

**ADVERTISEMENT FOR BIDS
COLUMBIA COUNTY- ELLISVILLE WATER MAIN INSTALLATION
BID NO. 2008-P**

Columbia County Board of County Commissioners herein referred to as the Owner, will receive sealed bids marked "**Sealed Bid for the COLUMBIA COUNTY- ELLISVILLE WATER MAIN INSTALLATION**" bid packages will be received by the Columbia County Purchasing Director, 135 NE Hernando Ave., Room 203, Lake City, Florida 32055 for the construction of the Project described as follows:

COLUMBIA COUNTY - ELLISVILLE WATER MAIN INSTALLATION project includes approximately 15,300 LF of 12" PVC water main, 63' of steel cased bore and jacks, 1243' of directional bores, 16 fire hydrants, FDOT traffic control and restoration of FDOT right of way following system installation. Project connects the County Potable Water Wells to HWY 441. A bid alternate is included to provide lump sum pricing to furnish and install a pre-stressed concrete ground storage tank at the well site. The contractor shall submit a one lump sum price for the concrete ground storage tank and unit prices for the items on the bid schedule.

Proposals shall be addressed to the Purchasing Director, Columbia County and delivered to the County Offices, located in Lake City, Florida, no later than 2:00 p.m., on December 10, 2008. Proposals shall be designated as "**Sealed Bid for COLUMBIA COUNTY - ELLISVILLE WATER MAIN INSTALLATION**". All bids must be submitted in **triplicate**. Any bids received after the specified time and date will not be considered. The sealed bids will be publicly opened and read aloud at 2:00 p.m. at the County Offices in Lake City by the Purchasing Director.

The information for Bidders, Forms of Proposal, Form of Contract, Plans, Specifications, and Forms of Bid Bond, Performance and Payment Bond, and other contract documents will be available and may be examined at the office of Columbia County Board of County Commissioners Copies may be obtained at this office upon payment of **\$50.00** which amount constitutes the cost of reproduction and handling. This payment will not be refunded.

The owner reserves the right to waive any informality or to reject any or all bids. Columbia County is an Equal Opportunity Employer. Each Bidder must deposit with his/her bid security in the amount, form and subject to the conditions provided in the Information for Bidders. Sureties used for obtaining bonds must appear as acceptable according to the Department of Treasury Circular 570 or the by Columbia County Board Of County Commissioners.

The contractor shall begin mobilization and procurement of materials within ten working days of the receipt of the notice to proceed.

**COLUMBIA COUNTY BOARD OF COUNTY
COMMISSIONERS (BOCC)**

**ELLISVILLE WATER SYSTEM
DW1201010**

**CONTRACT DOCUMENTS
&
SPECIFICATIONS**

Prepared For:

THE COLUMBIA COUNTY BOCC
135 NE Hernando Avenue, Suite 203
Lake City, Florida 32055 PH: 386-758-1005

Prepared by:

EUTAW UTILITIES, INC
415 SAINT FRANCIS STREET
TALLAHASSEE, FLORIDA 32301
PH: 850-383-0400, FX: 888-878-2939

(THIS PAGE INTENTIONALLY LEFT BLANK)

TABLE OF CONTENTS

DIVISION 0 - BIDDING REQUIREMENTS AND CONTRACT FORMS

Advertisement for Bids – 1	Advertisement for Bids
Instruction For Bidders – 1-8	Instructions for Bidders
Bid Form – 1-5	Bid Form
C-430	Bid Bond
C-510	Notice of Award
C-521	Agreement
C-550	Notice to Proceed
C-610	Performance Bond
C-615	Payment Bond
C-620	Application for Payment
C-625	Substantial Completion
C-700	General Conditions
FDEP – 1-33	Supplemental Conditions
C-941	Change Order

TECHNICAL SPECIFICATIONS

DIVISION 1 - GENERAL REQUIREMENTS

00400 - Misc Requirements
00410 - Basis of Payment
00420 - Special Conditions
01010 - Special Provisions
01011 - Summary of Work
01090 - Definitions and Standards
01155 - Sched Reports Payments
01205 - Procedure and Controls
01620 - Storage & Protection
01705 - Project Closeout
01720 - Project Record Docs
01740 - Warranties

DIVISION 2 - SITEWORK

02070 - Boring and Jacking
02200 - Earthwork
02210 - Grassing
02221 - Excavation & Backfill
02240 - Dewatering
02300 - Directional Boring
02513 - Asphalt Concrete Paving

- 02620 - HDPE Pipe
- 02665 - Piping & Accessories
- 03300 - Cast In Place Concrete
- 03410 - Structural Precast Concrete
- 04640 - Valves & Accessories
- 13200 - Prestressed Tanks
- 13201 - Concrete Tank Foundation

Instructions to Bidders

TABLE OF ARTICLES

	Page
Article 1 - Defined Terms	1
Article 2 - Copies of Bidding Documents	1
Article 3 - Qualifications of Bidders	2
Article 4 - Examination of Bidding Documents, Other Related Data, and Site	2
Article 5 - Pre-Bid Conference	4
Article 6 - Site and Other Areas	4
Article 7 - Interpretations and Addenda	4
Article 8 - Bid Security	4
Article 9 - Contract Times	5
Article 10 - Liquidated Damages	5
Article 11 - Substitute and "Or-Equal" Items	5
Article 12 - Subcontractors, Suppliers, and Others	5
Article 13 - Preparation of Bid	6
Article 14 - Basis of Bid; Comparison of Bids	7
Article 15 - Submittal of Bid	7
Article 16 - Modification and Withdrawal of Bid	8
Article 17 - Opening of Bids	8
Article 18 - Bids to Remain Subject to Acceptance	8
Article 19 - Evaluation of Bids and Award of Contract	8
Article 20 - Contract Security and Insurance	9
Article 21 - Signing of Agreement	9

ARTICLE 1 - DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. Issuing Office--The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement for Bids may be obtained from the Issuing Office. in good condition within 30 days after opening of Bids.
- 2.02 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request, Bidder shall submit written evidence such as financial data; previous experience, present commitments, and such other data as may be called for below.

ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

- A. The Supplementary Conditions identify:
1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.
 2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.
- B. Copies of reports and drawings referenced in paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.02 of the General Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition

- A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that ENGINEER has used in preparing the Bidding Documents.
- B. Copies of reports and drawings referenced in paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in paragraph 4.06 of the General Conditions has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

- 4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in paragraph 4.06 of the General Conditions.

- 4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.
- 4.06 Reference is made to the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.
- 4.07 It is responsibility of each Bidder before submitting a Bid to:
- A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;
 - B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
 - C. Become familiar with and satisfy Bidder as to all Federal, State, and local Laws and Regulations that may affect cost, progress, or performance of the Work;
 - D. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the in paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in paragraph 4.06 of the General Conditions;
 - E. Obtain and carefully study (or accept consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;
 - F. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
 - G. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
 - H. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;
 - I. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

J. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

5.01 A pre-Bid conference will be held at {_____} {a.m.}{p.m.} on {_____} at {_____}. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 - SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easement for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 - INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than five days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 - BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 % of Bidder's maximum Bid price and in the form of a certified check or a Bid bond (EJCDC No. C-430, 2002 Edition) issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may

be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

- 8.03 Bid security of other Bidders whom OWNER believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 - CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 - LIQUIDATED DAMAGES

- 10.01 Provisions for liquidated damages are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

- 11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or "or-equal" materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute materials and equipment approved by the Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function and quality to be met by any proposed substitute or "or-equal" item. Request for Engineer's clarification of materials and equipment considered "or-equal" prior to the Effective Date of the Agreement must be received by the Engineer at least 5 days prior to the date for receipt of Bids. No item of material or equipment will be considered by Engineer as a substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed substitute item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.
- 12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest responsible Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner and Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.
- 12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

- 12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in General Conditions.
- 12.05 The Contractor shall satisfactorily carry out the following affirmative steps to meet MBE/WBE requirements of the SUPPLEMENTARY CONDITIONS (CONSTRUCTION PROCUREMENT) EXHIBIT WATER-03Lh
- 1) Include qualified minority and women's businesses on solicitation lists.
 - 2) Solicit minority and women's businesses whenever they are potential sources.
 - 3) Divide total requirements, when economically feasible, into small tasks or quantities to permit maximum participation by minority and women's businesses.
 - 4) Where feasible, establish delivery schedules which will encourage participation by minority and women's businesses.
 - 5) Use the services and assistance of the U.S. Department of Commerce's Minority Business Development Agency (MBDA) and the U.S. Small Business Administration to identify MBEs/WBEs.

ARTICLE 13 - PREPARATION OF BID

- 13.01 The Bid form is included with the Bidding Documents. Additional copies may be obtained from Engineer.
- 13.02 All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each *Bid item* listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.
- 13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. If required by State where work is to be performed, the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporation business address and state of incorporation shall be provided on the Bid Form.
- 13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The business address of the partnership shall be provided on the Bid Form.
- 13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the business address of the firm must be provided on the Bid Form.
- 13.06 A Bid by an individual shall show the Bidder's name and business address.
- 13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid form. The business address of the joint venture must be provided on the Bid Form.
- 13.08 All names shall be typed or printed in ink below the signatures.
- 13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers and dates of which shall be filled in on the Bid form.
- 13.10 The address and telephone number for communication regarding the Bid shall be shown.

- 13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number for the state of the Project, if any, shall also be shown on the Bid Form.
- 13.12 The Bid shall contain a list of minority and women's (M/WBE) subcontractors solicited as part of the minority or women's business requirement of the SUPPLEMENTARY CONDITIONS (CONSTRUCTION PROCUREMENT) EXHIBIT WATER-03Lh, stating name, address, whether minority or women's business, and anticipated subcontractor amount, if any. Include current certifications for each M/WBE subcontractor. Also, note if the prime contractor is M/WBE.

ARTICLE 14 - BASIS OF BID; COMPARSION OF BIDS

14.01 Unit Price

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.
- B. The total of all bid prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with paragraph 11.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

ARTICLE 15 - SUBMITTAL OF BID

- 15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and the Bid bond form. The unbound copy of the Bid Form is to be completed and submitted with all the attachments outlined in Article 7 of the Bid Form.
- 15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." When using the mail or other delivery system, the Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the Advertisement for Bid. A mailed Bid shall be addressed to Owner at address in Article 1.01 of Bid Form.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

- 16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.
- 16.02 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid or negotiated, that Bidder will be disqualified from further bidding on the Work. This provision to withdraw a Bid without forfeiting the Bid security does not apply to Bidder's errors in judgment in preparing the Bid.

ARTICLE 17 - OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form.

ARTICLE 19 - EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the contract Documents.

19.06 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Instructions to Bidders, is lowest, price and other factors considered.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by such bonds.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

21.02 This Contract is expected to be funded in part with funds provided by the Florida Department of Environmental Protection State Revolving Fund (FDEP SRF).

21.03 Concurrence by FDEP SRF in the award of the Contract is required before the Contract is effective.

ARTICLE 22 - SALES AND USE TAXES

22.01 Blank

ARTICLE 23 - CONTRACTS TO BE ASSIGNED

23.01 Blank\

23.02 Blank

Bid Form

Project Identification: _____

Contract Identification and Number: _____

TABLE OF ARTICLES

	Page
Article 1 - Bid Recipient	1
Article 2 - Bidder's Acknowledgments	1
Article 3 - Bidder's Representations	1
Article 4 - Further Representations	2
Article 5 - Basis of Bid	3
Article 6 - Time of Completion	3
Article 7 - Attachments to Bid	4
Article 8 - Defined Terms	4
Article 9 - Bid Submittal	4

ARTICLE 1 - BID RECIPIENT

- 1.01 This Bid Is Submitted To: Columbia County
- 1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in the Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENTS

- 2.01 Bidder accepts all of the terms and conditions of the Advertisement and Instructions to Bidders, including without limitations those dealing with the dispositions of Bid security. The Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 - BIDDER'S REPRESENTATIONS

- 3.01 In submitting this Bid, Bidder represents that:
 - A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____
_____	_____

- B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

- C. Bidder is familiar with and is satisfied as to all Federal, State, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in GC-4.02, and (2) reports and drawings of a Hazard Environmental Condition, if any, which has been identified in GC-4.06.
- E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by the Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.
- F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of the Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
- I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- K. Bidder will submit written evidence of its authority to do business in the State where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 - FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

- A. This Bid is genuine and not made in the interest of or on the behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 - BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

See Attached Itemized Unit Price Bid Schedule

ARTICLE 6 - TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with paragraph 14.07.B of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the Contract Times.

ARTICLE 7 - ATTACHEMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of the Bid:

- A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);

ARTICLE 8 - DEFINED TERMS

8.01 The terms used in this Bid with the initial capitol letters have the meanings indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____

(Individual's signature)

SEAL,
if required
by State

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____

(Signature of general partner -- attach evidence of authority to sign)

SEAL,
if required
by State

Name (typed or printed): _____

A Corporation

Corporation Name: _____

State of Incorporation: _____

Type (General Business, Profession, Service, Limited Liability): _____

By: _____

(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

CORPORATE
SEAL,
if required by State

Attest _____
(Signature of Corporate Secretary)

Date of Qualification to do business in _____ [State where Project is located] is ___/___/_____

A Joint Venture

Name of Joint Venture: _____

First Joint Venture Name: _____

SEAL,
if required
by State

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venture Name: _____

SEAL,
if required
by State

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is party to the venture should be in the manner indicated above.)

Bidder's Business address: _____

Business Phone No. (_____) _____

Business FAX No. (_____) _____

Business E-Mail Address _____

State Contractor License No. _____ . (If applicable)

Employer's Tax ID No. _____

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:

9.02 Bid submitted on _____, 20__.

**COLUMBIA COUNTY
ELLISVILLE WATER SYSTEM**

BID SCHEDULE

1.0 WATER SYSTEM IMPROVEMENTS		Unit	Quantity	Unit Price	Total
12" C-900 (DR-18) PVC Water Main(blue) Installed, including fittings, tracer wire & 1.1 appurtenances		LF	15300	_____	_____
1.2 12" Gate Valve & Valve Box		EA	26	_____	_____
1.3 Fire Hydrant Assembly Installed		EA	16	_____	_____
Jack & Bore 24" Steel Casing (.35" wt) including 1.4 12" DIP carrier pipe		LF	63	_____	_____
1.5 12" Directional Bore		LF	1,243	_____	_____
1.6 Driveway Repair (Gravel)		SF	2,140	_____	_____
1.7 Traffic Control (FDOT Index 600)		LS	1	_____	_____
1.8 Testing (Pressure and Bac'T)		LS	1	_____	_____
WATER SYSTEM IMPROVEMENTS TOTAL =					
2.0 ENVIRONMENTAL		Unit	Quantity	Unit Price	Total
2.1 Silt Fencing		LF	2000	_____	_____
2.2 Tree Protection		LF	200	_____	_____
2.3 Right of Way Restoration, Seed and Mulch		SY	7,650	_____	_____
2.4 Right of Way Restoration, Sod		SF	74,560	_____	_____
2.5 Inlet Protection		EA	5	_____	_____
ENVIRONMENTAL TOTAL =					
3.0 PROFESSIONAL SERVICES BY CONTRACTOR		Unit	Quantity	Unit Price	Total
3.1 Project Layout		LS	1	_____	_____
3.2 Certified As-Built by RLS		LS	1	_____	_____
3.3 Soil Testing by PE		LS	1	_____	_____
SERVICES TOTAL =					
4.0 START-UP		Unit	Quantity	Unit Price	Total
4.1 Mobilization		LS	1	_____	_____
4.2 Insurance		LS	1	_____	_____
START-UP TOTAL =					
TOTAL AMOUNT of BASE BID =					
A.0 GROUND STORAGE (BID ALTERNATE)		Unit	Quantity	Unit Price	Total
Prestressed concrete ground storage tank, complete including foundation, baffles, and appurtenances as presented in plans and A.1 specifications		LS	1	_____	_____
BID ALTERNATE TOTAL =					

(THIS PAGE INTENTIONALLY LEFT BLANK)

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address): _____

SURETY (Name and Address of Principal Place of Business): _____

OWNER (Name and Address): _____

BID

Bid Due Date: _____

Project (Brief Description Including Location): _____

BOND

Bond Number: _____

Date (Not later than Bid due date): _____

Penal sum _____

(Words)

(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER

SURETY

(Seal
)

(Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature and Title

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title

Attest: _____
Signature and Title

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

Notice of Award

Dated _____

Project:	Owner:	Owner's Contract No.:
Contract:		Engineer's Project No.:
Bidder:		
Bidder's Address: (send Certified Mail, Return Receipt Requested)		

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for _____

The Contract Price of your Contract is _____ Dollars (\$_____).

(Insert appropriate data if Unit Prices are used. Change language for Cost-Plus contracts.)

_____ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner [_____] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]
3. Other conditions precedent:

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

Owner
By: _____
Authorized Signature

Title

Copy to Engineer

(THIS PAGE INTENTIONALLY LEFT BLANK)

**AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR
CONSTRUCTION CONTRACT(UNIT PRICE)**

THIS AGREEMENT is by and between _____

(Owner) and _____

(Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by

(Engineer), who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment

A. The Work will be substantially completed within _____ days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within _____ days after the date when the Contract Times commence to run.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of

requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$_____ for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$_____ for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, 5.01.B, and 5.01.C below:

A. For all Work other than Unit Price Work, a Lump Sum of:

_____ (\$_____) (words) (numerals)

All specific cash allowances are included in the above price and have been computed in accordance with paragraph 11.02 of the General Conditions.

B. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this paragraph 5.01.B:

As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

UNIT PRICE WORK

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Estimated Quantity</u>	<u>Unit Price</u>	<u>Estimated</u>
-----------------	--------------------	-------------	---------------------------	-------------------	------------------

TOTAL OF ALL ESTIMATED PRICES _____ \$_____ (words) (numerals)

C. For all Work, at the prices stated in Contractor’s Bid, attached hereto as an exhibit.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor’s Applications for Payment on or about the _____ day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

a. _____ percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage; and

b. _____ percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to _____ percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less _____ percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 - INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of _____ percent per annum.

ARTICLE 8 – CONTRACTOR’S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.

E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work

as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to _____, inclusive).
2. Performance bond (pages _____ to _____, inclusive).
3. Payment bond (pages _____ to _____, inclusive).
4. Other bonds (pages _____ to _____, inclusive).
 - a. _____ (pages _____ to _____, inclusive).
 - b. _____ (pages _____ to _____, inclusive).
 - c. _____ (pages _____ to _____, inclusive).
5. General Conditions (pages _____ to _____, inclusive).
6. Supplementary Conditions (pages _____ to _____, inclusive).
7. Specifications as listed in the table of contents of the Project Manual.
8. Drawings consisting of _____ sheets with each sheet bearing the following general title: _____ [or] the Drawings listed on attached sheet index.
9. Addenda (numbers _____ to _____, inclusive).
10. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages _____ to _____, inclusive).
 - b. Documentation submitted by Contractor prior to Notice of Award (pages _____ to _____, inclusive).
 - c. _____.
11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed (pages _____ to _____, inclusive).
 - b. Work Change Directives.

c. Change Order(s).

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 - MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

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

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

This Agreement will be effective on _____, _____ (which is the Effective Date of the Agreement).

OWNER:

CONTRACTOR:

By: _____

By: _____

Title: _____

Title: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement.)

License No.: _____
(Where applicable)

Agent for service or process: _____

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Notice to Proceed

Dated _____

Project:	Owner:	Owner's Contract No.:
Contract:		Engineer's Project No.:

Contractor:

Contractor's Address: [send Certified Mail, Return Receipt Requested]

You are notified that the Contract Times under the above contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is _____, and the date of readiness for final payment is _____ [(or) the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must [add other requirements]:

_____	Owner
_____	Given by:
_____	Authorized Signature
_____	Title
_____	Date

Copy to Engineer

(THIS PAGE INTENTIONALLY LEFT BLANK)

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT

Date:

Amount:

Description (Name and Location):

BOND

Bond Number:

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By:

Signature and Title

(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest:

Signature and Title

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By:

Signature and Title

(Attach Power of Attorney)

Attest:

Signature and Title:

EJCDC No. C-610 (2002 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3. Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;
2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:

4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

8. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions.

12.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker
Owner's Representative (engineer or other party)

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

CONTRACT

Date:

Amount:

Description (Name and Location):

BOND

Bond Number:

Date (Not earlier than Contract Date):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____

Signature and Title

(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____

Signature and Title

CONTRACTOR AS PRINCIPAL

Company:

Signature: _____ (Seal)

Name and Title:

SURETY

(Seal)

Surety's Name and Corporate Seal

By: _____

Signature and Title

(Attach Power of Attorney)

Attest: _____

Signature and Title:

EJCDC No. C-615 (2002 Edition)

Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

**FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker:
Owner's Representative (engineer or other party):**

Contractor's Application For Payment No. _____

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer)
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE	\$	
2. Net change by Change Orders	\$	
3. CURRENT CONTRACT PRICE (Line 1 ± 2)	\$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)	\$	
5. RETAINAGE:		
a. ____ % x \$ _____ Work Completed.....	\$	
b. ____ % x \$ _____ Stored Material	\$	
c. Total Retainage (Line 5a + Line 5b)	\$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)	\$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)	\$	
8. AMOUNT DUE THIS APPLICATION	\$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)	\$	

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By: _____	Date: _____
-----------	-------------

Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is recommended by:	_____	_____ (Date)
	(Engineer)	
Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is approved by:	_____	_____ (Date)
	(Owner)	
Approved by:	_____	_____ (Date)
	Funding Agency (if applicable)	

Stored Material Summary

Contractor's Application

For (contract):					Application Number:				
Application Period:					Application Date:				
A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage (\$) (D + E - F)
			Date (Month/Year)	Amount (\$)	Amount (\$)	Subtotal	Date (Month/Year)	Amount (\$)	
		Totals							

Certificate of Substantial Completion

Project:	Owner:	Owner's Contract No.:
Contract:	Date of Contract:	
Contractor:	Engineer's Project No.:	

This [tentative] [definitive] Certificate of Substantial Completion applies to:

- All Work under the Contract Documents:
 The following specified portions:

_____ Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

- Amended Responsibilities
 Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

(THIS PAGE INTENTIONALLY LEFT BLANK)

STANDARD
GENERAL CONDITIONS
OF THE
CONSTRUCTION CONTRACT

TABLE OF CONTENTS

Page

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY	6
1.01 <i>Defined Terms</i>	6
1.02 <i>Terminology</i>	8
ARTICLE 2 - PRELIMINARY MATTERS	9
2.01 <i>Delivery of Bonds and Evidence of Insurance</i>	9
2.02 <i>Copies of Documents</i>	9
2.03 <i>Commencement of Contract Times; Notice to Proceed</i>	9
2.04 <i>Starting the Work</i>	9
2.05 <i>Before Starting Construction</i>	9
2.06 <i>Preconstruction Conference</i>	9
2.07 <i>Initial Acceptance of Schedules</i>	9
ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE	10
3.01 <i>Intent</i>	10
3.02 <i>Reference Standards</i>	10
3.03 <i>Reporting and Resolving Discrepancies</i>	10
3.04 <i>Amending and Supplementing Contract Documents</i>	11
3.05 <i>Reuse of Documents</i>	11
3.06 <i>Electronic Data</i>	11
ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS	11
4.01 <i>Availability of Lands</i>	11
4.02 <i>Subsurface and Physical Conditions</i>	12
4.03 <i>Differing Subsurface or Physical Conditions</i>	12
4.04 <i>Underground Facilities</i>	13
4.05 <i>Reference Points</i>	13
4.06 <i>Hazardous Environmental Condition at Site</i>	13
ARTICLE 5 - BONDS AND INSURANCE	14
5.01 <i>Performance, Payment, and Other Bonds</i>	14
5.02 <i>Licensed Sureties and Insurers</i>	15
5.03 <i>Certificates of Insurance</i>	15
5.04 <i>Contractor's Liability Insurance</i>	15
5.05 <i>Owner's Liability Insurance</i>	16
5.06 <i>Property Insurance</i>	16
5.07 <i>Waiver of Rights</i>	17
5.08 <i>Receipt and Application of Insurance Proceeds</i>	17
5.09 <i>Acceptance of Bonds and Insurance; Option to Replace</i>	17
5.10 <i>Partial Utilization, Acknowledgment of Property Insurer</i>	18
ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES	18
6.01 <i>Supervision and Superintendence</i>	18
6.02 <i>Labor; Working Hours</i>	18
6.03 <i>Services, Materials, and Equipment</i>	18
6.04 <i>Progress Schedule</i>	18
6.05 <i>Substitutes and "Or-Equals"</i>	19
6.06 <i>Concerning Subcontractors, Suppliers, and Others</i>	20
6.07 <i>Patent Fees and Royalties</i>	21
6.08 <i>Permits</i>	21
6.09 <i>Laws and Regulations</i>	21
6.10 <i>Taxes</i>	22
6.11 <i>Use of Site and Other Areas</i>	22
6.12 <i>Record Documents</i>	22
6.13 <i>Safety and Protection</i>	22
6.14 <i>Safety Representative</i>	23
6.15 <i>Hazard Communication Programs</i>	23

6.16	<i>Emergencies</i>	23
6.17	<i>Shop Drawings and Samples</i>	23
6.18	<i>Continuing the Work</i>	24
6.19	<i>Contractor's General Warranty and Guarantee</i>	24
6.20	<i>Indemnification</i>	24
6.21	<i>Delegation of Professional Design Services</i>	25
ARTICLE 7 - OTHER WORK AT THE SITE		25
7.01	<i>Related Work at Site</i>	25
7.02	<i>Coordination</i>	26
7.03	<i>Legal Relationships</i>	26
ARTICLE 8 - OWNER'S RESPONSIBILITIES		26
8.01	<i>Communications to Contractor</i>	26
8.02	<i>Replacement of Engineer</i>	26
8.03	<i>Furnish Data</i>	26
8.04	<i>Pay When Due</i>	26
8.05	<i>Lands and Easements; Reports and Tests</i>	26
8.06	<i>Insurance</i>	26
8.07	<i>Change Orders</i>	26
8.08	<i>Inspections, Tests, and Approvals</i>	26
8.09	<i>Limitations on Owner's Responsibilities</i>	27
8.10	<i>Undisclosed Hazardous Environmental Condition</i>	27
8.11	<i>Evidence of Financial Arrangements</i>	27
ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION.....		27
9.01	<i>Owner's Representative</i>	27
9.02	<i>Visits to Site</i>	27
9.03	<i>Project Representative</i>	27
9.04	<i>Authorized Variations in Work</i>	27
9.05	<i>Rejecting Defective Work</i>	27
9.06	<i>Shop Drawings, Change Orders and Payments</i>	28
9.07	<i>Determinations for Unit Price Work</i>	28
9.08	<i>Decisions on Requirements of Contract Documents and Acceptability of Work</i>	28
9.09	<i>Limitations on Engineer's Authority and Responsibilities</i>	28
ARTICLE 10 - CHANGES IN THE WORK; CLAIMS		28
10.01	<i>Authorized Changes in the Work</i>	28
10.02	<i>Unauthorized Changes in the Work</i>	29
10.03	<i>Execution of Change Orders</i>	29
10.04	<i>Notification to Surety</i>	29
10.05	<i>Claims</i>	29
ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK.....		30
11.01	<i>Cost of the Work</i>	30
11.02	<i>Allowances</i>	31
11.03	<i>Unit Price Work</i>	31
ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES		32
12.01	<i>Change of Contract Price</i>	32
12.02	<i>Change of Contract Times</i>	33
12.03	<i>Delays</i>	33
ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK.....		33
13.01	<i>Notice of Defects</i>	33
13.02	<i>Access to Work</i>	33
13.03	<i>Tests and Inspections</i>	33
13.04	<i>Uncovering Work</i>	34
13.05	<i>Owner May Stop the Work</i>	34
13.06	<i>Correction or Removal of Defective Work</i>	34
13.07	<i>Correction Period</i>	34
13.08	<i>Acceptance of Defective Work</i>	35
13.09	<i>Owner May Correct Defective Work</i>	35
ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION		36
14.01	<i>Schedule of Values</i>	36
14.02	<i>Progress Payments</i>	36
14.03	<i>Contractor's Warranty of Title</i>	37
14.04	<i>Substantial Completion</i>	37

14.05	<i>Partial Utilization</i>	38
14.06	<i>Final Inspection</i>	38
14.07	<i>Final Payment</i>	38
14.08	<i>Final Completion Delayed</i>	39
14.09	<i>Waiver of Claims</i>	39
ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION.....		39
15.01	<i>Owner May Suspend Work</i>	39
15.02	<i>Owner May Terminate for Cause</i>	39
15.03	<i>Owner May Terminate For Convenience</i>	40
15.04	<i>Contractor May Stop Work or Terminate</i>	40
ARTICLE 16 - DISPUTE RESOLUTION		41
16.01	<i>Methods and Procedures</i>	41
ARTICLE 17 - MISCELLANEOUS		41
17.01	<i>Giving Notice</i>	41
17.02	<i>Computation of Times</i>	41
17.03	<i>Cumulative Remedies</i>	41
17.04	<i>Survival of Obligations</i>	41
17.05	<i>Controlling Law</i>	41
17.06	<i>Headings</i>	41

GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*--The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

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

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*--The individual or entity named as such in the Agreement.

20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site*--Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain

administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

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

51. *Work*--The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times

but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. Intent of Certain Terms or Adjectives

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. Day

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. Defective

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

- a. does not conform to the Contract Documents, or
- b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or
- c. has been damaged prior to Engineer's - recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. Furnish, Install, Perform, Provide

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 Copies of Documents

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement

or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 Starting the Work

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 Before Starting Construction

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 Preconstruction Conference

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 Initial Acceptance of Schedules

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or

responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work

(unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's

sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

- a. reviewing and checking all such information and data,
- b. locating all Underground Facilities shown or indicated in the Contract Documents,
- c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
- d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will

promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to

entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified

in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection

from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any

deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order .

