANIZED STEEL – PIPE AND MISCELLANEOUS FABRICATIONS

A. EXTERIOR/ (NON-IMMERSION)

A.1 System No. 73-2 Epoxy/High Build Urethane

Surface Preparation: SSPC-SP1 Solvent Cleaning and Scarify Brush Off Blasting or Hand Sanding

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 66-Color Hi-Build Epoxoline	2.0 – 4.0
<u>2nd Coat:</u> 73-Color Endura-Shield	<u>2.0 – 4.0</u>
	4.0 – 8.0
	Minimum 5.0 Mils

NOTE: Series 66 has excellent adhesion to galvanized steel. This system is highly resistant to abrasion, wet conditions, corrosive fumes, and chemical contact. Provides 2-3 times the color and gloss retention of conventional paints. First coat to be same color as or close to the finish color. Specify Series 74 Endura-Shield for gloss finish.

B. INTERIOR EXPOSURE (NON IMMERSION)

B.1 System No. 66-6 Polyamide Epoxy

Surface Preparation: SSPC-SP1 Solvent Cleaning and Scarify by Brush Off Blasting or Hand Sanding

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 66-Color Hi-Build Epoxoline	2.0 – 4.0
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	<u>2.0 – 4.0</u>
	4.0 – 8.0
	Minimum 5.0 Mils

C. IMMERSION (POTABLE WATER)

C.1 System No. 20-1 Epoxy-Polyamide (Potable Water)

Surface Preparation: Solvent Clean Per SSPC-SP1 & Cleaning per SSPC-SP7

1st Coat: 20-1255 Pota-Pox Primer
2nd Coat: 20-WH02 Pota-Pox Finish

Dry Film-Mils

4.0 – 6.0

4.0 – 6.0

8.0–12.0

Minimum 10.0 Mils

NOTE: Series 20 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61.

3.15.5 CHAIN-LINK FENCES

A. GALVANIZED STEEL & NON-FERROUS METAL

A.1 System No. 6-2 Acrylic

Surface Preparation: Surface shall be clean and dry

Dry Film-Mils

1st Coat: 6-Color Tneme-Cryl

2.0 – 3.0

2nd Coat: 6-Color Tneme-Cryl

2.0 – 3.0

4.0 – 6.0

Minimum 5.0 Mils

3.15.6 CONCRETE

A. EXTERIOR – ABOVE GRADE

A.1 System No. 180-1 High Build Acrylic Emulsion – Smooth

Surface Preparation: Surface shall be clean and dry.

Dry Film-Mils

1st Coat: 180-Color W.B. Tneme-Crete

4.0 – 6.0

2nd Coat: 180-Color W.B. Tneme-Crete

4.0 – 6.0

8.0 –12.0 Mils

NOTE: Series 180 is a high build decorative acrylic coating in a smooth finish. Substitute Series 181 if a sand texture finish if desired.

B. System No. 6-1 Acrylic Emulsion Low Sheen

Surface Preparation: Surface must be clean and dry.

Dry Film-Mils

1st Coat: 6-Color Tneme-Cryl

2.0 – 3.0

2nd Coat: 6-Color Tneme-Cryl

2.0 – 3.0

4.0 – 6.0

Minimum 5.0 Mils

NOTE: If semi-gloss finish is desired, use Series 7 Tneme-Cryl SG as the 2nd coat.

C. System No. 156-1 Modified Acrylic Elastomer

Surface Preparation: Surface must be clean and dry.

1st Coat: 156-Color Enviro-Crete

Dry Film-Mils

4.0 – 8.0

2nd Coat: 156-Color Enviro-Crete

4.0 – 8.0

8.0 – 16.0

Minimum 10.0 Mils

NOTE: If texture is needed, use 157 Enviro-Crete TX (medium texture) or 159 Enviro-Crete XTX (coarse texture). For application over previously applied coatings, use TNE MEC Series 151 Elasto-Grip at 1.0 – 2.5 mils DFT prior to the application of Series 156 Enviro-Crete. Also use Series 151 for stucco surface.

D. EXTERIOR – BELOW GRADE

D.1 System No. 46-61 Coal Tar Pitch Solution

Surface Preparation: Surface must be clean and dry. Level all protrusions.

1st Coat: 46-465 H.B. Tnemecol

Dry Film-Mils

8.0 – 12.0

2nd Coat: 46-465 H.B. Tnemecol

8.0 – 12.0

16.0 - 24.0

Minimum 16.0 Mils

D.2 System No. 46-31 Coal Tar Epoxy

Surface Preparation: Surface shall be clean and dry.

One Coat: 46H-413 Hi-Build Tneme-Tar

Dry Film-Mils

14.0-20.0

D.3 System No. 100-1 Crystalline Waterproofing

Surface Preparation: Surface to be clean and roughened by Brush Blasting or Acid Etching.

1st Coat: XYPEX Concentrate @ (1.5 #/SY)

2nd Coat: XYPEX Modified @ (1.5 #/SY)

NOTE: This system can be applied to concrete that is still wet or hasn't developed final cure. It can be used where wet surface conditions exist or where there is the potential for water intrusion due to hydrostatic pressure. Application shall be per XYPEX specification manual.

E. EXTERIOR/INTERIOR EXPOSURE (NON-IMMERSION)

E.1 System No. 6-1 Acrylic Emulsion, Low Sheen (Interior/Exterior)

Surface Preparation: Surface shall be clean and dry. Allow concrete to cure for 28 days.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 6-Color Tneme-Cryl	2.0 – 3.0
<u>2nd Coat:</u> 6-Color Tneme-Cryl	<u>2.0 – 3.0</u>
	4.0 – 6.0
	Minimum 5.0 Mils

NOTE: This system will provide a decorative coating with good exterior durability, color retention, and a high vapor transmission rate. For Semi-Gloss finish, use 7-Color Tneme-Cryl S/G.

E.2 System No. 66-4 Epoxy-Polyamide (Interior/Exterior)

Surface Preparation: Surfaces shall be clean and dry. Allow concrete to cure for 28 days. SSPC-SP7 Brush Off Blast Clean.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 66-Color Hi-Build Epoxoline	3.0 – 5.0
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	<u>4.0 – 6.0</u>
	7.0–11.0
	Minimum 9.0 Mils

E.3 System No. 83-1 High Solids Catalyzed Epoxy (Interior)

Surface Preparation: Surfaces shall be clean and dry. Allow concrete to cure for 28 days. SSPC-SP7 Brush Off Blast Clean. Concrete block surfaces: Allow to cure 28 days. Level fins, protrusion, and mortar splatter.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 83-Color Ceramlon II	6.0 – 10.0
<u>2nd Coat:</u> 83-Color Ceramlon II	<u>6.0 – 10.0</u>
	12.0 - 20.0
	Minimum 14.0 Mils

F. IMMERSION – POTABLE & NON-POTABLE WATER

F.1 System No. 66-4 Epoxy-Polyamide (Non-Potable Water)

Surface Preparation: SSPC-SP7 Brush Off Blast Cleaning

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 66-Color Hi-Build Epoxoline	4.0 – 6.0
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	4.0 – 6.0
	8.0 – 12.0
	Minimum 10.0 Mils

NOTE: Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler & Surfacer. First coat should be spray applied and backrolled.

F.2 System No. 104-5 High Solids Epoxy (Non-Potable Water)

Surface Preparation: SSPC-SP7 Brush Off Blast Cleaning

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 104-1255 H.S. Epoxy Primer	6.0 – 10.0
<u>2nd Coat:</u> 104-Color H.S. Epoxy	6.0 – 10.0
	12.0 - 20.0
	Minimum 10.0 Mils

NOTE: Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler & Surfacer. First coat should be spray applied and backrolled.

F.3 System No. 46-31 Coal Tar-Epoxy (Non-Potable Water)

Surface Preparation: Brush Off Blasting Cleaning

	<u>Dry Film-Mils</u>
<u>One Coat:</u> 46H-413 Hi-Build Tneme-Tar	14.0 – 20.0

NOTE: May be applied in a two-coat application. Review critical recoat time if utilized. Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler & Surfacer.

F.4 System No. 20-2 Epoxy-Polyamide (Potable Water)

Surface Preparation: SSPC-SP10 Near White Blast Cleaning

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 20-1255 Pota-Pox	4.0 – 6.0

2nd Coat: 20-WH02 Pota-Pox Finish

4.0 – 6.0

8.0 – 12.0

Minimum 10.0 Mils

NOTE: This system meets American Water Works Association AWWA D 102 inside System No. 1. Series 20 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler & Surfacer. (NSF Standard 61 approved). Substitute Series FC20 for low temperature cure or quick recoats.

F.5 System No. 140-2 Epoxy-Polyamidoamine (Potable Water)

Surface Preparation: SSPC-SP10 Near White Blast Cleaning

1st Coat: 140-1255 Pota-Pox Plus

2nd Coat: 140-WH02 Pota-Pox Plus

Dry Film-Mils

6.0 – 8.0

6.0 – 8.0

12.0-16.0

Minimum 14.0 Mils

NOTE: Series 140 meets the new requirements of approval for potable water use as established by the National Sanitation Foundation Standard 61. Surface irregularities and bug holes should be filled to a smooth uniform appearance as required with TNEMEC Series 63-1500 Filler & Surfacer. (NSF Standard 61 approved). First coat should be sprayed and backrolled.

F.6 System No. 264-1 Elastomeric Polyurethane

Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive blast clean per SSPC-SP7 (Brush Off Blast).

Primer: 20-WH02 (Tank White)

Coating: 264 Elasto-Shield (Black)

Dry Film-Mils

5.0 Mils

60.0 Mils ±

Minimum 65.0 Mils

NOTE: This system is NSF Certified for Potable Water. This flexible liner can be used to rehab tanks with leaks. Multiple passes may be required to achieve the desired thickness that can range from 50-100 mils. See Elasto-Shield Application Guide for detailed instructions.

G. INTERIOR EXPOSURE (NON-IMMERSION)

G.1 System No. 104-3 High Solids Epoxy

Surface Preparation: Surface to be clean and dry.

<u>1st Coat:</u>	104-Color H.S. Epoxy	<u>Dry Film-Mils</u>
<u>2nd Coat:</u>	104-Color H.S. Epoxy	6.0 – 8.0
		<u>6.0 – 8.0</u>
		12.0 -16.0
		Minimum 14.0 Mils

NOTE: This system will produce a slick, tile-like finish that has excellent chemical and water resistance. Surface will be easy to clean. First coat should be spray applied and backrolled.

G.2 System No. 113-1 Acrylic-Epoxy Semi-Gloss

Surface Preparation: Surface must be clean and dry.

<u>1st Coat:</u>	113-Color Tneme-Tufcoat	<u>Dry Film-Mils</u>
		4.0 – 6.0

NOTE: This system will provide high performance and can be applied directly over existing coatings without lifting. Can be used when low odor is required during application. Specify Series 114 Tneme-Tufcoat for Gloss Finish. Two coats will be required to achieve the specified film thickness if applied by roller.

3.15.7 CONCRETE FLOORS

A. EPOXY FLOOR COATING

A.1 System No. 66-1 Epoxy-Polyamide

Surface Preparation: Allow concrete to cure 28 days. Acid Etch or Brush Off Blast Cleaning

<u>1st Coat:</u>	66-Color Hi-Build Epoxoline	<u>Dry Film-Mils</u>
<u>2nd Coat:</u>	66-Color Hi-Build Epoxoline	2.0 – 3.0
		<u>2.0 – 3.0</u>
		4.0 – 6.0
		Minimum 5.0 Mils

NOTE: This system will provide a durable, long-wearing coating that bonds tightly to concrete and stands up under heavy foot traffic, frequent cleaning, and spillage of water, oil, grease, or chemical.

A.2 System No. 287-1 Waterborne Epoxy-Amine

Surface Preparation: Allow concrete to cure 28 days. Acid Etch or Brush Off Blast Cleaning

<u>1st Coat:</u>	287-Color Enviro-Tread	<u>Dry Film-Mils</u>
<u>2nd Coat:</u>	287-Color Enviro-Tread	2.0 – 4.0
		<u>2.0 – 4.0</u>
		4.0 – 8.0
		Minimum 5.0 Mils

NOTE: For a non-skid finish, add 287-300C skid-resistance sand into the first coat.

A.3 System No. 291-12 Epoxy/Urethane

Surface Preparation: Allow concrete to cure 28 days. Acid Etch or Brush Off Blast Cleaning

<u>1st Coat:</u>	66-Color Hi-Build Epoxoline	<u>Dry Film-Mils</u>
<u>2nd Coat:</u>	66-Color Hi-Build Epoxoline	2.0 – 3.0
<u>3rd Coat:</u>	291-Color CRU	2.0 – 3.0
		<u>2.0 – 3.0</u>
		6.0 – 9.0
		Minimum 7.0 Mils

NOTE: This system offers a hard, chemically resistant floor coating with excellent flow properties and color and gloss retention.

A.4 System No. 281-1 High Build Polyamine-Epoxy Floor

Surface Preparation: Allow concrete to cure 28 days. Abrasive Blast Cleaning (Refer to Installation Guide of manufacturer.)

<u>1st Coat:</u>	201 Epoxoprime	<u>Dry Film-Mils</u>
<u>2nd Coat:</u>	281 Tneme-Glaze	6.0 – 8.0
<u>3rd Coat:</u>	281 Tneme-Glaze	6.0 – 8.0
		<u>6.0 – 8.0</u>
		18.0 –24.0
		Minimum 18 Mils

Please refer to manufacturer's Installation Guide and Technical Data for proper installation.

A.5 System No. 221/281 Functional Flooring (Non-Slip)

Surface Preparation: Abrasive Blast Cleaning (Refer to Installation Guide of manufacturer.)

<u>1st Coat:</u>	201 Epoxoprime	<u>Dry Film-Mils</u>
<u>2nd Coat:</u>	221 Lami-Tread	6.0 – 8.0
		1/8" (2 cts @ 1/16" each)

3rd Coat: 281 Tneme-Glaze

8.0 – 12.0
Minimum ¼"+

Please refer to manufacturer's Installation Guide and Technical Data for proper installation.

3.15.8 POROUS MASONRY

A. EXTERIOR/INTERIOR EXPOSURE

A.1 System No. 180-2 Acrylic Emulsion – Smooth

Surface Preparation: Surface shall be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 180-Color W.B. Tneme-Crete	6.0 – 8.0
<u>2nd Coat:</u> 180-Color W.B. Tneme-Crete	6.0 – 8.0
	12.0-16.0

NOTE: First coat of Tneme-Crete will act as a filler coat while the second coat will completely seal and finish. Long-term life and high performance. Available in Series 181 in a sand finish.

A.2 System No. 6-2 Acrylic Emulsion, Low Sheen

Surface Preparation: Surface shall be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 54-562 Modified Epoxy	80 SF Gal Masonry Filler
<u>2nd Coat:</u> 6-Color Tneme-Cryl	2.0 – 3.0
<u>3rd Coat:</u> 6-Color Tneme-Cryl	<u>2.0 – 3.0</u>
	*4.0 – 6.0

*Total dry film thickness of topcoats only.

NOTE: This system will fill the block and provide a sealed surface. For semi-gloss finish, use 7-Color Tneme-Cryl S/G.

A.3 System No. 66-15 Epoxy-Polyamide (Interior)

Surface Preparation: Surface shall be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 54-660 Epoxy Masonry Filler	100 SF Gal
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	4.0 – 6.0

3rd Coat: 66-Color Hi-Build Epoxoline $\frac{4.0 - 6.0}{*8.0-12.0}$

*Total dry film thickness of topcoats only.

NOTE: Block filler is a modified epoxy designed for high moisture.

A.4 System No. 104-6 High Solids Epoxy (Interior Only)

Surface Preparation: Surface to be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 104-Color H.S. Epoxy	6.0 – 10.0
<u>2nd Coat:</u> 104-Color H.S. Epoxy	$\frac{6.0 - 10.0}{12.0 - 20.0}$
	Minimum 14.0 Mils

NOTE: This system will produce a film thickness of 16 mils. The surface will be tile-like for easy cleaning and will provide protection against chemical attack, corrosive fumes, high humidity and wash down. Backroll first coat to fill porosity.

A.5 System No. 113-1 Acrylic-Epoxy Semi-Gloss (Interior Only)

Surface Preparation: Surface must be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 130 Envirofill	100 SF/Gal
<u>2nd Coat:</u> 113-Color Tneme-Tufcoat*	$\frac{4.0 - 6.0}{4.0 - 6.0}$

*Two coats may be required if applied by roller

NOTE: Series 113 Tneme-Tufcoat has very low odor and can be used when painting in occupied areas. Specify Series 114 Tneme-Tufcoat for a gloss finish.

A.6 System No. 156-1 Modified Acrylic Elastomer

Surface Preparation: Surface must be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 130 Envirofill	100 SF/Gal
<u>2nd Coat:</u> 156-Color Enviro-Crete	4.0 – 8.0
<u>3rd Coat:</u> 156-Color Enviro-Crete	$\frac{4.0 - 8.0}{8.0-16.0}$
	Minimum 10.0 Mils (For 2 nd & 3 rd Coats)

NOTE: If texture is needed, use 157 Enviro-Crete TX (medium texture or 159 Enviro-Crete XTX – coarse texture). For application over previously applied coatings, use TNEMEC 151 Elasto-Grip at 1.0 – 2.5 mils DFT.

3.15.9 GYPSUM WALLBOARD

A. INTERIOR EXPOSURE

A.1 System No. 113-5 Acrylic-Epoxy

Surface Preparation: Surface must be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 51-792 PVA Sealer	1.0 – 2.0
<u>2nd Coat:</u> 113 H.B. Tneme-Tufcoat*	<u>4.0 – 5.0</u>
	5.0 – 7.0
	Minimum 6.0 Mils

NOTE: *Two coats may be required if application is by brush and roller. Substitute Series 114 if a gloss finish is desired.

A.2 System No. 66-22 Hi-Build Epoxoline

Surface Preparation: Surface must be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 51-792 PVA Sealer	1.0 – 2.0
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline*	<u>4.0 – 6.0</u>
	5.0 – 8.0
	Minimum 5.0 Mils

NOTES: *Two coats may be required if applied by roller.

A.3 System No. 6-1 Acrylic Emulsion, Low Sheen (Interior / Exterior Exposure)

Surface Preparation: Surface must be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 6-Color Tneme-Cryl	2.0 – 3.0
<u>2nd Coat:</u> 6-Color Tneme-Cryl	<u>2.0 – 3.0</u>
	4.0 – 6.0
	Minimum 5.0 Mils

NOTE: This system is designed for mild use areas like office walls, laboratory ceilings, stairwells, etc. For semi-gloss finish, use 7-Color Tneme-Cryl S/G.