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract

Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or

received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. "*Or-Equal*" Items: If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

- c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
- 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services;
- 4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. Engineer's Evaluation: Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. Special Guarantee: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. Engineer's Cost Reimbursement: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract

Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. Contractor's Expense: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 Concerning Subcontractors, Suppliers, and Others

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual

or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

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

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 Taxes

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 Use of Site and Other Areas

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. Removal of Debris During Performance of the Work: During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. Cleaning: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

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

6.12 Record Documents

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 Safety and Protection

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

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

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Draw-

ings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples*: Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals , any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents

with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. Engineer's Review

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. Resubmittal Procedures

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 Continuing the Work

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or

disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 Contractor's General Warranty and Guarantee

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 Indemnification

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal

shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and
2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and

properly integrate with such other work. Contractor shall 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 Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep

Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show

partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall

promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK;
ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. 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 11.01.B.

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. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. 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 cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' 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 returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and

Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

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

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. 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 workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. 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 advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the 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.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than 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, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages 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.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. Costs Excluded: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

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.

4. 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.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. Contractor's Fee: When all the Work is performed on the basis of cost-plus, Contractor's fee shall

be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. Cash Allowances

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an

allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted

by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to

be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
2. correct such defective Work; or
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications .

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress

payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent

inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

- a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
- b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
- c. there are other items entitling Owner to a set-off against the amount recommended; or
- d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, , Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial

Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals

that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations

under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and , will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance

with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be

governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. 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

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

Certificate of Owner's Attorney.

I, the undersigned, _____, the duly authorized and acting legal representative

of _____, do hereby certify as follows

I have examined the attached contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements are adequate and have has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

Date: _____

(THIS PAGE INTENTIONALLY LEFT BLANK)

Florida Department of Environmental Protection
Bureau of Water Facilities Funding
Supplementary Conditions
for

Formally Advertised
Construction Procurement

**TABLE OF CONTENTS FOR THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS**

Article Number	Article Title	Page
1	DEFINITIONS	FDEP-4
2	PRIVITY OF AGREEMENT/CONTRACT	FDEP-6
3	PROCUREMENT REQUIREMENTS	FDEP-7
4	RESOLUTION OF PROTESTS AND CLAIMS/DISPUTES	FDEP-7
5	CHANGES TO THE BIDDING AND CONTRACT DOCUMENTS	FDEP-8
6	ADVERTISEMENT FOR BIDS; SUBMISSION OF BIDS; OPENING OF BIDS	FDEP-8
7	BONDS AND INSURANCE	FDEP-8
8	AWARD OF AGREEMENT/CONTRACT	FDEP-9
9	CONTRACT TIME AND NOTICE TO PROCEED	FDEP-10
10	ITEMIZED CONSTRUCTION COST BREAKDOWN; CONSTRUCTION AND PAYMENT SCHEDULES	FDEP-10
11	AVAILABILITY OF LANDS	FDEP-10
12	FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION CONSTRUCTION PERMIT(S)	FDEP-11
13	ENGINEER	FDEP-11
14	APPLICATIONS FOR PAYMENT	FDEP-11
15	ACCESS TO RECORDS	FDEP-11
16	ACCESS TO WORK SITE(S)	FDEP-11
17*	MINORITY AND WOMEN'S BUSINESS ENTERPRISES	FDEP-11
18*	VIOLATING FACILITIES (SECTION 306 OF THE CLEAN AIR ACT, SECTION 508 OF THE CLEAN WATER ACT, AND EXECUTIVE ORDER 11738)	FDEP-12
19*	DEBARMENT AND SUSPENSION (EXECUTIVE ORDER 12549)	FDEP-13
20	EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)	FDEP-14

***DESIGNATES PROVISIONS THAT ARE NOT REQUIRED FOR NON-EQUIVALENCY PROJECTS**

Appendix Letter	Appendix Title	Page
A*	CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION – LOWER TIER COVERED TRANSACTIONS	FDEP-16
B	NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)	FDEP-18
C	GOALS AND TIMETABLES FOR MINORITIES AND FEMALES	FDEP-20
D	EQUAL OPPORTUNITY CLAUSE	FDEP-23
E	NOTICE TO BE POSTED	FDEP-25
F	STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)	FDEP-26
G	CERTIFICATION OF COMPLIANCE WITH 41 CFR 60-1.7: REPORTS AND OTHER REQUIRED INFORMATION	FDEP-31
H	CERTIFICATION OF NONSEGREGATED FACILITIES	FDEP-33

***DESIGNATES PROVISIONS THAT ARE NOT REQUIRED FOR NON-EQUIVALENCY PROJECTS**

**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS**

The intent of the Florida Department of Environmental Protection (FDEP) Supplementary Conditions is to complement and supplement other provisions of the Bidding Documents. However, if there is any conflict between the FDEP Supplementary Conditions and other provisions of the Bidding Documents, the FDEP Supplementary Conditions shall take precedence over the other provisions except when the other provisions are similar to, but more stringent than, the FDEP Supplementary Conditions. When other provisions of the Bidding Documents are similar to, but more stringent than, the FDEP Supplementary Conditions, the more stringent provisions shall apply.

ARTICLE 1 - DEFINITIONS

1.1. Wherever used in these Supplementary Conditions (except in the appendices to these Supplementary Conditions), the following terms have the meanings indicated, which are applicable to both the singular and plural thereof.

1.1.1. Addendum - A written or graphic instrument that is issued prior to the opening of bids and that clarifies, corrects, or changes the Bidding Documents.

1.1.2. Agreement or Contract - The written agreement between the Owner and the Contractor covering the Work to be performed and furnished; these Supplementary Conditions and other Contract Documents are attached to the Agreement/Contract and made a part thereof as provided therein.

1.1.3. Application for Payment - The form that is accepted by the Engineer and used by the Contractor in requesting progress and/or final payments and that is to include such supporting documentation as is required by the Contract Documents.

1.1.4. Bid - The offer or proposal of a bidder submitted on the prescribed form and setting forth the price(s) for the Work to be performed and furnished.

1.1.5. Bidder - Any person, firm, or corporation that submits a bid directly to the Owner.

1.1.6. Bidding Documents - The Advertisement for Bids or the Invitation to Bid, the Instructions to Bidders or the Information for Bidders, the Bid Form, the proposed Contract Documents, and all addenda.

1.1.7. Bond - An instrument of security.

1.1.8. Change Order - A document that is recommended by the Engineer and signed by the Contractor and the Owner; that authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price

or the Contract Time; and that is issued on or after the Effective Date of the Agreement/Contract.

1.1.9. Contract Documents - The Agreement/Contract; the Contractor's Bid when attached as an exhibit to the Agreement/Contract; the Performance and Payment Bond(s); the General Conditions; the Supplementary Conditions (including these Supplementary Conditions); the Specifications (written technical descriptions of material, equipment, construction systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto); the Drawings (drawings that show the character and scope of the Work to be performed and furnished); all addenda that pertain to the Contract Documents; and all change orders.

1.1.10. Contract Price - The moneys payable by the Owner to the Contractor under the Contract Documents as stated in the Agreement/Contract.

1.1.11. Contract Time - The number of days or the date stated in the Contract Documents for completion of the Work.

1.1.12. Contractor - The person, firm, or corporation with whom or which the Owner enters into the Agreement/Contract.

1.1.13. Effective Date of the Agreement/Contract - The date indicated in the Agreement/Contract on which the Agreement/Contract becomes effective, or if no such date is indicated in the Agreement/Contract, the date on which the Agreement/Contract is signed and delivered by the last of the two parties to sign and deliver the Agreement/Contract.

1.1.14. Engineer - The person, firm, or corporation named as such in the Contract Documents.

1.1.15. Minority Business Enterprise (MBE) - A historically Black college or university or a business that is (a) certified as socially and economically disadvantaged by the Small Business Administration, (b) certified as an MBE by a state or Federal agency, or (c) an independent business concern which is at least 51-percent owned and controlled by minority group members. (A minority group member is an individual who is a citizen of the United States and one of the following: [i] Black American; [ii] Hispanic American [with origins from Puerto Rico, Mexico, Cuba, or South or Central America]; [iii] Native American [American Indian, Eskimo, Aleut, or native Hawaiian]; or [iv] Asian-Pacific American [with origins from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the U.S. Trust Territories of the Pacific, Northern Marianas, Laos, Cambodia, Taiwan, or the Indian Subcontinent].)

1.1.16. Notice to Proceed - The written notice given by the Owner to the Contractor fixing the date on which the Contract Time will commence to run and on which the Contractor shall start to perform its obligations under the Contract Documents.

1.1.17. Owner - The local government (municipality, county, district, or authority; or any agency thereof; or a combination of two or more of the foregoing acting jointly) with which the Florida Department of Environmental Protection may execute, or has executed, a State revolving fund loan agreement and for which the Work is to be provided.

1.1.18. Project - The total construction or facilities described in a State revolving fund loan agreement between the Florida Department of Environmental Protection and the Owner, of which the Work to be provided under the Contract Documents may be the whole or a part.

1.1.19. Subcontract - A direct contract between a subcontractor and the Contractor, or any other subcontractor at any tier, for the furnishing of goods (material and equipment) or the performance of services (including construction) necessary to complete the Work.

1.1.20. Subcontractor - A person, firm, or corporation having a direct contract with the Contractor, or any other subcontractor at any tier, for the furnishing of goods (material and equipment) or the performance of services (including construction) necessary to complete the Work.

1.1.21. Successful Bidder - The lowest responsive, responsible bidder to whom or which the Owner intends to award the Agreement/Contract.

1.1.22. Women's Business Enterprise (WBE) - A business that is (a) certified as a WBE by a state or Federal agency or (b) an independent business concern which is at least 51-percent owned and controlled/operated by women. (Determination of whether a business is at least 51-percent owned by women shall be made without regard to community property laws [e.g., an otherwise qualified WBE that is 51-percent owned by a married woman in a community property state will not be disqualified because the married woman's husband has a 50-percent interest in the married woman's share of the business; similarly, a business that is 51-percent owned by a married man and 49-percent owned by women will not become a qualified WBE by virtue of the married man's wife having a 50-percent interest in the married man's share of the business].)

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

ARTICLE 2 - PRIVACY OF AGREEMENT/CONTRACT

2.1. The Owner expects to finance this Agreement/Contract with assistance from the Florida Department of Environmental Protection, which administers a State revolving fund loan program supported in part with funds directly made available by grants from the United States Environmental Protection Agency. Neither the State of Florida nor the United States (nor any of their

departments, agencies, or employees) will be a party to this Agreement/Contract or any lower-tier subcontract.

ARTICLE 3 - PROCUREMENT REQUIREMENTS

3.1. This Agreement/Contract and the Owner's solicitation and award of this Agreement/Contract are subject to requirements contained in Chapter 62-552 (Revolving Loan Program), Florida Administrative Code.

ARTICLE 4 - RESOLUTION OF PROTESTS AND CLAIMS/DISPUTES

Resolution of Protests Concerning the Owner's Solicitation and/or Award of this Agreement/Contract:

4.1. Protests concerning the Owner's solicitation and/or award of this Agreement/Contract must be filed in writing with the Owner to be considered.

4.2. All timely written protests concerning the Owner's solicitation and/or award of this Agreement/Contract are to be resolved in accordance with the Owner's dispute resolution process. A copy of the ordinance(s), resolution(s), or written policy(policies) that set forth the Owner's dispute resolution process is included elsewhere in the Bidding Documents or is to be made available by the Owner upon request.

4.3. Neither the Florida Department of Environmental Protection (FDEP) nor the United States Environmental Protection Agency (USEPA) will become a party to, or have any role in resolving, protests concerning the Owner's solicitation and/or award of this Agreement/Contract. Protest decisions made by the Owner can not be appealed to the FDEP or the USEPA.

Resolution of Claims and Disputes Between the Owner and the Contractor:

4.4. Unless otherwise provided in the Contract Documents, all claims and disputes between the Owner and the Contractor arising out of, or relating to, the Contract Documents or the breach thereof are to be decided by arbitration (if the Owner and the Contractor mutually agree) or in a court of competent jurisdiction within the State of Florida.

4.5. Neither the Florida Department of Environmental Protection nor the United States Environmental Protection Agency will become a party to, or have any role in resolving, claims and disputes between the Owner and the Contractor.

ARTICLE 5 - CHANGES TO THE BIDDING AND CONTRACT DOCUMENTS

5.1. All changes to the Bidding Documents made subsequent to the Florida Department of Environmental Protection's (FDEP's) acceptance of the Bidding Documents and prior to the opening of bids are to be documented via addendum(addenda) to the Bidding Documents; all changes to the Contract Documents made after the opening of bids are to be documented by change order(s) to the Contract Documents. The Owner shall submit all addenda and change orders to the FDEP.

ARTICLE 6 - ADVERTISEMENT FOR BIDS; SUBMISSION OF BIDS; OPENING OF BIDS

Advertisement for Bids:

6.1. At a minimum, this Agreement/Contract is to be advertised for bids in local and statewide newspapers.

Submission of Bids:

6.2. Bidders shall submit their bids at the place and by the deadline indicated elsewhere in the Bidding Documents.

Opening of Bids:

6.3. Bids are to be opened and read aloud publicly at the time and place indicated elsewhere in the Bidding Documents.

ARTICLE 7 - BONDS AND INSURANCE

Bid Guarantees:

7.1. Each bidder's bid is to be accompanied by a bid guarantee made payable to the Owner in an amount at least equal to five percent of the bidder's maximum bid price and in the form of a certified check or bid bond.

Performance and Payment Bond(s):

7.2. The Contractor shall furnish a combined performance and payment bond in an amount at least equal to 100 percent of the Contract Price (or, if required elsewhere in the Contract Documents, the Contractor shall furnish separate performance and payment bonds, each in an amount at least equal to 100 percent of the Contract Price) as security for the faithful performance and payment of all the Contractor's obligations under the Contract Documents. This(these) bond(s) are to be delivered to the Owner by the Contractor along with the executed Agreement/Contract. The Owner shall forward a copy of this(these) bond(s) to the Florida Department of Environmental Protection.

Insurance :

7.3. The Owner and/or the Contractor (as required elsewhere in the Contract Documents) shall purchase and maintain, during the period of construction, such liability insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims that may arise out of, or result from, the Contractor's performance and furnishing of the Work (whether the Work is to be performed or furnished by the Contractor or any subcontractor at the Work site) and the Contractor's other obligations under the Contract Documents. This insurance is to include workers' compensation insurance, comprehensive general liability insurance, comprehensive automobile liability insurance, and contractual liability insurance applicable to the Contractor's indemnification obligations and is to be written for not less than the limits of liability and coverages determined by the Owner or required by law, whichever is greater.

7.4. The Owner and/or the Contractor (as required elsewhere in the Contract Documents) shall purchase and maintain, during the period of construction, property insurance upon the Work at the Work site in an amount equal to the full replacement cost of the Work or the full insurable value of the Work. This insurance is to include the interests of the Owner, the Contractor, and all subcontractors at the Work site (all of whom are to be listed as insureds or additional insured parties); is to insure against the perils of fire and extended coverage; and is to include "all-risk" insurance for physical loss or damage due to theft, vandalism and malicious mischief, collapse, water damage, and/or all other risks against which coverage is obtainable.

7.5. Before any Work at the Work site is started, the Contractor shall deliver to the Owner certificates of insurance that the Contractor is required to purchase and maintain in accordance with Paragraphs 7.3 and 7.4 of this Article and other provisions of the Contract Documents, and the Owner shall deliver to the Contractor certificates of insurance that the Owner is required to purchase and maintain in accordance with Paragraphs 7.3 and 7.4 of this Article and other provisions of the Contract Documents. The Owner shall forward a copy of these certificates to the Florida Department of Environmental Protection.

ARTICLE 8 - AWARD OF AGREEMENT/CONTRACT

8.1. If this Agreement/Contract is awarded, it is to be awarded to the lowest responsive, responsible bidder. A fixed-price (lump-sum or unit-price or both) agreement/contract is to be used. A clear explanation of the method of evaluating bids and the basis for awarding this Agreement/Contract are included elsewhere in the Bidding Documents. All bids may be rejected when in the best interest of the Owner.

ARTICLE 9 - CONTRACT TIME AND NOTICE TO PROCEED

Contract Time:

9.1. The number of days within which, or the date by which, the Work is to be completed and ready for final payment (the Contract Time) is set forth elsewhere in the Contract Documents.

Notice to Proceed:

9.2. The Owner shall give the Contractor a notice to proceed fixing the date on which the Contract Time will commence to run. The Owner shall forward a copy of this notice to proceed to the Florida Department of Environmental Protection.

ARTICLE 10 - ITEMIZED CONSTRUCTION COST BREAKDOWN; CONSTRUCTION AND PAYMENT SCHEDULES

10.1. The Contractor shall submit to the Owner, within ten calendar days after the Effective Date of this Agreement/Contract, an itemized construction cost breakdown and construction and payment schedules.

10.1.1. The itemized construction cost breakdown, or schedule of values, is to include quantities and prices of items aggregating the Contract Price and is to subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices are to include an appropriate amount of overhead and profit applicable to each item of Work.

10.1.2. The construction, or progress, schedule is to indicate the Contractor's estimated starting and completion dates for the various stages of the Work and is to show both the projected cost of Work completed and the projected percentage of Work completed versus Contract Time.

10.1.3. The payment schedule is to show the Contractor's projected progress and final payments cumulatively by month.

ARTICLE 11 - AVAILABILITY OF LANDS

11.1. The Owner shall furnish all lands and shall obtain all rights-of-ways and easements upon which the Work is to be performed and furnished.

ARTICLE 12 - FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION CONSTRUCTION PERMIT(S)

12.1. The Owner shall obtain the appropriate Florida Department of Environmental Protection construction permit(s) required for the Work.

ARTICLE 13 - ENGINEER

13.1. The Owner shall employ a professional engineer registered in the State of Florida to oversee the Work.

ARTICLE 14 - APPLICATIONS FOR PAYMENT

14.1. The Contractor's applications for payment are to be accompanied by such certificates or documents as may be reasonably required. The Owner shall forward a copy of such certificates or documents as may be reasonably required to the Florida Department of Environmental Protection.

ARTICLE 15 - ACCESS TO RECORDS

15.1. Authorized representatives of the Owner, the Florida Department of Environmental Protection, and the United States Environmental Protection Agency shall have access to, for the purpose of inspection, any books, documents, papers, and records of the Contractor that are pertinent to this Agreement/Contract. The Contractor shall retain all books, documents, papers, and records pertinent to this Agreement/Contract for a period of five years after receiving and accepting final payment under this Agreement/Contract.

ARTICLE 16 - ACCESS TO WORK SITE(S)

16.1. Authorized representatives of the Owner, the Florida Department of Environmental Protection (FDEP), and the United States Environmental Protection Agency (USEPA) shall have access to the Work site(s) at any reasonable time. The Contractor shall cooperate (including making available working copies of plans and specifications and supplementary materials) during Work site inspections conducted by the Owner, the FDEP, or the USEPA.

ARTICLE 17 - MINORITY AND WOMEN'S BUSINESS ENTERPRISES

17.1. A goal of ____* percent of the Contract Price is established for Minority Business Enterprise (MBE) participation in the Work, and a goal of ____* percent of the Contract Price is established for Women's Business Enterprise (WBE) participation in the Work. If bidders or prospective contractors (including the Contractor) intend to let any lower-tier goods or services (including construction) subcontracts for any portion of the Work, they shall physically include these percentage goals for MBE and WBE participation in all solicitations for subcontracts and shall take affirmative steps to assure that MBEs and WBEs are utilized, when possible, as sources of goods and services. Affirmative steps are to include the following: (a) including small, minority, and women's businesses on solicitation lists; (b) assuring that small, minority, and women's businesses are solicited whenever they are potential sources; (c) dividing total requirements, when economically feasible, into small tasks or quantities to permit maximum participation by small, minority, and women's businesses; (d) establishing delivery schedules, when requirements permit, that will encourage participation by small, minority, and women's businesses; and (e) using the services of the Small Business Administrative and the Office of Minority Business Enterprise of the United States Department of Commerce as appropriate.

*The percentage goals for MBE and WBE participation are to be inserted by the Owner and are to be based upon the percentage goals that have been, or will be, stipulated in the State revolving fund loan agreement

for the Owner's FDEP-assisted Project.

17.2. Within ten calendar days after being notified of being the apparent Successful Bidder, the apparent Successful Bidder shall submit to the Owner documentation of the affirmative steps it has taken to utilize Minority and Women's Business Enterprises (MBEs and WBEs) in the Work and documentation of its intended use of MBEs and WBEs in the Work. The Owner shall keep this documentation on file and shall forward to the Florida Department of Environmental Protection a copy of the apparent Successful Bidder's documentation concerning its intended use of MBEs and WBEs in the Work.

17.3. Minority and Women's Business Enterprise (MBE and WBE) participation in the Work is to be considered in the award of this Agreement/Contract. The Owner shall not execute this Agreement/Contract until the Florida Department of Environmental Protection has approved the extent of MBE and WBE participation in the Work.

ARTICLE 18 - VIOLATING FACILITIES (SECTION 306 OF THE CLEAN AIR ACT, SECTION 508 OF THE CLEAN WATER ACT, AND EXECUTIVE ORDER 11738)

18.1. The Contractor, and all subcontractors at any tier, shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 U.S.C. 1857[h]), Section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738 (Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans), and 40 CFR Part 15, which prohibit the use, under nonexempt Federal contracts, grants, or loans, of facilities included on the United States Environmental Protection Agency's List of Violating Facilities.

18.2. In accordance with 40 CFR Part 15, if the price of this Agreement/Contract exceeds \$100,000 and/or if this Agreement/Contract is otherwise nonexempt from 40 CFR Part 15, the Contractor agrees to the following:

18.2.1. the Contractor will not use any facility on the United States Environmental Protection Agency's List of Violating Facilities in the performance of this Agreement/Contract for the duration of time that the facility remains on the List;

18.2.2. the Contractor will notify the Florida Department of Environmental Protection/United States Environmental Protection Agency (USEPA) if a facility it intends to use in the performance of this Agreement/Contract is on the USEPA's List of Violating Facilities or if it knows that a facility it intends to use in the performance of this Agreement/Contract has been recommended to be placed on the USEPA's List of Violating Facilities; and

18.2.3. in the performance of this Agreement/Contract, the Contractor will comply with all requirements of the Clean Air Act and the Clean Water Act, including the requirements of Section 114 of the Clean Air Act and Section 308 of the Clean Water Act, and all applicable clean air standards and clean water standards.

18.3. If the Contractor, or any subcontractor at any tier, awards any lower-tier goods or services (including construction) subcontracts for any portion of the Work, it shall physically include in all such subcontracts the following provision:

18.3.1. The Subcontractor shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 U.S.C. 1857[h]), Section 508 of the Clean Water Act (33 U.S.C. 1368), Executive Order 11738 (Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans), and 40 CFR Part 15, which prohibit the use, under nonexempt Federal contracts, grants, or loans, of facilities included on the United States Environmental Protection Agency's (USEPA's) List of Violating Facilities. In accordance with 40 CFR Part 15, if the price of this Subcontract exceeds \$100,000 and/or if this Subcontract is otherwise nonexempt from 40 CFR Part 15, the Subcontractor agrees to the following: (a) the Subcontractor will not use any facility on the USEPA's List of

Violating Facilities in the performance of this Subcontract for the duration of time that the facility remains on the List; (b) the Subcontractor will notify the Florida Department of Environmental Protection/USEPA if a facility it intends to use in the performance of this Subcontract is on the USEPA's List of Violating Facilities or if it knows that a facility it intends to use in the performance of this Subcontract has been recommended to be placed on the USEPA's List of Violating Facilities; and (c) in the performance of this Subcontract, the Subcontractor will comply with all requirements of the Clean Air Act and the Clean Water Act, including the requirements of Section 114 of the Clean Air Act and Section 308 of the Clean Water Act, and all applicable clean air standards and clean water standards. In addition, if the Subcontractor awards any lower-tier goods or services (including construction) subcontracts under this Subcontract, the Subcontractor shall physically include this provision in all such subcontracts.

ARTICLE 19 - DEBARMENT AND SUSPENSION (EXECUTIVE ORDER 12549)

19.1. If the price of this Agreement/Contract equals or exceeds \$25,000, the Owner shall not award this Agreement/Contract, nor permit any lower-tier goods or services (including construction) subcontract with a price equaling or exceeding \$25,000 to be awarded, to any party that is debarred or suspended or is otherwise excluded from, or ineligible for participation in, Federal assistance programs under Executive Order 12549 (Debarment and Suspension).

19.2. The attention of all bidders or prospective contractors (including the Contractor) is directed to the certification/clause entitled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions", which has been extracted from Appendix B to 40 CFR Part 32 and included as Appendix A to these Supplementary Conditions. The certification/clause entitled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions" is applicable to this Agreement/Contract if the price of this Agreement/Contract equals or exceeds \$25,000.

19.3. If bidders or prospective contractors (including the Contractor), or any prospective subcontractors at any tier, intend to let any lower-tier goods or services (including construction) subcontracts for any portion of the Work, they shall physically include the certification/clause entitled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions", which is included as Appendix A to these Supplementary Conditions, in all lower-tier goods and services (including construction) subcontracts with a price equaling or exceeding \$25,000 and in all solicitations for such subcontracts.

ARTICLE 20 - EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

20.1. If the price of this Agreement/Contract exceeds \$10,000, the Contractor, and each construction subcontractor awarded a lower-tier construction subcontract with a price exceeding \$10,000, shall comply with Executive Order 11246 of September 24, 1965 (Equal Employment Opportunity), as amended by Executive Order 11375 of October 13, 1967, and as supplemented in United States Department of Labor regulations (41 CFR Part 60).

20.2. The attention of all bidders or prospective contractors (including the Contractor) is directed to the following, all of which are applicable to this Agreement/Contract if the price of this Agreement/Contract exceeds \$10,000:

20.2.1. the "Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)", which has been extracted from 41 CFR 60-4.2(d) and included as Appendix B to these Supplementary Conditions;

20.2.2. the "Goals and Timetables for Minorities and Females", which are included as Appendix C to these Supplementary Conditions;

20.2.3. the "Equal Opportunity Clause", which has been extracted from 41 CFR 60-1.4(b) and included as Appendix D to these Supplementary Conditions;

20.2.4. the "Notice to Be Posted", which has been extracted from 41 CFR 60-1.42(a) and included as Appendix E to these Supplementary Conditions;

20.2.5. the "Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)", which have been extracted from 41 CFR 60-4.3(a) and included as Appendix F to these Supplementary Conditions;

20.2.6. the "Certification of Compliance with 41 CFR 60-1.7: Reports and Other Required Information", which is required by 41 CFR 60-1.7(b) and is included as Appendix G to these Supplementary Conditions; and

20.2.7. the "Certification of Nonsegregated Facilities", which is required by 41 CFR 60-1.8(b) and is included as Appendix H to these Supplementary Conditions.

20.3. If bidders or prospective contractors (including the Contractor), or any prospective construction subcontractors at any tier, intend to let any lower-tier construction subcontracts for any portion of the Work, they shall physically include in all lower-tier construction subcontracts with a price exceeding \$10,000 and in all solicitations for such subcontracts the "Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)", the "Goals and Timetables for Minorities and Females", the "Equal Opportunity Clause", the "Notice to Be Posted", the "Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)", the "Certification of Compliance with 41 CFR 60-1.7: Reports and Other Required Information", and the "Certification of Nonsegregated Facilities", which are included as Appendices B through H to these Supplementary Conditions.

20.4. If the price of this Agreement/Contract exceeds \$10,000, all bidders shall complete and submit to the Owner, with their bids, the "Certification of Compliance with 41 CFR 60-1.7: Reports and Other Required Information", which is included as Appendix G to these Supplementary Conditions. In addition, if bidders (including the Contractor), or any prospective construction subcontractors at any tier, intend to let any lower-tier construction subcontracts for any portion of the Work, they shall obtain the "Certification of Compliance with 41 CFR 60-1.7: Reports and Other Required Information" from each prospective construction subcontractor that may be awarded a lower-tier construction subcontract with a price exceeding \$10,000 and shall do so at the time bids or offers for each such subcontract are received or at the outset of negotiations for each such subcontract.

20.5. If the price of this Agreement/Contract exceeds \$10,000, the apparent Successful Bidder shall complete and submit to the Owner, within ten calendar days after being notified of being the apparent Successful Bidder, the "Certification of Nonsegregated Facilities", which is included as Appendix H to these Supplementary Conditions. In addition, if the Contractor, or any construction subcontractor at any tier, intends to let any lower-tier construction subcontracts for any portion of the Work, it shall obtain the "Certification of Nonsegregated Facilities" from each prospective construction subcontractor that will be awarded a lower-tier construction subcontract with a price exceeding \$10,000 and shall do so before awarding each such subcontract.

20.6. If the price of this Agreement/Contract exceeds \$10,000, the Owner shall give written notice to the Director of the Office of Federal Contract Compliance Programs within ten working days of award of this Agreement/Contract. The notice is to include the name, address, and telephone number of the Contractor; the employer identification number of the Contractor; the dollar amount of this Agreement/Contract; the estimated starting and completion dates of this Agreement/Contract; the number of this Agreement/Contract; and the geographical area in which the Work is to be performed.

20.7. If the price of this Agreement/Contract equals or exceeds \$50,000 and if the Contractor has 50 or more employees, the Contractor shall file with the Florida Department of Environmental Protection (FDEP)/United States Environmental Protection Agency (USEPA), within 30 calendar days after the award of this Agreement/Contract, a report on Standard Form 100 (EEO-1), which has been promulgated jointly by the Office of Federal Contract Compliance Programs, the Equal Employment Opportunity Commission, and Plans for Progress, unless the Contractor has submitted such a

report within 12 months preceeding the date of award of this Agreement/Contract. In addition, the Contractor shall ensure that each construction subcontractor having 50 or more employees and a lower-tier construction subcontract with a price equaling or exceeding \$50,000 also files with the FDEP/USEPA, within 30 calendar days after the award to it of the lower-tier construction subcontract, a report on Standard Form 100 (EEO-1) unless the construction subcontractor has submitted such a report within 12 months preceding the date of award of the lower-tier construction subcontract. (Subsequent reports are to be submitted annually in accordance with 41 CFR 60-1.7(a) or at such other intervals as the Director of the Office of Federal Contract Compliance Programs may require.)

**APPENDIX A TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS****CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY
EXCLUSION - LOWER TIER COVERED TRANSACTIONS**

[Note: This certification/clause has been extracted from Appendix B to 40 CFR Part 32 and is applicable to all FDEP-assisted goods and services (including construction) contracts and subcontracts with a price equaling or exceeding \$25,000; this certification/clause is to be included in all FDEP-assisted goods and services (including construction) contracts and subcontracts with a price equaling or exceeding \$25,000 and in all solicitations for such contracts and subcontracts.]

Instructions for Certification

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms "covered transaction", "debarred", "suspended", "ineligible", "lower tier covered transaction", "participant", "person", "primary covered transaction", "principal", "proposal", and "voluntarily excluded", as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions", without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily

excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

(3) The prospective lower-tier participant also certifies that it and its principals:

(a) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(b) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (3)(a) of this certification; and

(c) Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default. Where the prospective lower-tier participant is unable to certify to any of the above, such prospective participant shall attach an explanation to this proposal.

**APPENDIX B TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS**

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL
EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

[Note: This notice has been extracted from 41 CFR 60-4.2(d) and is applicable to all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000; this notice is to be included in all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000 and in all solicitations for such contracts and subcontracts.]

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on on all construction work in the covered area, are as follows:

Timetables	Goals for minority participation for each trade	Goals for female participation in each trade
	Insert goals for each year.	Insert goals for each year.

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is _____.
(Insert description of the geographical areas where the contract is to be performed giving the state, county and city, if any.)

**APPENDIX C TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS**

GOALS AND TIMETABLES FOR MINORITIES AND FEMALES

[Note: These goals and timetables are the goals and timetables referred to in Paragraph 2 of the "Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)"; these goals and timetables are to be included in all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000 and in all solicitations for such contracts and subcontracts.]

Appendix A

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of \$10,000. The goals are applicable to the contractor's aggregate on-site construction workforce whether or not part of that workforce is performing work on a Federal or federally-assisted construction contract or subcontract.

Area covered: Goals for Women apply nationwide.

Goals and Timetables

Timetable	Goals (percent)
Indefinite	6.9

Appendix B-80

Until further notice, the following goals for minority utilization in each construction craft and trade shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of \$10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total onsite construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors which are participating in an approved Hometown Plan (see 41 CFR 60-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work, such contractors are required to comply with the applicable SMSA or EA goal contained in this Appendix B-80.

Economic Areas

State	Goal (percent)
-------	----------------

Florida

041 Jacksonville, FL:	
SMSA Counties:	
2900 Gainesville, FL	20.6
FL - Alachua	
3600 Jacksonville, FL	21.8
FL - Baker, Clay, Duval, Nassau, St. Johns	
Non-SMSA Counties	22.2
FL - Bradford, Columbia, Dixie, Gilchrist, Hamilton, LaFayette, Levy, Marion, Putnam, Suwannee, Union; GA - Brantley, Camden, Charlton, Glynn, Pierce, Ware	
042 Orlando - Melbourne - Daytona Beach, FL:	
SMSA Counties:	
2020 Daytona Beach, FL	15.7
FL - Volusia	
4900 Melbourne - Titusville - Cocoa, FL	10.7
FL - Brevard	
5960 Orlando, FL	15.5
FL - Orange, Osceola, Seminole	
Non-SMSA Counties	14.9
FL - Flagler, Lake, Sumter	
043 Miami - Fort Lauderdale, FL:	
SMSA Counties:	
2680 Fort Lauderdale - Hollywood, FL	15.5
FL - Broward	
5000 Miami, FL	39.5
FL - Dade	
8960 West Palm Beach - Boca Raton, FL	22.4
FL - Palm Beach	
Non-SMSA Counties	30.4
FL - Glades, Hendry, Indian River, Martin, Monroe, Okeechobee, St. Lucie	

Economic Areas

State	Goal (percent)
-------	----------------

Florida - continued

044 Tampa - St. Petersburg, FL:	
SMSA Counties:	
1140 Bradenton, FL	15.9
FL - Manatee	
2700 Fort Myers, FL	15.3
FL - Lee	
3980 Lakeland - Winter Haven, FL	18.0
FL - Polk	
7510 Sarasota, FL	10.5
FL - Sarasota	
8280 Tampa - St. Petersburg, FL	17.9
FL - Hillsborough, Pasco, Pinellas	
Non-SMSA Counties	17.1
FL - Charlotte, Citrus, Collier, DeSoto, Hardee, Hernando, Highlands	
045 Tallahassee, FL:	
SMSA Counties:	
8240 Tallahassee, FL	24.3
FL - Leon, Wakulla	
Non-SMSA Counties	29.5
FL - Calhoun, Franklin, Gadsden, Jackson, Jefferson, Liberty, Madison, Taylor	
046 Pensacola - Panama City, FL:	
SMSA Counties:	
6015 Panama City, FL	14.1
FL - Bay	
6080 Pensacola, FL	18.3
FL - Escambia, Santa Rosa	
Non-SMSA Counties	15.4
FL - Gulf, Holmes, Okaloosa, Walton, Washington	

**APPENDIX D TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS**

EQUAL OPPORTUNITY CLAUSE

[Note: This clause has been extracted from 41 CFR 60-1.4(b) and is applicable to all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000; this clause is to be included in all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000 and in all solicitations for such contracts and subcontracts.]

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor 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, or national origin. Such action shall include, but not be limited to the following: 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 contractor 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.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor 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.

(5) The contractor 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.

(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor 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.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) 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 contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a contractor becomes involved in, or is threatened with, litigation with a

subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

**APPENDIX E TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS**

NOTICE TO BE POSTED

[Note: This notice has been extracted from 41 CFR 60-1.42(a) and is the notice referred to in Paragraphs (1) and (3) of the "Equal Opportunity Clause"; this notice is to be included in all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000 and in all solicitations for such contracts and subcontracts.]

EQUAL EMPLOYMENT OPPORTUNITY IS THE LAW - DISCRIMINATION IS PROHIBITED
BY THE CIVIL RIGHTS ACT OF 1964 AND BY EXECUTIVE ORDER NO. 11246

Title VII of the Civil Rights Act of 1964 - Administered by:

THE EQUAL EMPLOYMENT OPPORTUNITY COMMISSION

Prohibits discrimination because of Race, Color, Religion, Sex, or National Origin by Employers with 75 or more employees, by Labor Organizations with a hiring hall of 75 or more members, by Employment Agencies, and by Joint Labor-Management Committees for Apprenticeship or Training. After July 1, 1967, employers and labor organizations with 50 or more employees or members will be covered; after July 1, 1968, those with 25 or more will be covered.

ANY PERSON

Who believes he or she has been discriminated against

SHOULD CONTACT

THE EQUAL EMPLOYMENT OPPORTUNITY COMMISSION

2401 E Street NW, Washington, D.C. 20506

Executive Order No. 11246 - Administered by:

THE OFFICE OF FEDERAL CONTRACT COMPLIANCE PROGRAMS

Prohibits discrimination because of Race, Color, Religion, Sex, or National Origin, and requires affirmative action to ensure equality of opportunity in all aspects of employment.

By all Federal Government Contractors and Subcontractors, and by Contractors Performing Work Under a Federally Assisted Construction Contract, regardless of the number of employees in either case.

ANY PERSON

Who believes he or she has been discriminated against

SHOULD CONTACT

THE OFFICE OF FEDERAL CONTRACT COMPLIANCE PROGRAMS

U.S. Department of Labor, Washington, D.C. 20210

**APPENDIX F TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS**

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION
CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

[Note: These specifications have been extracted from 41 CFR 60-4.3(a) and are applicable to all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000; these specifications are to be included in all FDEP-assisted

construction contracts and subcontracts with a price exceeding \$10,000 and in all solicitations for such contracts and subcontracts.]

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction Contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the FEDERAL REGISTER in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make

substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
- i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
- k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
- o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
- p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority

and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligation under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

APPENDIX G TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS

CERTIFICATION OF COMPLIANCE WITH 41 CFR 60-1.7: REPORTS AND OTHER REQUIRED
INFORMATION

[Note: This certification is required by 41 CFR 60-1.7(b) and is applicable to all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000; this certification is to be included in all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000 and in all solicitations for such contracts and subcontracts.]

This certification relates to a construction contract proposed by _____, which expects to finance the proposed (insert the name of the Owner) construction contract with assistance from the Florida Department of Environmental Protection (which administers a State revolving fund loan program supported in part with funds directly made available by grants from the United States Environmental Protection Agency). I am the undersigned prospective construction contractor or subcontractor. I certify that...

- (1) I ___ have/ ___ have not participated in a previous contract or subcontract subject to the Equal Opportunity Clause and
- (2) if I have participated in a previous contract or subcontract subject to the Equal Opportunity Clause, I ___ have/ ___ have not filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance Programs, or the Equal Employment Opportunity Commission all reports due under the applicable filing requirements.

I understand that, if I have participated in a previous contract or subcontract subject to the Equal Opportunity Clause and have failed to file all reports due under the applicable filing requirements, I am not eligible, and will not be eligible, to have my bid or offer considered, or to enter into the proposed contract or subcontract, unless and until I make an arrangement regarding such reports that is satisfactory to the office where the reports are required to be filed.

I agree that I will obtain identical certifications from prospective lower-tier construction subcontractors when I receive bids or offers or initiate negotiations for any lower-tier construction subcontracts with a price exceeding \$10,000. I also agree that I will retain such certifications in my files.

(Signature of Authorized Official) (Date)

(Name and Title of Authorized Official [Print or Type])

(Name of Prospective Construction Contractor or Subcontractor
[Print or Type])

(Address and Telephone Number of Prospective Construction Contractor or
Subcontractor [Print or Type])

(Employer Identification Number of Prospective Construction Contractor or
Subcontractor)

APPENDIX H TO THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
SUPPLEMENTARY CONDITIONS

CERTIFICATION OF NONSEGREGATED FACILITIES

[Note: This certification is required by 41 CFR 60-1.8(b) and is applicable to all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000; this certification is to be included in all FDEP-assisted construction contracts and subcontracts with a price exceeding \$10,000 and in all solicitations for such contracts and subcontracts.]

This certification relates to a construction contract proposed by _____, which expects to finance the proposed (insert the name of the Owner)

construction contract with assistance from the Florida Department of Environmental Protection (which administers a State revolving fund loan program supported in part with funds directly made available by grants from the United States Environmental Protection Agency). I am the undersigned prospective construction contractor or subcontractor. I certify that I do not and will not maintain any facilities I provide for my employees in a segregated manner and that I do not and will not permit my employees to perform their services at any locations under my control where segregated facilities are maintained.

I agree that I will obtain identical certifications from prospective lower-tier construction subcontractors prior to the award of any lower-tier construction subcontracts with a price exceeding \$10,000. I also agree that I will retain such certifications in my files.

(Signature of Authorized Official)

(Date)

(Name and Title of Authorized Official [Print or Type])

(Name of Prospective Construction Contractor or Subcontractor [Print or Type])

(Address and Telephone Number of Prospective Construction Contractor or Subcontractor [Print or Type])

(Employer Identification Number of Prospective Construction Contractor or Subcontractor)

(THIS PAGE INTENTIONALLY LEFT BLANK)

Change Order

No. _____

Date of Issuance: _____ Effective Date: _____

Project:	Owner:	Owner's Contract No.:
Contract:	Date of Contract:	
Contractor:	Engineer's Project No.:	

The Contract Documents are modified as follows upon execution of this Change Order:

Description: _____

Attachments: (List documents supporting change): _____

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: \$ _____	Original Contract Times: <input type="checkbox"/> Working days <input type="checkbox"/> Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: \$ _____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: \$ _____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: \$ _____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: \$ _____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____ Engineer (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____
Approved by Funding Agency (if applicable): _____		Date: _____

Change Order Instructions

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

TECHNICAL SPECIFICATIONS

(THIS PAGE INTENTIONALLY LEFT BLANK)

1. COORDINATION OF WORK

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

2. SUBMITTAL DATA

The Contractor shall be required to submit five (5) copies of pertinent information, shop drawings and literature on all materials and items of equipment to be installed in conjunction with these specifications. Before ordering or installing any of the equipment or materials, the Contractor shall have one copy of submittal data on each item approved by the Engineer in writing and returned to him.

3. OPERATION AND MAINTENANCE MANUALS

The Contractor shall furnish the Engineer three (3) complete, bound and indexed sets of literature giving the following information:

- a. Clear and concise instructions for operation, adjustment, and lubrication and other maintenance of the equipment. These instructions shall include a complete lubrication chart.
- b. A list of all parts of the equipment, with catalog numbers and other data necessary for ordering replacement parts.
- c. Such instruction and parts lists shall have been prepared specifically for the model and type of equipment furnished and shall not refer to other models and types of similar equipment.

4. AS-BUILT RECORDS

A complete set of as-built records shall be kept by the Contractor. These records shall show all items of construction and equipment which differ in size, shape or location from those shown on the contract drawings. All new valve installations shall be referenced to three (3) permanent points. These records shall be kept up-to-date daily. They may be kept on a mark-up set of contract drawings for this purpose, or in any other form which is approved prior to the beginning of the work.

5. INSPECTIONS REQUIRED BY CONTRACTOR

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

- 1) Bottom of all footings and slabs prior to reinforcing steel placement.
- 2) Reinforcing steel prior to concrete placement.
- 3) Placement of concrete.
- 4) Placement of mechanical equipment.
- 5) Any major tie-ins or valve placements prior to backfill.
- 6) Hydrostatic tests of pressure pipework.
- 7) Process operational tests.
- 8) Start-up.
- 9) Final clean-up of sites.

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

6. PROJECT COMPLETION

The date of substantial completion shall be that date that the Owner can receive for use and benefit the work completed. This date is also the date for figuring any liquidated damages. However, if the final work is not fully completed within 30 days from the date of substantial completion, then the Owner reserves the right to reactivate the liquidated damage clause and the time will run until all work is fully completed, including any outstanding punch list items.

7. PROJECT SIGN

The Contractor for Contract I shall provide one (1) project sign in accordance with the enclosed drawing. The sign shall be erected at the System office. The sign shall be erected as soon as the project starts and shall remain until final acceptance. If warranted by the Owner, the Contractor will then remove and dispose of the sign upon project completion.

END OF SECTION 00400

(THIS PAGE INTENTIONALLY LEFT BLANK)

This section and the bid items identified below describe the basis of payment for all work required by the contract documents. If the contractor believes that any work required by the contract documents is not specifically accounted for in the bid items below (and on the bid form) the contractor shall assume that the work in question is a subsidiary obligation of one of the existing bid items and shall account for the work in his bid for an item of his choosing. All work, fees and costs associated with the performance of the work specified by the contract documents, which may not be specifically addressed by the contract documents, shall be considered subsidiary obligations of the contractor and shall be accounted for by the contractor under the following item bids. No additional payment or consideration shall be made for subsidiary obligations. Some specific examples, but not a complete listing, of subsidiary obligations are; permits, utility bills, trench safety equipment, bypass pumping and overtime labor and materials charges.

1. UNIT PRICES

The unit price bid for the various items shall be compensation in full for furnishing and installing the complete work including but not limited to all profit, labor materials, equipment, dewatering, taxes, permits, insurance, bonds, temporary and permanent power, site restoration (unless noted otherwise) and all other necessary to furnish and install these items complete and operable in every detail and in accordance with these plans and specifications. Payment shall be based upon the number of units actually installed as verified by the Engineer.

2. LUMP SUM

The lump sum price bid for any items shall be compensation in full for furnishing and installing the complete work including but not limited to all profit, labor, materials, equipment, dewatering, taxes, permits, insurance, bonds, temporary and permanent power, site restoration (unless noted otherwise) and all other incidentals necessary to furnish and install these items complete and operable in every detail and in accordance with these plans and specifications. Payment shall be based upon the percentage complete as determined at the sole discretion of the Engineer.

3. PIPE

The unit price bid for furnishing and laying the various sizes of pipe will be compensation in full for furnishing all material, labor, equipment and incidentals necessary for laying the pipe, in accordance with these specifications. Measurement for payment will be made along the centerline of junctions or to the various ends. There will be no deduction in measured length for fittings, valves or manholes installed in the line.

4. PIPE FITTINGS

Unless specifically called for in the Bid Schedule, no payment will be made for various pipe fittings. All materials, labor, equipment, thrust restraint devices and incidentals for installing each fitting should be covered under the Unit Price for furnishing and installing pipe.

5. CONCRETE THRUST BLOCKS

No measurement or payment will be made for concrete thrust blocks and all material and work in connection therewith will be considered a subsidiary obligation of the Contractor covered under the unit price bid for furnishing and installing pipe.

6. VALVES AND BOXES

The unit price bid for the various sizes of valves shall be compensation in full for furnishing all material, labor, equipment and incidentals necessary to install and complete one valve with box in accordance with these specifications. NOTE: The number of meters and boxes listed in the bid tab is an approximation.

7. FIRE HYDRANT ASSEMBLIES

The unit price bid for fire hydrant assemblies will be compensation in full for furnishing all material, labor, equipment and incidentals necessary to install and complete one fire hydrant as shown in the detail on the drawings.

8. WATER SERVICES

The unit price bid for furnishing and installing the various sizes of water services will be compensation in full for furnishing all material, labor, equipment and incidentals for installing each service in accordance with the plans and specifications. Each 5/8 x 3/4 service shall include: saddle, corporation stop, tubing, curb stop, meter, customer valve and box and meter box. Each 1" service shall be installed as listed above, the 3" meters shall be installed in accordance with the details on the construction plans.

The Bid items described as:

- 1) "Short Run" means the meter is located on the same side of the road as the water main.
- 2) "Long Run – Unpaved Road" means the meter is located on the opposite side of the road as the water main and the road is unpaved, i.e., dirt, clay or other.
- 3) "Long Run – Paved Road" means the meter is located on the opposite side of the road as the water main and road is paved.

9. PAVEMENT RESTORATION

The unit price bid for all asphalt road and driveway restorations (asphalt or concrete) will be compensation in full for furnishing all material, labor equipment and incidentals necessary to replace all asphalt-concrete pavement disturbed or damaged during the performance of the work in accordance with the plans and specifications. The price will be based on a per linear foot basis and shall be computed as being measured along the line of pipe installed. No adjustment in price will be made for varying trench widths, no matter how much material is disturbed, although if disturbed, the Contractor will be made to replace at the direction of the Engineer. The Contractor may (with Engineer's approval) dry bore certain pavement and driveways in lieu of open cutting. If this option is elected, the payment shall be based on the unit price for re-paving.

10. STEEL CASING JACK & BORES

The unit price bid for furnishing and installing steel pipe casing will be compensation in full for furnishing all material, labor equipment, de-watering, traffic control and all other costs necessary to install the required casing in accordance with the contract documents. This price bid shall also include full compensation for any Florida Department of Transportation bonds, reports or traffic control that may be required.

11. INSTALLATION BY DIRECTIONAL DRILLING

The unit price bid for furnishing and placing water mains by directional drilling methods will be compensation in full for furnishing all material, labor, equipment, dewatering, cleanup, traffic control and incidentals necessary to install the various size piping by directional drilling methods in accordance with these plans and specifications. The unit price bid shall also include compensation for any additional Florida Department of Transportation or County bonds and/or permits that may be necessary other than that supplied by the Owner. Placement and measurement of directional drilling quantities shall be coincident and shall be as shown on the plans or as directed by the Engineer provided that any directional bore shall be not less than fifty feet in length.

12. TIE TO EXISTING SYSTEM

The unit price bid for each tie to existing system shall be compensation in full for furnishing all materials, fittings, labor, equipment, dewatering, maintenance of traffic and incidentals necessary to tie the new system to the existing water system. When tying to an existing system that is to be removed from service, the unit cost of will include disconnecting and plugging the abandoned system. The unit price also includes injecting flowable fill into any pipe removed from service by this contract and crossing under a state roadway. The Contractor will not be allowed to adjust the contract price due to minor adjustments necessary to complete each tie-in.

13. SITE RESTORATION

The unit price bid for complete project site restoration will be compensation in full for

furnishing all material, labor equipment and incidentals necessary to repair or replace to preexisting or better condition all disturbed or damaged site appurtenances including, but not limited to sod, grass or seeded areas, shell (oyster or other), rock, site grading, drainage structures, flower beds or gardens, mail boxes, fences, decorative appurtenances, lighting and irrigation systems. As required by the contract documents, site restoration shall be conducted in an ongoing manner and shall be completed within thirty days of initial disturbance or damage. Payment will be based on a per linear foot basis and shall be computed as being measured along the line of pipe installed. No adjustment in price will be made for varying trench widths, no matter how much area is disturbed, although if disturbed, the Contractor will be required to perform restoration at no additional cost. THIS BID ITEM SHALL NOT BE LESS THAN 3% OF THE ENTIRE CONTRACT BID AMOUNT.

14. FLUSHING AND TESTING

The unit price bid for all testing will be compensation in full for furnishing all material, labor, equipment and incidentals necessary to successfully perform all flushing and testing (hydrostatic testing and bacteriological) including sampling taps as required by these contract documents so that compliance may be demonstrated to the Engineer. This pay item shall also include all additional tests required due to failure of previous tests or reinstallation of any work. Payment will be based on linear footage of water main tested. The Contractor will ensure that all water lines are properly flushed prior to taking these samples. Further, FDEP approval will be required before placing into service all new construction. Any cost associated with remobilizing back to the project shall be included in this unit price.

15. RECORD DRAWINGS AND O&M MANUALS

The Lump Sum price bid for furnishing record drawings and O & M manuals shall be compensation in full for all material, labor, equipment and incidentals necessary to prepare and furnish all engineer-approved record drawings and O & M manuals required by the contract documents. The Owner shall make no additional payment for draft or preliminary submittals initially made or resubmitted due to incompleteness or rejection by the Engineer.

16. BONDS AND INSURANCE

This lump sum bid is for the Contractor to furnish all required Bonds and Insurance in accordance with the contract documents. Payment shall be made with the Contractor's first monthly partial pay estimate submitted. THIS BID ITEM SHALL NOT BE GREATER THAN 3% OF THE ENTIRE CONTRACT BASE BID AMOUNT.

17. APPLICATION FOR PAYMENT

The Contractor shall submit an application for payment, no more frequent than monthly, to the Engineer for review and approval upon partial completion of the project before

the Contractor will be compensated for the work performed during that period. The application shall invoice work completed as detailed in the Contractor's Proposal. Final payment in full will be made when work is completed to the satisfaction of the Owner, and the Engineer, when it has been shown that the Contractor has discharged all obligations of this Contract (Release of Liens) and when all punch list items have been corrected. Application for payment will be made on the form supplied by the Engineer or approved equal.

END OF SECTION 00410

(THIS PAGE INTENTIONALLY LEFT BLANK)

1.1 GENERAL:

- A. The following Special Conditions shall take precedence over and modify any paces of statements of the General Conditions of the Contract and shall be used in conjunction with them as part of the Contract Documents.

1.2 INSURANCE:

- A. The Contractor shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's execution of the work, whether such execution be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable.
- B. Claims under workmen's compensation, disability benefit and other similar employee benefit acts.
- C. Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees.
- D. Claims for damages because of bodily injury, sickness or death of any person other than his employees.
- E. Claims for damages insured by usual personal injury liability coverage which are sustained by:
 - 1. Any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or
 - 2. By any other person.
- F. Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.
- G. Certificate of Insurance acceptable to the owner shall be filed with the Owner prior to commencement of the work. These certificates shall contain a provision that coverages afforded under the policies will not be cancelled unless at least fifteen (15) days prior Written Notice has been given to the Owner.
- H. The Contractor shall procure and maintain, at his own expense, during the contract time liability insurance naming the Owner, the Engineer and himself as the insured as hereinafter specified.

- I. Contractor's General Public Liability and Property Damage Insurance including vehicle coverage issued to the Contractor and protecting him from all claims for destruction of or damage to property, arising out of or in connection with any operations under the Contract Documents, whether such operations be by himself or by a Subcontractor under him, or anyone directly or indirectly employed by the Contractor or by a Subcontractor under him. Insurance shall be written with a limit of liability of not less than \$1,000,000 for all damages arising out of bodily injury, including death, at any time resulting there from, sustained by any one person in any one accident; and a limit of liability of not less than \$3,000,000 from any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than \$200,000 for any such damages sustained by two or more persons in any one accident.

- J. The Contractor shall procure and maintain at his own expense, during the contract time, in accordance with the provisions of the laws of the State of Florida Workmen's Compensation Insurance, including occupational disease provisions, for all employees at the site of the project and in case any work is sublet, the Contractor shall require each Subcontractor similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the Contractor. In case of any class of employees engaged in hazardous work under this Contractor at the site of the project is not protected under Workmen's Compensation statute, the Contractor shall provide, and shall cause each Subcontractor to provide adequate and suitable insurance for the protection of his employees not otherwise protected.

1.3 PERFORMANCE AND PAYMENT BOND:

- A. A Performance Bond and a Payment Bond, each in the amount of 100% of the Contract Price, with a corporate surety approved by the Owner, will be required for the faithful performance of the Contract.

1.4 EXECUTION OF CONTRACT:

- A. The party to who each contract is awarded will be required to execute the Agreement within ten calendar days from the date when Notice of Award is delivered to the Bidder. The Notice of Award shall be accompanied by the necessary Agreement. In case of failure of the Bidder to execute the Agreement, the Owner may at his option consider the Bidder in default.

- B. The Owner within ten (10) days of receipt of acceptable Agreement signed by the party to whom the Agreement was awarded shall sign the Agreement. Should the

Owner not execute the Agreement within such period, the Bidder may, by written notice, withdraw his signed Agreement. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

- C. The Notice to Proceed shall be issued within ten (10) days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement of the Owner and Contractor. If the Notice to Proceed has not been issued within ten (10) day period or within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

1.5 CONTRACTS AND COOPERATION:

- A. At the same time that work under this contract is being provided at the site, there may be other contractors working on the site. The Owner reserves the right to award other contracts for work to be constructed at the same time, and in connection with, the work included in this contract.
- B. The Contractor shall cooperate with all other contractors in such a manner, and to such extent, as best to facilitate the completion of the entire project in the shortest time possible, subject to, at all times, the approval of the Engineer. It shall be the duty of each Contractor to work with the other contractors, render such assistance, and to arrange his work in such a manner that shall allow the entire project to be delivered complete and in the best possible condition.
- C. The Contractor shall keep himself fully informed at all times regarding all details of the work of other contractors working at the site, and he shall be responsible for all delays that may result from his failure to install his own work in the proper manner and at the proper time.
- D. The Contractor shall be responsible for coordinating the relocation of existing utilities (with the respective utility companies) as needed to construct the project.

The Owner will pay fees charged by the utility company for relocating these utilities.

1.6 PERMITS:

- A. Owner will have construction plans approved by the local, County, and the Florida Department of Environmental Protection will be responsible for conforming to requirements of these approvals.

- B. The Owner will notify all permitting agencies when construction commences.
- C. All permits required by the County relating to trades such as electrical, building, sitework, etc. are to be obtained by the Contractor.

1.7 SCHEDULE OF WORK:

- A. All work under this contract shall be arranged and be carried out in such a manner as to complete the work on or before the contract completion date. The contractor must notify the owner at the time of bidding if the chronology of the work as shown or the subdivision of work will affect warranties or guarantees in any way. No such claims shall be allowed once the work has begun.
- B. Should the Contractor(s) work, through no fault of the Engineer, the Owner, or other contractors, fail to progress according to the schedule, and if, in the opinion of the Engineer, the work cannot be completed within the time stated in the contract, or if deemed necessary to protect this or adjoining work from damage, the Contractor shall work such additional time over the established hours of work, including Holidays as required to meet the schedule time without additional expense to the Owner.
- C. The Contractor is required to furnish adequate manpower at the project to complete the work within the time allowed by the progress schedule. Should payment of premium time, bonuses, or the like be necessary to attract sufficient manpower for the project, such extra labor costs shall be borne by the Contractor without additional compensation from the Owner.
- D. When so ordered, in writing, by the Project Engineer, whether to advance the contract completion date, or for any other reason for the Owner's benefit, the Contractor shall work overtime and or additional shifts and shall be reimbursed by the Owner for his actual net premium costs of such overtime and or shifts so ordered and so worked, including insurance and taxes applicable thereto, (without other overhead or profit). Such costs and expenses shall be subject to audit by the Owner.
- E. Inclement weather will be reason for granting extension in contract time if the number of delays of rain (trace not included) for the period of the Contract is in excess of the average for that period for the past five (5) years. The increase in time shall be one day for each day of inclement weather over the average.
- F. The time of completion will stop at the date of substantial completion. However, this does not relieve the contractor of finishing the project within a

timely manner. If after 30 calendar days from the date of substantial completion, the contractor is not completely finished with the project, the Owner reserves the right to re-enact the liquidated damage clause for that time over the 30-day period after substantial completion date.

1.8 USE OF SITE:

- A. The Contractor(s) shall confine their use of the site for storage or materials, erection of temporary facilities and parking of vehicles to areas within his Contract limits as directed by the Engineer. The Contractor shall not unnecessarily encumber the premises at any time.
- B. Areas of the site in which work under this contract may be performed may be used by other contractors for storage of materials, erection of temporary facilities and parking of vehicles. Areas used by other Contractors will be vacated, as directed by the Engineer to permit work under this Contract, provided reasonable notice is given requesting such, all in accordance with this Contractor's construction schedule.
- C. No signs or advertisements shall be displayed on the site or building except with the written consent of the Owner.

1.9 TEMPORARY FACILITIES:

- A. The Contractor shall provide electric power and water as he may require for his construction purposes, and shall pay all costs incurred. At completion of the contract, all temporary facilities shall be removed from the site.
- B. The Contractor shall provide sanitary facilities for his workmen at all times. Sanitary facilities shall be of an approved chemical type with regular servicing, as approved by the Engineer and Health Authorities.