3.15.10 WOOD

A. EXTERIOR/INTERIOR EXPOSURE

A.1 System No. 23-4 Alkyd Semi-Gloss

Surface Preparation: Surface shall be clean and dry.

<u>1st Coat:</u>	36-603 Undercoater	<u>Dry Film-Mils</u>
		2.5 – 3.5
<u>2nd Coat:</u>	23 Enduratone	1.5 – 3.5
<u>3rd Coat:</u>	23 Enduratone	<u>1.5 – 3.5</u>
		5.5–10.5
		Minimum 6.0 Mils

NOTE: Specify Series 2H Hi-Build Thene-Gloss for High Gloss finish.

A.2 System No. 6-5 Acrylic Latex

Surface Preparation: Surface shall be clean and dry.

<u>1st Coat:</u>	36 Undercoater	<u>Dry Film-Mils</u>
		2.0 – 3.5
<u>2nd Coat:</u>	6-Color Thene-Cryl	2.0 – 3.0
<u>3rd Coat:</u>	6-Color Thene-Cryl	<u>2.0 – 3.0</u>
		6.0 – 9.5
		Minimum 7.5 Mils

NOTE: Substitute Series 7 if semi-gloss finish is desired.

3.15.11 PVC PIPE

A. EXTERIOR OR INTERIOR

A.1 System No. 66-23 Epoxy-Polyamide

Surface Preparation: Surface shall be clean and dry.

<u>One Coat:</u>	66-Color Hi-Build Epoxoline	<u>Dry Film-Mils</u>
		4.0 – 6.0

NOTE: Optional topcoat of Series 73/74 Endura-Shield would give long-term color and gloss retention for exterior exposure.

3.15.12 INSULATED PIPE

A. INTERIOR EXPOSURE

A.1 System No. 6-1 Acrylic Emulsion, Low Sheen

Surface Preparation: Surface shall be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 6-Color Tneme-Cryl	2.0 – 3.0
<u>2nd Coat:</u> 6-Color Tneme-Cryl	2.0 – 3.0
	4.0 – 6.0
	Minimum 5.0 Mils

NOTE: For semi-gloss finish, use 7-Color Tneme-Cryl S/G.

3.15.13 HIGH HEAT COATING

A. EXTERIOR/INTERIOR EXPOSURE

A.1 System No. 39-2 Silicone Aluminum (1200° F Maximum)

Surface Preparation: SSPC-SP10 Near White Blast Cleaning – 1.0 Mil Surface Profile

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 39-1261 Silicone Aluminum	1.0 – 1.5
<u>2nd Coat:</u> 39-1261 Silicone Aluminum	1.0 – 1.5
	2.0 – 3.0
	Minimum 2.0 Mils

A.2 System No. 39-4 Silicone Aluminum (600° F Maximum)

Surface Preparation: SSPC-SP10 Near White Blast Cleaning 1.0 Mil Surface Profile

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 39-661 Silicone Aluminum	1.0 – 1.5
<u>2nd Coat:</u> 39-661 Silicone Aluminum	1.0 – 1.5
	2.0 – 3.0
	Minimum 2.0 Mils

3.15.1 SURFACES EXPOSED TO H₂S/H₂SO₄ (SEVERE EXPOSURE/IMMERSION)

A. CEMENTITIOUS SURFACES

A.1 System No. 120-1 Vinyl Ester

Surface Preparation: Abrasive blast clean to remove all laitance, fines, and contamination.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 120-5002 Vinester	6.0 – 10.0*
<u>2nd Coat:</u> 120-5003 Vinester F&S	As Required**
<u>3rd Coat:</u> 120-5002 Vinester	12.0 – 18.0
<u>4th Coat:</u> 120-5001 Vinester	12.0 – 18.0
	30.0 - 46.0
	Minimum 36.0 Mils +

Notes:

*First coat to be applied by roller application or spray applied followed by backrolling.

**All surface voids, cracks, pinholes, and other defects must be filled flush with the adjacent surfaces by putty knife, trowel, float, squeegee, or other suitable method.

B. FERROUS METAL SURFACES

B.1 System No. 120-2 Vinyl Ester

Surface Preparation: SSPC-SP5 White Metal Blast Cleaning (3.0 Mil Profile)

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 120-5002 Vinester	12.0 – 18.0
<u>2nd Coat:</u> 120-5001 Vinester	12.0 – 18.0
	24.0 – 36.0
	Minimum 30.0 Mils

3.15.15 EXTERIOR OF PRESTRESSED CONCRETE TANKS

A. System No. 156-3 New Tanks

Surface Preparation: Surface to be clean and dry.

	<u>Dry Film-Mils</u>
<u>1st Coat:</u> 156-Color Envirocrete	4.0 – 6.0
<u>2nd Coat:</u> 156-Color Envirocrete	4.0 – 6.0
	8.0–12.0
	Minimum 10.0 Mils

A.1 System No. 156-4 Existing Tanks (Previously Painted)

Surface Preparation: Remove all dirt, oil, grease, chalk, and loose paint per High Pressure Water Blast (Min 3500 PSI).

		<u>Dry Film-Mils</u>
<u>1st Coat:</u>	151 Elasto-Grip	1.0 – 2.5
<u>Stripe Coat:</u>	Stripe all hairline cracks with a Brushed coat of Series 156 Envirocrete	3.0 – 5.0
<u>Topcoat:</u>	156-Envirocrete	4.0 – 6.0
	(Cracks)	8.0–13.5
	(Other)	5.0 – 8.5

3.15.16 SECONDARY CONTAINMENT AREAS

A. System No. 66-4 Epoxy Polyamide

Surface Preparation: Surface shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive Blast Clean per SSPC-SP7 (Brush Off Blast).

		<u>Dry Film-Thickness</u>
<u>Primer:</u>	66-Color Hi-Build Epoxoline	4.0 – 6.0
<u>Topcoat:</u>	66-Color Hi-Build Epoxoline	4.0 – 6.0
		8.0–12.0
		Minimum 10.0 Mils

NOTE: This system will provide excellent resistance to most chemicals including petrochemicals. Use Tnemec Series 63-1500 between coats as a filler and surfacer wherever it is required.

A.1 System No. 61-1 Amine Epoxy

Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive Blast Clean per SSPC-SP6 (Brush Off Blast).

		<u>Dry Film-Thickness</u>
<u>Primer:</u>	61-5002 Tneme-Liner (Beige)	8.0 – 12.0
<u>Topcoat:</u>	61-5001 Tneme-Liner (Gray)	8.0 – 12.0
		16.0 - 24.0

NOTE: This system offers superior chemical resistance to a wide range of chemicals. Use Tnemec Series 63-1500 between coats as a filler and surfacer wherever it is required.

A.2 System 262-1 Flexible Polyurethane

Surface Preparation: Surfaces shall be clean and dry. Allow new concrete to cure for 28 days. Abrasive Blast Clean per SSPC-SP7 (Brush Off Blast).

		<u>Dry Film-Thickness</u>
<u>Primer:</u>	66 Hi-Build Epoxoline	5 Mils
<u>Coating:</u>	262 Elasto-Shield (Black)	50Mils

NOTE: Multiple passes may be required to achieve recommended film thickness. See Elasto-Shield Application Guide for additional instructions. This product is only available in black

3.15.17 CLEAR WATER REPELLENT FOR CONCRETE, MASONRY & BRICK

A. Silane Sealer (Min 28% Solids)

Surface Preparation: Allow new concrete to cure 28 days. Clean surfaces to be sealed by abrasive blasting or waterblasting.

	<u>Coverage</u>
<u>Brick, Concrete:</u> PRIME A PELL Plus	125-200 SF/GAL

<u>Porous Masonry:</u> PRIME A PELL Plus	65-100 SF/GAL

3.15.18 MANHOLES, WET WELLS & LIFT STATIONS

A. System No. 120-1 Vinyl Ester

Surface Preparation: Abrasive blast clean to remove all laitance, fines, and contamination.

	<u>Dry Film-Thickness</u>
<u>1st Coat:</u> 120-5002 Vinester	6.0 – 10.0*
<u>2nd Coat:</u> 120-5003 Vinester F&S	As required**
<u>3rd Coat:</u> 120-5002 Vinester	12.0 – 18.0
<u>4th Coat:</u> 120-5001 Vinester	<u>12.0 – 18.0</u>
	30.0 – 46.0
	Minimum 36.0 Mils +

*First coat to be applied by roller application or spray applied followed by backrolling.

**All surface voids, cracks, pinholes, and other defects must be filled flush with the adjacent surfaces by putty knife, trowel, float, squeegee, or other suitable method.

B. System No. 100-1 Crystalline Waterproofing

Surface Preparation: Surface to be clean and roughened by Brush Blasting, Acid Etching, or High Pressure Water Blasting (3500 PSI) with turbo tips.

<u>1st Coat:</u> XYPEX Concentrate @ (1.5#/SY) – 1/16"±
<u>2nd Coat:</u> XYPEX Modified @ (1.5#/SY) – 1/16"±

NOTE: This system can be applied to concrete that is still wet or hasn't developed final cure. It can be used where wet surface conditions exist or where there is the potential for water intrusion due to hydrostatic pressure.

3.15.19 CANAL PIPE CROSSINGS

A. System 90-97 Zinc/Epoxy/Urethane for New Pipe or Pipe Requiring Removal of Existing Coatings

Surface Preparation: SSPC-SP6 Commercial Blast Cleaning

	<u>Dry Film-Thickness</u>
<u>Primer:</u> 90-97 Tneme-Zinc	2.5 – 3.5
<u>2nd Coat:</u> 66-Color Hi-Build Epoxoline	2.0 – 3.0
<u>3rd Coat:</u> 74-Color Endura-Shield	2.0 – 3.0
	6.5 – 9.5
	Minimum 8.0 Mils

A.1 System No. 135-2 High Build, High Gloss Urethane for Marginally Cleaned Surfaces or Topcoating Over Existing Systems

Surface Preparation: High Pressure Water Blast (Min 3500 PSI) or Solvent Clean (SSPC-SP1) and Spot Hand and Power Tool Clean (SSPC-SP2 & 3) or Brush Blast (SSPC-SP7). Existing coatings must be clean, dry, and tightly adhering prior to application of coatings.

	<u>Dry Film-Thickness</u>
<u>1st Coat:</u> N27 S.T. Typoxy	3.0 – 4.0
<u>2nd Coat:</u> 74-Color Endura-Shield	2.0 – 3.0
	5.0 – 7.0
	Minimum 5.0 Mils

NOTE: A test Patch is always recommended to insure proper adhesion to existing coatings without lifting of existing coatings.

4.00 GENERAL STATEMENT

Manufacturer's Technical Data Sheets, Installation Instructions and Label Directions are considered to be part of this specification.

Systems not applicable to this project should be deleted.

Consult TNEMEC for additional systems needed to address surfaces not included within these specifications.

SYSTEMS REFERENCE GUIDE

4.01 STEEL

A. EXTERIOR (NON-IMMERSION)

- A.1 System No. 73-1 Epoxy/High Build Urethane
- A.2 System No. 73-2 High Build Urethane
- A.3 System No. 23-1 Alkyd Enamel
- A.4 System 90-97 Zinc/Epoxy/Urethane
- A.5 System 30-1 DTM Acrylic Overcoat

B. INTERIOR EXPOSURE (NON-IMMERSION)

- B.1 System No. 69-1 High Solids Epoxy
- B.2 System No. 66-2 High Build Epoxy
- B.3 System No. 66-6 High Build Epoxy

C. IMMERSION

- C.1 System No. 69-2 High Solids Epoxy (Non-Potable)
- C.2 System No. 66-2 High Build Epoxy (Non-Potable)
- C.3 System No. 20-1 Epoxy-Polyamide (Potable)
- C.4 System No. 140 High Solids Epoxy (Potable Water)
- C.5 System No. 46-30 High Build Coal Tar Epoxy (Non-Potable Only)
- C.6 System No. 91-H₂O Hydrozinc

D. OVERHEAD METAL DECKING, JOIST (INTERIOR EXPOSURE)

- D.1 System No. 15-1 Uni-Bond

E. OVERHEAD METAL DECKING, JOIST (EXTERIOR EXPOSURE)

- E.1 System No. N27 S.T. Typoxy

F. MILL COATED STEEL PIPE

- F.1 System No. 66-3 Epoxy Polyamide

G. GALVANIZED STEEL-PIPE AND MISCELLANEOUS FABRICATORS

- G.1 System No. 73-2 Epoxy/High Build Urethane

H. GALVANIZED STEEL-INTERIOR EXPOSURE (NON-IMMERSION)

- H.1 System No. 66-6 Polyamide Epoxy

I. GALVANIZED STEEL-IMMERSION (POTABLE WATER)

I.1 System No. 20-1 Epoxy Polyamide (Potable Water)

J. CHAIN LINK FENCES

J.1 System No. 6-2 Acrylic

4.02 CONCRETE

A. EXTERIOR-ABOVE GRADE

1. System No. 180 High Build Acrylic Emulsion – Smooth
2. System No. 6-1 Acrylic Emulsion Low Sheen
3. System No. 156-1 Modified Acrylic Elastomer

B. EXTERIOR-BELOW GRADE

1. System No. 46-61 Coal Tar Pitch Solution
2. System No. 46-31 Coal Tar Epoxy
3. System No. 100-1 Crystalline Waterproofing

C. EXTERIOR/INTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 6-1 Acrylic Emulsion Low Sheen
2. System No. 66-4 Epoxy-Polyamide
3. System No. 83-1 High Solids Catalyzed Epoxy

D. IMMERSION (POTABLE & NON-POTABLE)

1. System No. 66-4 Epoxy-Polyamide (Non-Potable)
2. System No. 104-5 High Solids Epoxy (Non-Potable)
3. System No. 46-31 High Build Coal Tar Epoxy (Non-Potable Only)
4. System No. 20-2 Epoxy Polyamide (Potable)
5. System No. 140-2 Epoxy Polyamidoamine (Potable)
6. System No. 264-1 Elastomeric Polyurethane (Potable)

E. INTERIOR EXPOSURE (NON-IMMERSION)

1. System No. 104-3 High Solids Epoxy
2. System No. 113-1 Acrylic Epoxy Semi-Gloss

F. CONCRETE FLOORS

1. System No. 66-1 Epoxy-Polyamide
2. System No. 287-1 Waterborne Epoxy Amine
3. System No. 291-12 Epoxy/Urethane

4. System No. 281-1 High Build Polyamide-Epoxy Flooring
5. System No. 221/281 Functional Flooring (Non-Slip)

G. POROUS MASONRY-EXTERIOR/INTERIOR EXPOSURE

1. System No.180-2 High Build Acrylic Emulsion – Smooth
2. System No. 6-2 Acrylic Emulsion, Low Sheen
3. System No. 66-15 Epoxy-Polyamide (Interior)
4. System No. 104-6 High Solids Epoxy (Interior Only)
5. System No. 113-1 Acrylic Epoxy Semi-Gloss (Interior Only)
6. System No. 156-1 Modified Acrylic Elastomer

H. GYPSUM WALLBOARD

1. System No. 113-5 Acrylic Epoxy
2. System No. 66-22 Hi-Build Epoxoline
3. System No. 6-1 Acrylic Emulsion, Low Sheen

I. WOOD EXTERIOR/INTERIOR EXPOSURE

1. System No. 23-4 Alkyd Semi-Gloss
2. System No. 6-5 Acrylic Latex

J. PVC PIPE EXTERIOR/INTERIOR EXPOSURE

1. System No. 66-23 Epoxy-Polyamide

K. INSULATED PIPE-INTERIOR EXPOSURE

1. System No. 6-1 Acrylic Emulsion, Low Sheen

L. HIGH HEAT SURFACES – FERROUS METAL

1. System No. 39-2 Silicone Aluminum (1200° F Maximum)
2. System No. 39-4 Silicone Aluminum (600° F Maximum)

M. SURFACES EXPOSED TO H₂S/H₂SO₄ (SEVERE EXPOSURE/IMMERSION)

1. System No. 120-1 Vinyl Ester
2. System No. 120-2 Vinyl Ester

N. EXTERIOR OF PRESTRESSED CONCRETE TANKS

1. System No. 156-3 New Tanks
2. System No. 156-4 System 156-2 Existing Tanks (previously painted)

O. SECONDARY CONTAINMENT AREAS

1. System No. 66-4 Epoxy Polyamide
2. System No. 61-1 Amine Epoxy
3. System No. 262-1 Flexible Polyurethane

P. CLEAR WATER REPELLENT FOR CONCRETE, MASONRY, AND BRICK

1. Silane Sealer (Min 28% Solids)

Q. MANHOLES, WET WELLS, AND LIFT STATIONS

1. System No. 120-1 Vinyl Ester
2. System No. 100-1 Crystalline Waterproofing

R. CANAL PIPE CROSSINGS

1. System No. 90-97 Zinc/Epoxy/Urethane
2. System No. 135-2 High Build/High Gloss Urethane

4.03 COATING SCHEDULE

	FINISH COLOR	SURFACE	EXPOSURE	COATING SYSTEM
1.	As Directed by Engineer	Steel	Exterior (Non-Immersion)	73-1 Epoxy/High Build Urethane
2.	As Directed by Engineer	Steel	Interior Exposure (Non-Immersion)	69-1 High Solids Epoxy
3.	As Directed by Engineer	Steel	Immersion	69-2 High Solids Epoxy
4.	As Directed by Engineer	Concrete	Exterior-Above Grade	180 High Build Acrylic
5.	As Directed by Engineer	Concrete	Exterior-Below Grade	46-61 Coal Tar Pitch Solution
6.	As Directed by Engineer	Concrete	Porous Masonry- Exterior/Interior	180-2 High Build Acrylic
7.				
8.				
9.				
10.				

END OF SECTION

SECTION 15050

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish, install, and test equipment specified and indicated in the Contract Documents.

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Equipment and Materials

- 1. Equipment and materials used in this installation shall be new, of the best quality and, unless otherwise noted, shall be standard catalog items of the various manufacturers.

B. Design

- 1. Equipment and appurtenances shall be designed in conformity with the USA, ASME, AIEE, NEMA and other generally accepted applicable standards and shall be of rugged construction and of sufficient strength to withstand stresses which may occur during fabrication testing, transportation, installation and conditions of operation.
- 2. Bearings and moving parts shall be adequately protected by bushings or other approved means against wear, and provision shall be made for an adequate lubrication by readily accessible devices.
- 3. Details shall be designed for appearance as well as utility.
- 4. Protruding members, joints, corners, and gear covers, shall be furnished in appearance.
- 5. Exposed welds on machinery shall be ground smooth and the corners of structural shapes shall be rounded or chamfered.

C. Safety Requirements

- 1. In addition to the components specified and shown in the Drawings and necessary for the specified performance, incorporated in the design and

show in the shop drawings, the safety features required by the current codes and regulations, including but not limited to those of the Occupational Safety and Health Act of 1970, and Amendments thereto.