1.10 PRECAUTIONS:

- A. Attention is called to the fact that Contractor is responsible for contacting all utility companies to obtain locations of all existing utilities or obstructions which he may encounter during construction. After location of utilities by the appropriate utility company, it is the Contractor's liability to protect all such utility lines, including service lines and appurtenances, and to replace at his own expense any which may be damaged by the Contractor's equipment or forces during construction of the project.
- B. Barricades, Guards and Safety Provisions: To protect persons from injury and to avoid property damage, adequate barricades, construction signs, torches, red lanterns and guards shall be placed and maintained during progress of construction work and until it is safe for both pedestrians and vehicular traffic. Rules and regulations of local authorities regarding safety provisions shall be

observed.

- C. Traffic Controls: Trenching and earthwork shall be conducted in a manner to cause the least interruption to traffic. Where traffic must cross open trenches, provide suitable bridges.
- D. Work in Progress: Protect completed work from damage by other work in progress. Maintain such protection as long as work is in progress.

1.11 SPECIAL PRECAUTIONS:

- A. The Contractor shall at all times during construction activity control turbidity caused by construction related acts, by the placement of containment curtains, hay bales or suitable temporary erosion control barriers. The Owner will apply for a generic permit for stormwater discharge from construction activities. The Contractor will be required to comply with the requirements of these Specifications, Construction Plans, Florida Department of Environmental Protection and at all times, use Best Management Practices (BMP). The pumping and discharge of trench water shall be in accordance with all local, State, and Federal agencies which control such activities. Any permits for such activities shall be obtained by the Contractor and the cost of same shall be included in the bid price submitted.

1.12 PROJECT LAYOUT AND CONTROL:

- A. The Contractor shall engage a Professional Land Surveyor registered in the State of Florida to practice land surveying. Said surveyor should carry Professional Liability Insurance. The land surveyor employed for this project must comply with the Minimum Technical Standards for land surveyors in the State of Florida pursuant to Florida Statute 472.027 adopted rule 121HH-6. The Contractor shall be held responsible for all mistakes that may be caused by the loss of disturbance of the Engineer's layout work.
- B. Should the Contractor in the course of the work find that the points, grades and levels which are shown upon the Drawings are not conformable to the physical conditions of the locality at the proposed work or structure, he shall immediately inform the Engineer of the discrepancy between actual physical conditions of the locality of the proposed work, and the points, grades and levels which are shown on the drawings. No claim shall be made by the Contractor against the Owner for compensation or damage by reasons of failure of the Engineer to represent upon said drawings, points, grades and levels conformable to the actual physical conditions of the locality of the proposed work.

1.13 TESTING:

- A. The Contractor will furnish and pay for the services of a qualified independent testing laboratory approved by the Engineer to provide project quality control if required. It is the Contractor's responsibility to notify the Engineer and testing laboratory as items become ready for tests. Retesting of all testing failures shall be at the Contractor's expense. Testing laboratory shall work under direction of the Engineer. Copies of reports of all tests shall be sent to Contractor, Engineer and Owner.

1.14 DISPOSAL OF WASTE MATERIALS:

- A. No burial of waste materials will be permitted on the premises. The Contractor shall at all times keep the premises free from accumulations of waste material or debris caused by his employees or work and shall remove same when necessary or required by the Engineer.

1.15 WARRANTY OF TITLE AND WAIVER OF LIEN:

- A. No material, supplies or equipment for the work shall be purchased by the Contractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by the seller or supplier. The Contractor warrants good title to all materials, supplies and equipment installed or incorporated in the work and agrees upon completion of all work to deliver the premises, together with all improvements and appurtenances constructed or placed thereon by him, to the Owner free from any claims, liens or charges and further agrees that neither he nor any person, firm, or corporation furnishing any material or labor for any work covered by this contract shall have any right to a lien upon the premises or any improvements or appurtenances thereon as a result of the Contractor's failing in his commitment to the Owner or any person, firm or corporation furnishing any material or labor for any work covered by this contract. The Contractor shall not at any time suffer or permit any lien, attachment, or other encumbrances under the law of Florida or otherwise by any person or persons whomsoever to remain on file with the Owner against any money due or to become due for any work done or materials furnished under the contract or by reason of any other claim or demand against the Contractor. Such lien, attachment, or other encumbrance, until it is removed, shall preclude any and all claims or demands for any payment under virtue of the contract.

1.15 ESTIMATES AND PAYMENTS:

- A. The Contractor shall submit to the Engineer at time of signing his Contract a schedule of values (if not already given in the Bid Schedule) of the various parts of the work aggregating the total sum of the Contract, divided so as to facilitate payments, and made out in such forms as the Engineer may direct,

and if required, supported by the evidence of the correctness. The schedule, upon approval by the Engineer, shall be used as a basis of payment.

- B. On or about the 25th of each month, the Contractor shall submit an estimate of the amount of materials and work in place. The Engineer shall thereupon check such estimate, and if found correct, certify to its correctness. Ninety percent (90%) of the value of all work in place shall be paid for on or before the 30th day after receipt of the Request for Payment. Payments shall be made within forty-five (45) days after the completion and acceptance by the Engineer of the work included on the estimate.
- C. No error or oversight in the making of estimates or certificates shall relieve the Contractor from his obligation to do and complete the work according to the true intent of the specifications and drawings.
- D. In case labor or materials not in strict accordance with the drawings and specifications are furnished, no certificates will be issued until the defective work shall have been removed and replaced to the satisfaction of the Engineer.
- E. In case the Contractor shall fail to complete his Contract or before the time stated in the Contract, no further estimates or payments shall be made until the entire completion of the Contract.

1.16 OWNERSHIP OF HIDDEN VALUABLE MATERIALS:

- A. If the excavation of this project uncovers treasure or valuable materials of any kind buried or hidden within the work, it shall remain the property of the Owner, other provisions in the documents to the contrary notwithstanding. Guard same until it is turned over to the Owner.

1.17 AS-BUILT PLANS:

- A. Before final inspection the Contractor shall turn over to the Engineer a set of marked up drawings showing field changes and actual installed conditions. This also includes valve references with no less than two (2) distances to permanent objects.

1.18 CLEAN UP:

- A. Before final inspection and acceptance of the work, clean ditches, shape shoulders and restore all disturbed areas, including street crossings, grass plots, regrassing if necessary, to as good condition as existed before work started.

1.19 FINAL ACCEPTANCE:

- A. As soon as work is substantially complete, the Contractor will request a final inspection. This inspection will be made by the Owner's Representative, the Engineer, and the Contractor. Any work remaining to be completed or any defective work will be listed on a punch list and delivered to the Contractor. This punch list may be updated as work items are completed or if other defects are discovered.
- B. Final acceptance of any portion of the project will occur after all punch list items are completed and the work is in accordance with the plans and specifications.
- C. All facilities will be subject to inspection and acceptance by any Governmental and State Agency having jurisdiction prior to acceptance by the Owner.

1.20 GUARANTEE:

- A. The Contractor by entering into this Agreement shall warranty all work to remain in serviceable and good condition (ordinary wear and tear, abuse and causes beyond the control of the Contractor for the work accepted) for a period of one year from date of final acceptance of the work, and stating that he will repair or replace without cost to the Owner, any imperfection in whole or in part which may develop in the work during the period above stated and any damaged to other work caused by imperfections or the repairing of same.

1.21 SILENCE OF SPECIFICATIONS:

- A. The apparent silence of these specifications and supplemental specifications as to any details or the omission from it of a detailed description concerning any point shall be regarded as meaning that all work shall be performed in accordance with the Florida DOT Standard Specifications for Road and Bridge Construction, Latest Edition.

1.22 SUBCONTRACTORS AND SUPPLIERS:

- A. The Contractor shall supply the names and addresses of subcontractors and material suppliers when requested to do so by the Owner.
- B. The Contractor shall not use a subcontractor or material supplier against whom the Owner has a reasonable objection.

END OF SECTION 00420

(THIS PAGE INTENTIONALLY LEFT BLANK)

PART 1 - GENERAL**1.1 CONSTRUCTION AREAS**

- A. The Contractor shall limit his use of the construction areas for work and for storage to allow for:
 - 1. Work by other contractors.
 - 2. District use.
 - 3. Public use.
- B. Coordinate use of work site under direction of Engineer.
- C. Assume full responsibility for the protection and safekeeping of materials and products under this Contract, stored on the site.
- D. Move any stored products, under Contractor's control, which interfere with operations of the District or separate contractor.
- E. Obtain and pay for the use of additional storage of work areas needed for operations.

1.2 CONTRACT DOCUMENTS**A. Specifications**

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

B. Intent

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

The apparent silence of the specifications as to any detail, or the apparent

omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these specifications shall be made upon that basis. The inclusion of the General Requirements (or work specified elsewhere) in the General part of the specifications is only for the convenience of the Contractor, and shall not be interpreted as a complete list of related Specification Sections.

1.3 WORK IN PROGRESS

The Contractor shall furnish personnel and equipment which will be efficient, appropriate, and adequately sized to secure a satisfactory quality of work and a rate of progress which will insure the completion of the work within the time stipulated in the Proposal. If at any time such personnel appears to the Engineer to be inefficient, inappropriate, or insufficient for securing the quality of work required for producing the rate of progress aforesaid, he may order the Contractor to increase the efficiency, change the character, or increase the personnel and equipment, and the Contractor shall conform to such order. Failure of the 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.

1.4 WORK LOCATIONS

Work shall be located 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. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve him from laying and jointing different or additional items where required.

1.5 OPEN EXCAVATIONS

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by vehicles, pedestrians and workmen. 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. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be barricaded and

well lighted at all times when construction is not in progress.

- C. The maximum length of open trench shall be 40 feet at any one time.

1.6 UTILITY SYSTEMS AND FACILITIES

- A. The Contractor shall interrupt water, telephone, power, cable TV, sewer, gas or other related utility services and disturb the normal functioning of the system as little as possible. He shall notify the Engineer and the appropriate agency well in advance of any requirements for dewatering, isolating, or relocating a section of a utility, so that necessary arrangements may be made with the appropriate agency.
- B. The Contractor shall bear full responsibility for obtaining locations of all underground structures and utilities (including existing water services, drain lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage to any utility or structure shall be paid by the Contractor.
- C. Protection and temporary removal and replacement of existing utilities and structures as described in this Section shall be a part of the work under the Contract and no separate payment will be made for this work.
- D. If, in the opinion of the Engineer, permanent relocation of a utility owned by the District is required, he may direct the Contractor in writing, to perform the work. Work so ordered will be paid for at the contract unit prices, if applicable, or as extra work. If relocation of a privately owned utility is required, the District will notify the utility to perform the work as expeditiously as possible. The Contractor shall fully cooperate with the District and utility and shall have no claim for delay due to such relocation. The Contractor shall notify all utility companies in writing at least 48 hours (excluding Saturdays, Sundays, and legal holidays) before excavating near their utilities.
- E. The Contractor shall be responsible to maintain water, telephone, power, cable TV, sewer, gas and other related utilities throughout construction at no additional cost to the District.
- F. The Contractor shall fully cooperate with all private and public utilities during the installation of new facilities, or relocation of existing facilities. The Contractor shall coordinate his work accordingly and shall have no claim except for time extension for delays associated with the proposed utility improvements.

1.7 TEST PITS

Test pits for the purpose of locating underground pipeline or structures in advance of the construction shall be excavated and backfilled by the Contractor at the direction of the Engineer. 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. No separate payment will be made.

1.8 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in another manner acceptable to the Engineer.
- B. All sidewalks and driveways which are disturbed by the Contractor's operations shall be restored to their original or better condition by the use of similar or comparable materials.
- C. Along the location of the work, all walks, bushes, trees, shrubbery and other physical features shall be protected and restored to their original or better condition by use of similar or comparable materials. Fences and other features removed by the Contractor shall be replaced in the location indicated by the Engineer as soon as conditions permit. All grass areas which have been damaged by the Contractor shall be regraded, and sodded as directed by the Engineer.
- D. Trees close to the work shall be boxed or otherwise protected against injury. The Contractor shall trim all branches that are liable to damage because of his operations, but in no case shall any tree be cut or removed without prior notification of the Engineer. All injuries to bark, trunk, limbs and roots of trees shall be repaired by dressing, cutting, and painting according to approved methods, using only approved tools and materials.
- E. The protection, removal, and replacement of existing physical features along the line of work shall be a part of the work under the Contract, and all costs in connection therewith shall be included in the unit and/or lump sum prices established under other items in the Proposal.

1.9 WATER FOR CONSTRUCTION PURPOSES

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

1.10 MAINTENANCE OF FLOW

- A. The Contractor shall, at his own costs, provide for the flow of sewers, drains, and water courses interrupted during the progress of the work, and shall immediately remove all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow. The Contractor shall prepare a written plan on maintenance of flow as requested by the Engineer.

1.11 CLEAN-UP

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

1.12 COOPERATION WITH THIS CONTRACT

- A. All firms or persons authorized to perform any work under this contract shall cooperate with the Contractor and his sub-contractors 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 sub-contractor having jurisdiction, unless otherwise indicated or directed by the Engineer.

1.13 PROTECTION OF CONSTRUCTION AND EQUIPMENT

- A. All newly constructed work shall be carefully protected from injury in any way. No wheeling or walking or placing of heavy loads on it shall be allowed and all portions injured shall be reconstructed by the Contractor at his own expense.
- B. All structures shall be protected in a manner approved by the Engineer. Should any 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. If, in the final inspection of the work, any

defects, faults, or omissions are found, the Contractor shall cause the same to be repaired or removed and replaced by proper materials and workmanship without extra compensation for the materials and labor required. Further, the Contractor shall be fully responsible for the satisfactory maintenance and repair of the construction and other work undertaken herein, for at least the guarantee period described in the Contract.

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

1.14 CONSTRUCTION SCHEDULING PROVISIONS

- A. No work shall be done between 7:00 p.m. and 7:00 a.m. or on Sundays or legal holidays without the written permission of the District. However, emergency work may be done at any time without prior permission.
- B. The Contractor shall be fully responsible for providing all temporary piping, pumping, electrical hook-ups, lighting, temporary structures, or whatever is required to maintain the existing sewer system. All details of temporary piping and temporary construction are not necessarily shown on the Drawings or covered in the Specifications. However, this does not relieve the Contractor of the responsibility to insure that construction will not create unacceptable interruptions.

1.15 THE FLORIDA TRENCH SAFETY ACT

The Contractor shall adhere to the requirements of the Florida Trench Safety Act, and O.S.H.A. Excavation Safety Standards 29 CFRs 1926.650 Subpart P.

END OF SECTION 01010

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work will be constructed under a single prime contract.
- B. The scope for the subcontractor to the prime contractor includes, but is not limited to the following:
 - 1. Directional Drilling.
 - 2. Jack and Bore Installation.
 - 3. Project Layout & As-built by Professional Surveyor
 - 4. Testing by Professional Engineer
 - 5. Pipeline Construction/Tank Construction
 - 6. Water Service
 - 7. Abandon/remove Existing appurtenances
- C. Bid Alternate
 - 1. 250,000 gallon pre-stressed concrete ground storage tank

1.3 WORK UNDER OTHER CONTRACTS

- A. Separate Contract: The Owner reserves the right to award separate contracts for performance of certain construction operations at the site as needed. It may be necessary to conduct these operations simultaneously with work under this Contract.
 - 1. The Contractor shall at all times allow other contractors on the site as the Owner sees fit.
 - 2. The Contractor shall provide a work/location schedule to any contractor working on site.
 - 3. The Contractor shall make claim within seven working days if delays are created by the presence of another contractor on site. In no case shall

monetary claims be made for interference between contractors.

- B. Cooperate fully with separate contractors so that work under those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.4 WORK SEQUENCE

- A. The Work will be conducted in phases.

Phase 1 – Water System Installation & Testing

Phase 2 – Construct 250,000 gal ground storage tank (if awarded)

Phase 3 – Project Closeout & Record Drawings

1.5 CONTRACTOR USE OF PREMISES

- A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
 - 1. Allow for use by the public.
 - 2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF PRODUCTS ORDERED IN ADVANCE

- A. No Products have been ordered in Advance.

END OF SECTION 01010

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 DEFINITIONS

- A. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other contract documents, including drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in contract documents are defined generally in this article.
- B. General Requirements: The General Requirements apply to entire work of Contract and, where so indicated, to other elements which are included in project.
- C. Indicated: The term "Indicated" is a cross-reference to graphics, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown", "noted", "scheduled" and "specified" are used in lieu of "indicated", it is for the purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.
- D. Directed, Requested, etc: Where not otherwise explained, terms such as "directed", "requested", "authorized", "selected", "approved", "required", "accepted", and "permitted" mean "directed by Architect/Engineer", "requested by Architect/Engineer", etc. However, no such implied meaning will be interpreted to extend Architect's/Engineer's responsibility into Contractor's area of construction supervision.
- E. Approve: Where used in conjunction with Architect's/ Engineer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of Architect's/Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will "approval" by Architect/Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of contract documents.
- F. Project Site: The space available to Contractor for performance of the work, either exclusively or in conjunction with others performing other work as part of the project. The extent of the project site is shown on the drawings, and may or

may not be identical with description of land upon which project is to be built.

- G. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
- H. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing protecting, cleaning and similar operations, as applicable in each instance.
- I. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.
- J. Installer: The entity (person or firm) engaged by Contractor or its subcontractor or sub-subcontractor for performance of a particular unit of work at project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (Installers) be expert in operations they are engaged to perform.
- K. Testing Laboratory: An independent entity engaged to perform specific inspections or tests of work, either at project site or elsewhere; and to report (if required) interpret results of those inspections or tests.

1.3 SPECIFICATION EXPLANATIONS

- A. Specification Content: Because of methods by which this project specification has been produced, certain general characteristics of content, and conventions in use of language or explained as follows:
 - 1. Specifying Methods: The techniques or methods of specifying to record requirements varies throughout text, and may include "prescriptive", "open generic-descriptive", or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work.
 - 2. Overlapping and Conflicting Requirements: Where compliance with 2 or more industry standards or sets or requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, most stringent requirement (which is generally recognized to be more costly) is intended and will be enforced, unless specifically detailed language written into contract documents (not by way of reference to an industry standard) clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is the more

stringent, to Architect/Engineer for a decision before proceeding.

3. Contractor's Options: Except for overlapping or conflicting requirements, where more than one set of requirements are specified for a particular unit of work, option is intended to be Contractor's regardless of whether specifically indicated as such.
4. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to Architect/Engineer for decision before proceeding.
5. Specialists, Assignments: In certain instances, specification text requires (or at least implies) that specific work be assigned to specialists or expert entities, who must be engaged for performance of those units of work. These must be recognized as special requirements over which Contractor has no choice or option. These assignments must not be confused with (and are not intended to interfere with) normal application of regulations, union jurisdictions and similar conventions. One purpose of such assignments is to establish which party or entity involved in a specific unit of work is recognized as "expert" for indicated construction processes or operations.

Nevertheless, final responsibility for fulfillment of entire set of requirements remains with Contractor.

6. Trades: Except as otherwise indicated, the use of titles such as "carpentry" in specification text, implies neither that the work must be performed by an accredited or unionized tradesperson of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by tradesperson of that corresponding generic name.
7. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual work abbreviations of a self-explanatory nature have been included in texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and in schedules. These are frequently defined in section at first instance of use. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and

where full context of the contract documents so indicates.

1.4 INDUSTRY STANDARDS

- A. General Applicability of Standards: Applicable standards of construction industry have same force and effect (and are made a part of contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith.
- B. Referenced standards (referenced directly in contract documents or by governing regulations) have precedence over non-referenced standards which are recognized in industry for applicability to work.
- C. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.
- D. Copies of Standards: Provide where needed for proper performance of the work, obtain directly from publication sources.
- E. Abbreviations and Names: Where acronyms or abbreviations are used in specifications or other contract documents they are defined to mean the industry recognized name of trade association, standards generating organization, governing authority or other entity applicable to context of text provision. Refer to "Encyclopedia of Associations", published by Gale Research Co., available in large libraries.

1.5 SUBMITTALS

- A. Permits, Licenses and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgements, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION 01090.

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 PRELIMINARY PROGRESS SCHEDULE

- A. Bar-Chart Schedule: Not more than 7 days after date established for "commencement of the work", submit a bar-chart type progress schedule indicating a time bar for each major category or unit of work to be performed at site, properly sequenced and intermeshed, and showing completion of the work sufficiently in advance of date established for "substantial completion of the work". This schedule shall also include estimated amounts of work completed for each month shown.

1.3 PROGRESS MEETING

- A. Initial Progress Meeting: Schedule initial progress meeting, recognized as "Pre-Construction Meeting", for a date not more than 15 days after date of commencement of the work. Use it as an organizational meeting, and review responsibilities and personnel assignments.

1.4 UNIT PRICE SCHEDULE

- A. General: Refer to individual specification sections for units of work where the establishment of unit prices is required. Methods of measurement and pricing are specified in these sections.
- B. The Owner reserves the right to reject the Contractor's measurement of work-in-place which involves use of established unit prices, and to have this work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

1.5 PAYMENT REQUESTS

- A. General: Refer to 00100, Part 19, "Payment to Contractor" for more specific guidelines.
- B. Waivers of Lien: For final payment application, submit waiver of lien from every entity (including the Contractor) who could lawfully and possibly file a lien in

excess of \$100 arising out of Contract and related to work covered by payment. Owner reserves right to designate which entities involved in the work must submit waivers.

C. Final Payment Application: The administrative actions and submittals which must precede or coincide with submittal of final payment application can be summarized as follows, but not necessarily by way of limitation:

1. Completion of project closeout requirements.
2. Completion of items specified for completion beyond time of substantial completion (regardless of whether special payment application was previously made).
3. Assurance, satisfactory to Owner, that unsettled claims will be settled and that work not actually completed and accepted will be completed without undue delay.
4. Proof, satisfactory to Owner, that taxes, fees and similar obligations of Contractor have been paid.
5. Removal of temporary facilities, services, surplus materials, rubbish and similar provisions.
6. Consent of surety for final payment.

D. Application Transmittal: Submit 5 executed copies of each payment application.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01155

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 DESCRIPTION OF WORK

- A. The types of minimum requirements for procedures and performance of control work of a general nature include but are not necessarily limited to the following categories:
 - 1. Administrative/Supervisory personnel.
 - 2. Surveys and records of reports.
 - 3. Trades people and workmanship standards.
 - 4. Inspections, tests and reports.
 - 5. General installation provisions.
 - 6. Cleaning and protection.
 - 7. Conservation and salvage.

1.4 ADMINISTRATIVE/SUPERVISORY PERSONNEL

- A. General: In addition to a General Superintendent and other administrative and supervisory personnel required for performance of the work, provide specific coordinating personnel as specified herein.
- B. Project Coordinator: Provide a full-time Project Coordinator, who is experienced in administration and supervision of construction including mechanical and electrical work, and who is hereby authorized to act as the general coordinator of interfaces between units of work. For the purpose of this provision, "interface" is defined to include the scheduling and sequencing of work, sharing of access to work spaces, installations, protection of each other's work, cutting and, patching,

tolerances, cleaning, selection for compatibility preparation of coordination drawings, inspections, tests, and temporary facilities and services.

1.5 SURVEYS AND RECORDS/REPORTS

- A. General: Working from lines and levels established by property survey, and as shown in relation to the work, establish and maintain bench marks and other dependable markers to set lines and levels for the work as needed to properly locate each element of entire project. Calculate and measure required dimensions as shown (within recognized tolerances if not otherwise indicated); do not scale drawings to determine dimensions. Advise tradesmen performing the work, of marked lines and levels provided for their use in layout work.
- B. Surveyor: Engage a Land Surveyor or a Professional Engineer experienced and specializing in land survey work, who is registered in state where project is located, to perform services specified in this article. Surveyor shall carry Professional Liability Insurance.
- C. Surveyor Procedures: Verify layout information shown on drawings, in relation to property survey and existing benchmarks, before proceeding with layout of actual work. Record deviations from required lines and levels, and advise Architect or Engineer promptly upon detection of deviations exceeding indicated or recognized tolerances. Record deviations which are accepted (not corrected) on record drawings.

1.6 TRADESPERSONS AND WORKMANSHIP STANDARDS

- A. General: Instigate and maintain procedures to ensure that persons performing work at site are skilled and knowledgeable in methods and craftsmanship needed to produce required quality levels for workmanship in completed work. Remove and replace work which does not comply with workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

1.7 INSPECTIONS, TESTS AND REPORTS

- A. General: Required inspection and testing services are intended to assist in determination of probable compliances of work with requirements, but do not relieve Contractor of responsibility for those compliances, or for general fulfillment of requirements of contract documents. Specified inspections and tests are not intended to limit Contractor's quality control program. Afford reasonable access to agencies performing tests and inspections.
- B. Qualification of Testing Agencies: Except as otherwise indicated and except where manufacturer's testing facilities are located as acceptable, engage

- independent testing laboratories specializing in required services.
- C. Reports: Submit test/inspection reports, including agency's analysis of results and recommendations where applicable, in duplicate to Architect/Engineer except as otherwise indicated, and submit copies directly to governing authorities where required or requested.
 - D. Tests that will be required but are not limited to the following:
 - 1. Lab Percolation Tests.
 - 2. Field Density
 - 3. Compressive Strength Test on Concrete.
 - 4. Bacteriological testing.
 - 5. Pressure Tests

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS:

- A. Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to extent these are more explicit or more stringent than requirements indicated in contract documents.
- B. Inspect each item of materials or equipment immediately prior to installation, and reject damaged and defective items.
- C. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect.

Refer questionable visual effect choices to Engineer for final decision.
- D. Recheck measurements and dimensions of the work, as an integral step of starting each installation.

- E. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work, in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.
- F. Mounting Heights: Where mounting heights are not indicated, mount individual units of work at industry-recognized standard mounting heights for applications indicated. Refer questionable mounting height choices to Architect/Engineer for final decision.

3.2 CLEANING AND PROTECTION

- A. General: During handling and installation of work at project site, clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- B. Limiting Exposures of Work: To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful dangerous, damaging, or otherwise deleterious exposures during construction period. Such exposures include (where applicable, but not by way of limitation) static loading, dynamic loading, internal pressures, external pressures, high or low temperatures, thermal shock, high or low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling, bacteria, insect infestation, combustion, electrical current, high speed operation, improper lubrication, unusual wear, misuse, incompatible interface, destructive testing, misalignment, excessive weathering, unprotected storage, improper shipping/handling, theft and vandalism.

3.3 CONSERVATION AND SALVAGE

- A. General: It is a general procedural requirement for supervision and administration of the work that construction operations be carried out with maximum practical consideration for conservation of energy, water and materials; and with maximum practical consideration for salvaging materials and equipment involved in performance of the work but not incorporated therein. Refer to other sections for required disposition of salvage materials and equipment which are Owner's property (change order procedures).

END OF SECTION 01205.

(THIS PAGE INTENTIONALLY LEFT BLANK)

PART 1 - GENERAL**1.1 REQUIREMENTS INCLUDED**

Provide secure storage and protection for products to be incorporated into the work and maintenance and protection for products after installation and until complete of work.

1.2 STORAGE

- A. Store products immediately on delivery and protect until installed in the work.
 - 1. Store in accord with manufacturer's instructions, with seals and labels intact and legible.
- B. Store products subject to damage by elements in substantial weathertight enclosures.
 - 1. Maintain temperatures within ranges required by manufacturer's instructions.
 - 2. Provide humidity control for sensitive products, as required by manufacturer's instructions.
 - 3. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.
- C. Exterior Storage
 - 1. Provide substantial platform, blocking or skids to support fabricated products above ground, prevent soiling or staining.
 - a. Cover products, subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
 - b. Cover all PVC piping with plastic tarp to protect from sunlight.
- D. Arrange storage in manner to provide easy access for inspection.

1.3 MAINTENANCE OF STORAGE

- A. Maintain periodic system of inspection of stored products on scheduled basis

to assure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continued basis.
3. Surfaces of products exposed to elements are not adversely affected.
 - a. Any weathering of products, coatings and finishes is not acceptable under requirements of these Contract Documents.

1.4 PROTECTION AFTER INSTALLATION

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

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 01620

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 DESCRIPTION OF REQUIREMENTS

- A. Definitions: Closeout is hereby defined to include general requirements near the end of Contract Time, in preparation for final acceptance, final payment, normal termination of Contract, and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in sections of Division 2 through 16. Time of closeout is directly related to "Substantial Completion", and therefore may be either a single time period for entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. That time variation (if any) shall be applicable to other provisions of this section.

1.3 PREREQUISITES FOR SUBSTANTIAL COMPLETION

- A. General: Prior to requesting Architect's/Engineer's inspection for certification of substantial completion (for either entire work or portions thereof), complete the following and list known exceptions in request:
 - 1. In progress payment request, coincident with or first following date claimed, show either 100% completion for portion of work claimed as "substantially complete", or list incomplete items, value of incompleteness, and reasons for being incomplete.
 - 2. Include supporting documentation for completion as indicated in these contract documents.
 - 3. Submit statement showing accounting of changes to the Contract Sum.
 - 4. Advise Owner of pending insurance changeover requirements.
 - 5. Submit special warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.

6. Obtain and submit releases enabling Owner's full and unrestricted use of the work and access to services and utilities, including (where required) operating certificate, and similar releases.
 7. Submit record drawings, maintenance manuals, and similar final record information.
 8. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.
 9. Make final change-over of locks and transmit keys to Owner, and advise Owner's personnel to change-over in security provisions.
 10. Complete start-up testing of systems, and instructions of owner's operating/maintenance personnel. Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.
 11. Complete final cleaning up requirements, including touch-up painting of marred surfaces.
 12. Touch-up and otherwise repair and restore marred exposed finishes.
- B. Inspection Procedures: Upon receipt of Contractor's request, Architect/Engineer will either proceed with inspection or advise Contractor of prerequisites not fulfilled. Following initial inspection, Architect/Engineer will either prepare certificate of substantial completion, or advise Contractor of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been substantially completed. Results of completed inspection will form initial "punch-list" for final acceptance.

1.4 PREREQUISITES FOR FINAL ACCEPTANCE

- A. General: Prior to requesting Architect's/Engineer's final inspection for certification of final acceptance and final payment, as required by General Conditions, complete the following and list known exceptions (if any) in request:
1. Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
 2. Submit updated final statement, accounting for additional (final) changes to the Contract Sum.

3. Submit consent of surety.
 4. Submit final liquidation damages settlement statement, acceptable to Owner.
 5. Revise and submit evidence of final (continuing insurance coverage complying with insurance requirements).
- B. Re-inspection Procedure: Upon receipt of Contractor's notice that the work has been completed, including punch-list items resulting from earlier inspections, and excepting incomplete items delayed because of acceptable circumstances, Architect/Engineer will re-inspect the work. Upon completion of re-inspection, Architect/Engineer will either prepare certificate of final acceptance or advise Contractor of work not completed or obligations not fulfilled as required for final acceptance. If necessary, procedure will be repeated.

1.5 RECORD DOCUMENT SUBMITTALS

- A. General: Specific requirements for record documents are indicated in individual sections of these specifications. Other requirements are indicated in General Conditions. General submittal requirements are indicated in "Submittals" sections. Do not use record documents for construction purposes; protect from deterioration and loss in a secure fire-resistive location; provide access to record documents for Architect's/Engineer's reference during normal working hours.
- B. Record Drawings: Maintain a set of contract drawings and shop drawings in clean, undamaged condition, with mark-up of actual installations which vary substantially from the work as originally shown. Mark whichever drawing is most capable of showing "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross-reference at corresponding location on working drawings. Mark with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work. Mark up new information, which is recognized to be of importance to Owner, but was for some reason not shown on either the contract drawings or shop drawings. Give particular attention to concealed work, which would be difficult to measure and record at a later date. Note related change order numbers where applicable.
- C. Record Specifications: Maintain one copy of specifications, including addenda, change orders and similar modifications issued in printed form during construction, and mark-up variation (of substance) in actual work in comparison with text of specifications and modifications as issued. Give particular attention to substitutions, selection of options, and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related record drawing information and product data, where applicable. Upon completion of mark-up, submit to Architect/Engineer for Owner's records.

- D. Maintenance Manuals: Organize maintenance-and-operating manual information into suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumbtabbed). Include emergency instructions, spare parts listing, copies of warranties, wiring diagrams, recommended "turn-around" cycles, inspection procedures, shop drawings, product data, and similar applicable information.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

- A. General Operating/Maintenance Instructions: Arrange for each installer of work requiring continuing maintenance or operation, to meet with Owner's personnel, at project site, to provide basic instructions needed for proper operation and maintenance of entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and similar procedures and facilities. For operational equipment, demonstrate start-up, shutdown, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, energy effectiveness, and similar operations. Review maintenance and operations in relation with applicable warranties, agreements to maintain bonds and similar continuing commitments.

3.2 FINAL CLEANING

- A. General: Special cleaning for specific units of work is specified in sections of Division 2 through 16. Provide final cleaning of the work, at time indicated, consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, of cleaning levels required:
 1. Remove labels which are not required as permanent labels.
 2. Clean transparent materials, including mirrors and window/door glass, to a polished condition, removing substances which are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.
 3. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of dust, stains, films and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original

reflective condition.

4. Wipe surfaces of mechanical and electrical equipment clean, including elevator equipment and similar equipment; remove excess lubrication and other substances.
 5. Remove debris and surface dust from limited access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
 6. Clean concrete floors in non-occupied spaces broom clean.
 7. Clean light fixtures and lamps so as to function with full efficiency.
 8. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petro-chemical spills and other foreign deposits. Rake grounds which are neither planted nor paved, to a smooth, even-textured surface.
- B. Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on Owner's property, or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.
- C. Where extra materials of value remaining after completion of the associated work have become Owner's property, dispose of these to Owner's best advantage as directed.

END OF SECTION 01705.

(THIS PAGE INTENTIONALLY LEFT BLANK)

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The CONTRACTOR shall maintain at the site for the OWNER one record copy of:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. ENGINEER's Field Orders or written instructions.
 - 6. Approved Shop Drawings, Working Drawings and Samples.
 - 7. Field Test records.
 - 8. Construction photographs.
 - 9. Detailed Progress Schedule.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in CONTRACTOR's field office apart from documents used for construction.
 - 1. Provide files and racks for storage of documents.
 - 2. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with CSI format.
- C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and samples available at all times for inspection by the ENGINEER.
- E. As a prerequisite for monthly progress payments, the CONTRACTOR is to provide the currently updated "record documents" (Blue Lines) for review by the ENGINEER and OWNER.

1.03 MARKING DEVICES

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

1.04 RECORDING

- A. Label each document "PROJECT RECORD" or "Record Drawing" as applicable, with month and year in neat large printed letters.
- B. Record information concurrently with construction progress.
 - 1. Do not conceal any work until required information is recorded.
- C. Drawings; Legibly mark to record actual construction:
 - 1. Elevations of various structure elements in relation to grade.
 - 2. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.
 - 3. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
 - 4. Field changes of dimension and detail.
 - 5. Changes made by Field Order or by Change Order.
 - 6. Details not on original contract drawings.
 - 7. Equipment and piping relocations.
 - 8. Major architectural and structural changes including relocation of doors, windows, etc.
 - 9. Architectural schedule changes according to CONTRACTOR's Records and shop drawings.
 - 10. All underground duct banks with elevations and dimensions, horizontal and vertical locations of underground duct banks, and manholes along duct banks.
 - 11. All underground cable elevations and horizontal locations of underground cables.
 - 12. Electrical changes in accordance with Section 16000.
- D. Specifications and Addenda; provide one complete set and 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.
 - 3. As an Alternate, keep a log that references Specification section, page and paragraph.

1.05 SUBMITTAL

- A. Prior to final completion or partial OWNER occupancy, deliver reproducible mylars (and AutoCad files, as required) of the Record Documents to the ENGINEER for the OWNER.
- B. Accompany submittal with transmittal letter in duplicate, containing:
Submit one set of specifications and Addenda, and shop drawings in accordance with Paragraphs 1.04 D and E of this Section, prior to final completion.
- C. 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.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01720

(THIS PAGE INTENTIONALLY LEFT BLANK)

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers standard warranties on products and special warranties.

- 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.

- B. Related Sections: The following Sections contain requirements that relate to this Section:

- 1. Division 1 Section "Submittals" specifies procedures for submitting warranties.
 - 2. Division 1 Section "Project Closeout" specifies contract closeout procedures.
 - 3. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

- C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.4 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted construction.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.
- F. Contractor will take delivery of all Owner purchased equipment. All warranties for Owner purchased equipment shall be the responsibility of the Contractor.

1.5 SUBMITTALS

- A. Submit written warranties to the Engineer prior to the date certified for Substantial Completion. If the Engineer's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Engineer.

1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Engineer within 15 days of completion of that designated portion of the Work.
- B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Engineer, for approval prior to final execution.
- C. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Submit a draft to the Owner, through the Engineer, for approval prior to final execution.
 1. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- D. Form of Submittal: At Final Completion compile 3 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Specifications.
- E. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (115-by-280-mm) paper.
 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," appropriate volume numbering, project title or name, and name of the Contractor.
 3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 LIST OF WARRANTIES

- A. Schedule: Provide warranties on products and installations as specified in all Division 2-16 Specification sections.

END OF SECTION 01740

1.0 GENERAL**1.1 DESCRIPTION**

A. The Work of this Section includes all labor, machinery, construction equipment and appliances required to perform in a good workmanlike manner all boring and jacking of pipeline casings and installation of pipe therein.

1. The overall work scope shall include, but not be limited to, boring and jacking pits and equipment, sheeting, steel casing pipe, skid, steel straps, coatings, location signs as required, installation of the carrier pipe within the casings, miscellaneous appurtenances to complete the entire work as shown on the Construction Drawings, and restoration.

2. Boring and jacking operations shall be performed within the right-of-way and/or easements shown on the Construction Drawings.

B. The equipment used in boring and jacking casings shall be of adequate commercial size and satisfactory working condition for safe operation, and may be subject to approval by the County at the discretion of the Project Manager. Such approval, however, shall not relieve the Contractor of the responsibility for making a satisfactory installation meeting the criteria set forth herein. Only workmen experienced in boring and jacking operations shall be used in performing the Work.

C. Provide all structures, safety equipment, and professional services required to provide for the health and safety of the general public and of personnel involved in pipe boring and jacking work in accordance with the requirements of the regulatory agencies having jurisdiction.

D. Take all measures necessary to protect surrounding public and private property, adjacent buildings, roads, drives, sidewalks, drains, sewers, utilities, trees, structures, and appurtenances from damage due to pipe boring and jacking work. Responsibility and payment for correction of such damage shall be the sole responsibility of the Contractor.

1.2 REFERENCE DOCUMENTS

- A. American Society for Testing and Materials (ASTM).
- B. American Water Works Associations (AWWA).
- C. American Welding Society (AWS)

1.3 RELATED WORK

- A. Section 02221 Excavation and Backfill.
- B. Section 03300 Cast-in-Place Concrete.

2.0 PRODUCT**2.1 PIPE CASING**

A. Steel pipe casings shall conform to the requirements of ASTM A139 (straight seam pipe only), Grade "B" with a minimum yield strength of 35,000 psi and be of a thickness equal to or exceeding the minimum gauge indicated on the Contract Drawings, and equal to or exceeding the requirements of the applicable governing agency. Pipe casing to be placed by jacking methods shall be of sufficient thickness and axial strength to withstand the forces to be encountered during the jacking process. The pipe shall be coated externally with coal-tar primer followed by hot coal-tar enamel in accordance with ANSI/AWWA C203. The casing shall be shop cut with ends square with centerline, leveled and welded so that the entire length of the casing shall be straight and true.

B. Field and shop welds of the casing pipes shall conform with American Welding Society (AWS) standard specifications. Field welds shall be complete penetration, single-bevel groove type joints. Welds shall be airtight and continuous over the entire circumference of the pipe and shall not increase the outside pipe diameter by more than 3/4-inch, nor shall there be intrusion of the weld metal into the bore of the casing.

2.2 JOINTS

Joints shall be butt welded in accordance with the requirements of ANSI/AWWA C206. The joints shall be welded with a continuous circumferential weld. It shall be the Contractor's responsibility to provide stress transfer across the joints which is capable of resisting the jacking forces involved.

2.3 CARRIER PIPE

The carrier pipe material shall be in accordance with the Construction Drawings and specifications and will be restrained with manufacturer's restrained joints.

3.0 EXECUTION**3.1 GENERAL**

The installation of pipeline casings under the railroad or highway as shown on the Construction Drawings shall be in accordance with all the requirements of the railway company, the Florida Department of Transportation, Columbia County, or other governing regulatory agency.

3.2 EXCAVATION

A. A two-inch auger pilot hole shall first be attempted to determine if rock will prevent the installation of the casing. If the pilot hole is successfully made, the casing shall be installed.

B. The leading section of casing shall be equipped with a jacking head securely anchored thereto to prevent any wobble or variation in alignment during the jacking operation.

C. Excavation shall be performed entirely within the jacking head and no excavation in advance thereof shall be permitted. Every effort shall be made to avoid any loss of earth outside the jacking head.

D. Excavated material shall be removed from the casing as excavation progresses, and no accumulation of such material within the casing will be permitted.

3.3 BORING AND JACKING

A. The boring and jacking operations shall be done simultaneously with correct line and grade carefully maintained for the casing. Holes for casing shall be bored with an auger mounted inside the pipe with the auger extending a short distance beyond the lead end of the pipe to preclude caving.

B. Excavation for jacking pits or shafts shall be in accordance with applicable sections of these specifications.

C. Carrier pipes shall have manufacturer's restrained joints and shall be supported to prevent damages to either carrier pipe or casing pipe. The ends of the casing pipe shall be sealed with brick and mortar after installation of the utility pipe or other approved method.

D. The top of the casing shall maintain a minimum of 36-inch clearance under the roadway surface or as indicated on the Construction Drawings.

E. The invert elevation of the steel casing for the individual roadway crossings shall be set in the field by the Contractor and shall be based on the minimum vertical clearance between the top of the carrier pipe, unless otherwise indicated on the Construction Drawings, and the existing utilities on either side of the crossing site unless otherwise noted on the Construction Drawings.

F. Casing invert elevations which are proposed by the Contractor are subject to approval by Columbia County.

3.4 GROUTING

After jacking is completed, the Contractor shall drill holes in the casing at the locations of ground loss and elsewhere where voids are suspected and shall force grout in to fill voids to refusal at satisfactory pressures, but not to exceed 50 psi. This shall be done only in casings with large enough diameter to provide adequate working room.

3.5 LOSS OF GROUND

A. Should appreciable loss of ground occur during the jacking operation, the voids shall be backpacted promptly to the extent practicable with soil cement consisting of a slightly moistened mixture of 1 part cement to 5 parts granular material. Where the soil is not suitable for this purpose, the Contractor shall provide suitable material at his expense.

B. The soil cement shall be thoroughly mixed and rammed into place as soon as possible after the loss of ground.

3.6 TOLERANCES

Extreme care shall be exercised by the Contractor to maintain line and grade during jacking operation, and the Contractor may be required to modify the manner in which he is conducting his jacking operation to correct any deviation when deemed necessary by the County Project Manager, or Inspector.

3.7 RESPONSIBILITY

The Contractor shall be fully responsible for the placement of the casing. The details shown on the Construction Drawings are to be considered minimum only.

3.8 INSTALLATION OF PIPE

A. The pipe shall be installed in the casing using approved manufactured casing spacer centered on pipe length.

B. The pressure of sliding carrier pipe into the casing shall not be applied directly to carrier pipe. A plank, timber, or other material acceptable to the Project Manager shall be placed over the pipe end, during pushing, to protect it from damage.

C. Adjust the pipe grade as required by changing the thickness of the spacers to compensate for any grade variations of the casing.

D. If the alignment of the casing is such that the pipe grade cannot be met, the grade of the pipe shall be adjusted, if required by the Project Manager or Inspector. If realignment is not deemed feasible, another casing meeting the required grade shall be installed. The abandoned casing shall be filled with sand and the ends plugged with 12-inch thick masonry plugs. Realignment or replacement work shall in no way result in extra cost to the County.

E. Ends of casing pipe shall be sealed with brick and mortar after installation of the carrier pipe. Seal thickness shall be a minimum 4 inches or as specified on contract drawings. Elastomeric end seals fastened with stainless steel bands shall be installed at each end of casing.

3.9 INSURANCE REQUIREMENTS AND FEES

A. With respect to the railway line crossings, the Contractor shall provide insurance in accordance with the railroad company requirements.

B. All work performed within the State of Florida Department of Transportation rights-of-way or within the Railroad property limits shall be in accordance with the requirements of those agencies which are hereby made a part of these specifications. It is the responsibility of the Contractor to determine all requirements of these agencies and to comply with said requirements including any necessary bonds, cash deposit, or insurance.

C. The Contractor will not be permitted to commence work on the railroad or highway crossing until bonds, cash deposits, or insurance furnished pursuant to the above by the Contractor is to the satisfaction of the railroad company or Florida Department of Transportation.

3.10 SUCCESSFUL COMPLETION

A. The Contractor shall be considered as having completed the requirements of any one boring or jacking when he has successfully completed the work to the satisfaction of the Engineer of Record.

B. The locations of any second or third attempts shall have the concurrence of the County Project Manager, or Inspector. If, after three attempts, the Contractor is not able to complete a boring or jacking, he may request authorization to use a trench. If such authorization is granted, the installation of the pipe and restoration of the surface shall be at no additional cost except that the Contractor shall be reimbursed for any casing abandoned in place at the unit price set forth in the Unit Price Schedule for Change Orders. If such authorization is not granted and the Contractor is required to utilize other methods approved by Water Resource Services, it shall be considered additional work. However, appropriate credit shall be given for not having performed the borings or trenching.

END OF SPECIFICATION

(THIS PAGE INTENTIONALLY LEFT BLANK)

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Preparing and grading subgrades for slabs-on-grade, walks, pavements, and landscaping.
 - 2. Excavating and backfilling for buildings and structures.
 - 3. Subbase course for walks and pavements.
 - 4. Excavating and backfilling trenches within building lines.
 - 5. Excavating and backfilling for underground mechanical and electrical utilities and appurtenances.
 - 6. Pavement Crossings (Cased) for paved roadways.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Section "Site Clearing" for site stripping, grubbing, topsoil removal, and tree protection.

1.3 DEFINITIONS

- A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
- D. Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.
- E. Base Course: The layer placed between the subbase and surface pavement in a

paving system.

- F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.
- G. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within building lines.

1.4 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Test Reports: In addition to test reports required under field quality control, submit the following:
 - 1. Laboratory analysis of each soil material proposed for fill and backfill from on-site and borrow sources.
 - 2. One optimum moisture-maximum density curve for each soil material.
 - 3. Report of actual unconfined compressive strength and/or results of bearing tests of each stratum tested.

1.5 QUALITY ASSURANCE

- A. Testing and Inspection Service: Contractor will employ a qualified independent geotechnical engineering testing agency approved by the Engineer to classify proposed on-site and borrow soils to verify that soils comply with specified requirements and to perform required field and laboratory testing.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt existing utilities serving facilities occupied by the Owner or others except when permitted in writing by the Engineer and then only after acceptable temporary utility services have been provided.
- B. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner, and utility companies in keeping respective services and facilities in operation. Contractor shall bear all costs of repairing damaged utilities to the satisfaction of utility owner.
- C. Provide a minimum 48-hours' notice to the utility and Engineer and receive written notice to proceed before interrupting any utility.
- D. Use of Explosives: The use of explosives is not permitted.

- E. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.
- F. Operate warning lights as recommended by authorities having jurisdiction.

- G. Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- H. Perform excavation within drip-line of large trees to remain by hand, and protect the root system from damage or dryout in the manner prescribed in Division 2 specification sections.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Backfill and Fill Materials: Satisfactory soil materials free of clay, rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter. The fill material should be a sand containing little fines. Prior to placing the fill material, the existing material shall be stripped of all soils containing a significant percentage of organics and all loose soils which cannot be readily compacted.
- B. Subbase and Base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, as approved by the Engineer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.
- C. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- D. Tree protection is specified in the Section "Site Clearing."

3.2 DEWATERING

- A. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

- B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

3.3 EXCAVATION

- A. Explosives: Do not use explosives.
- B. Unclassified Excavation: Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.

3.4 STABILITY OF EXCAVATIONS

- A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.
 - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.7 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.
- B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove stones and sharp objects to avoid point loading.

3.8 APPROVAL OF SUBGRADE

- A. Notify Engineer when excavations have reached required subgrade.

- B. When Engineer determines that unforeseen unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Engineer.

3.9 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation of concrete foundation or footing to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position when acceptable to the Engineer.

3.10 STORAGE OF SOIL MATERIALS

- A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:
 - 1. Acceptance of construction below finish grade.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Testing, inspecting, and approval of underground utilities.
 - 4. Concrete formwork removal.
 - 5. Removal of trash and debris from excavation.
 - 6. Removal of temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.12 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on rock and other unyielding bearing surfaces and to fill unauthorized excavations. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Concrete backfill trenches that carry below or pass under footings and that are excavated within 18 inches of footings. Place concrete to level of bottom of footings.
- C. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or

conduit.

- D. Fill voids with approved backfill materials as shoring and bracing, and sheeting is removed.
- E. Place and compact final backfill of satisfactory soil material to final subgrade.
- F. Install warning tape directly above utilities, no less than 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 FILL

- A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills.
 - 1. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface.
- B. When subgrade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and recompact to required density.
- C. Place fill material in layers to required elevations for each location listed below.
 - 1. Under grass, use satisfactory excavated or borrow soil material.
 - 2. Under walks and pavements, use subbase or base material, or satisfactory excavated or borrow soil material.
 - 3. Under steps and ramps, use subbase material.
 - 4. Under building slabs, use drainage fill material.
 - 5. Under footings and foundations, use engineered fill.

3.14 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density.
 - a. Stockpile or spread and dry removed wet satisfactory soil material.

3.15 COMPACTION

- A. Unless otherwise stated in an attached Soils Report, the following conditions shall apply to this project:
 - 1. Place backfill and fill materials in layers not more than 12 inches in loose

depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

2. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.
- B. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D 698 (Standard Proctor):
1. Under structures, building slabs, steps, and pavements, compact the top 12 inches below subgrade and each layer of backfill or fill material at 100 percent maximum dry density.
 2. Under walkways, compact the top 6 inches below subgrade and each layer of backfill or fill material at 100 percent maximum dry density.
 3. Under lawn or unpaved areas, compact the top 6 inches below subgrade and each layer of backfill or fill material at 95 percent maximum dry density.

3.16 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
1. Provide a smooth transition between existing adjacent grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
1. Lawn or Unpaved Areas: Plus or minus 0.10 foot.
 2. Walks: Plus or minus 0.10 foot.
 3. Pavements: Plus or minus 1/2 inch.
- C. Grading Inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBBASE AND BASE COURSES

- A. Under pavements and walks, place subbase course material on prepared subgrades. Place base course material over subbases to pavements.
1. Compact subbase and base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 100 percent of ASTM D 698 (Standard Proctor).
 2. Shape subbase and base to required crown elevations and cross-slope grades.

3. When thickness of compacted subbase or base course is 6 inches or less, place materials in a single layer.
 4. When thickness of compacted subbase or base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.
- B. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders at least 12 inches wide of acceptable soil materials and compact simultaneously with each subbase and base layer.
- C. For pre-stressed ground storage tank foundation see Appendix A

3.18 PAVEMENT CROSSINGS

- A. The procedure for the crossings of roads shall be made by boring and casing where noted on the construction plans. The casing and equipment shall be placed in accordance with the FDOT permit and requirements. Steel pipe as specified in these specifications shall be used as casing where required. When the Contractor proposes to install pipe by means of boring and/or jacking, he shall submit to the Engineer for approval the method and equipment to be used. Where the boring and/or jacking is to be performed under highways, railroads, city streets or other areas not controlled by the Owner, the Contractor must coordinate and comply with the desires of the affected entity.
- B. Pipe used for casing shall be wrought steel and have a minimum yield strength of 35,000 psi designed for E 72 loading. The casing shall have a wall thickness meeting the minimum requirements of the Florida Department of Transportation for steel casing bored and jacked into position. Ends shall be free from splits or other rough edges which might damage the carrier pipe. Skids or casing spacers shall be used on the carrier pipe to prevent damage to the pipe and bell joints. Skids shall be fastened securely to the carrier pipe with stainless steel strapping. If wooden skids are used, the wood shall be pressure-treated with a preservative.
- C. In areas where open cuts are allowed, the edges shall be saw-cut. The backfilling and repaving shall be done in accordance with the applicable sections of these specifications and the construction drawings. At least one-half of the traveled portion of the roadway must be open to traffic at all times and adequate barricades and warning signs shall be provided.

3.19 FIELD QUALITY CONTROL

- A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
1. Footing Subgrade: At footing subgrades, perform at least one test of each soil stratum to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of each subgrade with related tested strata when acceptable to the Engineer.

2. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, perform at least one field in-place density test for every 2,000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
 3. Foundation Wall Backfill: In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall face.
- B. When testing agency reports that subgrades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, recompact and retest until required density is obtained.

3.19 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace material to depth directed by the Engineer; reshape and recompact at optimum moisture content to the required density.
- C. Settling: Where settling occurs during the Project correction period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing.
6. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.12 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.
1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off the Owner's property.

END OF SECTION 02200

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 DESCRIPTION OF WORK:

- A. Extent of grassing work is as specified or shown on the construction plans. Sodded areas disturbed during construction of pipe lines shall be re-sodded to match existing. All other areas disturbed during construction operations shall be seeded and mulched.

1.3 QUALITY ASSURANCE:

- A. All seed used shall be labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of Invitation for Bids. All seed shall be furnished in sealed standard containers, unless exception is granted in writing by the Owner. Seed which has become wet, moldy, or otherwise damaged in transit or in storage shall not be used. Fertilizer shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, shall not be used. Seed, fertilizer and other grassing materials shall be stored under cover and protected from damage which would make them unacceptable for use.

1.4 SUBMITTALS:

- A. Approvals, except those required for field installations, field applications, and field tests shall be obtained before delivery of materials or equipment to the project. The results of laboratory tests performed on the topsoil material shall be submitted. The reports shall include the pH level, the amount of organic matter, and available phosphoric acid and potash of the soil intended for use in the work. Certificate of conformance will be required for the following:
 - 1. Grass seed shall be certified by registered, certified seed association or a registered testing laboratory not more than ten months prior to seeding.
 - 2. Sprigs

3. Fertilizer
4. Topsoil
5. Lime
6. Mulching

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. If the quantity of existing stored or excavated topsoil is inadequate for planting, sufficient additional topsoil shall be furnished. Topsoil furnished shall be a natural, fertile, friable soil, possessing characteristics of representative productive soils in the vicinity. It shall be obtained from naturally well-drained areas. Topsoil shall be without admixture of subsoil and free from Johnson grass (*Sorghum halepense*), nut grass (*Cyperus rotundus*) and objectionable weeds and toxic substances.

2.2 SOIL AMENDMENTS

- A. Lime:

Ground limestone (Dolomite) containing not less than 85 percent of total carbonates, and shall be ground to such a fineness that 50 percent will pass a 100-mesh sieve and 90 percent will pass a 20-mesh sieve.

- B. Fertilizer:

16-16-16 formulation of which 60 percent of the nitrogen is in the urea-formaldehyde form and shall conform to the applicable State Fertilizer laws. It shall be granulated so that 80 percent is held on a 16-mesh screen, uniform in composition, dry and free-flowing.

- C. Mulch:

Clean hay, fresh straw mulch or wood chips.

2.3 GRASS MATERIALS

- A. Grass Seed:

Federal Specifications JJJ-S-181 and shall satisfy the following requirements:

Min. % Germination Max. %
Pure Seed and Hard Seed Weed Seed

Argentine Bahia
(Paspalum notatum)

65%

80%

15%

.25%

Seed failing to meet the purity or germination requirements by no more than twenty-five percent may be used, but the quantity shall be increased to yield the required rate of pure live seed. Seed failing to meet the weed seed requirements shall not be used.

B. Sod:

Centipede or match existing when possible.

PART 3 - EXECUTION

3.1 GRADING

- A. Areas to be grassed shall be graded to remove depressions, undulations, and irregularities in the surface before grassing.

3.2 PLACING TOPSOIL

- A. Areas to be grassed shall have a minimum topsoil cover of two inches. Topsoil shall not be placed when the subgrade is excessively wet, extremely dry or in a condition otherwise detrimental to the proposed planting or proper grading.

3.3 TILLAGE

- A. The area to be grassed shall be thoroughly tilled to a depth of four inches using a plow and disc harrow or rotary tilling machinery until a suitable bed has been prepared and no clods or clumps remain larger than 1-1/2 inches in diameter.

3.4 APPLICATION OF FERTILIZER

- A. Fertilizer shall be applied at the rate of 6 pounds per 1,000 square feet and shall be thoroughly incorporated into the top three to four inches of soil.

3.5 PLANTING SEEDS

- A. All areas disturbed during construction shall be seeded as specified herein. Immediately before seeds are sown and after fertilizer and lime are applied, the ground shall be scarified as necessary and shall be raked until the surface is smooth, friable, and of uniformly fine texture. Areas to be grassed shall be seeded evenly with a mechanical spreader, raked lightly, rolled with a 200-pound roller, and watered with a fine spray.

- 1. Seed shall be applied at the following rate:

<u>Seed</u>	<u>Rate of Application</u>
Argentine Bahia Grass (Paspalum notatum)	6 lbs./1000 sq. ft. 260 lbs./acre

2. Seeded areas shall be mulched at the rate of not less than 1-1/2" loose measurement over all seeded areas. Spread by hand, blower, or other suitable equipment. Mulch shall be cut into the soil with equipment capable of cutting the mulch uniformly into the soil. Mulching shall be done within 24 hours of the time seeding is completed.

3.6 ROLLING

- A. After seeding and mulching, a cultipacker, traffic roller, or other suitable equipment shall be used for rolling the grassed areas. Areas shall then be watered with a fine spray.

3.7 WINTER COVER

- A. All areas to be grassed shall be protected against erosion at all times. For protection during Winter months (November 1st through March 31st) Italian rye grass shall be planted at the rate of four pounds per 1,000 square feet on all areas which are not protected by permanent grass.

3.8 CLEAN-UP

- A. All excess soil, excess grass materials, stones, and other waste shall be removed from the site daily and not allowed to accumulate.

3.9 MAINTENANCE

- A. Maintenance of the grass shall continue until the Owner accepts the project for use. Prior to acceptance, maintenance shall include watering, mowing, replanting and other work necessary to produce a uniform stand of grass. If during the warranty period the grass fails to grow, producing bare areas, the Contractor will replant as necessary.

END OF SECTION 02210

(THIS PAGE INTENTIONALLY LEFT BLANK)

SECTION 02221

EARTH EXCAVATION AND BACKFILL IN TRENCHES

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This section includes trenching for the installation of pipelines and appurtenances, including excavation, backfilling, dewatering, disposal of surplus material and restoration of trench surfaces.
- B. Trench excavations shall extend to the widths and depths shown on the contract drawings. In all cases, side slopes during trench excavation shall comply with O.S.H.A. Safety Standards.
- C. The Contractor shall furnish and place all sheeting, bracing, and supports as necessary and shall remove from the excavation all materials which are unsuitable for backfill or which the Engineer may deem unsuitable for backfilling. The bottom of the excavation shall be firm and the Contractor shall furnish and place crushed stone or shell as necessary to stabilize the trench bottom.
- D. The District shall have the option to receive all excess excavated material. The Contractor shall be responsible for delivering excess excavated material to a remote site, chosen by the District, within a five mile radius of the construction site. All cost associated with transferring the excess excavated material shall be included in the unit price for piping. Should District not choose to receive any excavated material, the Contractor shall dispose of said material at no additional cost to District.