D. Drives and Belt Guards

1. Provide for each V-belt drive or rotating shaft a protective guard that shall be constructed around an angle iron frame, security bolted to the floor or apparatus.
2. The guard shall completely enclose drives and pulleys and be constructed to comply with safety requirements.
3. Hinged access doors not less than six (6) inches x six (6) inches shall be provided for access to motor and fan shaft for test purposes.
4. For double inlet fans, the belt-guard shall be arranged so as not to restrict the airflow into the fan inlet.
5. Guards shall not interfere with lubrication of equipment.

E. Shop Tests

1. Equipment so noted in the detailed equipment specifications, shall be tested in the shop of the manufacturer in a manner that shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents and that it will operate in the manner specified or implied.
2. None of this equipment shall be shipped to the project until the OWNER has been furnished a certified copy of test results and has been furnished a certified copy of test results and has notified the CONTRACTOR, in writing, that the results of these tests are acceptable.
3. When called for in the detailed equipment specifications, arrangements shall be made for the OWNER to witness performance tests in the Manufacturer's shop.
4. Certified copies of the manufacturer's actual test data and interpreted results thereof, shall be submitted to the OWNER for review in accordance with the Special Conditions.

F. Space and Access

1. Equipment shall fit the allotted space and shall leave reasonable access for servicing and repairs.

G. Prevention of Electrolysis

1. Where the contact of dissimilar metals may cause electrolysis and where aluminum will contact concrete, mortar or plaster, the contact surface of the metals shall be separated using not less than one (1) coat off zinc chromate primer and one (1) heavy coat of aluminum pigmented asphalt paint on each surface; or where deemed necessary by the OWNER, not less than one (1) course of asphalt saturated cotton fabric cemented to both metals with flashing cement, shall be used.
2. Finished works shall be cleaned and excess cement removed.

H. Metal Fasteners

1. Metal fasteners and related parts shall be of aluminum or stainless steel and of adequate strength for the purpose intended.

I. Standardization of Grease Fittings

1. The grease fittings on mechanical equipment must be able to be serviced with a single type of grease gun.
2. Fittings shall be hydraulic type, Alemite, Lincoln, or equal.

PART 3 EXECUTION

3.01 GENERAL

- A. Obtain written installation manuals from the equipment manufacturer prior to installation.
 1. Equipment shall be installed strictly in accordance with recommendations of the manufacturer.
 2. A copy of installation instructions shall be furnished the OWNER's field representative one (1) week prior to installation.
- B. Have on hand sufficient proper construction equipment and machinery of ample capacity to facilitate the work and to handle emergencies normally encountered in work of this character.
- C. To minimize field erection problems, mechanical units shall be factory-assembled insofar as practical.
- D. Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown in the Drawings.

- E. For pumping equipment units, which require field alignment and connections, provide the services of the manufacturer's qualified mechanic, millwright or machinist, to align the pump and motor prior to making piping connections or anchoring the pump base.
- F. Assume responsibility for the exact alignment of equipment with associated piping and under no circumstances will pipe springing be permitted.

3.02 ANCHORS AND SUPPORTS

- A. Furnish, install and protect necessary guides, bearing plates, anchor and attachment bolts, and other appurtenances required for the installation of the devices included in the equipment specified.
 - 1. Drawings for installation shall be furnished by the equipment manufacturer, and suitable templates shall be used when required in the detailed equipment specifications.
- B. Anchor bolts shall be of size, strength and material required for the purpose intended, and shall be in accordance with Division 5, Miscellaneous Metals, and the detailed equipment specifications.
- C. Provide concrete pedestals required for equipment and supports, hangers, and racks for piping and duct systems and appurtenances.
- D. Pipe sleeves or other means of adjusting anchor bolts shall be provided where indicated or required.
 - 1. Equipment shall be leveled by first using sitting nuts on the anchor bolts and then filling the space between the equipment base and concrete pedestal with non-shrink grout unless alternate methods are recommended by the manufacturer and approved by the OWNER (such as shim leveling).

3.03 EQUIPMENT IDENTIFICATION

- A. Each piece of equipment shall be provided with a stainless steel nameplate, securely fastened in a conspicuous place and clearly inscribed with the manufacturer's name, year of manufacture, serial number and principal rating data, as specified.

END OF SECTION

SECTION 15105

PIPES AND TUBES

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish, install, place in operation, and test specified piping complete with fittings, wall pipes, exterior wall sleeves, couplings, adapters, hanger supports and other appurtenances as shown in the Drawings and Specifications as required for a complete installation.
- B. Pipe and fittings covered by these specifications shall be furnished by fully qualified manufacturers experienced in the fabrication, casting and manufacture of the pipe materials specified herein.
 - 1. The pipe and fittings shall be designed, fabricated and installed in accordance with the best practice of the trade and the standards specified herein.
- C. No material furnished under this specification shall be shipped to the job site until submittals have been reviewed.
- D. Each submittal shall be identified as specified in the General Conditions.

1.02 RELATED SECTIONS

- A. Clearing and Grubbing - Section 02231
- B. Earthwork - Section 02300
- C. Construction Photographs and Video Recordings - Section 01321
- D. Valves - Section 15110
- E. Submittal Procedures - Section 01330
- F. Shop Drawings, Product Data, and Samples - Section 01334

1.03 SUBMITTALS

- A. Submit Shop Drawings in accordance with the procedures and requirements set forth in the Specifications.
- B. Each submittal shall be complete incorporating information and data listed

herein and additional information required to evaluate the proposed piping material's compliance with the Contract Documents.

1. Partial or incomplete submissions will be returned to the CONTRACTOR without review.

C. Data to be submitted shall include, but not be limited to:

1. Catalog Data consisting of specifications, illustrations and a parts schedule that identifies the materials to be used for the various piping components and accessories.
 - a. The illustrations shall be in sufficient detail to serve as a guide for assembly and disassembly.
2. Complete layout and installation drawings with clearly marked dimensions.
 - a. Piece numbers, which are coordinated with the tabulated pipe layout schedule, shall be clearly marked.
 - b. Scale and size of the drawings shall conform to the specifications in the General Conditions.
 - c. Piping layout drawings shall indicate the following information; pipe supports, location, support type, hanger rod size, insert type and the load on the hanger in pounds.
3. Weight of all component parts.
4. Design calculations where specified.
5. Tabulated pipe layout schedule that shall include the following information for pipe and fittings, restrained joints, service, pipe size, working pressure, wall thickness, and piece number.

1.04 Manufacturer's Recommendations

- A. Where installation procedures are required to be in conformance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the ENGINEER prior to the installation.

1.05 MEASUREMENT AND PAYMENT

- A. Measurement and payment will be based upon work completed and accepted in accordance with the Drawings and Specifications.

1. No separate payment will be made for excavation, trenching, backfilling, leakage tests or other incidental items of work not shown in the BID SCHEDULE and authorized by the ENGINEER, in writing, as extra work.

1.06 GUARANTEE

- A. Guarantee materials and equipment furnished and installed, and work performed for a period of one (1) year from the date of substantial completion.
 1. The guarantee shall stipulate that the completed system is free from all defects due to faulty materials or workmanship and promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Pipe and fittings shall be marked with the manufacturer's name or trade mark, size, class or pressure rating, and the date of manufacture in accordance with the standards specified herein.
- B. Bolts and nuts shall be hexagonal conforming to ANSI B18.2.
- C. No raised face flanges in conformance with ANSI 816.5 class 150 will be acceptable.
 1. Raised faces shall be milled flat.
 2. The only exceptions to this rule are ANSI B16.5 class 300 pound flanges where specified and the lap joint flanges for the stainless steel pipe for low pressure air service and light wall stainless steel pipe.
- D. Gasket shall be full-faced type conforming to ANSI B16.21 except for lap joints and 300 lb. flanges.
- E. The equipment shall include, but not be limited to the following:

Paragraph	Title
2.02	Ductile Iron Pipe (DIP) and Fittings
2.03	Polyvinylchloride (PVC) Pipe
2.04	Polyvinylchloride (PVC) Pressure Pipe
2.05	High Density Polyethylene (HDPE) Pipe
2.06	Sleeve Type Couplings

2.07	Grooved Couplings
2.08	Flanged Adapters
2.09	Wall Sleeves, Pipes, and Castings
2.10	Wall Penetration Seal
2.11	Unions
2.12	Insulating Type Fittings

2.02 DUCTILE IRON PIPE (DIP) AND FITTINGS

A. Ductile iron pipe shall conform to the requirements of AWWA/ANSI C151/A21.51.

1. Provide pipe with a wall thickness for buried and encased piping conforming to the following:

Size	Pressure Class
4-inch through 6-inch	350
8-inch through 20-inch	250
24-inch	200
30-inch through 64-inch	150

2. Subject each ductile iron pipe to a hydrostatic test of at least 500 psi for 10 or more seconds.
 - a. Subject pipes of diameter 18 inches or larger to a continuing hydrostatic test in which the pressure is elevated from 500 psi to a peak pressure that induces a stress in the pipe wall equivalent to 75% of the minimum specified yield of ductile iron (42,000 psi) as calculated by:

$$P = \frac{2 \times f_s \times t}{d} \quad \text{where:}$$

P	=	peak hydrostatic pressure
f_s	=	stress in pipe wall during hydrostatic test (0.75 times the minimum yield strength of the ductile iron in tension)
t	=	nominal wall thickness, inches
d	=	outside diameter, inches

B. The pressure classes indicated above are the minimum permitted unless noted elsewhere.

C. Fittings for use with the ductile iron pipe specified above shall be ductile iron.

1. Cast ductile-iron fittings shall be pressure rated at 250 psi, minimum.
2. Fittings with mechanical joints, flange joints and push-on joints shall conform

to AWWA/ANSI C153/A21.53.

3. In addition, fittings with mechanical joints and push-on joints shall conform to AWWA/ANSI C111/A21.11, except that neoprene gaskets shall be used for the joint.
- D. Ductile iron pipe and fittings intended for interior use and for use above grade shall be flanged.
- E. Ductile iron pipe for use below grade shall be push-on joint and thrust restrained, where necessary, as listed on the drawing details.
- F. Ductile iron pipe for use below grade shall be thrust restrained mechanical joint, where indicated on the drawings or required for pipe crossing right-of-ways by their governing agencies.
- G. Ductile iron pipe with threaded flanges shall be manufactured in accordance with AWWA/ANSI C115/A21.15, unless otherwise specified, and with the provisions contained herein for ductile iron pipe except that wall thickness shall not be less than Class 53 unless a higher class is noted.
- H. Flanges shall be ANSI Standard Class 125, plain faced and drilled, in accordance with ANSI B16.1.
 1. Flanges on ductile iron pipe and fittings shall be ductile iron and shall be provided by the pipe manufacturer.
 2. Joint materials for flanged pipe and fittings shall be ANSI sized and approved and shall consist of hot dip galvanized bolts and nuts and 1/8 inch thick full-face neoprene gaskets.
- I. Mechanical joint pipe and fittings shall be furnished with high strength cast iron or alloy steel tee head bolts and hex nuts, with composition, dimensions and threading in accordance with AWWA/ANSI C111/A21.11.
 1. Segmented glands will not be acceptable.
 2. Bolt holes for mechanical joints shall be equally spaced, and shall straddle the vertical centerline.
- J. Thrust restrained mechanical joints for ductile iron pipe and fittings shall utilize a restraining follower gland, which when actuated imparts a multiple wedging action against the pipe, increasing its resistance as the pressure increases.
 1. Glands shall be manufactured of ductile iron conforming to ASTM A536.
 - a. Restraining devices shall be of ductile iron heat treated to a minimum

hardness of 370 BHN.

- 1) Dimensions shall be such that the gland can be used with the standardized mechanical joint bell and tee head bolts.
 - b. Twist off nuts, sized same as tee head bolts, shall be used to insure proper actuating of restraining devices.
 - c. The mechanical joint shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and shall be MEGALUG Series 1100 as manufactured by EBAA Iron, Inc., or equal.
- K. Alternatively, thrust restrained mechanical joints for ductile iron pipe and fittings may be TR-FLEX as manufactured by U.S. Pipe and Foundry, Lok-Ring by the American Ductile Iron Pipe Co., Locked Mechanical Joint F-127D or Super Lock Joint by the Clow Corporation.
1. The restraining components, when not cast integrally with the pipe and fittings, shall be ductile iron or a high strength non-corrosive alloy steel.
 2. Tee head bolts and hexagonal nuts for restrained joints in pipe and fittings shall be of high strength cast iron or alloy steel, with composition, dimensions and threading as specified in AWWA/ANSI C111/A21.11, except that the length of the bolts shall meet the requirements for the restrained joint design.
 3. For cut grooved retainers, the thickness of barrel left after grooving shall not be less than the nominal wall thickness of equal sized non-restrained pipe as specified here in above for the centrifugally cast ductile iron pipe.
 4. The gasket and joint accessories shall be shipped in suitable protective containers.
 5. Each restrained joint and the pipe and fitting of which it is a part, shall be designed to withstand the axial thrust from an internal pipeline pressure of at least 150 psi at bulkhead conditions without reduction because of its position in the pipeline nor from support by external thrust blocks.
 6. Restrained joint pipe and fittings shall be capable of being deflected after assembly.
- L. Provide cement-mortar coating for Water Main ductile-iron pipe and fittings in accordance with AWWA/ANSI C104/A21.4 and ANSI/NSF Standard 61 for potable water contact.
1. The interior of the pipe shall receive the standard thickness of the protective cement-mortar coating, unless otherwise specified.

2. The coating shall not be applied in the gasket grooves.
- M. Provide ceramic epoxy coating for Sanitary Sewer Force main ductile-iron pipe and fittings in conform with Method A of ASTM E-96-66, Procedure A, ASTM D714-56, ASTM D 2794, and ASTM G 53-77.
1. The interior of the pipe shall receive 40 mils dry film thickness of the protective ceramic epoxy coating.
 2. The coating shall not be applied in the gasket grooves.
 - a. Special attention shall be given to the coating of fittings.
 3. Coating shall be applied to bare metal.
 4. Coating shall extend to the faces of flanges, to the end of spigots, or to the shoulder of hubs, as the case may be.
- N. Asphaltic coating shall be applied to the exterior of ductile iron pipe and fittings intended for buried service and shall conform to AWWA/ANSI C151/ A21.51.
1. Ductile iron pipe and fittings intended for interior use and for use above grade shall receive a prime coat compatible with the coating system specified in Paints and Coatings - 09900.

2.03 POLYVINYLCHLORIDE (PVC) PIPE

- A. PVC pipe shall conform to ASTM D1785 and shall be made from a 12454B compound which is a Type 1, Grade 1 plastic as defined by ASTM D1784.
1. Rerun or reclaimed materials will not be acceptable.
- B. Pipe to be used for potable water applications shall comply with the National Sanitation Foundation Standard No. 14 and shall have markings on the pipe to indicate that it has been tested and is in compliance.
- C. Wall Thickness shall be a minimum of Schedule 80, unless otherwise noted in Schedule 15D.
- D. Pipe joints shall be provided as specified in the pipe schedule.
1. Where required, socket type adapters and socket type flange adapters shall be provided.
- E. PVC pipe intended for buried service shall be socket weld joint.
- F. Socket type joints shall be made up in accordance with ASTM D2855 with a

PVC solvent cement complying with ASTM D2564.

1. The cement shall have a minimum viscosity of 2000 cps.
- G. Where flanges are to be used, flanges shall be van stone type with full-faced vinyl gaskets.
- H. Socket type pipe fittings for schedule 80 pipe shall conform to ASTM D2467.
- I. Fittings shall have the same schedule designation, joint type and be made of the same PVC compound as the connecting pipe.

2.04 POLYVINYLCHLORIDE (PVC) PRESSURE PIPE

- A. Joints shall be bell and spigot type using flexible elastomeric seals conforming to AWWA C900, DR 18 with ductile iron fittings.
- B. Restraining PVC pipe to mechanical joint DIP fittings:
 1. The mechanical joint restraint shall have working pressure of at least 150 psi with a minimum safety factor of 2:1.
 2. Retainer glands shall consist of a plurality of individually activated gripping surfaces to maximize restraint capability. The glands shall have serrations on the I.D. sufficient to hold the working and test pressures.
 3. Dimensions of the glands shall be such that it can be used with standardized mechanical joint bell and tee-head bolts conforming to AWWA/ANSI C111/A21.11 and AWWA/ANSI C153/A21.53.
 4. Twist off nuts, sized same as tee-head bolts, shall be used to insure proper actuating of the restraining devices.
- C. Retainer glands for 4 through 12-inch mechanical joint fittings shall be MEGALUG Series 2000 PV as manufactured by EBAA Iron, Inc., or approved equal.
- D. Retainer glands for 14 through 30-inch mechanical joint fittings shall be MEGALUG Series 1000 PV as manufactured by EBAA Iron, Inc., or approved equal.

2.05 HIGH DENSITY POLYETHYLENE (HDPE) PIPE

- A. This specification covers high density polyethylene (PE 3408) pressure pipe primarily intended for transportation of potable water either buried or above grade.

B. Referenced Standards:

1. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, ½ inch through 3 inch For Water Services.
2. AWWA C906 - Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 63 inch For Water Distribution.
3. ASTM D2683 - Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
4. ASTM B3261 - Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
5. ASTM D3350 - Standard Specification for Polyethylene Plastic Pipe Fittings Materials.
6. PPI TR-3 - Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.
7. PPI TR-4 - Recommended Hydrostatic Strength and Design Stresses for Thermoplastic Pipe and Fittings Compounds.
8. NSF Standard # 14 - Plastic Piping Components and Related Materials.

C. Qualification of Manufacturers:

1. The Manufacturer shall have manufacturing and quality control facilities capable of producing and assuring the quality of the pipe and fittings required by these specifications.
2. Given reasonable notice, the Manufacturer's production facilities shall be open for inspection by the CITY or an authorized representative.
3. Qualified manufacturers shall be approved by the ENGINEER.
4. Approved manufacturers include PLEXCO Performance Pipe Division - Chevron Chemical Company, or approved equal.

D. Material

1. Materials used for the manufacturing of polyethylene pipe and fittings shall be PE 3408 High Density Polyethylene (HDPE) meeting the ASTM D3350 cell classification of 345434C.
2. The material shall have a minimum Hydrostatic Design Basis (HDB) of 1600 psi at 73°F when tested in accordance with PPI TR-3 and shall be listed in

the name of the pipe and fitting manufacturer in PPI TR-4.

3. The material used in production of potable water pipe shall be approved by the National Sanitation Foundation (NSF).
4. The Manufacturer shall certify that the materials used to manufacture pipe and fittings meet the requirements of this specification.

E. Pipe:

1. Polyethylene pipe ½" through 3" shall be DR 11, iron pipe size (IPS), and manufactured in accordance with AWWA C901, unless otherwise noted.
2. Polyethylene pipe 4" though 12" shall be DR 17, ductile iron pipe size (DIPS), and in accordance with AWWA C906, unless otherwise noted.
2. Permanent identification of piping service shall be provided by co-extruding longitudinal blue stripes into the outside surface of the pipe.
 - a. The striping material shall be the same material as the pipe material except for color.
 - b. Stripes printed or painted on the pipe outside surfaces shall not be acceptable

F. Fittings:

1. Polyethylene fittings shall be made from material meeting the same requirements as the pipe.
 - a. Polyethylene fittings shall be molded or fabricated by the manufacturer of the pipe.
2. Where applicable, fittings shall meet the requirements of AWWA C906.
3. Molded fittings shall be manufactured in accordance with either ASTM D2683 (socket fused) or ASTM D3261 (butt fused) and shall be so marked.
4. Mechanical Fittings used with polyethylene pipe shall be specifically designed for, or tested and found to be acceptable for use with polyethylene pipe.
 - a. Mechanical Fittings designed for other materials shall not be used unless authorized by the Mechanical Fitting Manufacturer.
 - b. Special precaution may exist with certain mechanical fittings or additional components may be required - consult the manufacturer of the fittings

prior to use.

G. Manufacturer's Quality Control

1. The pipe and fittings Manufacturer shall have an established quality control program responsible for inspecting incoming and outgoing materials.
 - a. Incoming polyethylene materials shall be inspected for density, melt flow rate, and contamination.
 - b. The cell classification properties of the material shall be certified by the supplier.
 - c. Incoming materials shall be approved by Quality Control before processing into finished goods.
 - d. Outgoing products shall be tested as required in AWWA C901 or C906.
2. The Manufacturer shall maintain permanent Quality Control (QC) and Quality Assurance (QA) records.
 - a. Certification or copy of these records shall be made available to the purchaser on request.

2.06 SLEEVE TYPE COUPLINGS

- A. Sleeve couplings shall be Style 38 for either steel, or ductile iron pipe as manufactured by Dresser Manufacturing Division or equivalent models by Smith Blair, Rockwell Industries, or equal.
 1. Sleeve couplings shall be Style 62 for joining steel pipes to ductile iron pipe as manufactured by Dresser or equivalent models by Smith Blair, Rockwell Industries, or equal.
 2. Applications with stainless steel pipe shall be fabricated of type 316 stainless steel for components except the gaskets.
 3. Gasket material shall be compatible with the service application especially with respect to temperature requirements and chemical compatibility.
- B. The interior of the middle ring shall be painted with two coats of asphaltic coating suitable for the service intended.
 1. The middle ring shall not have a pipe stop.

2.07 GROOVED COUPLINGS

- A. Grooved couplings shall be in accordance with AWWA C606.

- B. For ductile iron pipe with nominal pipe sizes ranging from three (3) inches to twenty-four (24) inches, groove couplings shall be style 31 by Victualic, or equal.
 - 1. The joint grooving dimensions shall be in conformance to the rigid joint specifications.
 - 2. The gasket shall be a flush-seal type.
- C. Pipe wall thickness for ductile iron pipe shall be in accordance with AWWA C606.

2.08 FLANGED ADAPTERS

- A. Flanged adapters for ductile iron piping shall have either steel or gray iron bodies; models 912 or 913 as manufactured by Rockwell Industries, Styles 127 and 128 by Dresser Ind., Clow, or equal.
- B. Flange adapters shall have a minimum rated working pressure of 175 psig for gray iron body types and 150 psig for steel body types, and shall conform to applicable requirements of AWWA/ANSI C115/A21.15 and AWWA/ANSI C111/A21.11.
 - 1. Bolt hole and bolt patterns shall conform to the mating flange patterns as specified in the piping paragraphs.
 - 2. Bolts, nuts and flange gaskets shall conform to the specifications for the adjacent piping.
- C. Pipe shall be anchored by using anchor studs drilled into the coupling and connected pipe for nominal pipe sizes to twelve (12) inches.
 - 1. For nominal pipe sizes above twelve (12) inches, pipe shall be restrained by harnesses.

2.09 WALL SLEEVES, PIPES, AND CASTINGS

- A. Wall pipes or wall sleeves shall be provided in accordance with the following schedule, except where otherwise noted, when passing through new concrete or masonry structures:

From	To	Fitting
Dry Interior	Dry Interior	Wall Sleeve with Penetration Seal
Dry Interior	Dry Exterior	Wall Pipe
Dry Interior	Wet Tank	Wall Pipe
Dry Interior	Earth Exterior	Wall Pipe

Wet Tank	Earth Exterior	Wall Pipe
Wet Tank	Wet Tank	Wall Pipe
Wet Tank	Dry Exterior	Wall Pipe

- B. Transitions between interior piping materials and yard piping materials, which occur in the structural walls, shall be furnished in accordance with the details shown on the Drawings.
 - 1. Special adapters or wall fittings shall be provided by the piping manufacturer.
- C. Except where noted, wall pipes and castings shall be equipped with a water stop and shall be ductile or gray cast iron for piping with nominal pipe sizes to thirty (30) inches.
- D. Wall sleeves shall be either galvanized steel, ductile or gray cast iron pipe and shall have a water stop where required.
 - 1. For wall sleeves through floors, the top of the sleeve shall be raised 4-inches above finished floor elevation.
- E. Wall pipes shall be of sufficient length to pass through the wall in accordance with the details on the Drawings and shall conform to the details shown on the Drawings.
- F. The end of the wall pipes shall be of a type consistent with the piping to be connected to them and shall conform to their standards and specifications.
- G. Wall pipes shall have the same interior protection as specified for the connecting piping.
- H. Exterior protection shall be as specified for the yard or underwater piping.

2.10 WALL PENETRATION SEAL

- A. Wall penetration seals shall be a modular mechanical type, consisting of interlocking sealing links of an elastomer such as ethylene propylene and piene monomer (EPDM) shaped to continuously fill the annular space between the pipe and wall sleeve.
 - 1. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut.
 - 2. After the seal assembly is positioned in the sleeve, tightening of the bolts shall cause the rubber sealing elements to expand and provide a watertight seal between the pipe and sleeve.
 - 3. The watertight seal shall be effective against a hydrostatic head of at least

40 feet.

4. The seal shall also be constructed so as to provide electrical insulation between the pipe and wall, thus reducing chances of cathodic reaction between these two members.
 5. Metal hardware shall be type 18-8 stainless steel.
 6. The seal shall be similar to the Link-Seal modular wall and casing seal manufactured by Thunderline Corporation or the equivalent by other manufacturers.
- B. Select required inside diameter of each wall opening or sleeve for each pipe and the correct sizing of seal.

2.11 UNIONS

- A. For ductile iron, carbon steel, and gray cast iron pipes assembled with threaded joints and malleable iron fittings, unions shall conform to ANSI 816.39.
- B. For copper piping, unions shall have ground joints and conform to ANSI B16.18.
- C. For PVC and CPVC piping, unions shall be socket weld type with Viton O-ring.

2.12 INSULATING TYPE FITTINGS

- A. When joining two pipes of dissimilar materials, insulating type fittings shall be used to prevent galvanic action.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Furnish labor, tools, materials, and equipment necessary for installation and jointing of the pipe.
 1. Piping shall be installed in accordance with the Drawings in a neat workmanlike manner, and shall be set for accurate line and elevation.
 2. Piping shall be thoroughly cleaned before installation, and care shall be taken to keep the piping clean throughout the installation.
- B. Before setting wall sleeves, pipes, castings, and pipes to be cast in place, check Drawings, figures, and shop drawings, which may have a direct bearing on the pipe locations.

1. Assume responsibility for the proper location of the pipes and appurtenances during the construction of and renovation of the tanks and structures.
- C. Piping shall be attached to pumps, valves, or equipment in accordance with the respective manufacturers' recommendations.
- D. For piping assembled with threaded, solvent cemented, welded or soldered joints, liberal use of unions shall be made.
 1. Unions shall be provided close to main pieces of equipment and in branch lines to permit ready dismantling of piping without disturbing main pipelines or adjacent branch lines.
 2. A minimum of one union per straight run of pipe between fitting and/or valves with multiple lengths of pipe shall be used.
- E. Elbows between 45 and 90 degrees, for scum and sludge lines, shall be long radius type, unless designated otherwise on the Drawings.
- F. Changes in directions or elevations shall be made with fittings except for Flexible Process Tubing or as noted in the piping paragraphs.

3.01 DELIVERY, STORAGE, AND HANDLING

- A. Material delivered to the site shall be inspected for damage, unloaded and stored with a minimum of handling.
 1. Material shall be stored in accordance with the manufacturer's recommendations.
 2. The insides of pipe and fittings shall be kept free from dirt and debris.
 3. Gasket and plastic materials shall be kept protected from exposure to direct sunlight over extended periods.
 4. Solvents, solvent compounds, lubricants, elastomeric gaskets, and similar material required to install the pipes shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf or pot life.
 5. Storage facilities for plastic pipe, fittings, joint material and solvents shall be classified and marked in accordance with NAPA No. 704, with classification as indicated in NAPA Nos. 49 and 325M.
 6. Material shall be handled in such a manner as to insure delivery to the trench in a sound, undamaged condition.
 7. Pipes shall be carried to the trench, not dragged.

3.02 SHIPPING, HANDLING, AND STORAGE

- A. Special care in handling shall be exercised during delivery, distribution and storage of pipe to avoid damage and setting up stresses.
 - 1. Damaged pipe will be rejected and shall be replaced at the CONTRACTOR's expense.
 - 2. Pipe and specials stored prior to use shall be stored in such a manner as to keep the interior free from dirt and foreign matter.
- B. No pipe shall be dropped from cars or trucks to the ground.
 - 1. Pipe shall be carefully lowered to the ground by mechanical means.
 - 2. In shipping, pipe and fittings shall be blocked in such manner as to prevent damage to castings or lining.
 - 3. Broken or chipped lining shall be carefully patched.
 - 4. Where it is impossible to repair broken or damaged lining in pipe because of its size, the pipe shall be rejected as unfit for use.
- C. Mechanical joint pipe shall be laid with a 1/8-inch space between the spigot and shoulder of pocket.

3.03 LAYING PIPE

- A. Proper and suitable tools and appliances for the safe convenient handling and laying of pipe shall be used and shall, in general, agree with manufacturer's recommendations.
 - 1. At the time of laying, the pipe shall be examined carefully for defects, and should pipe be discovered to be defective after being laid, it shall be removed and replaced with sound pipe at the CONTRACTOR'S expense.
- B. Perform earthwork including excavation, backfill, bedding, compaction, sheeting, shoring and bracing, denaturing and grading in accordance with Site Preparation - Section 02200.
- C. Upon satisfactory excavation of the pipe trench and completion of the pipe bedding, a continuous trough for the pipe barrel and recesses for the pipe bells, or couplings, shall be excavated by hand digging.
 - 1. When the pipe is laid in the prepared trench, true to line and grade, the pipe barrel shall receive continuous, uniform support and no pressure shall be

exerted on the pipe joints from the trench bottom.

- D. Piping 3 inches and larger shall be provided with two 4 foot lengths of pipe for the first two joints outside a building or tank wall.
- E. Pipe shall be installed in accordance with the manufacturer's recommendation.
 - 1. Before being lowered into the trench, the pipes and accessories shall be carefully examined and the interior of the pipes shall be thoroughly cleaned of foreign matter and other approved methods.
 - 2. At the close of each workday and during suspension of work, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other foreign material from entering the pipe.
- F. Lines shall be laid straight and depth of cover shall be maintained uniform with respect to finish grade, whether grading is completed or proposed at time of pipe installation.
 - 1. Where a grade or slope is shown on the Drawings, use laser based surveying instruments to maintain alignment and grade.
 - 2. At least one elevation shot shall be taken on each length of pipe and recorded.
 - 3. No abrupt changes in direction or grade will be allowed.
- G. Concrete thrust blocks shall be provided in addition to restrained joint piping where indicated on the Drawings.
- H. After pipe has been laid, inspected and found satisfactory, sufficient backfill shall be placed along the pipe barrel to hold the pipe securely in place during the conduction of the hydrostatic test.
 - 1. No backfill shall be placed over the joints until the hydrostatic test is satisfactorily completed, leaving the joints exposed to view for the detection of visible leaks.
 - 2. Upon satisfactory completion of the hydrostatic test, backfilling of the trench shall be completed.

3.04 INSTALLATION OF DUCTILE IRON PIPE AND FITTINGS

- A. Unless otherwise directed, ductile iron pipe shall be laid with the bell ends facing upstream in the normal direction of flow and in the direction of laying.
 - 1. For lines on an appreciable slope, the bells shall, at the discretion of the

ENGINEER, face upgrade.

- B. Push-on, thrust restrained and mechanical joints in ductile cast iron pipe and fittings shall be made in accordance with the manufacturer's standards except as otherwise specified herein.
 - 1. Joints between push-on and mechanical joint pipe and/or fittings shall be made in accordance with AWWA C600, except that deflection at joints shall not exceed one-half of the manufacturer's recommended allowable deflection, or one-half of the allowable deflection specified in AWWA C600, whichever is the lesser amount.
- C. Before laying push-on, thrust restrained and mechanical joint pipe and fittings, lumps, blisters, and excess bituminous coating shall be removed from the bell and spigot ends.
 - 1. The outside of each spigot and the inside of each bell shall be wire brushed, and wiped clean and dry.
 - 2. The entire gasket groove area shall be free of bumps or foreign matter, which might displace the gasket.
 - 3. The cleaned spigot and gasket shall not be allowed to touch the trench walls or trench bottom.
 - 4. Vegetable soap lubricant shall be applied in accordance with the pipe manufacturer's recommendations, to aid in making the joint.
 - 5. The workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt.
 - 6. Deflections shall only be made after the joint has been assembled.
- D. Flanged joints shall only be used where indicated on the plans.
 - 1. Before making up flanged joints in ductile iron pipe and fittings, the back of each flange under the bolt heads and the face of each flange shall have lumps, blisters, and excess bituminous coating removed and shall be wire brushed and wiped clean and dry.
 - 2. Flange faces shall be kept clean and dry when making up the joint, and the workmen shall exercise caution to prevent damage to the gasket or the adherence of grease or particles of sand or dirt.
 - 3. Bolts and nuts shall be tightened by opposites in order to keep flange faces square with each other, and to insure that bolt stresses are evenly distributed.

- E. Bolts and nuts in thrust restrained, mechanical and flanged joints shall be tightened in accordance with the recommendations of the pipe manufacturer for a leak-free joint.
 - 1. The mechanics shall exercise caution to prevent overstress.
 - 2. Torque wrenches shall be used until, in the opinion of the ENGINEER, the mechanics have become accustomed to the proper amount of pressure to apply on standard wrenches.
- F. Cutting of the ductile iron pipe for inserting valves and fittings shall be done by the CONTRACTOR in a neat and workmanlike manner without damage to the pipe, the lining, or the coating.
 - 1. Pipe 16 inches and larger in diameter shall be cut with a mechanical pipe saw.
 - 2. After cutting the pipe, the plain end shall be beveled with a heavy file or grinder to remove sharp edges.
- G. Areas of loose or damaged polyethylene lining associated with field cutting shall be repaired as recommended by the pipe manufacturer.
 - 1. Repair methods shall be as recommended by the manufacturer and shall be submitted to the ENGINEER for review.
- H. Work within the pipe shall be performed with care to prevent damage to the lining.
 - 1. Damaged lining shall be repaired or the pipe section replaced as required by the ENGINEER.
 - 2. No cable, lifting arms or other devices shall be inserted into the pipe.
 - 3. Lifting, pulling or pushing mechanisms shall be applied to the exterior of the pipe barrel.
- I. Homing the pipe shall be accomplished by the use of a hydraulic or mechanical pulling device, unless otherwise approved by the ENGINEER.
 - 1. No pipe shall be driven or struck in order to seat it home.
- J. Cleaning methods shall meet the ENGINEER's approval, and must be sufficient to remove silt, rocks, or other debris, which may have entered the pipeline during its installation.
- K. Maximum tap size for corporation stops (Mueller thread) in ductile iron pipe shall

be 1½ -inches.

3.05 INSTALLATION OF POLYVINYLCHLORIDE (PVC) PIPE

A. PVC pipes shall be installed in accordance with ASTM D2321.

3.06 HDPE INSTALLATION AND FUSION TESTING

A. The Manufacturer shall supply an Installation Manual to the ENGINEER which outlines and guideline for handling, joining, installation, embedding and testing of polyethylene pipeline.

1. These guidelines shall be used as reference material for the ENGINEER in the determination of the required procedures.

B. Joints between plain ends of polyethylene pipe shall be made by butt fusion when possible.

1. The Pipe Manufacturer's fusion process shall be followed at all times as well as the recommendations of the Fusion Machine Manufacturer.

2. The wall thickness of the adjoining pipes shall have the same DR at the point of fusion.

C. When saddle connections are fusion welded, the Manufacturer's recommended saddle fusion procedure shall be used.

D. If mechanical fittings (which are designed for, or tested and found acceptable for use with polyethylene pipe) are utilized for transitions between pipe materials, repairs, joining pipe sections, saddle connections, or at other locations; the recommendation of the Mechanical Fitting Manufacturer must be followed.

1. These procedures may differ from other pipe materials.

E. On each day butt fusion's are to be made, the first fusion of the day shall be a trial fusion.

1. The trail fusion shall be allowed to cool completely, and then fusion test straps shall be cut out.

2. The test strap shall be 12" or 30 times the wall thickness in length (minimum) and 1" or 1.5 times the wall thickness in width (minimum). Bend the test strap until the ends of the strap touch.

3. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested.

4. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.
- F. Socket and Saddle fusions shall be tested by a bent strap, as described by the Pipe Manufacturer.
 1. The pipe Manufacturer shall provide visual guidelines for inspecting the butt, saddle, and socket fusion joints.
- G. Pressure testing shall be conducted in accordance with the Manufacturer's recommended procedure.
 1. Pressure testing shall use water as the test media.
 2. Pneumatic (air) testing is prohibited.

3.07 JOINTS

A. Flanged Joints

1. Shall be made up with full-face gaskets as specified in the piping paragraphs.
2. Shall have the flange faces bearing uniformly on the gaskets.
3. Shall have the flanges drawn together uniformly until the joint is tight.
4. No washers shall be permitted for the bolt and nut assemblies.
5. The length of the bolts shall be uniform and in accordance with the standards specified herein.
 - a. The maximum projection of the bolt beyond the end of the nut shall be 0.25 inch. The bolt shall not fall short of the end of the nut.