PART 2 - PRODUCTS

2.1 PIPE BEDDING MATERIAL

- A. Crushed stone shall consist of hard, durable, subangular particles of proper size and gradation, and shall be free from organic material, wood trash, sand, loam clay, excess fines, and other deleterious materials. The stone shall be graded within the following limits:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
5/8-inch	100
1/2-inch	40 - 100
3/8-inch	15 - 45
No. 10	0 - 5

- B. Sand for bedding pipe shall be a dry screened sand. Sand shall be graded with 100 percent passing a 3/8-inch sieve and not more than 15 percent passing a No. 200 sieve.
- C. Washed shell used for stabilization and bedding shall be mollusk shell in accordance with F.D.O.T. Specifications, Section 913, "Shell Material".

PART 3 - EXECUTION

3.1 EXCAVATION

- A. All excavation shall be unclassified regardless of material encountered. Excavation shall be open cuts with safe side slopes, unless in special cases the Engineer permits vertical sides. In all cases, Contractor shall comply with O.S.H.A. safety standards for safe side slopes during trench excavations.
- B. Where muck, rock, clay or other material within the limits of construction is, in the opinion of the Engineer, unsuitable in its original position, the Contractor shall excavate such material and backfill the excavated area with suitable materials approved by the Engineer, which shall be compacted and shaped to conform to the required section. No separate payment will be made for this item.
- C. In case the excavation of any pipeline is carried below the required depth, the Contractor shall fill the bottom of the excavation up to grade with crushed stone or washed stone in a manner acceptable to the Engineer, without additional compensation for either the excavation or the backfilling.
- D. All material excavated shall be placed so as to minimize interference with public travel or damage to private property and to permit proper access for inspection of the work.
- E. Prior to the start of construction, the Contractor shall provide complete details of the proposed method to be used for the removal of rock or other dense material. Rock shall be removed to a minimum depth of 6-inches below the invert of the pipe or structure and refill material shall be furnished, installed and compacted for pipe or structure bedding as necessary. All costs for removal and refills shall be included in the prices bid for linear feet of force main, sewers, water mains, storm sewers and other piping systems. No additional compensation will be provided for removal or refills.

3.2 DISPOSAL OF MATERIALS

- A. Excavated material shall be stacked without excessive surcharge on the trench bank or obstructing free access to hydrants and valves. Inconvenience to traffic and abutters shall be avoided as much as possible. Excavated material shall be

segregated for use in backfilling as specified below.

- B. All excavated material which is either unsuitable for backfill or which will not be used for backfill in the same location (i.e. streets) shall be removed from the site of the work by the Contractor. All rock excavated with any dimension in excess of 6-inches shall be considered unsuitable material and shall be removed from the project site. The Contractor shall include all costs for removal and disposal of unsuitable material and the required backfill material in the unit prices bid for pipe. No additional compensation will be provided for this item.
- C. Should conditions make it impracticable or unsafe to stack material adjacent to the trench, the material shall be hauled and stored at a location provided by the Contractor. When required, it shall be rehandled and used in backfilling the trench.

3.3 SHEETING AND BRACING

- A. Protection of the excavation against caving or settling of the banks shall be the sole responsibility of the Contractor. He shall protect the sides of his excavation by sheeting and bracing as may be necessary. No actions or instructions by the Engineer shall be regarded as the responsibility for security of the trench or the surrounding areas. The full responsibility remains with the Contractor. The Contractor shall furnish, put in place, and maintain sheeting and bracing required to support the side of the excavation and prevent loss of ground which could damage or delay the work or endanger adjacent structures or vehicular traffic. If the Engineer is of the opinion that at any point sufficient or proper supports have not been provided, he may order additional supports placed at the expense of the Contractor. Compliance with such order shall not relieve the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.
- B. The Contractor shall leave in place to be imbedded in the backfill of the trench, all wood sheeting, bracing, and other related items as shown on the drawings, or which the Engineer may direct him in writing to leave in place at any time during the progress of the work for the purpose of preventing injury to structures, utilities, or property, whether public or private. The Engineer may direct that timber used for sheeting and bracing in the trench be cut off at any specified elevation, after backfilling and tamping has reached this level.
- C. All sheeting and bracing not left in place shall be carefully removed in such manner as not to endanger the construction of other structures, utilities, or property, whether public or private.

- D. The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such 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.
- E. The Contractor shall receive no payment, other than that included in the price to be paid for pipe, for any extra materials used for sheeting, bracing, and other related items. The Contractor shall receive no payment for such materials which was used for the convenience of the Contractor. No separate payment will be made for sheeting, shoring and bracing and the costs shall be included in the appropriate bid item(s).

3.4 TEST PITS

- A. The pits for the purpose of locating underground utilities or structures in advance of the construction may be excavated by the Contractor. Test pits shall be backfilled immediately after the desired information has been obtained. The backfilled surface shall be restored and maintained in a manner satisfactory to the Engineer. The cost of test pits shall be included in the appropriate bid item(s).

3.5 DEWATERING

- A. The Contractor shall furnish all materials and equipment necessary and perform all incidental work required to install and maintain a dewatering system for handling ground water or surface water encountered. The Contractor shall assume all responsibility for the adequacy of the methods, materials, and equipment employed. Construction shall not begin until the Engineer is assured that the proposed method will be satisfactory. The requirements for a stable sub-grade are indicated above and the Contractor must alter his drainage methods, if in the opinion of the Engineer, the trench bottom is unsatisfactory.
- B. The Contractor shall provide pumping equipment and dewatering devices to properly remove and dispose of all water entering trenches and excavations. The grade shall be maintained acceptably dry until the structures to be built therein are completed. All drainage shall be performed without damage to the trench, pavements, pipes, electrical conduits, or other utilities.
- C. The Contractor shall prevent floatation of the pipe by promptly placing and compacting backfill prior to removing any dewatering equipment.
- D. All costs for dewatering systems shall be included in the pipe unit price. No additional compensation will be provided.

3.6 BACKFILLING

- A. As soon as practicable after the pipe has been laid, backfilling shall begin. Bedding shall conform to the details on the drawings. When laying pipe, the groove for the pipe and bell hole must be accurately shaped, and the backfill must be closely compacted under and around the pipe.
- B. Density tests will be taken as determined by the Engineer to establish control of Contractor's backfill operations. Contractor shall pay the cost of density tests. Contractor shall pay all costs involved in retesting areas that fail. Bedding and backfill material shall be compacted to a density of not less than 95% of the maximum density as determined by AASHTO T-180 unless otherwise noted on the plans. Pipe bedding material shall be clean sand, crushed stone or washed shell as specified. Bedding material shall be placed to the width and height dimensions as shown in the bedding detail on the contract drawings
- C. After the required bedding has been placed as shown on the drawings, backfill material free from stones, pieces of lumber, rock and other foreign material shall be placed and compacted over the top of the pipe to a depth of 2 feet above the pipe crown.
- D. Sand for bedding when required shall be placed 6-inches below the invert to a point 8-inches above the crown of the pipe.
- E. Where the pipes are laid cross-country, the remainder of the trench shall be filled with backfill material as shown on the drawings and thoroughly compacted and mounted 6-inches above the existing grade or as directed. Excavated rock with all dimensions less than 6-inches may be used as backfill from 2 feet above the pipe crown to the surface.
- F. Where the pipes are laid in streets, the remainder of the trench above the bedding and the limits stated in Paragraph "C" above and up to within 3 feet of the finish base grade shall be backfilled in 12-inch layers and thoroughly compacted to a density of not less than 98% of the maximum density determined by AASHTO T-180. The top 3 feet shall be compacted to a density of not less than 98% of the maximum density as determined by AASHTO-T-180. Excavated rock with all dimensions less than 6-inches may be used as backfill between the area 2 feet above the pipe crown and the pavement sub-base.
- G. Backfill around manholes, lift stations and other structures shall be thoroughly compacted to a density of not less than 98% of the maximum density as determined by AASHTO T-180. All backfill shall be compacted, especially under and over pipes connected to manholes.

- H. Concrete or bituminous asphalt removed during excavation shall not be placed in backfill.
- I. All road surfaces adjacent to backfilling operations shall be broomed and hose-cleaned immediately after backfilling. Dust control measures acceptable to the Engineer shall be employed at all times.

3.7 RESTORING TRENCH SURFACE

- A. Where the trench occurs adjacent to paved streets, in shoulders, sidewalks, or in cross-country areas, the Contractor shall thoroughly consolidate the backfill and shall maintain the surface as the work progresses. If settlement takes place, he shall immediately deposit additional fill to restore the level of the ground.
- B. The surface of any driveway or paved street or any other area which is disturbed by the trench excavation shall be restored by the Contractor to a condition at least equal to that existing prior to construction. Cost of this work shall be included in other items of work. No separate payment.
- C. In sections where the pipeline passes through grassed areas, the Contractor shall re-grade and grass all disturbed areas as specified in Section 02485.

3.8 PROTECTION

- A. Guard rails, curbing, fencing and other existing facilities in the vicinity of the Contractor's operations shall be adequately protected, and if necessary removed and restored after backfilling. All curbing, fences, guard rails and other existing facilities which are damaged during construction shall be replaced with material fully equal to that existing prior to construction.

END OF SECTION 02221

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Division 2 Section "Earthwork" for excavating, backfilling, and site grading.
- C. Division 2 Section "Excavation Support and Protection".

1.2 DESCRIPTION OF WORK

- A. This Section includes construction dewatering for the purposes of excavation, backfill, compaction and foundation construction.

1.3 PERFORMANCE REQUIREMENTS

- A. Dewatering Performance: Design, provide, test, operate, monitor, and maintain a dewatering system of sufficient scope, size, and capacity to control ground-water flow into excavations and permit construction to proceed on dry, stable subgrades.
- B. Work includes removing dewatering system when no longer needed.
- C. Maintain dewatering operations to ensure erosion is controlled, stability of excavations and constructed slopes is maintained, and flooding of excavation and damage to structures are prevented.
- D. Prevent surface water from entering excavations by grading, dikes, or other means.
- E. Accomplish dewatering without damaging existing buildings adjacent to excavation.

1.4 SUBMITTALS

- A. Shop Drawings: For dewatering system. Show arrangement, locations, and details of wells and well points; locations of headers and discharge lines; and

means of discharge and disposal of water.

1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
2. Include a written report outlining control procedures to be adopted if dewatering problems arise.

- B. Sampling: Provide a plan outlining required sampling for water quality requirements.
- C. Erosion Control: Provide a plan for prevention of erosion and discharge of sediments.
- D. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.
- E. Field Test Reports: Before starting excavation, submit test results and computations demonstrating that dewatering system is capable of meeting performance requirements.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to assume responsibility and perform dewatering who has installed dewatering systems similar to those required for this Project and with a record of successful in-service performance.
- B. Regulatory Requirements: Comply with water disposal requirements of authorities having jurisdiction.

1.4 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others unless permitted in writing by the OWNER and then only after arranging to provide temporary utility services according to requirements indicated.
- B. Survey adjacent structures and improvements, employing a qualified professional surveyor, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. During dewatering, resurvey benchmarks weekly, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify

OWNER if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

1.5 REGULATORY REQUIREMENTS

- A. Comply with water disposal requirements of authorities having jurisdiction over the project areas.
- B. It is the Contractor's responsibility to comply with the requirement of Florida Department of Environmental Protection, including but not limited to, sampling, analysis, permitting and reporting.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. 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. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
 - 2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.2 DEWATERING

- A. Install dewatering system utilizing well points complete with pump equipment, standby power and pumps, valves, appurtenances, water disposal, and surface-water controls.
- B. Before excavation below ground-water level, place system into operation to lower water to specified levels and then operate it continuously until drains,

sewers, and structures have been constructed and fill materials have been placed, or until dewatering is no longer required.

- C. Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
 - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
- D. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
 - 1. Maintain piezometric water level a minimum of 24 inches (600 mm) below lowest surface of the excavation.
- E. Dispose of water removed from excavations in a manner to avoid endangering public health, property, and portions of work under construction or completed. Dispose of water in a manner to avoid inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction. Water removed with dewatering cannot be placed in effluent holding pond.
- F. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on a continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense.
- G. Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

END OF SECTION 02240

PART 1 - GENERAL**1.0 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections, apply to this Section.
- B. Section 02620 apply to this Section

1.1 DESCRIPTION OF WORK

- A. The extent of directional boring is shown on the drawings.
- B. The work included in this section covers the installation of carrier pipe by the directional boring (trenchless installation) method as described herein, within the limits indicated on the drawings. In general, include bore pit, pilot hole (as required), drilling fluids, carrier pipe, removal and disposal of drilling fluids and soil cuttings, soil reports as required by jurisdictional agencies, siltation and sediment control, and all other work required to install the carrier pipe as specified herein and as shown on the drawings.
- C. The Contractor will furnish all labor, equipment, materials and supplies and will perform all work necessary to provide Owner with a complete, finished water main crossing via horizontal directional drilling.
- D. The proposed alignment length, profile and grade to which the water main shall be installed are noted on the applicable drawings. This profile indicates the minimum grade to which the pipe will be installed.

1.2 DESIGN/PERFORMANCE REQUIREMENTS

- A. Provide design engineering for the work as described in paragraph 1.2 and as described herein and on the contract drawings, including, but not limited to, the following elements:
 - 1. Bore hole diameter and length,
 - 2. Location of borehole entry and exit points,
 - 3. Drilling procedures,
 - 4. Pipeline pulling operations,
 - 5. Method of drilling fluid disposal,
 - 6. Area required for drilling operations and storage of pipe,
 - 7. Drilling fluids management plan, and

8. Review of plan and profile drawings and proposed horizontal and vertical alignment of the pipeline, with written certification of agreement with them, or recommended departure from them.
- B. The Contractor's submitted design shall be signed and sealed by a Professional Engineer whose specialty includes design of horizontal drilling operations. The cost of these engineering services will be included in the bid price.
 - C. The Contractor shall be responsible for conducting the job in accordance with all applicable federal, state and local permits, codes and statutes.

1.3 SUBMITTALS

- A. Drawings: Working drawings showing in detail the size and location of boring pits together with all sheeting and shoring to be used in supporting embankments and trench walls, and any other details of the proposed methods of installation required to allow adequate review by the engineer. The Contractor shall prepare a drilling plan indicating equipment proposed for each location, pull-back forces anticipated and shall verify that the DR of the pipe specified is adequate to withstand the anticipated pull-back forces in addition to the earth, line and groundwater loads.
- B. Shop Drawings: Complete layout and details for fabrication and installation of pipeline; including design data and calculations. Submittal shall include, but not be limited to, elements listed in paragraph 1.2 A.
- C. Task Schedule: Detailed schedule of tasks for each stage or operation involved in the work of this section. Include as a minimum the following major tasks:
 1. Preparatory earthwork operations,
 2. Drilling rig mobilization and set-up,
 3. Pipe delivery and on-site pipe joining operations,
 4. Pilot hole drilling and reaming operations,
 5. Pipeline pulling operations,
 6. Pipeline hydrostatic testing,
 7. Drilling fluid disposal, and
 8. Restoration and demobilization.
- D. Task Schedule shall conform to contract schedule as outlined in the General Provisions.
- E. On completion of pilot hole phase of each drill site, a complete set of "as-built" records shall be submitted in duplicate to the Engineer. These records shall include copies of the plan and profile drawing, as well as directional survey reports as

recorded during the drilling operation. Upon completion of directional boring and pipe installation, a complete set of final record shall be submitted in duplicate to the Engineer

- F. Technical data of equipment to be utilized.
- G. Prior to approval, submit the names of supervisory field personnel and historical information of directional boring experience.
- H. Submit MSDS (Material Safety Data Sheets) information for the drilling slurry compounds.
- I. Disposal Plan: The plan shall describe the Contractor's plans for disposal of the drilling fluid and the names, addresses and telephone numbers of any and all subcontractors who will be performing any portion of the disposal activities. At a minimum the plan shall include:
 - 1. Disposal method,
 - 2. Disposal hauler(s),
 - 3. Disposal locations,
 - 4. Estimated quantity to be disposed,
 - 5. Type of vehicle hauling drilling fluids,
 - 6. Signed statement that all hauling equipment (ie., vehicle, tanker, dump truck, trailer, etc.) meets all requirements of state agencies, and
 - 7. Letter from proposed disposal site(s) accepting material.
- J. Erosion Control Plan: An erosion control plan shall be submitted prior to the preconstruction conference. It shall be a written, detailed plan for the accomplishment of acceptable erosion control of the bore sites. The plan shall describe all necessary temporary measures to be implemented for preventing soil erosion from the bore sites until permanent erosion control and finished surfaces are installed. The plan shall comply with all state and local requirements.
- K. Pipe Connection Procedures: The Contractor shall submit pipe connection procedures to the Engineer prior to connecting any pipe. For HDPE pipe, the Contractor shall submit the pipe manufacturer's representative's written approval of the proposed procedures.

1.3 PERMITS

- A. The Owner shall obtain necessary FDEP environmental permits. Copies of the permits shall be kept on-site during construction operations.

1.4 QUALITY ASSURANCE

- A. Crossings must conform to applicable requirements of all utility companies affected, State Highway Department, and environmental agencies.
- B. Qualifications: The Contractor shall be thoroughly experienced in the type construction contemplated herein.
- C. The Contractor must demonstrate expertise in trenchless methods by providing a list of five references for whom similar work has been performed with the last two years. Two of the references shall be from projects where the SAME SIZE OR LARGER pipe than the largest carrier pipe specified in the contract documents was successfully installed at a linear distance greater than or equal to the longest bore required by the contract documents. The references shall include a name and telephone number where contact can be made to verify capability. The subcontractor must provide documentation showing successful completion of the projects used for reference. Conventional trenching experience will not be considered applicable.
- D. Upon completion of carrier pipe installation, Contractor shall pass a mandrel through the entire length of the bore in the presence of the Owners representative to inspect for roughness and necking. Mandrell shall not be more than two-inches in diameter smaller than the ID of the carrier pipe installed. Mandrel and towrope shall be constructed of materials that will not scar or harm the carrier pipe in any manner.
- E. Pipe Manufacturer's Quality Control: The pipe manufacturer shall have an on going Quality Control program for incoming and outgoing materials. High-density polyethylene (HDPE) resins for manufacturing of pipe shall be checked for density, melt flow rate, and contamination. These incoming resins shall be approved by NSF before being converted to pipe. Pipe shall be checked for outside diameter, wall thickness, length, roundness, and surface finish on the inside and outside and end cut.
- F. Fittings Manufacturer's Quality Control: The fitting manufacturer shall have an on-going quality control program for incoming and outgoing materials. Molded fittings shall be inspected for voids and knit lines. All fabricated fittings shall be inspected for joint quality and alignment. All fabricated fitting welds shall be made using a Data Logger. A record of the temperature, pressure and graph of the fusion cycle shall be maintained by the fitting manufacturer.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. The pipe and fitting manufacturer shall package products for shipment in a manner suitable for safe transport on commercial carriers. When delivered, a receiving inspection shall be performed, and any shipping damage reported to the pipe and

fittings manufacturer. Pipe and fittings shall be handled, installed, and tested in accordance with manufacturer's recommendations and the requirements of this specification.

- B. Deliver and store materials within limits of rights-of-way and/or property lines as shown on the drawings as directed by the owner.
- C. The Contractor shall be responsible for securing all project materials and shall bear the cost of replacing any materials which may become misplaced or stolen.

1.6 JOB CONDITIONS

- A. The Contractor shall be held fully responsible for protecting against surface subsidence, damage, or disturbance of adjacent property and facilities from his construction methods.
- B. Each directional boring crew shall have a reasonable proportion of experienced men. A superintendent and/or engineer experienced in directional boring methods and techniques, and who represents the boring contractor, shall be present at all times while work is proceeding. He shall also be responsible for the frequent checking of line and grade, if needed. Tolerances should be agreed to in the light gradient and easement requirements.
- C. Contractor shall be held responsible for the coordination and scheduling of all construction work.

1.7 SAFETY

- A. All drilling equipment must have a permanent, inherent alarm system capable of detecting an electrical current. The ground system shall be equipped with an audible alarm to warn the operator when the drill head nears electrified cable.
- B. All crews shall be provided with grounded safety mats, heavy gauge ground cables with connectors, and hot boots and gloves.
- C. All supervisory personnel must be adequately trained and have direct supervisory experience in directional boring.

PART 2 - PRODUCTS

2.0 MATERIALS

- A. Drilling fluid shall be a gel-forming colloidal fluid consisting of at least 10% of high-grade bentonite, which is totally inert and contains no environmental risk, or equal.
- B. Carrier Pipe:
1. Pipe and fittings shall be high-density polyethylene manufactured from NSF approved PLEXCO P34CH compound, PE 3408, or equal.
 2. Pipe shall meet AWWA C-906, PE Pressure Pipe and Fittings 4" – 53" for Distribution and be marked with the NSF-pw logo.
 3. Hydrostatic design stress (HDS) shall be 800 psi at 73.4 °F with a minimum pipe DR of 9 and operating pressure of 200 psi at 73.4 °F.
 4. Pipe and fittings shall be produced by the same manufacturer from identical materials meeting the requirements of this specification.
 5. Molded fittings shall meet the requirements of ASTM D-3261 and this specification. At the point of fusion, the outside diameter and minimum wall thickness of fitting butt fusion outlets shall meet the outside diameter and minimum wall thickness specifications of ASTM F-714 for the same size of pipe.
 6. Pipe shall be manufactured in accordance with ASTM F-714, ASTM D-3035, or the applicable dedicated service specification. Print line markings shall include a production code from which the location and date of manufacture can be identified. Upon request, the manufacturer shall provide an explanation of his production code.
 7. Pipe Marking: HDPE color coding shall be in accordance with the marking requirements specified herein.
- C. Acceptable Pipe Manufacturer: Performance Pipe, Driscoplex 4000, PE3408, AWWA C-906, DIPS sizing, Richardson, TX, (800) 527-0662; Supplier: ISCO Industries, Grand Bay, AL, 1-800-345-4726, or approved equal.
- D. Butt fusion Fittings: HDPE fittings shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99, and approved for AWWA use. Butt fusion fittings shall have a manufacturing standard of ASTM D3261. Molded and fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans. Fabricated fittings are to be manufactured using Data Loggers. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the Quality Control records. All fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the working pressure rating of the fitting.
- E. Transition Fittings: Terminate all HDPE pipe with fusion welded flanges (125 lb bolt pattern). See paragraph above for alternate fusion procedures.

2.2 EQUIPMENT

A. Directional Drilling Equipment

1. General: The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pull back the pipe, a drilling fluid mixing, delivery and recovery system of sufficient capacity to successfully complete the installation, a drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be reused (if required), a magnetic guidance system or walk over system to accurately guide boring operations, a vacuum truck of sufficient capacity to handle the drilling fluid volume, trained and competent personnel to operate the system. All equipment shall be in good, safe condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.
2. Drilling Rig: The directional drilling machine shall consist of a hydraulically powered system to rotate and push hollow drilling pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the installation. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pullback pressure during pullback operations. There shall be a system to detect electrical current from the drill string and an audible alarm, which automatically sounds when an electrical current is detected.
3. Drill Head: The drill head shall be steerable by changing it's rotation and shall provide necessary cutting surfaces and drilling fluid jets.

B. GUIDANCE SYSTEM

1. General: An electronic walkover tracking system or a Magnetic Guidance System (MGS) probe or proven gyroscopic probe and interface shall be used to provide a continuous and accurate determination of the location of the drill head during the drilling operation. The guidance shall be capable of tracking at all depths up to fifty feet and in any soil condition, including hard rock. It shall enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). The guidance system shall be accurate and calibrated to the manufacturer's specifications for the vertical depth of the borehole at sensing position at depths up to fifty feet and accurate to 2-feet horizontally.
2. Components: The Contractor shall supply all components and materials to install, operate, and maintain the guidance system.

3. The guidance System shall be of a proven type, and shall be set up and operated by personnel trained and experienced with the system. The operator shall be aware of any geo-magnetic anomalies and shall consider such influences in the operation of the guidance system.

2.3 JOINING METHODS

- A. Butt fusion joining: Plain end pipe and fittings shall be made using butt fusion. The butt fusion procedures shall be in accordance with the manufacturer or the PPI. The fusion equipment operator shall receive training using the recommended procedure. The Contractor shall be responsible to verify that the fusion equipment is in good operating condition and that the operator has been trained within the past twelve months. The fusion equipment shall be equipped with a Data Logger. Records of the welds (heater temperature, fusion pressure, and a graph of the fusion cycle) shall be maintained for five (5) years. Fusion beads shall not be removed.
- B. Mechanical Joining: Polyethylene pipe and fittings may be joined together using flanges or mechanical joint adapters. These fittings shall be made from PE 3048 HDPE, with a Cell Classification of 345464C as determined by ASTM D3350-99. Flanged and MJ adapters shall have a manufacturing standard of ASTM D3261. They shall have a pressure rating equal to the pipe unless otherwise specified on the plans.
- C. Electrofusion couplings: Polyethylene pipe and fittings may be joined using approved electrofusion couplings. Fittings shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-99. Electrofusion fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All electrofusion fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the working pressure rating of the fitting.

PART 3 - EXECUTION

3.0 EXECUTION

- B. The Contractor shall be responsible for setting all grade stakes, lines, and levels.
- B. Coordinate the locations of underground utilities with appropriate companies. Advise Engineer immediately if conflict exists.

- C. Contractor shall operate and maintain all equipment as required to keep the work free from excessive spoil and environmental risks.
- D. Install siltation fences, sediment barriers, etc., as required and as included in the Contractors erosion control plan
- E. The Contractor shall perform the necessary general earthwork operations as required for the directional drilling and pipe pulling operations.
- F. The Contractor shall be responsible for restoring all areas impacted by contractors work effort to pre-work conditions. The Contractor shall be responsible for constructing all means of temporary access to the designated work sites and shall be liable for all damages caused as a result of the work.

3.1 INSTALLATION

- B. Installation shall be in a trenchless manner producing continuous bores. The entry point shall be where shown on the plan submitted as required in 1.2 above. The exit point for the drilled hole shall be within 10 feet laterally and within 20 feet longitudinally of where shown on the plan submitted as required in 1.2 above. No exception to this requirement will be allowed.
- B. The tunneling system shall be remotely steerable and permit electronic monitoring of tunnel depth and location.
- C. Tunneling must be performed by a fluid-cutting process (high pressure-low volume) utilizing a liquid clay, i.e., bentonite. The clay lining will maintain tunnel stability and provide lubrication in order to reduce frictional drag while the pipe is being installed. In addition, the clay fluid must be totally inert and contain no environmental risk.
- D. The Contractor must also have a mobile vacuum spoils recovery vehicle on site to remove the drilling spoils from the access pits. The spoils must then be transported from the job site and be properly disposed of. Under no circumstances will the drilling spoils be permitted to be disposed of into sanitary, storm, or other public or private drainage systems.
- E. Mechanical, pneumatic, or water-jetting methods will be considered unacceptable due to the possibility of surface subsidence.
- F. After an initial bore has been completed, a reamer will be installed at the termination pit and the pipe will be pulled back to the starting pit. The reamer must also be capable of discharging liquid clay to facilitate the installation of the pipe into a stabilized and lubricated tunnel.

- G. The Contractor shall provide all material, equipment, and facilities required for directional drilling. Proper alignment and elevation of the borehole shall be consistently maintained throughout the directional drilling operation. The method used to complete the directional drill shall conform to the requirements of all applicable permits.
- H. The entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If Contractor is using a magnetic guidance system, drill path will be surveyed for any surface geo-magnetic variations or anomalies.
- I. Contractor shall place silt fence between all drilling operations and any drainage, well-fields, wetland, waterway or other area designated for such protection necessary by documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Fuel may not be stored in bulk containers within 200 feet of any water body or wetland.
- J. Readings shall be recorded after advancement of each successive drill pipe, (no more than 15') and the readings plotted on a scaled drawing of 1" = 5', both vertical and horizontal. Access to all recorded readings and plan and profile information shall be made available to the Engineer, or his representative, at all times. At no time shall the deflection radius of the drill pipe exceed the deflection limits of the carrier pipe as specified herein.
- K. A complete list of all drilling fluid additives and mixtures to be used in the directional operation will be submitted to the Engineer, along with their respective Material Safety Data Sheets. All drilling fluids and loose cuttings shall be contained in pits or holding tanks for recycling or disposal, no fluids shall be allowed to enter any unapproved areas or natural waterways. Upon completion of the directional drill project, the drilling mud and cuttings shall be disposed of by the Contractor at an approved dumpsite.
- L. The pilot hole shall be drilled on bore path with no deviations greater than 5% of depth over a length of 100-feet. In the event that pilot does deviate from the bore path more than 5-feet of depth in 100-feet, Contractor will notify Engineer and Engineer may require Contractor to pullback and re-drill from the location along bore path before the deviation. In the event that a drilling fluid fractures, inadvertent returns or returns loss occurs during pilot hole drilling operations, Contractor shall cease drilling, wait at least 30 minutes, inject a quantity of drilling fluid with a viscosity exceeding 120 seconds as measured by a Marsh funnel and wait another 30 minutes. If mud fracture or returns loss continues, Contractor will discuss

additional options with the Engineer and work will then proceed accordingly.

- M. Flange/MJ Adapter Installation: Flanges/MJ Adapters shall be attached to pipe and fittings using butt fusion. The flanges/MJ adapters shall be aligned and centered relative to the pipe. Flanges/MJ adapters should be square with the valve or other flange before tightening of bolts. Bolts should not be used to draw flanges into alignment. Bolt threads shall be lubricated, and flat washers shall be used under flange nuts. Bolts shall be tightened using a "star tightening pattern". See manufactures recommendations. Twenty-four hours after first tightening the flange bolts, they must be re-tightened using the same "star tightening patter" used above. The final tightening torque shall be as indicated by the manufacturer.
- O. On each day butt fusions are to be made, the first fusion of the day shall be a trial fusion. The trial fusion shall be allowed to cool completely, then fusion test straps shall be cut out. 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. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.
- P. Socket and saddle fusions shall be tested by a bent strap test as described by the pipe manufacturer. The pipe manufacturer shall provide visual guidelines for inspecting the butt, saddle and socket fusions joints.
- Q. The Contractor shall be liable for retrieving or sealing any pipe that becomes lodged in the drill hole.