B. Threaded Joints

1. Threads shall be clean, machine cut and pipe shall be reamed before erection.
2. Taps and dies shall be cleaned, sharpened and in good condition.
3. Threaded joints shall be made tight with Teflon tape.
4. After having been set up a joint shall not be backed off unless the joint is broken. The threads shall be cleaned and new tape shall be applied.

C. Solvent Cemented Joints

1. Shall be made up in accordance with ASTM D2855 and the manufacturers' recommendations.
2. The CONTRACTOR is advised to handle the solvent cements in accordance with ASTM F 402.

3.08 PIPE SUPPORT SYSTEMS

- A. Pipe support locations are not shown on the Drawings and shall follow the specifications herein in locating supports.
 1. Where deviations and modifications are required, they shall be made subject to review by the ENGINEER.
- B. Supports and parts required for the installation of the piping systems shall conform to the requirements of the ANSI Code for Pressure Piping B-31.1 and MSS Standard practice SP-58 and SP-69, except as modified and supplemented by the requirements set forth herein.
 1. Piping shall be supported in such a manner to fulfill the intent of this specification.
- C. Piping shall be rigidly supported from the building structure by approved hangers, inserts, or supports.
 1. No piping shall be supported from other piping or from metal stairs, ladders, and walkways unless specifically permitted by the ENGINEER.
- D. Unless otherwise indicated on the Drawings, piping supports shall consist of concrete piers or fabricated steel supports as specified below.
 1. Materials and workmanship shall be in full compliance with the Concrete, Reinforcing Steel, and Structural Steel sections of these specifications.
- E. Each section of the pipeline shall be laid out and connections made while the pipe is held in temporary supports
 1. After completion of connections the pipe may be clamped in position.
 2. When piping is correctly installed, a clamp or pipe connection may be loose or removed without displacement of the pipeline.
- F. Supporting appurtenances shall be arranged to prevent undue stress on equipment to which piping is connected.

1. Supporting appurtenances shall provide the desired pitch as specified or required for proper drainage of the piping.
2. The pipe suspension shall prevent excessive stress, excessive variation in supporting force, and possible resonance with imposed vibration while the system is in operation.
3. Valves and valve operators shall be rigidly supported independently of the piping.
4. Vertical runs of pipe shall be supported independently of the connected horizontal runs.
5. Vertical pipes shall be supported at each floor or at intervals of at least 10 feet by approved pipe collars, clamps, brackets or wall rests.
6. Supporting appurtenances, when used with copper piping, shall be copper, bronze or bronze plated.
7. Piping shall be supported independently of the equipment to which it is connected.
8. In-line devices (flowmeters) shall be removable without the need for temporary supports for adjacent and connecting piping.

G. In general, the type of pipe supports to be used shall be as follows:

Height of Centerline of Pipe Above Floor	Type of Support
0 - 3 ft.	Concrete Pier
3 - 6 ft.	Adjustable Pipe Saddle or Bracket Supports
Greater than 6 ft.	Hangers

- H. Wall bracket supports shall be used where shown for pipe to be installed adjacent to a wall.
1. Where it is not feasible to install hanger supports, adjustable pipe saddle supports may be used with the permission of the ENGINEER.
 2. Specifications for the bracket, saddle and hanger supports are hereinafter given in the Schedule of Pipe Supports attached at the end of the section.
- I. Install pipe supports in conformance with these specifications unless otherwise shown on the Drawings.
1. Where deviations and modifications are required, they shall be made only with the permission of the ENGINEER.

2. A detailed layout of pipe supports for each building shall be submitted to the ENGINEER for review.
- J. For couplings, supports shall be placed on each side and as close to the coupling as possible.
 1. Supports shall be of the guide type, which prevent axial movement resulting in pipe deflection or misalignment.
- K. Structural steel members can be used to support pipe.
- L. Stainless steel piping installed in wetwells, tanks, channels, or conduits shall be supported by hangers, hanger rods, anchorages, hardware, and inserts, fabricated of type 316 stainless steel (L grade, if welded).
- M. Where a specific pipe support is called for on the drawings, this support shall be used as, and where indicated, for the specific application.
 1. Spacing of supports shall be as specified herein, unless specifically modified by the ENGINEER.
- N. Support, saddles, bearing plates, and hangers, shall support by direct contact the pipe a minimum of 120 degrees around, except as specified herein.
- O. Where continuous concrete inserts are used, the maximum concentrated load shall not be more than 50 percent of the maximum recommended loading of the channel.
 1. Pipe supports shall be positioned such that they will not interfere with the use of hoisting equipment, where provided.
- P. Pipes subject to thermal expansion shall be installed perfectly aligned and concentricity guided.
 1. These piping (process air, heated sludge, and hot water) support systems shall be submitted to the ENGINEER for review.
 2. The submittal shall show location of anchors, concentric pipe Guides and Expansion Joints (single or double).

3.09 PIPE SUPPORT SPACING

- A. The distance between supports for each size of pipe shall not exceed those listed in the table below.

Nominal Pipe Size	Metallic Piping	Plastic, Fiberglass, and Copper Piping
O.D. (in.)	Max. Spacing (ft.)	Max. Spacing (ft.)
1/2	5	3
3/4 to 1-1/2	6	3
2 to 3	6	4
4	10	5
6 and larger	10	6

1. If the pipe size to be supported is not listed in the schedule, the next smaller nominal pipe size spacing shall be used.
2. There shall be a minimum of one support per laying length of pipe on uninterrupted horizontal runs.
3. This support shall be placed within one (1) foot of the joint.
4. If the pipe manufacturer recommends a smaller spacing interval than specified herein, then the manufacturer's spacing shall be used.

3.10 PIPE HANGERS AND HANGER RODS

- A. Where pipe hangers are used, they shall be of the clevis or friction clamp type, except where there is a longitudinal movement due to temperature changes.
 1. Pipe hangers shall be capable of supporting the pipe in all conditions of operation.
 2. They shall allow free expansion and contraction of the piping, and prevent excessive stress resulting from transferred weight being induced into the pipe or connected equipment.
- B. Hangers shall be designed so that they cannot become disengaged by movements of the supported pipe.
 1. Lock nuts shall be used on hangers.
 2. Piping systems shall be supported by means of hangers having an individual means of vertical adjustment for leveling of lines after piping is in place.
 3. Provide spring hangers where pipe is subject to expansion and/or contraction.
- C. Hanger rods shall be subject to tensile loading only.
 1. At hanger locations where lateral or axial movement is anticipated, suitable linkage shall be provided to permit swing.

2. Hanger rods and associated hardware shall be type 316 stainless steel.
- D. Concrete inserts and/or expansion bolts shall be capable of supporting the maximum working load of the attached rod.
- E. Sheet metal insulation protector saddle shall be used for hot water piping or refrigerant piping.
 1. Saddle shall be Grinnell Fig.167, or equal.

3.11 SADDLES

- A. Pipe saddles shall be used to cradle horizontal piping when being supported from below the springline, except where expansion of pipe requires rollers.
 1. Saddles shall be capable of being adjusted after installation.

3.12 BASE ELBOWS TEES AND CONCRETE PEDESTALS

- A. Base elbows, tees and concrete pedestals shall be provided at the locations shown on the drawings, and as specified.
 1. Vertical runs of pipe shall be supported on a base elbow and/or concrete pedestal.
 2. After completion of curing of the concrete pedestal, the piping shall be adjusted to the proper grade.

3.13 METAL FRAMING SYSTEMS

- A. A metal framing system as manufactured by Unistrut, Globe-Strut, Power-Strut, or approved equal may be used for supporting the piping system.
 1. The metal framing system shall be designed and installed according to manufacturer's recommended procedure and shall be capable of supporting the piping system as specified herein.
- B. Channels, inserts and closure strips shall be cold formed mild steel conforming to ASTM A-245.
- C. Fittings shall be Hot Rolled Steel conforming to ASTM A-307 or ASTM A-245.
 1. Fasteners shall conform to ASTM A-307.
 2. Pieces shall be hot-dip galvanized after fabrication, unless otherwise noted on the Drawings.

3.14 SUPPORTS FOR PLASTIC PIPE

- A. Pipe supports that will be used with plastic pipe shall be provided with a bearing plate where the width of hanger is less one-half ($1/2$) of the supported pipe's diameter.
 - 1. The bearing plate must provide bearing 180 degrees around and shall have a minimum laying length of one-half ($1/2$) the pipe diameter or three (3) inches minimum.
 - 2. The bearing plates shall be rigid, corrosion resistant and not subject to long term plastic flow properties.
 - 3. To assure one hundred (100) percent bearing, the pipe shall be seated on a filler material.
 - 4. This material shall be compatible for use with the plastic pipe.
 - 5. Clamps to be used with plastic pipe shall be fitted snug and shall not exert clamp pressure on the pipe.

3.15 THRUST RESTRAINT

- A. Pipe anchors shall be spaced to divide pipe into sections.
 - 1. Anchors shall be located at valves, changes in direction of piping, and major branch connections.
 - 2. Anchors shall be of a type recommended by the pipe manufacturer and reviewed by the ENGINEER.
- B. On piping, where sleeve type couplings and flanged adapters are located near fittings or valves, tie rods shall span across the coupling, as specified herein, to restrain movements of the pipe along its axial direction.
 - 1. Such restraints can be deleted if both ends of the pipe are anchored in a concrete structure with no fitting or valve occurring within the span length, in the suction piping to a pump where the coupling is between the pump and valve, or when the water pressure measured at the crown of the pipe is less than five (5) feet.
- C. Sleeve type couplings shall be harnessed except where noted.
 - 1. The harnessing shall be as shown on the drawings or as specified herein.
 - 2. Harnesses for steel pipe shall be in accordance with AWWA Manual M11 for

the pipe size and pressure, working or test whichever is greater.

- D. Harnesses for ductile iron pipe shall be tie rods spanning between adjacent flanges.
 - 1. Friction clamps shall not be permitted.
 - 2. The size and number of tie rods shall be the same as for steel pipe for the same pressure and pipe size.
- E. Where the distance between adjacent flanges is in excess of ten (10) feet or where a harness cannot be used, the pipe supports adjacent to the coupling shall restrain the piping, preventing linear or angular movement resulting in the pipe separating from the coupling or misalignment in the joint.
- F. Where expansion joints are used, control units shall be provided.
 - 1. Tie rods and control units shall be installed in accordance with to the manufacturer's recommended procedures.
- G. Tie rods and associated hardware shall be type 316 stainless steel.
- H. Valves and fittings shall be restrained in an approved manner such that the any developed unbalanced force shall be supported independent of the piping system.

3.16 FLUSHING AND TESTING

A. General

- 1. Furnish necessary labor and equipment required for the field tests specified below including, but not limited to, air compressor, gauges, conduit caps, temporary pipe, and connections.
- 2. Provide potable water for flushing and testing purposes.
- 3. Furnish and install means and apparatus necessary for getting the water into the pipeline and flushing and testing; including pumps, gages, meters, necessary plugs and caps, and temporary blow-off piping required to discharge water. Complete with necessary reaction-blocking to prevent pipe movement during the flushing and testing.
- 4. Pipelines shall be flushed and tested in such lengths or sections as agreed upon between the CITY, ENGINEER, and CONTRACTOR.
- 5. Give the CITY and ENGINEER reasonable notice of the time prior to testing the pipeline.

6. The CITY reserves the right, within reason, to request flushing and testing of a section or portion of a pipeline.
7. For sewage force mains, unless otherwise specified, the minimum test pressure shall be 150 psig.

B. Flushing

1. At the conclusion of the installation work, thoroughly clean new pipe by flushing with water or other means to remove dirt, stones, and pieces of wood, which may have entered the pipe during the construction period.
 - a. If after this cleaning should any obstructions remain, they shall be corrected by the CONTRACTOR, at his own expense and to the satisfaction of the ENGINEER.
 - b. Pipelines shall be flushed at a rate of at least 2.5 feet per second for a duration suitable to the CITY, but in no event less than 60 minutes.

C. Pressure Testing

1. After the pipe has been installed, joints completed, thrust blocks have been in place for at least five days, and the trench has been partially backfilled leaving the joints exposed for examination, the pipe shall be filled with water in a manner to expel air.
 - a. The pipeline shall be subjected to a test pressure of 150 psig, as measured at the low points of the pipe, for a period of at least two hours.
 - b. Each valve shall be opened and closed several times during the test.
 - c. The exposed pipe, joints, fittings, and valves shall be examined for leaks.
 - d. Visible leaks shall be stopped or the defective pipe, fitting, joints, or valve(s) shall be replaced.

D. Leakage Testing

1. The leakage test may be conducted subsequent to or concurrently with the pressure test.
2. Pressure piping shall be tested in accordance with AWWA C600, latest revision.
3. After the new piping has been laid and backfilled, it shall be pumped to a pressure of one and one half (1½) times the maximum working pressure, or

150 psig, minimum, as applicable, and visible leaks stopped by approved methods.

4. After pressurizing the pipe, before beginning the leakage test, and in the presence of representatives of the ENGINEER, bleed water from the far end of the pipe until a noticeable drop is apparent on the gauge.
 - a. The line will then be re-pressurized and the test begun.
5. The test shall be maintained for two hours, but may be continued for one additional hour if it becomes apparent that the leakage is equal to, or greater than, the amount allowable.
6. Where applicable, and when permitted by the ENGINEER, the CONTRACTOR may fill the line, and pressurize it prior to testing, to allow the pipe lining to saturate.
7. Water supplied to the main during the test to maintain the required pressure shall be measured by a 5/8-inch meter installed on the discharge side of the test pump, or by pumping from a calibrated container.
 - a. Exhaustion of the supply or the inability to maintain the required pressure will be considered test failure.
 - b. At the conclusion of the test, the amount of water remaining in the container shall be measured and the results recorded in the test report.
8. Provide a suitable pressure gauge, recently calibrated by a testing laboratory acceptable to the ENGINEER.
 - a. Copy of certification of calibration table shall be available during the test and shall be submitted with the test report.
9. Maximum length of pipe in one test shall be 2,000 linear feet.
 - a. If the CONTRACTOR wishes to test a longer length of pipe, the allowable leakage shall still only be based upon on 2,000 linear foot pipeline segment.
 - b. After successfully tested segments of the pipeline have been joined together, re-pressurize the pipeline and inspect the exposed joint(s) for evidence of leakage.
10. Upon completion of a successful test, the ENGINEER and the CONTRACTOR shall certify the test results.
11. Questions pertaining to procedures used during the test shall be answered

and decided by the ENGINEER.

12. Leaks or defective pipe disclosed by the hydrostatic test shall be corrected by the CONTRACTOR at his own expense, and the test shall be repeated.

E. Allowable Leakage – DIP and PVC Pressure Piping

1. No installation will be accepted by the ENGINEER until the leakage is less than the number of gallons per hour as determined by the formula:

$$Q = \frac{(S)(D) (\text{Square Root of } P)}{133,200}$$

in which Q = allowable leakage in gallons per hour, S = total length of pipe being tested in feet, D = diameter of pipe tested inches, and P = the average test pressure during the leakage test in pounds per square inch.

2. When testing against closed metal-seated valves, an additional leakage per closed valve of 0.0078 gal/hr/in of nominal valve size shall be allowed.

F. Allowable Leakage – HDPE Pressure Piping (Monitored Make-Up Water Test)

1. The testing procedure for HDPE pipe consists of initial expansion, and test phase. During the initial expansion phase, the test section is pressurized to the test pressure, and enough make-up water is added each hour for three (3) hours to return to test pressure.
2. The test phase follows immediately, and may be two (2), or three (3) hours. At the end of the test time, the test section is returned to test pressure by adding a measured amount of water. If the amount of make-up water added does not exceed the Table 1 values below, leakage is not indicated.

Table 1: Test Phase Make-Up Amount		
Nominal Pipe Size (in.)	Make-Up Water Allowance (U.S. Gallons/100 ft. of Pipe)	
	2-hour test	3-hour test
1½	0.10	0.17
2	0.11	0.19
3	0.15	0.25
4	0.25	0.40
6	0.60	0.90
8	1.00	1.50
10	1.30	2.10
12	2.30	3.40
14	2.80	4.20
16	3.30	5.00
18	4.30	6.50

20	5.50	8.00
22	7.00	10.50
24	8.90	13.30
30	12.70	19.20
36	18.00	27.00
42	23.10	35.30
48	27.00	43.00
54	31.40	51.70

3. For any test pressure from 1 to 1½ times the system operating design pressure, the total test time including initial pressurization, initial expansion, and time of test pressure, must not exceed eight (8) hours. If the test is not completed due to leakage, equipment failure, etc., depressurize the test section, then allow it to “relax” for at least eight (8) hours before bringing the test section up to test pressure again.

3.17 PAINTING

- A. Piping and supports shall be field painted as specified in Division 9 of the Specifications.

3.18 SPECIAL PROVISIONS AT CONCRETE EXPANSION JOINTS

- A. At ¾ or 1-inch concrete expansion joints, concrete encased pipes shall be provided with a sleeve type coupling.
 1. A cavity in the concrete shall be formed around the sleeve coupling.

3.19 REDUCING BRANCH CONNECTIONS

- A. Reducing branch connections shall be made up with tee fittings, saddles, branch outlets, or special tapped tee fittings provided with a boss.
 1. No pipe wall shall be tapped unless the tap is made with a saddle or sleeve.

3.20 EXISTING UTILITIES

- A. Pipelines shall be installed using due care with regard to existing utilities.
 1. Existing utilities are shown from best available as-built data and must be located by the CONTRACTOR (“potholed”) prior to construction.
- B. Reliance by the CONTRACTOR on existing utility locations shown on the drawings is not sufficient.
 1. Locate existing utilities prior to construction.

3.21 VALVE BOXES

- A. Valve boxes, manholes, and electrical boxes, which are proposed or existing, and are effected by the proposed work, shall be raised to the elevation of the final grading.
 - 1. This shall include additional materials as required on existing items.
- B. Valve boxes shall be installed over each outside, buried valve, unless otherwise indicated.
 - 1. Valve boxes shall be centered over the valve.
 - 2. Fill shall be carefully tamped around each valve box to a distance of 4 feet on all sides, or to undisturbed trench face if less than 4 feet.

3.22 DEPTH OF COVER

- A. Ductile iron pipe shall receive 30 inches minimum cover with approved trench and backfilling techniques.
- B. PVC/HDPE pipe shall receive 36 inches minimum cover with approved trench and backfilling techniques.

PRESSURE TEST REPORT

CRAIG A. SMITH & ASSOCIATES

CONSULTING ENGINEERS & SURVEYORS
1000 West McNab Road, Pompano Beach, Florida 33069

PROJECT NUMBER: _____ DATE: _____

PROJECT NAME: _____

LOCATION OF LINE TESTED: _____

TIME START TEST: _____ PRESSURE START TEST: _____ PSI

TIME END TEST: _____ PRESSURE END TEST: _____ PSI

TEST TIME (HRS. - MIN.) _____ AVERAGE PRESSURE: _____ PSI

QUANTITY WATER REQUIRED FOR RETURN TO START PRESSURE _____ GAL

COMPUTATION OF ALLOWABLE LEAKAGE:

LENGTH OF LINE TESTED = S _____

SIZE OF LINE IN INCHES = D _____

AVERAGE TEST PRESSURE = P _____

ALLOWABLE PER HOUR = Q _____

TOTAL ALLOWANCE = _____ GAL. X _____ HRS. TESTED = _____

WITNESSED BY:

(ENGINEERS REPRESENTATIVE)

(OWNER)

(COUNTY)

(UTILITY COMPANY)

(CITY)

(CONTRACTOR)

TEST RESULTS WERE: () SATISFACTORY () DOES MEET SPECIFICATIONS
() UNSATISFACTORY () DOES NOT MEET SPECIFICATIONS

(Amount Allowable for Testing DIP/PVC) $\frac{S \times D \times \sqrt{P}}{133,200}$
FORMULA Q =
END OF SECTION

SECTION 15110

VALVES

PART 1 GENERAL

1.01 SUMMARY

- A. Furnish materials, equipment, labor, and appurtenances required for proper installation and testing of operation valves, couplings, and connectors, as directed in the Drawings and Specifications.
- B. The equipment provided includes, but is not limited to the following:

Para	TITLE	Para	TITLE
2.03	AIR RELIEF VALVES	2.15	HYDRANTS
		2.39	HYDRO-STOP
2.13	ANGLE METER STOPS	2.05	PLUG VALVES
2.28	BACK PRESSURE SUSTAINING Valves	2.24	METER STOPS
2.17	BACKFLOW PREVENTERS	2.33	POLYVINYLCHLORIDE (PVC) BUTTERFLY VALVES
2.04	BALL VALVES	2.34	PRESSURE REDUCING REGULATOR VALVES (LESS THAN 3 INCHES)
2.22	BASKET STRAINERS	2.18	PRESSURE REDUCING VALVES
2.21	BUTTERFLY VALVES	2.07	PVC AND CPVC CHECK VALVES
2.06	CHECK VALVES	2.11	SERVICE CLAMPS
2.27	COMBINATION BACK PRESSURE SUSTAINING / CHECK VALVES 3 INCHES AND LARGER	2.36	SEWER VACUUM BREAKERS
2.16	CONCRETE METER BOXES	2.40	SLUICE GATES
2.23	CORPORATION STOPS	2.20	SOLENOID VALVES
2.26	ELECTRONIC MOTOR ACTUATORS	2.37	STRAINERS
2.14	FLANGED COUPLING ADAPTERS	2.29	TAPPING SLEEVES
2.10	FLEXIBLE CONNECTORS		
2.09	FLEXIBLE COUPLINGS	2.30	TAPPING VALVES
2.08	FOOT VALVES CHEMICAL FEED PUMPS	2.12	UNIONS

Para	TITLE	Para	TITLE
2.02	GATE VALVES	2.38	VALVE BOXES AND COVERS
2.31	GLOBE VALVES	2.25	VALVE I. D. DISKS
2.32	GAUGE COCKS	2.19	WATER PRESSURE GUAGES
2.35	HOSE BIBBS		

1.02 RELATED SECTIONS

- A. Trenching - Division 2
- B. Excavation and Fill - Division 2
- C. Paints and Coatings - Division 9
- D. Measurement and Control Instrumentation - Division 13
- E. Pipes and Tubes - Division 15
- F. Shop Drawings, Product Data, and Samples - Division 1

1.03 DESCRIPTION OF SYSTEMS

- A. Equipment and materials specified herein are intended to be standard items for use in controlling the flow of water, wastewater, chemical, and air.
- B. Provide valves and appurtenances of the size shown in the Drawings
 - 1. Provide similar valves from one manufacturer.
- C. Mark valves and appurtenances with the name of the manufacturer and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.
- D. Provide open-left, counter-clockwise valves.

1.04 QUALIFICATIONS

- A. Provide valves and appurtenances from well established reputable firms with full experience and qualification in the manufacture of the equipment to be furnished.
- B. Design, construct, and install equipment in accordance with the best practices and methods and in conformance with these Specifications.

1.05 SUBMITTALS

- A. Provide with each submittal complete information and data specified and additional information required to evaluate the proposed product compliance with Specifications.
- B. Partial or incomplete submissions will be returned to the CONTRACTOR not approved.
- C. Submit the following data:
 - 1. Catalog Data consisting of specifications, illustrations and a parts schedule that identifies the materials to be used for the various parts and accessories.
 - 2. Provide sufficiently detailed illustrations and information to serve as a guide for assembly and disassembly and for ordering parts.
 - 3. Complete assembly, and installation drawings with clearly marked dimensions.
 - 4. Weight of component parts and assembled weight.
 - 5. Design calculations.
 - 6. Listing of lubricants required for the equipment with a minimum of two equivalent and compatible natural and/or synthetic lubricants produced by different manufacturers.
 - 7. Estimated quantity of lubricant required for one year of operation.
 - 8. Sample data sheet of equipment nameplate(s) including information contained thereon.
 - 9. Spare parts list.
 - 10. Special tools list.
- D. Obtain from the manufacturer and submit to the ENGINEER copies of the results of certified shop tests.
- E. Obtain from the manufacturer and submit to the ENGINEER copies of certified letters of compliance in accordance with the General Conditions.
- F. Submit operation and maintenance manual in accordance the procedures and requirements set forth in the General Conditions.

1.06 TOOLS, SUPPLIES AND SPARE PARTS

- A. Obtain from the equipment manufacturer and submit to the ENGINEER the following spare parts lists in accordance with the procedures and requirements set forth in the General Conditions.
 - 1. A complete list of parts and supplies with current unit prices and source of supply.
 - 2. A list of parts and supplies that are either normally furnished at no extra cost with the purchase of the valve or hydrant as specified herein to be furnished as part of the Contract.
 - a. Submit this list of parts as part of the shop drawing submission.
- B. Completely identified parts with a numerical system to facilitate parts inventory control and stocking.
- C. Provide proper identification for each part by a separate number.
- D. Provide the same parts number for those parts that are identical for more than one size.
- E. Compile from the shop drawing submittals and furnish a comprehensive list of special tools required for the equipment.
- F. For each solenoid valve, provide a spare solenoid coil, suitably boxed and labeled, as elsewhere specified.

1.07 MANUFACTURER'S RECOMMENDATIONS

- A. Where installation procedures are required to be in conformance with the recommendations of the manufacturer of the material being installed, furnish printed copies of these recommendations to the ENGINEER prior to the installation.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Provide valves and accessories in the quantity, quality, types, and sizes as indicated in the Drawings and Specifications.
- B. Design operation of valves and gates so that less than forty pounds of force is required to operate the handwheel, lever, or chain when applied at the extremity of the wheel or lever.
 - 1. The handwheels on valves:

Valve Size	Minimum Operating Wheel Diameter
14 inch and smaller	8 inches
larger than 14 inch	12 inches

2. Except where noted otherwise, provide handwheel or lever operated interior and exposed valves if the centerline of the valve operator is within 6 feet of the floor or platform from which it is to be operated, and chain wheel operated if the distance is greater than 6 feet unless otherwise shown in the Drawings.
 3. Extend chains to within three (3) feet from the operating floor.
 4. Support rotated operators independent of the valve to prevent torsional loads induced on the piping system.
- C. Provide operators that are counter-clockwise to open, unless otherwise specified.
1. Provide operators with the open direction clearly and permanently marked.
 2. Provide valve operators, manual, motor, and pneumatic, with the valve by the valve manufacturer.
 3. Selection of the proper operator to meet the operating conditions specified is the responsibility of the valve manufacturer.
 4. The valve manufacturer is responsibility for field calibration and testing of the operators and valves to ensure a proper installation and an operating system.
- D. Provide valves with a minimum design pressure rating of 150-psi and capable of a test pressure of 300-psi.
1. For service applications with pressures in excess of 150-psi, valves provide having a minimum pressure rating in excess of the service application working pressure.
 2. Provide Victaulic ends on above grade valves with interior valves with a nominal pipe size of 3 inches and larger ends unless otherwise noted.
 3. Provide threaded ends above grade, interior valves less than 3-inch size.
 4. Provide mechanical joint pipe ends on buried service valves.

5. Provide Buried service valves with AWWA operating nuts, extension stems, and cast iron valve boxes.
 6. Provide extended valve stems, stem guides and operating nuts, as indicated or required.
- E. Provide valves of one type from of one manufacturer.
- F. Provide levers at each lever operated valve.
1. Provide tee wrenches for yard piping valves and hydrants at a rate of one (1) per five (5) valves.
- G. Provide cast iron parts of valves meeting the requirements of ASTM Designation A126, "Standard Specifications for Gray Iron Castings for Valves, Flanges, and Pipe Fittings, Class 'B'".
1. Provide flat-faced flanged ends having bolt circle and bolt patters conforming to ANSI B16.1 Class 125 unless otherwise specified.
 2. Provide clean castings and sound, without defects and no plugging, welding or repairing of defects will be permitted.
 3. Provide hexagonal bolt heads and nuts conforming to ANSI B18.2.
 4. Provide full-faced gaskets made of natural or synthetic elastomers in conforming with ANSI B16.21 suitable for the service characteristics especially chemical compatibility and temperature.
 5. Provide nonferrous alloys of various types for parts of valves as specified.
 6. Where no definite specification is given, provide the recognized acceptable standard material for that particular application.
- H. Buried valves and other valves located below the operating deck or level, specified or noted to be key operated, shall have an operator shaft extension from the valve or valve operator to finish grade or deck level, a 2-inch square AWWA operating nut, and cover or box and cover, as may be required.
- I. Except as otherwise specified, paint buried valves with 2 coats of asphalt varnish in accordance with the requirements of AWWA Standard C 500.
1. Protect this protective coating from damage until valve is backfilled.
- J. Provide valve identification tags in accordance with Division 1 for valves.
- K. Apply the same coatings to the valves as the adjacent piping.

- L. Provide blind flanges or plugs for valves, which are dead ends for active pipelines to prevent leakage.
- M. Raised face flanges in conformance with ANSI 816.5 class 150 will not be acceptable.

2.02 GATE VALVES

A. For Nominal Pipe Sizes less than 3-inches

- 1. Gate valves for water service for less than 3 inches in diameter shall conform to the requirements of Federal Specification WW-V-54 for Class B, Type II, and shall be bronze, double disc, solid wedge, rising stem, inside screw, screwed bonnet, 150 pound S.P., 300 W.O.G. with stuffing box repackable under pressure and renewable parts.
 - a. Ends shall be as shown or indicated in the Contract Drawings.
- 2. Small gate valves shall be as manufactured by Crane Company No. 431 or 435-UB to match application, or equal.

B. For Nominal Pipes Sizes 3-inches and larger

- 1. Gate valves 3 inches and larger shall be ductile iron body, bonnet and gate casing, epoxy coated, gate valves with the gate encapsulated in rubber that conforms to the requirements of AWWA C500 or C509 as applicable for the services noted except as modified or supplemented herein.
- 2. Valves for exposed and interior service shall be outside screw and yoke (OS&Y), solid wedge type and shall be provided with handwheels.
 - a. Valves shall have flanged bodies and packing for stem seals.
 - b. The valve shall be U.S. Pipe Metroseal 250, American-Darling or approved equal.
- 3. Valves for buried service for nominal pipe sizes 3 to 12-inches shall have resilient seats and non-rising stems with double O-ring stem seals conforming to AWWA C509.
 - a. Valves ends shall be flanged, mechanical joint, or "ring-tite" joint as required for the type of pipe used.
 - b. Valves shall be provided with 2-inch square operating nuts.

- c. Valves for buried service larger than 16 inches shall be double disc type with non-rising stems equipped with double O-ring seals conforming to AWWA C500.
- 4. Valves for potable and fire service water shall be of the double disc type as manufactured by Mueller A-2483-6, or equal with stems of silicon bronze conforming to ASTM B98, Alloy No. 661 or equal.
 - a. Valves shall be provided with seals consisting of multiple ring, V-type packing, which shall be adjustable and replaceable in the valves while in service without undue leakage.

C. Special Provisions

- 1. Special Provisions for AWWA double disc valves sixteen (16) inches and larger are:
 - a) Shall be provided with by-passes conforming to AWWA standards when so designated in the schedule.
 - b) Shall be provided when installed in a horizontal position with bronze tracks, bronze rollers and scraper in accordance with AWWA specifications.

2.03 AIR RELIEF VALVES

- A. Furnish and install air release valves as indicated in the Drawings and as directed by the ENGINEER in the field, with below ground exhaust or intake.
 - 1. The bid price for air release valves shall include costs for purchasing, delivering, and installing the air release valves and accessories complete, including tapping the main, furnishing and installing the tapping saddle, plug valve and valve box, the below ground air release valve, the enclosure and fountain and necessary piping and appurtenances, as shown in the Drawings and Specifications.
- B. Sewer air release valves shall be specially designed for use on sewerage force mains.
 - 1. The valves shall be threaded connection with a cast iron body and internal stainless steel trim parts.
 - 2. Working parts shall be located in the upper portion of the internal chamber.
 - 3. The lower chamber shall contain a ball float, which shall be suitable for 150-psi working pressure.

4. The orifice size shall be as indicated in the drawings.
 5. The Combination Sewage Air Valves shall consist of two separate valve bodies, one Release Sewage Air and one Sewage Air and Vacuum Valve.
 6. Air release valves shall be piped into a compact assembly and shall include provisions to back flush the valves.
 7. The Sewage Air Release Valve shall function automatically to release entrained air to the atmosphere.
 8. The Sewage Vacuum Valve shall exhaust large quantities of air during the filling of the system and allow air to reenter during drainage or when a vacuum occurs.
 9. Once air is exhausted, the valve shall seat tightly to prevent sewage leakage.
- C. Air valve shall be as manufactured by APCO, G-A Industries, Val-Matic or Crispin and shall meet ANSI/AWWA C-512.
- D. The connection to the main shall be stainless steel tapping saddle, as shown in the Drawings.
- E. Air Valve enclosure (manholes) shall have the inside and outside surfaces of the walls coated with two coats of heavy duty coal tar epoxy coating containing not less than 72.9 percent by volume nonvolatile solids.
1. The masonry surface may be damp, but not wet.
 2. If necessary, utilize blowers to achieve the necessary drying.
 3. The first coat shall be thinned approximately 15 percent with a thinner recommended and furnished by the manufacturer.
 4. The total dry film thickness of the finished coating shall not be less than 10 mils.
 5. The coating shall be Coppers 300-M, or equal, applied in accordance with the manufacturer's recommendations.
 6. Take necessary precautions to protect the workmen against toxic or harmful fumes during the painting operations.
- F. The air release valve for use in water mains shall be installed as shown in the Drawings.

1. The valves shall have cast iron body, cover and baffle, stainless steel float, bronze water diffuser Buna-N or Viton seat and stainless steel trim.
 2. Valves shall be provided with a vacuum check to prevent air from reentering the line.
 3. The fittings shall be threaded.
 4. The air release valves shall be Model 200 WD as manufactured by APCO Valve and Primer Corporation and Manufacturing Corp., Lyons, Illinois or equal.
- G. The two-valve air release valves for use in sewage force mains shall be provided in air release valve enclosures.
1. One valve shall be a sewage air release valve, both with stainless steel trim.
 2. Valve shall be Val-Matic Model No. 485/30/S, similar by APCO or equal.
 3. The valves shall be as follows:
 - a. Sewage Air/Vacuum Valve:
 - 1) The valve body shall be of cast iron ASTM A126-B. The floats, float guide, and stem shall be of stainless steel Type 316.
 - 2) The resilient seat shall be of Buna-N.
 - 3) The valve shall be suitable for 150-psig working pressure.
 - 4) Valve shall have standard 2 inch NPT inlets and outlet ports.
 - 5) Provisions shall be made for back-flushing the valve with clean water.
 - 6) The overall height of the valve not including the flushout attachment shall not exceed 22 inches.
 - b. Sewage Air Release Valve:
 - 1) The valve body and cover shall be of cast iron construction, ASTM A126-B, and internal working parts shall be of stainless steel Type 316.
 - 2) The venting orifice shall be of 3/8-inch in diameter and the seating material shall be of Viton.

- 3) The inlet opening shall be standard 2 inch NPT screwed connection.
- 4) The valve shall include a flush-out feature for periodic cleaning of the internal mechanism.
- 5) The overall height of the valve body shall not exceed 21 inches.

2.04 BALL VALVES

A. Bronze

1. Ball valves for service unless otherwise indicated shall be end entry type with bronze body and trim, TFE seats, TFE or Viton Stem seals and flanged or threaded end connections as indicated.
 - a. Valve body shall be either two or three piece design; no design with an internal retaining ring for the ball shall be acceptable.
 - b. Valves shall be Class 150.
 - c. Valves shall be as manufactured by Hills
2. McCanna, or equivalent by Jamesbury, WKM or Whitey.
 - a. Valves shall be supplied with manual lever or "T" handle.
 - b. Valves shall be non-lubricated, and capable of sealing in either flow direction.

B. Stainless Steel

1. Ball valves for use with stainless steel piping systems, including instrument isolation, air lines, moisture drains, and caustic soda shall be end entry type with type 316 stainless steel body and trim, TFE seats and seals and flanged or threaded connections as indicated.
 - a. Valve body shall be either two or three piece design. No internal ring for the ball shall be acceptable.
 - b. Valves shall be class 150.
 - c. Valves shall be McCannaFlo series 602 by Hills McCanna or equivalent models by Jamesbury, WKM or Whitey.
 - d. Valves shall be supplied with manual lever or "T" handle.

- 1) Valves used as moisture drain valves shall be installed at low points of the line and plugged or capped.

2.05 PLUG VALVES

- A. Provide the non-lubricated, eccentric plug type valves with elastomer faced plugs equivalent to series 100 models as manufactured by DeZurik Company or Ballcentric as manufactured by Henry Pratt.
 1. The construction of the valve shall require the opening movement of the valve to cause the plug to rise off the seat contact rather than sliding from its seat.
- B. Port areas for nominal pipe sizes four (4) inches and smaller shall be equal to 100 percent of the nominal full pipe area.
 1. Port areas for nominal pipe sizes larger than four (4) inches shall be 82 percent, or greater, of the nominal full pipe area.
- C. Valves shall be provided with limit stops and rotate 90 degrees from fully open to fully closed and shall be capable of providing shut-off up to the full working pressure rating in either direction working pressure ratings are as follows:

<u>Nominal Pipe Size (in.)</u>	<u>Working Pressure (psi)</u>
2 to 12	175
14 to 36	150
42 to 72	125

- D. Valves shall be bolted bonnet design and be provided with lever operators for interior and exposed service with nominal pipe sizes six (6) inches and less.
- E. Interior and exposed service with nominal pipe sizes eight (8) inches and larger shall be provided with totally enclosed worm gear actuators.
 1. The actuators shall be properly sized to suit the maximum differential across the valve.
- F. For buried or submerged service, provide valves with a totally enclosed worm gear and AWWA operating nut.
 1. Valves with nominal pipe sizes eight (8) inches and larger shall have permanently lubricated totally enclosed worm gear actuators.
- G. Flanged valves shall be faced and drilled conforming to ANSI B16.1 Class 125.
 1. Mechanical joint bells shall conform to AWWA C111.