3.2 PIPE PULLING OPERATIONS

- A. The full length of the pipe to be installed shall be laid out, welded and tested in one complete unit before being pulled back through the drilled hole. Once started, pipeline pullback shall be continuous unless approved otherwise in writing by the Owner or Owner's designated representative.
- B. The pulling head shall be designed by the Contractor to withstand the continuous tensile pull stresses with intermittent sudden occasional surges. The Contractor shall be responsible for determining the pulling loads.
- C. The pipe shall be continuously lubricated with a bentonite slurry and the assembled pipeline shall be laid on rollers, or other apparatus, to facilitate pullback and prevent damage to pipe.
- D. The Contractor shall continue pull back until 10 linear feet (minimum) of pipe is above ground for the purpose of pipe inspection.

- E. After inspection, a blind flange shall be temporarily bolted to the fusion welded flange and the pipe shall be marked and buried with a minimum cover of 36-inches. Connections, which will be made under this contract, will require the removal of the blind flange and a flanged ductile iron adapter shall be bolted to the fusion welded flange suitable for the transitional material.

3.3 TESTING

- A. In addition to the water system testing requirements specified for the entire system, the Contractor shall conduct a low pressure air test of the HDPE water main above ground prior to pullback as follows:
 - 1. Secure and brace ends of pipe to be tested.
 - 2. Provide calibrated low range air pressure gauge on high end of pipe.
 - 3. Fill pipe to maximum pressure of 20.0 psig. Add air as necessary to compensate for internal/external pipe temperature and initial pipe expansion. Check all pipe joints and test fittings with mild soap solution. Repair or replace all leaking joints, pipe and/or fittings.
 - 4. Once air pressure has stabilized, pipe should hold constant air pressure for two hours. If pipe does not hold pressure, check all joints and test fittings with soap solution.
 - 5. Repair or replace sources of leakage and completely retest entire section.
- B. In addition to the water system testing requirements specified for the entire system, the Contractor shall conduct a hydrostatic test of the HDPE water main in-ground after pullback as follows:
 - 1. Flush the HDPE water main with potable water to remove any sediment, solids and/or foreign material prior to any in place testing. Then, fill the pipe with potable water and after all free air is removed from the test section, raise the pressure at a steady rate to the required pressure. The pressure in the section shall be measured with calibrated pressure gauges at each end of the pipe section.
 - 2. Test pressure shall be 150 psi. The initial pressure test shall be applied and allowed to stand without makeup water for a sufficient time to allow for diametric expansion or pipe stretching to stabilize. This usually occurs within 2-3 hours. After this equilibrium period, the test section can be returned to 150 psi operating pressure, the pump turned off, and a final test pressure held for three hours.
 - 3. Immediately following the pressure test, the results shall be furnished to the Engineer or Inspector. Leaking pipes that cannot be repaired to meet pressure test must be removed, filled with concrete, or otherwise placed out of service.

3.4 DAMAGED OR IMPROPERLY INSTALLED PIPE

- A. If the pipe is damaged before installation, or does not meet the specifications, it shall be replaced at no expense to the Owner. If the pipe is damaged during installation by the Contractor's operations, placed at the improper grade or line, or cannot be advanced because of an unseen obstruction or any other reason, it shall, at the discretion of the Engineer, be retrieved or abandoned in place and the void filled with concrete by pressure grouting as soon as possible. If it becomes necessary to drill another hole, an alternate installation shall be made as directed by the Engineer. The Contractor shall re-drill the hole and furnish all additional labor and materials required to complete the job as indicated on the plans and specifications at no additional cost to the Owner. The cost for retrieval or abandonment of pipe shall be at the expense of the Contractor. No additional payment shall be made for pipe which is retrieved, abandoned, or damaged beyond use, including dewatering, excavation, drilling, backfilling, etc.

- B. Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using one of the joining methods allowed in this section.

END OF SECTION 02300

(THIS PAGE INTENTIONALLY LEFT BLANK)

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 DESCRIPTION OF WORK

- A. Extent of asphalt concrete paving work is shown on drawings. Replace all pavement markings disturbed during construction.
- B. Prepared aggregate subbase is specified in earthwork sections.

1.3 JOB CONDITIONS

- A. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 degrees F. (10 degrees C), and when temperature has not been below 35 degrees F. (1 degree C) for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
- B. Construct asphalt concrete surface course when atmospheric temperature is above 40 degrees F. (4 degrees C), and when base is dry. Base course may be placed when air temperature is above 30 degrees F. (-1 degree C) and rising.
- C. Grade Control: Establish and maintain required lines and elevations.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. General: Use locally available materials and gradations which exhibit a satisfactory record of previous installations.
- B. Base Course Aggregate: Sound, angular crushed stone, crushed gravel, or crushed slag, sand, stone or slag screenings.
 - 1. Uncrushed gravel may be used in base course mixture if required to suit local material availability.
- C. Surface Course Aggregate: Crushed stone, crushed gravel, crushed slag, sharp-edged natural sand.

1. Sand prepared from stone, blast-furnace slag, or gravel, or combinations thereof may be used if required to suite local material availability.
- D. Mineral Filler: Rock or slag dust, hydraulic cement, or other inert material complying with AASHTO M 17 (ASTM D 242).
- E. Asphalt Cement: Comply with AASHTO M 226 (ASTM D 3381).
- F. Viscosity Grade: AC-20, AR-80.
- G. Prime Coat: Cut-back asphalt type; AASHTO M 82 (ASTM D 2027) MC-30, MC-70 or MC-250.
- H. Tack Coat: Emulsified asphalt; AASHTO M 140 (ASTM D 997) or M208 (D 2397), SS-1, SS-1h, CSS-1 or CSS-1h, diluted with one part water to one part emulsified asphalt.
- I. Lane Marking Paint: Chlorinated rubber-alkyd type, FS TT-P-115, Type III. Color to match existing or as noted on construction drawings.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Prime Coat: Apply at rate of 0.20 to 0.50 gal. per sq. yd., over compacted subgrade. Apply material to penetrate and seal, but not flood, surface. Cure and dry as long as necessary to attain penetration and evaporation of volatile.
- B. Tack Coat: Apply to contact surfaces of previously constructed asphalt or portland cement concrete and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.05 to 0.15 gal. per sq. yd. of surface.
 1. Allow to dry until at proper condition to receive paving.

3.2 PLACING THE MIX

- A. General: Place asphalt concrete mixture on prepared surface, spread and strike-off. Spread mixture at minimum temperature of 225 degrees F. (107 degrees C). Place inaccessible and small areas by hand. Place each course to required grade, cross-section and compacted thickness.
- B. Paver Placing: Place in strips not less than 10' wide, unless otherwise acceptable to Engineer. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.

- C. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

3.3 ROLLING

- A. General: Begin rolling when mixture will bear roller weight without excessive displacement.
 - 1. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.
- C. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.
- D. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.
- E. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
 - 1. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.4 FIELD QUALITY CONTROL

- A. General: Test in-place asphalt concrete courses for compliances with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Engineer.

B. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:

Base Course: 1/2", plus or minus.

Surface Course: 1/4", plus or minus.

Check surfaced areas at intervals as directed by Engineer.

END OF SECTION 02513

SECTION 02620 HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND FITTINGS

PART 1 -- GENERAL

1.01 SECTION DESCRIPTION

This specification includes but is not limited to high-density polyethylene (PE 3408) (ductile iron pipe size O.D) pressure pipe primarily intended for the transportation of water and sewage either buried or above grade.

1.02 REFERENCES

Reference:	Title:
AWWA C901	Polyethylene (PE) pressure Pipe & Tubing, ½ inch through 3 inch for water
AWWA C906	Polyethylene (PE) pressure Pipe & Fittings, 4 inch through 63 inch for water
ASTM D3035	Standard Spec for PE Pipe (DR-PR) Based on Controlled Outside Diameter
ASTM D3261	Butt Heat Fusion PE Fittings for PE Pipe & Tubing
ASTM D3350	Standard Specification for PE Pipe & Fittings Materials
ASTM D1238	Melt Flow Index
ASTM D1505	Density of Plastics
ASTM D2837	Hydrostatic Design Basis
NSF Std.#14	Plastic Piping Components & Related Materials
TR-33/2005	Generic Butt Fusion Joining Procedure for Field Joining of PE Pipe

1.03 GENERAL

A. USE

High Density Polyethylene (HDPE) pipes/fittings shall be allowed for use as water, wastewater and reclaimed water pressure pipe where compatible with the specific conditions of the project. The use of material other than HDPE pipe may be required by COLUMBIA COUNTY if it is determined that HDPE pipe is unsuitable for the particular application. All material used in the production of water main piping shall be approved by the National Sanitation Foundation (NSF).

B. DOCUMENTATION

1. Documentation from the resin's manufacturer showing results of the following tests for resin identification:
 - a. Melt Flow Index ASTM D1238
2. Density ASTM D1505

C. MANUFACTURER

All HDPE pipe and fittings shall be from a single manufacturer, who is fully experienced, reputable and qualified in the manufacture of the HDPE pipe to be furnished. The pipe shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications. Qualified manufacturers shall be: PLEXCO Division of Chevron Chemical Company, DRISCOPIPE as manufactured by Phillips Products Co., Inc., SCLAIRPIPE as manufactured by Dupont of Canada or equal as approved by the Utilities Engineer.

D. FINISHED PRODUCT EVALUATION

1. Production staff shall check each length of pipe produced for the items listed below. The results of all measurements shall be recorded on production sheets, which become part of the manufacturer's permanent records.
 - a. Pipe in process shall be checked visually, inside and out for cosmetic defects (grooves, pits, hollows, etc.)
 - b. Pipe outside diameter shall be measured using a suitable periphery tape to ensure conformance with ASTM F714 or ASTM D3035, whichever is applicable.
 - c. Pipe wall thickness shall be measured at 12 equally spaced locations around the circumference at both ends of the pipe to ensure conformance with ASTM F714 or ASTM D3035, whichever is applicable.
 - d. Pipe length shall be measured.
 - e. Pipe marking shall be examined and checked for accuracy.
 - f. Pipe ends shall be checked to ensure they are cut square and clean.
 - g. Subject inside surface to a "reverse bend test" to ensure the pipe is free of oxidation (brittleness).

E. STRESS REGRESSION TESTING

The polyethylene pipe manufacturer shall provide certification that stress regression testing has been performed on the specific polyethylene resin being utilized in the manufacture of this product. This stress regression testing shall have been done in accordance with ASTM D2837 and the manufacturer shall provide a product supplying a minimum Hydrostatic

Design Basis (HDB) of 1,600 psi as determined in accordance with ASTM D2837.

F. COMPATIBILITY

Contractor is responsible for compatibility between pipe materials, fittings and appurtenances.

G. WARRANTY

The pipe MANUFACTURER shall provide a warranty against manufacturing defects of material and workmanship for a period of ten years after the final acceptance of the project by the OWNER. The MANUFACTURER shall replace at no expense to the OWNER any defective pipe/fitting material including labor within the warranty period.

PART 2 – PRODUCTS

2.01 MATERIALS FOR PIPE SIZES 4-INCH DIAMETER AND LARGER

- A. Materials used for the manufacture of polyethylene pipe and fittings shall be made from a PE 3408 high density polyethylene resin compound meeting cell classification 345434C per ASTM D3350; and meeting Type III, Class C, Category 5, Grade P34 per ASTM D1238.
- B. High Density Polyethylene (HDPE) pipe shall comply with AWWA Specifications C906.
- C. If rework compounds are required, only those generated in the Manufacturer's own plant from resin compounds of the same class and type from the same raw material supplier shall be used.
- D. Dimensions and workmanship shall be as specified by ASTM F714. HDPE fittings and transitions shall meet ASTM D3261. HDPE pipe shall have a minimum density of 0.955 grams per cubic centimeter. All HDPE pipe and fittings shall have a Hydrostatic Design Basis (HDB) of 1,600 psi.
- E. HDPE pipe and accessories 4-inch diameter and larger, shall be 160 psi at 73.4°F meeting the requirements of Standard Dimension Ration (SDR) 17 as MINIMUM STRENGTH.
- F. The pipe Manufacturer must certify compliance with the above requirements.

2.02 MATERIALS FOR PIPE SIZES 2-INCH DIAMETER AND LESS

- A. Materials used for the manufacture of polyethylene pipe and fittings shall be made from a PE 3408 high density polyethylene resin compound meeting cell classification 345434C per ASTM D3350; and meeting Type III, Class C, Category 5, Grade P34 per ASTM D1238.
- B. High Density Polyethylene (HDPE) pipes shall comply with AWWA Specifications C901.
- C. If rework compounds are required, only those generated in the Manufacturer's own plant from resin compounds of the same class and type from the same raw material supplier shall be used.
- D. Dimensions and workmanship shall be as specified by ASTM D3035. HDPE fittings and transitions shall meet ASTM D3261. HDPE pipe shall have a minimum density of 0.955 grams per cubic centimeter. All HDPE pipe and fittings shall have a Hydrostatic Design Basis (HDB) of 1,600 psi.
- E. HDPE pipe and accessories 2" and less in diameter, shall be 160 psi at 73.4°F meeting the requirements of Standard Dimension Ratio (SDR) 17 as MINIMUM STRENGTH.
- F. The pipe Manufacturer must certify compliance with the above requirements.

2.03 FITTINGS

- A. All molded fittings and fabricated fittings shall be fully pressure rated to match the pipe SDR pressure rating to which they are made. All fittings shall be molded or fabricated by the manufacturer. No Contractor fabricated fittings shall be used unless approved by the Engineer.
- B. The manufacturer of the HDPE pipe shall supply all HDPE fittings and accessories as well as any adapters and/or specials required to perform the work as shown on the Drawings and specified herein.
- C. All fittings shall be installed using butt-fused fittings, thermo-fused fittings/couplings, or flanged adapters and must be approved by the Engineer. **NO** size on size wet taps shall be permitted.
- D. All transition from HDPE pipe to ductile iron or PVC shall be made per the approval of COLUMBIA COUNTY Engineer and per the HDPE pipe manufacturer's recommendations and specifications. A molded flange connector adapter within a carbon steel back-up ring assembly shall be used for pipe type transitions. Ductile iron back-up rings shall mate with cast iron flanges per ANSI B16.1. A 316 stainless steel back-up ring shall mate with a 316 stainless steel flange per ANSI B16.1.

1. Transition from HDPE to ductile iron fittings and valves shall be approved by COLUMBIA COUNTY Engineer before installation.
2. No solid sleeves shall be allowed between such material transitions.
3. Fittings and transitions shall be as manufactured by Phillips Driscopipe, Inc., 1000 Series Pressure Pipe, Chevron Chemical Company Plexco/Spiralite pipe, or equal.
4. The pipe supplier must certify compliance with the above requirements.

2.04 PIPE IDENTIFICATION

- A. The following shall be continuously indent printed on the pipe or spaced at intervals not exceeding 5-feet:
 1. Name and/or trademark of the pipe manufacturer.
 2. Nominal pipe size.
 3. Dimension ratio.
 4. The letters PE followed by the polyethylene grade in accordance with ASTM
 5. D1248 followed by the hydrostatic design basis in 160's of psi, e.g., PE 3408.
 6. Manufacturing standard reference, e.g., ASTM F714 or D-3035, as required.
 7. A production code from which the date and place of manufacture can be determined.
 8. Color Identification, either stripped by co-extruding longitudinal identifiable color markings or shall be solid in color and as follows:
 - a. BLUE – Potable Water
 - b. GREEN – Sanitary Sewer
 - c. LAVENDER – Reuse
- B. Tracing Wire: Tracing Wire shall be per Section 02665.

Marking Tape: Marking tape shall be installed per COLUMBIA COUNTY Engineer approval.

PART 3 – EXECUTION

3.01 JOINTING METHOD

- A. The pipe shall be joined with butt, heat fusion joints as outlined in ASTM D2657 and conform to the Generic Butt Fusion Joining Procedure for Field Joining of Polyethylene Pipe, Technical Report TR-33/2005, published by the Plastic Pipe Institute (PPI). All joints shall be made in strict compliance with the manufacturer's recommendations. A factory qualified joining technician as designated by pipe manufacturer or experienced, trained technician shall perform all heat fusion joints in the presence of the COLUMBIA COUNTY inspector.
- B. Lengths of pipe shall be assembled into suitable installation lengths by the butt fusion process. All pipe so joined shall be made from the same class and type of raw material made by the same raw material supplier. Pipe shall be furnished in standard laying lengths not to exceed 50 feet and no shorter than 20 feet.
- C. On days butt fusions are to be made, the first fusion shall be a trial fusion in the presence of an COLUMBIA COUNTY inspector. The following shall apply:
 - 1. Heating plates shall be inspected for cuts and scrapes. The plate temperature shall be measured at various locations to ensure proper heating/melting per manufacturer's recommendations and approval by COLUMBIA COUNTY inspector.
 - 2. The fusion or test section shall be cut out after cooling completely for inspection.
 - 3. The test section shall be 12" or 30 times (minimum) the wall thickness in length and 1" or 1.5 times the wall thickness in width (minimum).
 - 4. The joint shall be visually inspected as to continuity of "beads" from the melted material, and for assurance of "cold joint" prevention (i.e. – joint shall have visible molded material between walls of pipe). Joint spacing between the walls of the two ends shall be a minimum of 1/16" to a maximum 3/16".
- D. The polyethylene flange adapters at pipe material transitions shall be backed up by stainless steel flanges conforming to ANSI B16.1 and

shaped as necessary to suit the outside dimensions of the pipe. The flange adapter assemblies shall be connected with corrosion resisting bolts and nuts of Type 316 Stainless Steel as specified in ASTM A726 and ASTM A307. All bolts shall be tightened to the manufacturer's specified torques. Bolts shall be tightened alternatively and evenly. After installation apply a bitumastic coating to bolts and nuts.

3.02 INSTALLATION

- A. High Density Polyethylene (HDPE) Pipe shall be installed in accordance with the instruction of the manufacturer, as shown on the Drawings and as specified herein. A factory qualified joining technician as designated by the pipe manufacturer shall perform all heat fusion joints.
- B. HDPE shall be installed either by Open Trench Construction or Directional Bore Method as outlined in Section 3.02 – Installation, Item P – Open Trench Installation or Item Q – Directional Bore Installation.
- C. Care shall be taken in loading, transporting and unloading to prevent injury to the pipe. Pipe or fitting shall not be dropped. All pipe or fitting shall be examined before installation, and no piece shall be installed which is found to be defective. Any damage to the pipe shall be repaired as directed by the Engineer. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner by the contractor, at his own expense.
- D. Under no circumstances shall the pipe or accessories be dropped into the trench or forced through a directional bore upon “pull-back”.
- E. Care shall be taken during transportation of the pipe such that it will not be cut, kinked or otherwise damaged.
- F. Ropes, fabric or rubber protected slings and straps shall be used when handling pipes. Chains, cables or hooks inserted into the pipe ends shall not be used. Two slings spread apart shall be used for lifting each length of pipe.
- G. Pipes shall be stored on level ground, preferably turf or sand, free of sharp objects, which could damage the pipe. Stacking of the polyethylene pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature conditions. Where necessary due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such width as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.
- H. Pipe shall be stored on clean level ground to prevent undue scratching or gouging. The handling of the pipe shall be in such a manner that the pipe

is not damaged by dragging it over sharp and cutting objects. The maximum allowable depth of cuts, scratches or gouges on the exterior of the pipe is 5 percent of wall thickness. The interior pipe surface shall be free of cuts, gouges or scratches.

- I. Pipe shall be laid to lines and grade shown on the Drawings with bedding and backfill as shown on the Drawings.
- J. When laying is not in progress, including lunchtime, the open ends of the pipe shall be closed by fabricated plugs, or by other approved means.
- K. Sections of pipe with cuts, scratches or gouges exceeding 5 percent of the pipe wall thickness shall be removed completely and the ends of the pipeline rejoined.
- L. The pipe shall be joined by the method of thermal butt fusion, as outlined in PART 3 – Execution, Section 3.1 Joining Method. All joints shall be made in strict compliance with the manufacturer’s recommendations.
- M. Mechanical connections of the polyethylene pipe to auxiliary equipment such as valves, pumps and tanks shall be through flanged connections which shall consists of the following:
 - 1. A polyethylene flange shall be thermally butt-fused to the stub end of the pipe.
 - 2. A 316 stainless steel back up ring shall mate with a 316 stainless steel flange.
 - 3. 316 stainless steel bolts and nuts shall be used.
- N. Flange connections shall be provided with a full-face neoprene gasket.
- O. All HDPE pipe must be at the temperature of the surrounding soil at the time of backfilling and compaction.
- P. If a defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional cost to the Owner. All pipe and fittings shall be thoroughly cleaned before installation, shall be kept clean until they are used in the work and when laid, shall conform to the lines and grades required.
- Q. Open Trench Installation:
 - 1. Section 02221 Excavation, and Backfill shall apply in its entirety.

2. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16-in per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.
3. Good alignment shall be preserved during installation. Deflection of the pipe shall occur only at those places on design drawings and as approved by the Engineer. Fittings, in addition to those shown on the Drawings, shall be used only if necessary or required by the Engineer.
4. Each length of the pipe shall have the assembly mark aligned with the pipe previously laid and held securely until enough backfill has been placed to hold the pipe in place. Joints shall not be "pulled" or "cramped".
5. Precautions shall be taken to prevent flotation of the pipe in the trench.
6. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below top of the pipe. As trench boxes, moveable sheeting, shoring or plates are moved, pipe bedding shall be placed to fill any voids created and the backfill shall be recompact to provide uniform side support for the pipe.
7. Restrained joints shall be installed where shown on the Drawings or as directed by the Engineer.

R. Directional Bore Installation:

1. Refer to Section 02300 Directional Boring.

3.03 CLEANING

- A.** At the conclusion of the work, thoroughly clean all of the new pipe lines to remove all dirt, stones, pieces of wood or other material which may have entered during the construction period by forcing a cleaning swab through all mains 6" or greater. Flushing velocities shall be a minimum of 2.5 feet per second. All flushing shall be coordinated with COLUMBIA COUNTY

Inspector and Water Resources Department. Debris cleaned from the lines shall be removed from the job site.

3.04 TESTING

- A.** Pressure testing shall be conducted per Manufacturer's recommendations and as approved by the COLUMBIA COUNTY Engineer.
- B.** All HDPE water mains shall be disinfected prior to pressure testing as per Section 02665.
- C.** All HDPE mains shall be field-tested. Contractor shall supply all labor, equipment, material, gages, pumps, meters and incidentals required for testing. Each main shall be pressure tested upon completion of the pipe laying and backfilling operations, including placement of any required temporary roadway surfacing.
- D.** All mains shall be tested at 150 percent of the operating design pressure of the pipe unless otherwise approved by the Engineer.
- E.** Pressure testing procedure shall be per Manufacturer's recommendations or as follows:
 - 1. Fill line slowly with water. Maintain flow velocity less than 2 feet per second.
 - 2. Expel air completely from the line during filling and again before applying test pressure. Air shall be expelled by means of taps at points of highest elevation.
 - 3. Apply initial test pressure and allow to stand without makeup pressure for two to three hours, to allow for diametric expansion or pipe stretching to stabilize.
 - 4. After this equilibrium period, apply the specified test pressure and turn the pump off. The final test pressure shall be held for one to three hours.
 - 5. Upon completion of the test, the pressure shall be bled off from a location other than the point where the pressure is monitored. The pressure drop shall be witnessed by the resident project representative and COLUMBIA COUNTY representative at the point where the pressure is being monitored and shall show on the recorded pressure read-out submitted to the Engineer of Record.
- F.** Allowable amount of makeup water for expansion during the pressure test shall conform to Chart 6, Allowance for Expansion Under Test Pressure,

Technical Report TR 31/9-79, published by the Plastic Pipe Institute (PPI). If there are no visual leaks or significant pressure drops during the final test period, the installed pipe passes the test.

- G.** If any test of pipe laid disclosed leakage significant pressure drop greater than the manufacturer's recommended loss, the Contractor shall, at his/her own expense, locate and repair the cause of leakage and retest the line. The amount of leakage, which will be permitted, shall be in accordance with AWWA C600 Standards.
- H.** All visible leaks are to be repaired regardless of the amount of leakage.
- I.** The Contractor must submit his plan for testing to the Engineer for review at least 10 days before starting the test and shall notify COLUMBIA COUNTY Inspector a minimum of 48 hours prior to test.

END OF SECTION

(THIS PAGE INTENTIONALLY LEFT BLANK)

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 RELATED WORK**1.3 QUALITY ASSURANCE**

- A. Substitution of Materials: Substitutions will not be allowed.
- B. Codes and Standards: NSF Label: Where plastic piping is indicated to transport potable water, provide pipes and pipe fittings bearing approval label by National Sanitation Foundation (NSF).

1.4 SUMMARY

- A. This section includes potable water system and process piping.
- B. For building interior plumbing, see division 15 sections.
- C. Specification of an item in this or any other section shall not relieve the Contractor from providing all items, articles, materials, operations, methods, labor, equipment and incidentals necessary for a complete and functional system.
- D. Use only new material, free of defects, rust and scale, and guarantee for the services intended.
- E. Follow local codes if they require other types of pipe or joints.

1.6 WELDER QUALIFICATIONS

- A. All welds to be made by qualified welders experienced in piping work with minimum 2000 hours' experience in like size/standard. Trained by manufacturer with yearly updates.
- B. Welding procedures, welders, and welding operators shall be qualified complying with the provisions of the latest revision of manufacturer's procedures.

- C. Before any welding is performed, Contractor to submit his Standard Welding Procedure Specification together with the Procedure Qualification Record as required by manufacturer fusion qualification procedures.
- D. The Engineer or Engineer reserves the right to test the work of any welder employed on the project, at the Contractor's expense. If the work of the welder is found to be unsatisfactory, the welder shall be prevented from doing further welding on the project.

1.7 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Protect all material from weather damage by using covered storage. Use caps to prevent dirt and construction debris from accumulating inside the pipe and pipe fittings. When plastic piping is specified, store pipe to prevent direct exposure to sunlight and to prevent sagging or bending. Pipe should be raised above the ground surface.

1.8 SUBMITTALS

- A. Submit welder's qualifications, including history, size and footage.
- B. Submit schedule of pipe and pipe fittings showing manufacturer and catalog number.
- C. Submittals may be in the form of a typewritten list, with proper references, indicating service and pipe or pipe fitting specifications.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Piping Materials: Provide pipe and tube of type, joint type, grade, size and weight (wall thickness or class) as indicated in the drawings (or attached schedule) and meeting the requirements of these specifications. Where type, grade or class is not indicated, provide proper selection as determined by installer for installation requirements, and comply with governing regulations and industry standards.
- B. Pipe/Tube Fittings: Provide factory-fabricated fittings of type, materials, grade, class and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve or equipment connection in each case. Where not otherwise indicated, comply with governing regulations and industry standards for selections, and with pipe manufacturer's recommendations where applicable.

C. All pipe shall be color coded according to the table below in accordance with one of the two approved methods as follow:

1. Pipe that is color pigmented.
2. Three stripes ½” high, equally spaced around circumference of the pipe with permanent ink running the entire length. The designation listed in the table below shall be placed on the stripe in ¾” letters every 21 inches along the pipe length:

	COLOR	DESIGNATION
Sewer Force Main	Green	FORCE MAIN
Sewer Gravity Main	Green	GRAVITY SEWER
Potable Water Main	Blue	POTABLE WATER
Chlorine Gas & Solution	Yellow	CHLORINE

2.2 DUCTILE-IRON PRESSURE PIPES AND PIPE FITTINGS

- A. General: Ductile iron shall be used as indicated in the attached schedule.
- B. Above ground pipe to be flanged, below ground to be flanged or mechanical joint.
- C. Ductile-Iron Pipe: ANSI A21.51; AWWA C151,
- D. Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water: ANSI A21.4; AWWA C104.
- E. Ductile-Iron Fittings: AWWA C110 flanged or mechanical joint with a minimum pressure rating of 250 psi.
- F. Rubber-Gasket Joints: AWWA C111 flanged or mechanical joint.
- G. All potable water piping shall be labeled “NSF Approved”.

2.3 PVC PIPE AND PIPE FITTINGS

- A. Tubing: AWWA C902, copper tubing size, SDR 9.
- B. Polyvinyl Chloride Pressure Pipe (PVC): For buried piping.
 - a. Four-inch through 12-inch Buried Pipe: AWWA C900, DR-18 with bell

type joints and elastomeric gaskets.

- b. Greater than 12-inch: AWWA C905, DR-21 with bell type joints and elastomeric gaskets.
 - c. Pipe less than 4": PVC ASTM D1785, Schedule 80, solvent cement jointed.
2. All fittings for PVC pipe 4" or larger shall be ductile iron and conform to AWWA C110 with mechanical joints meeting a minimum pressure rating of 250 psi.
 3. All PVC fittings less than 4" shall be solvent cement joined.
 4. All potable water and process piping shall be labeled "NSF Approved."

2.4 PE PIPE AND FITTINGS

- A. PE, ASTM Pipe: ASTM D 2239, SIDR No. 5.3, 7, or 9; with PE compound number required to give pressure rating not less than **160 psig**.
 1. Insert Fittings for PE Pipe: ASTM D 2609, made of PA, PP, or PVC with serrated male insert ends matching inside of pipe. Include bands or crimp rings.
 2. Molded PE Fittings: ASTM D 3350, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.
- B. PE, AWWA Pipe: AWWA C906, DR No. 7.3, 9, or 9.3; with PE compound number required to give pressure rating not less than **160 psig**.
 1. PE, AWWA Fittings: AWWA C906, socket- or butt-fusion type, with DR number matching pipe and PE compound number required to give pressure rating not less than **160 psig**.

2.5 FIRE HYDRANTS

- A. General: Cast-iron body, compression-type valve, opening against pressure and closing with pressure, 6-inch (150 mm) mechanical joint inlet, 150-psig (1035 kPa) working pressure.
- B. Outlet Threads: NFPA 1963, with external hose thread used by local fire department. Include cast-iron caps with steel chains.
- C. Operating and Cap Nuts: Pentagon 1-1/2 inch (40 mm) point to flat.