2. Screwed ends shall conform to the NPT Standard.
- H. Exposed nuts, bolts, springs, and washers shall be type 316 stainless steel.
- I. Valves shall have the standard face to face dimensions of AWWA gate valves for nominal pipe size three (3) to twelve (12) inches with flanged end connection.
- J. Valve Bodies and plugs shall be semi-steel conforming to the requirements of ASTM A126 Grade B, cast iron.
 1. Plugs shall be covered with Buna-N for general service and for digester gas service the covering provide High Nitrile Buna-N.
- K. Valve seats shall be corrosion resistant consisting of a welded in overlay of 90 percent pure nickel.
- L. Provide replaceable valve bearings of bronze or non-metallic composition for both the upper and lower journals.
- M. Shaft seals shall be multiple ring, V-type Buna-N packing.
 1. The stuffing box shall be designed to allow the packing to be adjusted and replaced when the valve is in service.
- N. Gear actuators shall be totally enclosed worm gear type with permanently lubricated bronze bearings and shall be designed to Handle the seating and unseating torque at the specified handwheel pull for applications with the maximum pressure differential in either direction.
- O. Manual actuators for buried service shall be provided with AWWA operating nut and a completely enclosed mounting bracket and actuator cover and extension stem sufficiently long to extend within 12 inches of the ground surface and shall be housed in a valve box and cover.
- P. Where indicated in the Drawings, valve operators shall be provided with extension bonnets.

2.06 CHECK VALVES

- A. Check Valves Less than 3-inches
 1. Unless otherwise indicated or specified, check valves less than 3 inches in size shall be standard, all-bronze construction, horizontal or vertical-swing check valves as required, with screwed ends.
 - a. Valves shall be Crane Co. No. 37, Walworth Co., No. 406, or equal.

B. Check Valves 3-inches and Larger

1. Unless otherwise indicated or specified, check valves 3 inches and larger shall be swing check type with clear waterway design with outside lever and weights conforming to the requirements of AWWA C508.
 - a. Valves shall have Class 125 flanged ends faced and drilled in accordance with ANSI Standard.
 - b. Check Valves shall have cast iron bodies, with the following components of stainless steel: body ring, disc ring, clapper hinge shaft, hinge shaft key, clapper spacers, disc stud, disc stud nut and bushing, disc retaining washer and cotter pin.
 - c. The hinge pin shall extend outside the cast iron body through lubricated stainless steel bushings and outside packed glands on each side of the valve.
 - d. Each bushing shall be provided with a buttonhead grease fitting.
 - e. Stainless steel shall be at least 18-8 nickel-chromium content.
 - f. Check valves shall be tested at the factory and shall be drip tight under a hydrostatic pressure of 200-psi applied to the downstream side of the disc.
 - g. A certified test report shall be furnished with each valve.
 - h. Check valves shall be GA Industries Fig. X250D, or equal.
2. Valves shall be furnished with air cushion cylinders and bleed cocks.

C. Globe Style Silent Check Valve

1. Silent operating type check valve that begins to close as the forward flow velocity diminishes and be fully closed at zero velocity preventing flow reversal and resultant water hammer or shock.
2. Operation of the valve shall not be affected by position of installation.
3. Valve design shall incorporate a center guide, spring loaded poppet, guided at opposite ends, and having a short linear stroke that generates a flow area equal to the pipe.

4. Spring shall be designed to withstand 100,000 cycles without failure and exert a force to open the valve with a differential pressure of 0.5-psi and to fully open at a flow velocity of 4 fps.
5. Valve disc shall be concave to the flow direction.
6. A Buna-N seal shall be furnished to provide zero leakage and the seal shall provide for both metal to metal seal and metal to Buna-N seal.
7. Component parts shall be field replaceable without the need of special tools.
8. Globe Style Valve shall be manufactured by Val-Matic Valve and Manufacturing Corp. or approved equal

2.07 PVC AND CPVC CHECK VALVES

- A. Check valves shall be swing check type or ball check type manufactured from PVC or CPVC compounds.
 1. PVC check valves shall be provided on PVC and fiberglass piping.
 2. CPVC check valves shall be provided on CPVC piping.
 3. Swing check valves shall be furnished with teflon seats, teflon seals and flanged end connections.
 4. Ball check valves shall be furnished with Viton seats, Viton seals and threaded ends.
- B. Ball check valves shall be provided on piping less than 3 inches in diameter.
- C. Swing check valves with outside lever and weight or spring shall be provided on piping 3 inches in diameter and larger.
- D. Check valves shall be as manufactured by Asahi/America, or equal.

2.08 FOOT VALVES CHEMICAL FEED PUMPS

- A. Foot valves shall be PVC Type 1 construction, Viton ball and body seal, PVC strainer, and shall be supplied with spigot end connector and union nut.
- B. Foot valves shall be Model No. 8333 as manufactured by Plastiline, Inc., Pompano Beach, Florida, Peabody-Barnes, Mansfield, Ohio, or equal.

2.09 FLEXIBLE COUPLINGS

- A. Flexible couplings shall be either the split type or the sleeve type as shown in the Drawings.
1. Split type couplings shall be used with interior piping and with exterior piping as noted in the Drawings.
 - a. The couplings shall be mechanical type for radius groove piping.
 - b. The couplings shall mechanically engage and lock grooved pipe ends in a positive couple and allow for angular deflection and contraction and expansion.
 2. Couplings shall consist of malleable iron, ASTM Specification A46, Grade 32510 housing clamps in two or more parts, a single chlorinated butyl composition sealing casket with a "C" shaped cross-section and internal sealing lips projecting diagonally inward, and two or more oval track head type bolts with hexagonal heavy nuts conforming to ASTM Specification A183 and A194 to assemble the housing clamps.
 - a. Bolts and nuts shall be cadmium plated.
 3. Victaulic type couplings and fittings may be used in lieu of flanged joints.
 - a. Provide pipes with radius groove as specified for use with the Victaulic couplings.
 - b. Flanged adapter connections at fittings, valves, and equipment shall be Victaulic Flange Style 741, equal by Gustin-Bacon Group, Division of Certain-Teed Products, Kansas City, Kansas, or equal.
 4. Sleeve type couplings shall be used with buried piping.
 - a. The couplings shall be of steel and shall be Dresser Style 38, Smith Blair Style 413, or equal.
 - b. The coupling shall be provided with black steel bolts and nut unless indicated otherwise.
 5. Couplings shall be furnished with the pipe stop removed.
 6. Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe.

2.10 FLEXIBLE CONNECTORS

- A. Flexible connectors shall be supplied for the piping as shown in the Drawings.

1. Connectors shall be constructed of bronze and braid with female copper tube sweat fitting brazed on each end.
2. Connectors shall be style BF as manufactured by Vibration Mountings and Control, Inc., Butler, NY, American, Waterbury, CN, Metraflex, Chicago, IL, or ENGINEER's approval equal.

2.11 SERVICE CLAMPS

- A. Stainless-steel, double strap service clamps shall be used on pipe.

2.12 UNION

- A. Unions on ferrous pipe 2 inches in diameter and smaller shall be 150 pounds malleable iron, zinc coated.
- B. Unions shall not be concealed in walls, ceilings or partitions.

2.13 ANGLE METER STOP

- A. Angle meter stops shall be manufactured by Mueller Catalog No. H14258, and be the 90 degree angle type with lock-wing head shutoff.

2.14 FLANGED COUPLING ADAPTER

- A. Coupling adapter shall be Smith-Blair Model No. 912, or equal.
 1. Body and follower flange shall be iron.
 2. Bolt circle, size, and spacings shall conform to ASA 125 flange.
 3. Gasket shall be Smith-Blair Grade 30 or 60, or equal.
 4. O-Ring shall be grade 60.
 5. Cross and tee bolts shall conform to ANSI A21.11.

2.15 HYDRANT

- A. Hydrant shall have a 6 inches pipe connection, one (1) 5-1/4 inch main valve opening, two (2) 2-1/2 inch hose nozzles, and one (1) 4-1/4 inches hose nozzles.
 1. Hydrants shall be cast iron body, fully bronzed mounted, suitable for a working pressure of 150 pounds and shall be in accordance with the latest specification of the AWWA C-502.

2. Hydrants shall be of the O-Ring seal type.
 3. Operating nut shall open counter-clockwise and be of the pentagonal shape, measuring 1 1/2 inches from point to opposite flat.
- B. Hydrants shall be painted on coat of zinc chromate primer and two finish coats of an approved paint as directed by the OWNER.
- C. Hydrants shall be "Centurion" Number A-423, Traffic Type, as manufactured by Mueller Company, or an approved equal.
1. Furnish one operating manual and one hydrant wrench.
- 2.16 CONCRETE METER BOX
- A. Concrete meter box shall be Series No. 37-T by Brooks Products, Inc., Medley, FL, or equal.
- B. Box body shall be precast concrete with a cast iron traffic cover weighing 27 lbs.
- C. Box body shall be nominal 12 inch deep.
- D. Set box in concrete side walk as shown in the Drawings.
- 2.17 BACKFLOW PREVENTER
- A. Backflow preventer shall be an approved reduced pressure zone backflow preventer conforming to the requirements of Section 4620 of the South Florida Building Code, Broward edition.
1. Units shall meet the following standards:
 - a. ASSE 1013, AWWA C506
 - b. UL EX 3185.
- B. Backflow preventer shall be Watts Regulator Model No. U909S, Febco Model 825Y, or equal.
1. The unit shall come complete with two independent check valves, strainer and ball type test cocks.
 2. Body shall be bronze construction with tight seating rubber check valves.
 3. Ball valves test cocks shall be bronze.
 4. Joints shall be N.P.T. and gate valves shall be non-rising stem.

C. Unit shall be rated 175-psi.

1. One-inch diameter units shall have no more than a 13-psig pressure drop at 30 gpm.

D. Parts must be removable or replaceable without removal of the unit from the line.

2.18 PRESSURE REDUCING VALVE

A. Pressure reducing valve shall be forged brass or cast iron body fully bronze mounted, direct acting, bronze internal trim, reinforced neoprene diaphragm

1. Valves shall have an inlet side pressure gauge connection and adjusting screw or "T" handle.

B. Pressure reducing valve sizes smaller than 1/2 inches shall have screwed ends; those 2 inches or larger, flanged ends and those in between these sizes shall have union ends.

C. Strainers shall be of the "Y" type.

1. Strainers shall have bronze bodies with a removable bronze screen and shall be as manufactured by Watts Regulator Company, Lawrence, MA, or equal.

D. The pressure reducing valve shall be as manufactured by Watts Regulator Company, Series No. 223 SHP, or equal.

2.19 WATER PRESSURE GAUGE

A. Pressure gauge shall be direct mounted, cast aluminum case, a 3-1/2 inch diameter dial and furnished with a clear glass crystal window, 1/4-inch shut-off valve, and a bronze pressure snubber.

1. Gauges shall be weatherproof.
2. The Face dial shall be white finished aluminum with jet-black graduations and figures.
3. The face dial shall indicate the units of pressure being measured (e.g., feet or inches) or be dual scale.

B. Pressure gauge shall be Model 600 as manufactured by H.O. Trerice Co., or equal.

2.20 SOLENOID VALVE

- A. Provide 2-way or 3-way solenoid valves as required, with a NEMA 4X water tight, dust tight, and corrosion resistant enclosure.
 - 1. They shall be of the type that is normally closed, energized to open, closed on failure, and can be opened manually on failure.
 - a. Plunger assembly (plunger and tube) shall be type 316 stainless steel.
 - b. Disc shall be Viton or Teflon.
 - c. Valves shall have a molded epoxy resin class B temperature range coil for continuous duty and a NEMA 4X water tight coil housing.
 - d. Solenoid valves shall be suitable for operation on a 120 volt, 60 hertz power supply or 24 VDC power supply as appropriate and shall be as manufactured by Automatic Switch Co., Magnatrol Corp., or equal.

2.21 BUTTERFLY VALVES

- A. Provide a rubber seated, self-adjusting permanent packing, streamline disc, cast iron bodied butterfly valve as manufactured by Henry Pratt, model 2F II or MK II.
- B. Provide a butterfly valves conforming to AWWA C-504, latest edition.
 - 1. Bodies shall be cast iron per ASTM A-126 Class B (model 2F II) or Class 40 (model MK II).
 - 2. Discs shall be cast or ductile iron with type 316 stainless steel or monel edge.
 - 3. Shafts shall be type 304 stainless steel with self-lubricating, corrosion resistant sleeve-type bearings.
- C. Butterfly valves unless otherwise specified, shall be the product of one manufacturer and shall meet the full requirements of AWWA C504 except as modified or supplemented herein.
- D. Provide valve seats of a synthetic compound, such as Buna-n or EPDM located in the valve body.
 - 1. Simultaneously mold, vulcanize and bond seat to the body or retain by mechanical means without use of retaining rings, segments, screws or hardware in the flow stream.
- E. Butterfly valves shall be AWWA class 150B and shall be bubble tight at 150-psi differential in both directions and hydro tested to 300-psi.

1. Where specified, use flanged ends on above ground valves paced and drilled to ANSI B16.1 Class 125.
 2. Where specified, use mono-flange bodies above ground valves incorporating an overlapping seat, which also forms a gasket for the flange face.
 3. For buried valves provide mechanical joint ends conforming to ANSI 21.11.
 4. Provide valves manufactured by Henry Pratt Company, DeZurik, or Mueller.
- F. For manual valves actuators provide either worm gear type or traveling nut type and meet the requirements of AWWA C-504 section 3.8 except capable of withstand an input torque of 450 FT-LBS at the open and close stops.

2.22 BASKET STRAINER

- A. Basket strainers shall be installed as shown in the Drawings.
1. Strainer shall have cast iron body with 125-pound flanges and a clamped cover.
 2. Each clamped cover shall be removable by hand with two large hand knobs.
- B. Strainer shall have duplex perforated baskets.
1. Strainer shall be designed for continuous serve so that the two strainers may be placed alternatively in and out of service while the other is being cleaned.
- C. Strainer baskets shall be stainless steel with 1/8-inch perforations allowing a pressure drop of .52-psi at a flow of 300 gpm when clean.
- D. Strainer shall include vent, drain and handle from isolation plug rotation.
- E. Strainer shall be by Mueller Steam Specialty Company, Model No. 691 or equal.

2.23 CORPORATION STOP

- A. AWWA C800 type, tapered threaded inlet, except when connecting to tapped fittings which require IPS tapered threads, outlet compression connection or IPS threads to suit connecting pipe, stop 1 inch smaller rated 100-psi, larger stop rated 80-psi.
1. Manufacturers and Products:

- a. Ford Meter Box Co.,
- b. Mueller Co.,
- c. Or Equal.

2.24 METER STOPS

- A. Meter stops shall be manufactured by Mueller No. H14250 or Ford and be the 90° angle type with lock-wing head shutoff as approved by the OWNER.

2.25 VALVE I.D. DISKS

- A. Disk shall be 3-inch diameter brass, 1/8 inch thick with brass theft proof anchor pin permanently attached to underside of the disk.
 - 1. The top surface is to be engraved with 1/4 inch to 3/8-inch capital letters.
 - 2. Valve I.D. disk shall identify valve size, type of valve and number of turns to open such as (24 inches, Plug Valve, L-36).

2.26 ELECTRIC MOTOR ACTUATORS

- A. Electric actuators shall meet the requirements of AWWA C-540 and be rated to produce not less than the required valve seating and dynamic torques.
 - 1. Motors shall be sized for 1.5 times the actuator torque requirements.
 - 2. Motors shall move the valve from full open to full close, or the reverse in 60 seconds plus or minus 10 percent.
 - 3. Electric actuators shall include the electric motor, reduction gearing, stem coupling, position limit switches, torque switches, a ductile iron gear case and auxiliary automatic declutching handwheel.
 - 4. Actuators shall include open-stop-close push buttons, open and close indicator lights and a lockable 3-position selector switch, local-off-remote.
- B. The actuator shall position a throttling valve based upon a 4-20 ma signal from the control panel.
 - 1. The position of the valve shall be field adjustable to allow the desired flow.
- C. Actuator shall contain a 4-20 ma feedback signal to indicate the position of the valve and a position indicator needle.
 - 1. Failure mode shall be last position.

- D. The actuator shall operate on 120 VAC 60 Hz 3 phase and be enclosed in NEMA 4x enclosure.
 - 1. Components of the actuator shall be fully capable of operating outdoors.
 - 2. Actuators shall be provided with a lightning arrestor.
- E. Actuator shall be totally compatible with the approved valve it will be mounted upon and controlling.
- F. Actuator shall permit hand wheel (which is to be included on the actuator) operation.
 - 1. The electric motor and hand wheel may not be operated simultaneously.
- G. Provide actuators (electric motors and gearing) of Series 2000 as manufactured by E. I. M., L-120 as manufactured by Limitorque, or SA series as manufactured by AUMA Actuators, Inc.
 - 1. Flow rate maximum and maximum differential pressure as shown in the Drawings.

2.27 COMBINATION BACK-PRESSURE SUSTAINING/CHECK VALVES THREE INCHES AND LARGER

- A. Hydraulically operated, diaphragm actuated, pilot controlled globe valve, cast iron, ductile iron, or steel body, rated 175-psi, ANSI B16.1 flanged ends, bronze or stainless steel trim, stainless steel stem, externally mounted strainers with cocks, solenoid, and limit switch, single pole double throw, 120V AC rated, a minimum upstream pressure, and prevents backflow.
- B. Manufacturers and Products:
 - 1. Cla-Val; Model 51G-01,
 - 2. WATTS, ACV
 - 3. Golden Anderson;
 - 4. Singer;
 - 5. Inbal Series 700
 - 6. OCV Model 125
 - 7. Ross Valve

8. Or Equal

2.28 BACK PRESSURE SUSTAINING VALVES

A. For Nominal Pipe Sizes less than 3-inches

1. Back pressure sustaining valves shall maintain constant upstream pressure by by-passing or relieving excess pressure, and shall maintain close pressure limits without causing surges.
 - a. The valve shall be a direct acting, adjustable, spring-loaded, diaphragm valve, designed to permit flow when controlling pressure exceeds spring setting.
 - b. The valves shall be bronze body with stainless steel diaphragm and stainless steel trim, with plugged outlet and a pressure adjustment range of 40-200-psi.
 - c. Valves shall be Cash-Acme Type FR, or equal.

B. For Nominal Pipe Sizes 3-inches and Larger

1. The back pressure sustaining valve shall be designed to protect the pressure integrity of the upstream pressure system by only opening when the upstream pressure exceeds an adjustable pilot setting.
2. The back pressure sustaining valve shall modulate as required to maintain a pre-set pressure on the upstream side of the valve.
 - a. If upstream pressure drops below valve setting, the valve shall close.
3. The valve shall be designed so that turning clockwise on the sustaining pilot handwheel will increase the setting and turning counter-clockwise will decrease the setting.
4. Needle valves shall be furnished to provide independent and adjustable control of the main valve opening and closing speed.
 - a. The valve shall be shipped completely piped and ready for installation.
5. The main valve shall operate on the differential piston principle such that the area on the underside of the piston is no less than the pipe area, and the area on the upper surface of the piston is of greater area than the underside of the piston.

6. The valve piston shall be guided on its outside diameter by long stroke stationary v-ports, which shall be downstream of the seating surface to minimize the consequences of throttling.
 - a. Throttling shall be done by the valve v-ports and not the valve seating surfaces.
7. The valve shall be capable of operating in any position and shall incorporate only one flanged cover at the valve top from which internal parts shall be accessible.
 - a. There shall be no stems, stem guides, or spokes within the waterway.
 - b. There shall be not springs to assist the valve operation.
8. The valve body shall be of cast iron ASTMA-126 with flanges conforming to the latest ANSI Standards.
 - a. The valve shall be extra heavy construction throughout.
 - b. The valve interior trim shall be bronze B-62 as well as the main valve operation.
9. The valve seals shall be easily renewable while no diaphragm shall be permitted within the main valve body.
10. Controls and piping shall be of non-corrosive construction.
11. A visual valve position indicator shall be provided for observing the valve piston position.
 - a. The back pressure sustaining valve shall be as manufactured by Golden-Anderson Industries Figure 6700-DR, Clayton, or equal.

2.29 TAPPING SLEEVES

- A. Tapping sleeves shall fit existing cast iron, ductile, PVC or AC pipe.
 1. Determine the outside diameter of the pipe before ordering the sleeve.
- B. Tapping sleeves shall be cast iron or ductile iron, designed for a working pressure of at least 150-psi for connections to distribution system.
- C. The tapping sleeve shall be mechanical joint ended, on the run, and shall have connecting flange outlet, with centering groove, for connecting to the tapping valve.

1. The flange outlet on tapping sleeve and the tapping valve shall be industry standard.
 - a. The tapping sleeve must be interchangeable with tapping valves by other manufacturers.
- D. The tapping sleeve shall be furnished with necessary longitudinal gaskets, glands, split end gaskets, and bolts and nuts, as specified below under TAPPING VALVES, or shall be standard carbon steel square, hex, or T-head bolts and nuts, which have been galvanized.
- E. The tapping sleeve shall be furnished with a tapped and plugged outlet for testing purposes.
 1. Threads shall be ANSI B2.1 (NPT).
 2. Tapping sleeve and valve shall be hydrostatically tested after installation and prior to tapping.
- F. Tapping sleeve to be manufactured from gray cast iron meeting or exceeding ASTM A126 Grade B or ductile iron meeting ASTM A536 Grade 65-45-12.
 1. Slide flange seals shall be of the O-ring type of either round, oval or rectangular cross-sectional shape.
- G. Tapping sleeves to be used in conjunction with a mating tapping valve from same manufacturer.
 1. Outlet flange of sleeve to be counter-bored per MSSAP-60 for true alignment of tapping valve and tapping machine.
 2. Sizes of outlet to be available through equal opening of sleeve diameters up to 24 inches.
- H. Size 12 inches and smaller must be capable of working on Class ABCD Pipe diameter without changing either half of sleeve.
 1. Size 14 inches and larger must be specified as to which class size is needed.
 2. Sleeves are to include the end joint accessories and split glands necessary to assemble sleeve to pipe.
 3. MJ bolts and nuts are to conform to ANSI/AWWA C111/A21.11.
 4. No special tools other than standard socket wrench to be required for assembly of sleeve to main.

- I. Sleeve shall be coated with asphaltic varnish per Federal Specification TT-V-51, Military Specification MIL C-450, or equal.

2.30 TAPPING VALVES

- A. Tapping Valves shall be as specified for Gate Valves.
- B. The valves for connection to distribution system shall have a standard mechanical joint end for connection to new piping, and a flange inlet with centering ring, for connecting to the tapping sleeve, which shall be interchangeable with other manufacturer's tapping sleeves.
- C. Tapping valves shall conform to Specification AWWA C509, latest version, covering gate valves except as modified for passage and clearance of tapping machine cutter.
 1. The opening through the valve flange to the tapping sleeve outlet must have a raised male face to insure true alignment of valve and tapping machine.
 2. The outlet of the valve shall have the desired joint connection for the intended pipe.
- D. Tapping valves shall allow full size cutter to be used.
 1. Seating of the disc gate shall not require sliding or wedging to achieve a zero leakage seal.
 2. A maximum of three inter moving parts shall be required for operation of the valve.
 3. The stem collar must be protected from outside grit, sand, by dual O-rings above the stem collar.
 4. Provide an O-ring below the stem collar sealing off the lubrication chamber from the line fluid.
 5. Pressure energized O-rings to be used in place of flat gasket on flanged joints in valve body/bonnet.
- E. Interior and exterior ferrous surfaces shall protect against corrosion by fusion-bonded epoxy coating, minimum 8 mils thick.
 1. Coating shall be applied prior to assembly to insure coverage of exposed areas, including bolt holes.

- F. Mechanical joint tapping sleeve and resilient seated tapping valves shall be manufactured by American-Darling Valves, Clow Valve Corp., Mueller, or approved equal.

2.31 GLOBE VALVES

- A. Valves less than 3-inches shall be bronze body, stem and bonnet, steel disc and seat ring type.
 - 1. Valves shall be designed for a minimum 300-psi cold-water non-shock service.
 - 2. Valves shall have screwed ends.
 - 3. Valves shall be no. 14-112 P as manufactured by Crane Co., Mueller Co., or equal.
- B. Valves 3-inches and larger shall be iron body and bonnet with bronze stem and disc.
 - 1. Valves shall be designed for a minimum 200-psi cold-water non-shock service.
 - 2. Valves shall have flanged connections conforming to ANSI 816.1.
 - 3. Valves shall be No. 351 as manufactured by Crane Co., Powell Valves, or equal.

2.32 GAUGE COCKS

- A. Gauge cocks shall be screwed, bronze, tee handle, as manufactured by Crane Co. Model No. 712 or 744.

2.33 POLYVINYLCHLORIDE (PVC) BUTTERFLY VALVES

- A. PVC butterfly valves shall be manufactured from polyvinyl chloride (PVC) compounds and shall be provided on PVC and fiberglass piping as indicated.
 - 1. Butterfly valves shall be wafer style with PVDF disc, teflon or Viton seal and 316 stainless steel shaft.
 - 2. Valves shall be G.F. Plastics Type 367, Asahi/America Type 75, or equal.

2.34 PRESSURE REDUCING REGULATOR VALVES (LESS THAN 3-INCHES)

- A. The pressure reducing regulator valve shall be direct acting, adjustable, spring-loaded, normally open diaphragm valve, which closes when downstream pressure exceeds the spring setting.
 - 1. Valve body and cover shall be bronze with reinforced Buna-N diaphragm, Buna-N seat and bronze piston and cylinder.
 - 2. The outlet pressure range of the valves shall be adjustable between 10 and 30-psi.
 - 3. Valves shall be provided with screwed ends as shown in the Drawings.
 - 4. Valves shall be Cash Acme Type B, or equal.

2.35 HOSE BIBBS

A. Reuse Water System

- 1. Hose bibs shall be 1-inch bronze body angle valves with screwed inlet, hose outlet, quick-connect coupling, cap and chain.
 - a. Hose bibs shall have a minimum 200-psi non-shock, cold water pressure rating.
 - b. Quick acting hose couplings shall be compatible with the hoses furnished.
 - c. Bibs shall be, Crane No. 117, Walworth or equal.

B. Potable Water System

- 1. Hose bibs shall be 3/4-inch brass, rough chrome plated, with vacuum breaker and loose key stop.
- 2. Hose bibs shall be Chicago No. 998, Sloan or equal.

C. Tags

- 1. Provide permanent, plastic or brass nametags located above the hose bibs, which shall state either "POTABLE" or "REUSE WATER - DO NOT DRINK," as required.
- 2. Letters shall be approximately 3/4-inch high.

2.36 SEWAGE VACUUM BREAKERS:

- A. Sewage vacuum relief valves shall be provided as shown on the force mains.

1. Valve shall be 4 inch, flanged, heavy duty, counterweighted, vacuum relief valve, G. A. Industries/ Golden Anderson, or equal.
2. Counterweights shall be adjustable lead weights on steel arms and shall be initially set by the manufacturer so as to open at a vacuum pressure of 1/2-inch Hg.
3. Final settings shall be made after field tests witnessed by the ENGINEER; counterweights shall than be sealed.
4. The body shall be cast iron, ASTM A126B.
5. The plug shall be type 304 stainless steel and the seat shall be resilient type.
6. The connections shall be 125 lb. flanged.
7. Where necessary, provide spool piece adapter to isolation plug valve.
8. Provide flushing connection, complete with bronze ball or eccentric plug (seat towards SVR) valve, as shown or, where not shown, provide flushing connection complete with quick disconnect hose connection (common to air relief valve and pressure gauge) and bronze ball valves.
9. Quick disconnects shall be supplied by Hansen Couplings, or equal.
 - a. Shop painting shall be complete with required prime and finish coats, as specified.
10. Valve shall not be field painted, except for touching up damaged finish.
11. CONTRACTOR to exercise extreme care that field painting does not “gum up” the sensitive operation of this valve.

2.37 STRAINER

- A. Strainer shall be Y-Pattern bronze or iron body, with threaded end connections, and shall be provided with a cylindrical 20 mesh Monel screen.
- B. Strainer shall be rated for 200-psi C.W.P. and shall be model No. 9881I2 by Crane, No. 3699 1/2 Walworth or equal.
- C. Provide a suitably sized gate or ball valve to blow off the strainer screen on each unit installed.

2.38 VALVE BOXES AND COVERS

- A. Valve box and cover assemblies shall be the adjustable slide type with round bases fabricated of asphalt coated cast iron and designed to withstand heavy traffic loads.
 - 1. They shall be model No. F2450 by Clow Corporation, or equivalent models by Mueller, or equal.
 - 2. Base shall be Clow Model No. F2480 for 4-inches and smaller, Model F-2465 for 6-inches and 8-inches, Model F-2484 for 10-inches and larger.
 - 3. The cover shall be Clow Model F-2494.
- B. Extension sleeves, Clow model No. F2475, shall be provided as required.
- C. The covers shall be marked "WATER", "SEWER" or "DRAIN" and shall have a bell end sufficiently large to fit over the stuffing box of the valve.
- D. Valves shall be provided with extension stems to bring the operating nut within twelve (12) to eighteen (18) inches of the finished grade.
- E. Two operating "T" wrenches suitable for use with the AWWA operating nut shall be provided.
- F. For corporation and curb stops, valve boxes and covers shall be furnished in cast iron with:
 - 1. Stationary rod and guide ring.
 - 2. Arch pattern base.
 - 3. Extension sections as required.
 - 4. Cover.

2.39 HYDRO-STOP

- A. Provide a Double Line Stop and Permanent Bypass as required and as manufactured by IPSCO or Hydro-Stop.
- B. Use Line Stop in conjunction with tapping sleeves.
- C. The line stop and tapping sleeve shall be mechanical compatible
- D. Any of the following types of line stops are acceptable:
 - 1. Pivoting Head Line Stop

2. Folding Head Line Stop
 3. Cylinder Wedge Line Stop
- E. Provide Line Stop components conforming to AWWA standards.

2.40 SLUICE GATES

- A. Provide heavy duty fabricated stainless steel type 316 sluice gates complete with anchor bolts, operating stems, gate lift operator, frame and guide rails, gate sealing gaskets, and appurtenances for a completely operational sluice gate system.
- B. Provide stems of type 316 stainless steel.
- C. Provide Sluice Gate conforming to AWWA C-501.
 1. Frame and Guide Rails.
 - a. Provide flanged or flat back frame with a rectangular opening.
 - b. Leakage rate shall be 0.025 gpm/ft. or wetted perimeter for both seating and unseating head conditions.
 2. Cover or Slide.
 - a. Provide a single Fabricated Stainless Steel Disc with horizontal and vertical ribs.
 3. Seating Faces.
 - a. Provide frames equipped with UHMW seats/seals to ensure no metal-to-metal contact.
 4. Manually Operated Lifts.
 - a. Provide a removable crank pedestal for each gate.
 - b. Provide crank with less than 40 pounds of effort.
 - c. Provide 90° gear box operator.
 5. Stem, Stem Guides, and Stem Couplings.
 - a. Provide type 316 stainless steel stems sized to withstand normal operating stresses.
 - b. Provide adjustable stem guides with bronze bushings.

6. Provide a Sluice Gate System from one single supplier WHIPPS, Inc. Series 940 or approved equal.
7. Provide one portable gas power drive unit to attach and match manual operator.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Valves and appurtenances shall be installed in the location shown, true to alignment and rigidly supported.
- B. Install floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances 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.
 1. Before setting these items, check 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.
- C. Flanged joints shall be made with hot dipped galvanized bolts, nuts, and washers.
 1. Mechanical joints shall be made with mild corrosion resistant alloy steel bolts and nuts.
 2. Exposed bolts shall be painted the same color as the pipe.
 3. Buried bolts and nuts shall be heavily coated with two (2) coats of bituminous paint.
- D. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned.
 1. 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.
 2. After the other pipe had been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes.
 3. The housing sections shall then be placed.

4. After the bolts have been inserted, the nuts shall be tightened until housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- E. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly.
1. Soapy water may be used as a gasket lubricant.
 2. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6 inches from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint.
 3. The other pipe end shall be inserted into the middle pipe already laid.
 4. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares.
 5. After the bolts have been inserted and nuts have been made up fingertight, diametrically opposite nuts shall be progressively and uniformly tightened around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.
- F. Valve boxes shall be installed as shown in the Drawings.
1. Joints shall be made in the standard manner.
 2. Valve stems shall be vertical.
 3. Place cast iron box over each stem with base bearing on compacted fill and top flush with final grade.
 4. Boxes shall have sufficient bracing to maintain alignment during backfilling.
 5. Remove sand or undesirable fill from within the valve box.
- G. Valves shall be manually opened and closed before installation to check their operation, and the interior of the valves shall be cleaned.
1. Valves shall be placed in the positions shown in the Drawings.
 2. Joints shall be made as directed under the piping specifications.
- H. Circular butterfly valves shall be installed with the shaft in a horizontal position.
1. Operators shall be provided with the necessary gearing to be positioned as shown in the Drawings.

I. Hydro-stop installation

1. Perform a Wet/Hot tap as described in the tapping sleeve portion of this specification.
2. Install the line stop equipment on the temporary tapping valve.
3. Open the temporary tapping valve.
4. Insert the stop head into the pipeline through the temporary tapping valve.
5. Stop flow.
6. Make repairs to pipe or install new pies as required by the Drawings.
7. Remove line stop head through the hot/wet tap connection.
8. Close the temporary plug.
9. Remove the line stop equipment.
10. Install a completion plug on the tapping sleeve.

3.02 VALVE SUPPORTS

- A. Valves shall be supported as integral components of the piping systems as specified in the Pipe Support Systems.
- B. Horizontally mounted valve operators, manual, pneumatic or electric, whose weight exceeds 25 pounds shall be supported independently of the valve and piping system.
- C. Vertically mounted valve operators, manual, pneumatic or electric, whose weight exceeds 100 pounds shall be supported independently of the valve and piping system.
- D. Valve supports shall anchor the valves against an unbalanced force in either direction.
 1. The magnitude of the force shall be based on a pressure equal to twice the maximum working pressure with a maximum allowable stress of 1/2 of the support's yield strength.

3.03 SHOP PAINTING

- A. Ferrous surfaces of valves and appurtenances shall receive an exterior coating of rust-inhibitive primer.
 - 1. Interior coatings shall be the manufacturer's standard except that valves for potable water lines shall be coated with paints approved by EPA, FDA, and AWWA for potable water service.
 - a. Pipe connection openings shall be capped after shop painting to prevent the entry of foreign matter prior to installation.

3.04 FIELD PAINTING

- A. Metal valves and appurtenances specified herein and exposed to view will be painted as part of the work.
 - 1. Paint in accordance with the requirements Paint - Division 9.

3.05 INSPECTION AND TESTING

- A. Valves shall be hydrostatically field tested at the specified pipeline test pressures specified in the piping sections.
 - 1. Leakage or "sweating" of joints shall be stopped and joints shall be tight.
 - 2. Motor operated and cylinder operated valves shall be tested for control operation as directed by the ENGINEER.
 - 3. Valves shall be operated at the pressures specified in the piping schedules for the connected pipe.
- B. Testing shall be performed in accordance with the specifications and the ANSI and/or AWWA standards contained herein including leakage tests.
 - 1. Supply copies of the certified test results provided by the manufacturer, in accordance with the Division 1 - Submittals Procedure, to the ENGINEER.
- C. The OWNER may at its discretion visit and inspect the manufacturer's facilities.
 - 1. During the inspection visit, a witness shop test shall be performed for all standard tests listed in applicable standards.
- D. Obtain and submit certified statements that the valves and hydrants comply with the requirements of the standards specified herein.

3.06 DELIVERY, STORAGE, AND HANDLING

- A. Material delivered to the site shall be inspected for damage, unloaded and stored with a minimum of handling.
1. Material shall not be stored on the ground and shall be stored in accordance with the manufacturer's recommendations.
 2. The insides of pipe and fittings shall be kept free from dirt and debris.
 3. Gasket and plastic materials shall be kept protected from exposure to direct sunlight over extended periods.
 4. Solvents, solvent compounds, lubricants, elastomeric gaskets, and similar material required to install the pipes shall be stored in accordance with the manufacturer's recommendations and shall be discarded if the storage period exceeds the recommended shelf or pot life.
 5. Storage facilities for plastic pipe, fittings, joint material and solvents shall be classified and marked in accordance with NFPA No. 704, with classification as indicated in NFPA Nos. 49 and 325M.
 6. Material shall be handled in such a manner as to insure delivery to the trench in a sound, undamaged condition.
 7. Carry pipes to the trench, do not drag pipe.

END OF SECTION