- D. Direction of Opening: Open hydrant valve by turning operating nut to the left, or counterclockwise.
- E. Finish: Red exterior alkyd gloss enamel paint.
- F. Dry-Barrel Fire Hydrants: AWWA C502, two 2-1/2-inch (65 mm) and one 4-1/2-inch (113 mm) outlets, 5-1/4-inch (133 mm) main valve, drain valve, and 6-inch (150 mm) mechanical joint inlet.

2.6 ANCHORAGES

- A. Clamps, Straps, and Washers: ASTM A 506, steel.
- B. Rods: ASTM A 575, steel.
- C. Rod Couplings: ASTM A 197, malleable iron.
- D. Bolts: ASTM A 307, steel.
- E. Cast-Iron Washers: ASTM A 126, gray iron.
- F. Concrete Reaction Backing: Portland cement concrete mix, 3000 psi (20.7 MPa).
 - 1. Cement: ASTM C 150, Type I.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.
- H. Fittings, pipe bells and valves installed for underground service shall be properly restrained in accordance with industry standards. Metal joint restraints, tie rods, and other approved restraining methods may be employed as equal to concrete thrust blocks. All metal joint restraints, tie rods, clamps, bolts, and nuts shall be coated after assembly with a bituminous coating or other acceptable corrosion retarding material.
- I. Mega-Lug restrained joints may be provided at all bends, wyes, tees, caps, valves, hydrants and reducers. If any joints are within the required restrained length they shall be restrained with a restraining harness as required. The restraints will be sized and placed according to the plans or according to the pipe manufacturer's recommendations when not shown on the plans, and approved by the District.

2.7 CASING/PIPE SPACERS

- A. The Contractor shall provide casing spacers for all piping routed through steel casing. The spacers shall be stainless steel construction with UHMW polymer runners and shall be in two (2) halves. The nuts and bolts used shall be stainless steel. A total of no less than two (2) spacers per joint of pipe shall also be used plus one (1) near the openings (ends) of the casing. The spacers shall be Model CCS by Cascade Water Works Manufacturing Co., or equal.

2.8 IDENTIFICATION

- A. On construction involving non-metallic pipe, a 14-gauge, THHN insulated, solid copper wire shall be laid in the pipe trench. The wire shall be continuous from valve box to valve box. All splices made along the pipe line shall also be insulated. The wire shall be wrapped two times around each valve, then extend up inside the valve box to enable a location device to be attached without digging up the valve box. The wire shall not be in contact with the pipe.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All excavation and backfilling for underground piping shall be done in accordance with the applicable sections of these specifications. All pipe, fittings, and valves shall be carefully handled at all times to prevent damage to the pipe or other installations on the job site.
- B. All joints shall be wiped free of all dirt, sand, and foreign material and the pipe shall be carefully examined for defects before installation. Scratches, gouges or cuts in pipe/fittings more than 10% are subject to removal.
- C. **At times when pipe installation is not in progress, the open ends of the pipe shall be closed by approved means and shall remain closed until construction on that particular section is resumed, eliminating the possibility of any flow obstructions getting into the pipe. No open trenches will be allowed when pipe installation is not in progress.**
- D. Cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe. All chain saw or saw cuts shall be cleaned properly to remove all oil residues.
- E. Deviations from the piping location line and grade indicated on the construction plans shall not be made without the prior approval of the Engineer.

- F. Joints between plain ends of polyethylene pipe shall be made by butt fusion when possible. The pipe manufacturer's fusion procedures shall be followed at all times, as well as the recommendations of the fusion machine manufacturer. The wall thickness of the adjoining pipes shall have the same DR at the point of fusion.
- G. When saddle connections to HDPE are fusion welded, the manufacturer's recommended saddle fusion procedures shall be used.
- H. 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. These procedures may differ from other pipe materials. Stiffeners shall be used if mechanical couplings are used.
- I. On each day butt fusions are to be made, the first fusion of the day shall be a trial fusion. The trial fusion shall be allowed to cool completely, then fusion test straps shall be cut out. 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. If the fusion fails at the joint, a new trial fusion shall be made, cooled completely and tested. Butt fusion of pipe to be installed shall not commence until a trial fusion has passed the bent strap test.
- J. Socket and saddle fusions shall be tested by a bent strap test as described by the pipe manufacturer. The pipe manufacturer shall provide visual guidelines for inspecting the butt, saddle and socket fusions joints.
- K. Metallic Pipe Locator Tape: Metallic pipe locator tape shall be buried above all piping. The tape shall be a minimum of 3 inches in width, and shall be as manufactured by Thor Enterprise, Inc., Sun Prairie, WI, or approved equal. The tape shall be buried approximately 12 inches below finish grade. Any unused pipe locator tape (partial or full rolls) shall be given to the Owner.

3.2 PROCEDURE

- A. Pressure Piping: All pressure piping shall be installed in strict accordance with the manufacturer's printed instructions. Before lowering the pipe into the trench, the bottom of the trench shall be graded so that when the pipe rests on the trench bottom, it will have a uniform bearing for its length. The pipe shall be carefully examined for defects and the inside cleaned. After placing the pipe in the trench, the ends shall be wiped free of all dirt, sand, and foreign material. The joints shall be made in accordance with the recommendations of the pipe manufacturer.

- B. Suitable concrete reaction or thrust blocks shall be applied on all piping (except those having screwed or flanged joints), at all tees, plugs, caps and bends deflecting 22-1/2 degrees or more, or movement shall be prevented by attaching suitable metal rods or straps. Unless otherwise directed, the pipe shall be laid with bell ends facing in the direction of laying. Whenever it is necessary to deflect the pipe from a straight line, either in the vertical or horizontal plane, to avoid obstruction, to plumb stems, or where long radius curves are permitted, the degree at deflection shall be as recommended by the manufacturer of the pipe.

The minimum cover for pipe will be 36-inches unless otherwise indicated on the plans. The depth of cover shall be measured from the established street grades or the surface of the permanent improvement to the top of the pipe. At street intersections or where the new pipe lines cross existing underground lines at the same approximate depth as the new line, the cover shall be increased and the new line laid below existing lines or structures. Where the existing lines or structures are of sufficient depth allowing 6-inches of separating earth between them and 30-inches cover, the new lines may be laid above the existing lines unless otherwise specified. In no case will potable water pipe go beneath sewer, force mains or reclaimed water mains.

- C. Construction Equipment: The use of mechanical equipment for trenching and excavating will be permitted; in places where the operation of same will cause damage to trees, shrubbery, buildings, pavements or existing structures, above or below ground, hand methods shall be employed. When the work is not performed on the Owner's property, the Contractor should obtain permission to use mechanical equipment. Where a main is constructed along paved streets, only rubber-tired equipment will be allowed for excavation and backfilling; the use of bulldozers or equipment on tracks will not be permitted. The Contractor will be responsible for any damage done to paved streets or lawns. Concrete saws shall be used for cutting concrete or asphalt pavement.
- D. Unsuitable Conditions: No pipes shall be laid in water or unsuitable soils conditions. Unsuitable soil, as determined by the Engineer, shall be removed or replaced with an approved material as specified elsewhere in these specifications.
- E. Trench Water: At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe.

3.3 PIPE JACKING

- A. Where noted on the construction plans, crossings of roads shall be made by boring and casing. The casing and equipment shall be placed at least eight

- (8) feet from the edge of the pavement including paved shoulders or four (4) feet from the back of the curb. Steel pipe as specified in these specifications shall be used as casing where required. When the Contractor proposes to install pipe by means of boring and/or jacking, he shall submit to the Engineer for approval the method and equipment to be used. Where the boring and/or jacking is to be performed under highways, railroads, District streets or other areas not controlled by the Owner, the Contractor must coordinate and comply with the desires of the affected entity.
- B. Prior to beginning work on crossings in FDOT right-of-way, the Contractor shall submit to the Florida Department of Transportation maintenance engineer a report of subsurface soil and groundwater conditions as they exist in the area of the jacking pits and along the path of the proposed crossing. These reports shall be in accordance with the Florida Department of Transportation *Utility Accommodation Guide*.
- C. Pipe used for casing shall be wrought steel and have a minimum yield strength of 35,000 psi designed for E72 loading. The casing shall have a wall thickness meeting the minimum requirements of the Florida Department of Transportation for steel casing bored and jacked into position. The casing shall be installed by either jacking or boring at the option of the Contractor. Ends shall be free from splits or other rough edges which might damage the carrier pipe.
- D. Setting Appurtenances:
1. Valves and Fittings: Gate valves and pipe fittings shall be set and jointed to new pipe in the manner heretofore specified for cleaning, laying and jointing pipe.
 2. Valve Boxes: Cast-iron valve boxes shall be firmly supported and maintained centered and plumb over the wrench nut of the valve, and box cover flush with the surface of the finished pavement or at such other level as may be directed.
 3. Valve operating nuts on buried valves shall be between 6" (min.) and 24" (max.) below finished grade.
- E. Anchorage of Bends, Tees, and Plugs:
1. Limiting Pipe Diameter and Degree of Bend: Reaction or thrust blocking shall be applied on all PVC pipe lines two-inches in diameter or larger at all tees, plugs, caps and at bends deflecting 22-1/2 degrees or more, or movement shall be prevented by attaching suitable metal rods or straps as directed.

2. Materials for Reaction Blocking: Reaction or thrust blocking shall be of concrete that conforms to sections of these specifications, but may have a 28-day compressive strength of not less than 2000 psi. Reaction blocking will be placed in accordance with the schedule on the construction plans.

Blocking shall be placed between solid ground and the fitting to be anchored. The blocking shall, unless otherwise directed, be so placed that the pipe and fitting joints will be accessible for repairs. No extra payment will be made for this material but shall be included in the unit price bid for the various sizes of pipe. In some cases, the Engineer may direct the Contractor to provide blocking using cable and "deadman" anchors where the soil conditions will not support the normal concrete type as described above.

3.4 DIRECTIONAL DRILLING

- A. Directional drilling operations shall use horizontal directional drilling rigs with thrust capacities sufficient for the pipe size and soil conditions present at the bore. The Contractor shall prepare a drilling plan indicating equipment proposed for each location, pull-back forces anticipated and shall verify that the SDR of the pipe to be used is adequate to withstand the anticipated pull-back forces in addition to the earth, line and groundwater loads.
- B. Clearance: Bore shall provide minimum 10 feet vertical clearance below streams and ditch crossings.
- C. Site Controls: Contractor shall prevent discharge of drilling fluids and mud and shall remove excess materials from site. Erosion control screens and hay bales shall be provided to prevent off-site discharge of silt and debris.
- D. Following installation of the directional drill, the pipe shall be inspected for roundness and necking by pulling a mandrel device equivalent to 90 percent of the pipe inside diameter through the entire installed length.

3.5 PIPING SYSTEM JOINTS

- A. PVC Pressure Pipe: Provide bell-type joint designed for conveying potable water under pressure (ASTM 2672). Ring-type neoprene gasket shall be provided in recesses in the bells to make the joints watertight for all slip joint piping. All PVC pipe and fittings less than 4" in diameter shall be solvent weld. All Class 160 or 200 pipe shall be suitable for use at maximum hydrostatic pressures of 160 and 200 psi respectively at 70° F. All fittings, including bends and tees shall be ductile iron, mechanical joint. Comply with manufacturer's instructions and recommendations, and with applicable standards.

1. PVC Joints: ASTM 2672, for Bell End Pipe.
2. Ductile Iron Joints: Underground shall have mechanical joints; above-grade shall be flanged joints.
3. Heat Joining of Thermoplastic Pipe: ASTM D2657.

3.7 FIRE HYDRANT INSTALLATION

- A. AWWA-Type Fire Hydrants: Comply with AWWA M17. Install with gate valve and provision for drainage as indicated.

3.8 CLEANING AND DISINFECTION

- A. Clean and disinfect water transmission as follows:

1. Each pipe segment shall be swabbed and cleaned with chlorine solution prior to installation.
2. Use pigging device to perform final cleaning due to large volume of water contained in piping system.
3. Prepare disinfection and pigging plan to minimize water losses and discharges. Plan shall be reviewed and approved by Owner and Engineer prior to commencing pigging operations.
4. Disinfect in accordance with AWWA C651-92. Highly chlorinated water shall be "dechlorinated" using Sulfur Dioxide (SO₂) prior to discharge. Provide and install temporary feed system to inject SO₂ into temporary discharge line.

3.9 PIPING TESTS

- A. General: Provide temporary equipment for testing, including pump and gauges. Test piping system before insulation is installed wherever feasible, and remove control devices before testing. Before applying the specified test pressure, expel air from the pipe. To accomplish this, taps shall be made, if necessary, at points of highest elevation, and afterwards tightly plugged. Test each section of each piping system independently but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and subject to a hydrostatic pressure equal to the pressure rating of the pipe being tested.
 1. Contractor is responsible for providing water for testing.

- B. All testing to be done in accordance with AWWA C600.
- C. Notify Engineer 48 hours prior to pressure testing any piping.
- D. Required test period is 2 hours or until the line has been completely inspected for visual leaks.
- E. Test pipe at 150 psi per manufacturer's recommended guide.
- F. Permissible leakage:

gal's/1000'/24 Hrs. gal's/1000'/1 Hr.

2"	4.1 gal.	0.17 gal.
3"	6.0 gal.	0.25 gal.
4"	7.9 gal.	0.33 gal.
6"	12.0 gal.	0.50 gal.
8"	16.0 gal.	0.66 gal.
10"	20.0 gal.	0.83 gal.
12"	24.6 gal.	0.99 gal.
16"	35.3 gal.	1.47 gal.
20"	44.2 gal.	1.84 gal.
24"	53.0 gal.	2.21 gal.

- G. Repair piping systems sections which fail required piping tests, by disassembly and re-installation using new materials to the extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.
- H. Drain test water from piping systems after testing and repair work has been completed. If reclaimed water is used for testing or reclaimed water transmission lines, work with Owner to dispose of test water in a proper manner.

3.9 DISINFECTION

- A. Disinfect and test in accordance with AWWA C651 and Rule 62-555.345 F.A.C.

3.10 VALVE INSTALLATIONS

- A. General Application: Refer to piping system specification sections for specific valve applications and arrangements.
- B. Locate valves for easy access and provide separate support where necessary.

- C. Install valves and unions for each fixture and item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.
- D. Install valves in horizontal piping with stem pointed up in a vertical position where possible, in all cases at or above the center of the pipe.
- E. Install valves in a position to allow full stem movement.
- F. Installation of Check Valves: Install for proper direction of flow and as follows:
 - 1. Swing Check Valves: Horizontal position with hinge pin level.
 - 2. Wafer Check Valves: Horizontal or vertical position, between flanges.
 - 3. Lift Check Valve: With stem upright and plumb.

END OF SECTION 02665

(THIS PAGE INTENTIONALLY LEFT BLANK)

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes.
- B. Cast-in-place concrete includes the following:
 - 1. Foundations and footings.
 - 2. Slabs-on-grade.
 - 3. Foundation walls.
 - 4. Load-bearing building walls.
 - 5. Building frame members.
 - 6. Equipment pads and bases.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 3 Section "Structural Precast Concrete - Plant Cast" for structural precast concrete.

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, and others if requested by Engineer.
- C. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include

special reinforcing required for openings through concrete structures.

- D. Samples of materials as requested by Engineer, including names, sources, and descriptions, as follows:
 - 1. Color finishes.
 - 2. Normal weight aggregates.
 - 3. Fiber reinforcement.
 - 4. Reglets.
 - 5. Waterstops.
 - 6. Vapor retarder/barrier.
 - 7. Form liners.

- E. Material certificates in lieu of material laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 - 1. American Concrete Institute (ACI) 301, "Specifications for Structural Concrete for Buildings."
 - 2. ACI 318, "Building Code Requirements for Reinforced Concrete."
 - 3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice."

- B. Concrete Testing Service: Engage a testing agency acceptable to Engineer to perform material evaluation tests and to design concrete mixes.

- C. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings.

- B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Form Release Agent: Provide commercial formulation form release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties designed to prevent form deflection and to prevent spalling of concrete upon removal. Provide units that will leave no metal closer than 1-1/2 inches to the plane of the exposed concrete surface.
 - 1. Provide ties that, when removed, will leave holes not larger than 1 inch in diameter in the concrete surface.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- D. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
 - 1. Use one brand of cement throughout Project unless otherwise acceptable to Architect.
- B. Fly Ash: ASTM C 618, Type F.
- C. Normal-Weight Aggregates: ASTM C 33 and as specified. Provide aggregates from a single source for exposed concrete.
 - 1. For exposed exterior surfaces, do not use fine or coarse aggregates that contain substances that cause spalling.

2. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer.
- D. Lightweight Aggregates: ASTM C 330.
 - E. Water: Potable.
 - F. Fiber Reinforcement: Polypropylene fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III may be used with the approval of the Engineer.
 - G. Admixtures, General: Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
 - H. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
 - I. Water-Reducing Admixture: ASTM C 494, Type A.
 1. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

2.4 RELATED MATERIALS

- A. Reglets: Where sheet flashing or bituminous membranes are terminated in reglets, provide reglets of not less than 0.0217-inch-thick (26-gage) galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized sheet steel, not less than 0.0336 inch thick (22 gage) with bent tab anchors. Fill slot with temporary filler or cover face opening to prevent intrusion of concrete or debris.
- C. Waterstops: Provide flat, dumbbell-type or centerbulb-type waterstops at construction joints and other joints as indicated. Size to suit joints.
- D. Polyvinyl Chloride Waterstops: Corps of Engineers CRD-C 572.
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
 - a. The Burke Co.
 - b. Greenstreak Plastic Products Co.
 - c. W.R. Meadows, Inc.

- d. Progress Unlimited.
 - e. Schlegel Corp.
 - f. Vinylex Corp.
- E. Sand Cushion: Clean, manufactured or natural sand.
- F. Vapor Retarder: Provide vapor retarder that is resistant to deterioration when tested according to ASTM E 154, as follows:
- 1. Polyethylene sheet not less than 8 mils thick.
 - 2. Water-resistant barrier consisting of heavy kraft papers laminated together with glass-fiber reinforcement and overcoated with black polyethylene on each side.
 - a. Product: Subject to compliance with requirements, provide Moistop by Fortifiber Corporation.
- G. Vapor Barrier: Premolded seven-ply membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weathercoating, and plastic antistick sheet. Water vapor transmission rate of 0.00 grains per sq. ft. per hr. when tested according to ASTM E 96, Method B. Provide manufacturer's recommended mastics and gusset tape.
- H. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
- 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- I. Liquid Membrane-Forming Curing Compound: Liquid-type membrane-forming curing compound complying with ASTM C 309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.

2.5 PROPORTIONING AND DESIGNING MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- B. Submit written reports to Engineer of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Engineer.
- C. Design mixes to provide normal weight concrete with the following properties as indicated on drawings and schedules:
 - 1. 4000-psi, 28-day compressive strength; water-cement ratio, 0.44 maximum

- (non-air-entrained), 0.35 maximum (air-entrained).
 2. 3000-psi, 28-day compressive strength; water-cement ratio, 0.58 maximum (non-air-entrained), 0.46 maximum (air-entrained).
 3. 2500-psi, 28-day compressive strength; water-cement ratio, 0.67 maximum (non-air-entrained), 0.54 maximum (air-entrained).
- D. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.
 2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.
 3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.
 4. Other concrete: Not more than 4 inches.
- E. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in Work.
- F. Fiber Reinforcement: Add to mix at rate of 1.5 lb per cu. yd. unless otherwise recommended by manufacturer.

2.6 ADMIXTURES

- A. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
- B. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 deg F (10 deg C).
- C. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, architectural concrete, parking structure slabs, concrete required to be watertight, and concrete with water-cement ratios below 0.50.
- D. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus or minus 1-1/2 percent within the following limits:
 1. Concrete structures and slabs exposed to freezing and thawing, deicer chemicals, or hydraulic pressure:
 - a. 4.5 percent (moderate exposure); 5.5 percent (severe exposure) for

1-1/2-inch maximum aggregate.

- E. Use admixtures for water reduction and set accelerating or retarding in strict compliance with manufacturer's directions.

2.7 CONCRETE MIXING

- A. Job-Site Mixing: Mix concrete materials in appropriate drum-type batch machine mixer. For mixers of 1 cu. yd. or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than 1 cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd.
 - 1. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- B. Ready-Mixed Concrete: Comply with requirements of ASTM C 94, and as specified.
 - 1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 GENERAL

- A. Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

3.2 FORMS

- A. General: Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
 - 1. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent
- B. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures.

cement paste from leaking.

- C. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
- D. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- E. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- F. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

3.3 VAPOR RETARDER/BARRIER INSTALLATION

- A. General: Place vapor retarder/barrier sheeting in position with longest dimension parallel with direction of pour.
- B. Lap joints 6 inches and seal with manufacturer's recommended mastic or pressure-sensitive tape.

3.4 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
 - 1. Avoiding cutting or puncturing vapor retarder/barrier during reinforcement placement and concreting operations. Repair damages before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and

hangers, as approved by Engineer.

- D. Place reinforcement to maintain minimum coverages as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure, as acceptable to Engineer.
- B. Provide keyways at least 1-1/2 inches deep in construction joints in walls and slabs and between walls and footings. Bulkheads designed and accepted for this purpose may be used for slabs.
- C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.
- D. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.
- E. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's printed instructions.
- F. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Joint fillers and sealants are specified in Division 7 Section "Joint Sealants."
- G. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 1/8 inch wide by one-fourth of slab depth or inserts 1/4 inch wide by one-fourth of slab depth, unless otherwise indicated.
 - 1. Form contraction joints by inserting premolded plastic, hardboard, or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.
 - 2. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without

dislodging aggregate.

3. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible (at column centerlines, half bays, third bays).

3.6 INSTALLING EMBEDDED ITEMS

- A. General: Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
- B. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, relieving angles, and other conditions.
- C. Install dovetail anchor slots in concrete structures as indicated on drawings.
- D. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

3.7 PREPARING FORM SURFACES

- A. General: Coat contact surfaces of forms with an approved, nonresidual, low-VOC, form-coating compound before placing reinforcement.
- B. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.

3.8 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
- C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.
- D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints.

Where placement

consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.
- E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
1. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 2. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 3. Maintain reinforcing in proper position on chairs during concrete placement.
- F. Cold-Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- G. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- H. Hot-Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent

- of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Engineer.

3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
- B. Smooth-Formed Finish: Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- C. Smooth-Rubbed Finish: Provide smooth-rubbed finish on scheduled concrete surfaces that have received smooth-formed finish treatment not later than 1 day after form removal.
 1. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
- D. Grout-Cleaned Finish: Provide grout-cleaned finish on scheduled concrete surfaces that have received smooth-formed finish treatment.
 1. Combine one part portland cement to one and one-half parts fine sand by volume, and a 50:50 mixture of acrylic or styrene butadiene-based bonding admixture and water to form the consistency of thick paint. Blend standard portland cement and white portland cement in amounts determined by trial patches so that final color of dry grout will match adjacent surfaces.
 2. Thoroughly wet concrete surfaces, apply grout to coat surfaces, and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- E. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar

unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.10 MONOLITHIC SLAB FINISHES

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated.
 - 1. After placing slabs, finish surface to tolerances of F(F) 15 (floor flatness) and F(L) 13 (floor levelness) measured according to ASTM E 1155. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo; and where indicated.
 - 1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared, or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Finish surfaces to tolerances of F(F) 18 (floor flatness) and F(L) 15 (floor levelness) measured according to ASTM E 1155. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or another thin film-finish coating system.
 - 1. After floating, begin first trowel-finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and finish surfaces to tolerances of F(F) 20 (floor flatness) and F(L) 17 (floor levelness) measured according to ASTM E 1155. Grind smooth any surface defects that would telegraph through applied floor covering system.
- D. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

- E. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Curing Methods: Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.
- D. Provide moisture curing by the following methods:
 - 2. Keep concrete surface continuously wet by covering with water.
 - 3. Use continuous water-fog spray.
 - 4. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
- E. Provide moisture-retaining cover curing as follows:

5. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Apply curing compound on exposed interior slabs and on exterior slabs, walks, and curbs as follows:
6. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 7. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- G. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- H. Curing Unformed Surfaces: Cure unformed surfaces, including slabs, floor topping, and other flat surfaces, by applying the appropriate curing method.
8. Final cure concrete surfaces to receive finish flooring with a moisture-retaining cover, unless otherwise directed.

3.13 REMOVING FORMS

- A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.14 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Engineer.

3.15 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Engineer.
- B. Mix dry-pack mortar, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 9. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 10. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repairing Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 11. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces

sloped to drain for trueness of slope and smoothness by using a template having the required slope.

12. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through nonreinforced sections regardless of width, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
 13. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 14. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.
 15. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
- G. Repair methods not specified above may be used, subject to acceptance of Architect.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. General: The Contractor will employ a testing agency to perform tests and to submit test reports.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Engineer.
16. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

- b. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - c. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 - d. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below, when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - e. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - f. Compressive-Strength Tests: ASTM C 39; one set for each day's pour for pours exceeding 5 cu. yd. Provide additional sets for each 50 cu. yd. more than the first 25 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
17. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
- C. Test results will be reported in writing to Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- E. Additional Tests: The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 03300

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. This Section includes structural precast concrete units, including the following:
 - 1. Hollow slab units.
- B. Related Sections: The following sections contain requirements that relate to this Section.
 - 1. Cast-in-place concrete is specified in Division 3 Section "Cast-In-Place Concrete."
 - 2. Joint sealants and backing are specified in Division 7 Section "Joint Sealants."
 - 3. Applied finishes are specified in Division 9 Sections.

1.3 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. Product data and instructions for manufactured materials and products. Include manufacturer's certifications and laboratory test reports as required.
- C. Mix design reports of proposed concrete mix as specified in Part 2 of this Section.
- D. Shop drawings prepared by or under the supervision of a qualified professional engineer, showing complete information for fabrication and installation of precast concrete units. Indicate member dimensions and cross-section; location, size, and type of reinforcement, including special reinforcement; and lifting devices necessary for handling and erection.
 - 1. Indicate layout and dimensions, and identify each precast unit

- corresponding to sequence and procedure of installation. Indicate welded connections by AWS standard symbols. Detail inserts, connections, and joints, including accessories and construction at openings in precast units.
2. Provide location and details of anchorage devices that are to be embedded in other construction. Furnish templates, if required, for accurate placement.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except as otherwise indicated:
 1. ACI 301, "Specifications for Structural Concrete for Buildings."
 2. ACI 318, "Building Code Requirements for Reinforced Concrete."
 3. AWS D1.1, "Structural Welding Code: Steel."
 4. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
 5. Prestressed Concrete Institute MNL 116, "Manual for Quality Control for Plants and Production of Precast Concrete Products."
- B. Fabricator Qualifications: Firm experienced in fabrication of precast concrete units similar to units required for this Project and that have a record of successful in-service performance, with sufficient production capacity to produce required units without causing delay in work.
 1. Fabricator must be a producer member of the Prestressed Concrete Institute (PCI) and/or participate in its Plant Certification Program.
- C. Design by Fabricator: Design precast slab units to support superimposed dead loads and live loads as indicated on drawings and as required for compliance with local governing code requirements.
- D. Fabrication Qualifications: Produce precast concrete units at fabricating plant engaged primarily in manufacturing of similar units, unless plant fabrication or delivery to Project site is impractical.
 1. If units are not produced at precast concrete fabricating plant, maintain procedures and conditions for quality control that are equivalent to plant production.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver the amount of precast concrete units needed in a timely manner to the Project site to ensure installation continuity.

- B. Store and handle the units at the Project site to prevent cracking, distortion, staining, or other physical damage, and so that markings are visible. Lift and support units at designated lift points.
- C. Deliver anchorage items that are to be embedded in other construction before starting such work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 FORMWORK

- A. Provide forms and, where required, form facing materials of metal, plastic, wood, or another acceptable material that is nonreactive with concrete and will produce required finish surfaces.
- B. Accurately construct forms, mortar-tight, of sufficient strength to withstand pressures due to concrete placing operations, temperature changes, and for prestressed, pre-tensioning, and detensioning operations. Maintain formwork to provide completed precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified in PCI MNL 116.
- C. Unless forms for plant-manufactured prestressed concrete units are stripped prior to detensioning, design forms so that stresses are not induced in precast units due to deformation of concrete under prestress or movement during detensioning.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Welded Wire Fabric: ASTM A 185.
- D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing, complying with CRSI recommendations.
 - 1. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs that are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).

2.3 PRESTRESSING TENDONS

- A. Uncoated, 7-wire, stress-relieved strand complying with ASTM A 416. Use Grade 250 unless Grade 270 is indicated.
- B. A strand similar to above, but having the size and ultimate strength of wires increased so that the ultimate strength of the strand is increased approximately 15 percent, or a strand with increased strength but fewer number of wires per strand, may be used at manufacturer's option.

2.4 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type III.
- B. Use only one brand and type of cement throughout Project, unless otherwise acceptable to Architect.
- C. Aggregates: ASTM C 33, and as specified here. Provide aggregates from a single source for exposed concrete.
 - 1. Local aggregates not complying with ASTM C 33, but that have shown by special test or actual service to produce concrete of adequate strength and durability, may be used when acceptable to Architect.
- D. Lightweight Aggregate: ASTM C 330.
- E. Water: Potable.
- F. Admixtures, General: Provide admixtures for concrete that contain not more than 0.1 percent chloride ions.
- G. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

2.5 CONNECTION MATERIALS

- A. Steel Plates: Structural quality, hot-rolled carbon steel, ASTM A 283, Grade C.
- B. Steel Shapes: ASTM A 36.
- C. Anchor Bolts: ASTM A 307, low-carbon steel bolts, regular hexagon nuts, and carbon steel washers.
- D. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, and hardened washers complying with ASTM A 325.

- E. Finish of Steel Units: Exposed units galvanized per ASTM A 153; others painted with rust-inhibitive primer.
- F. Bearing Pads: Provide bearing pads for precast concrete units as indicated on drawings.
- G. Welding Electrodes: Comply with AWS standards.
- H. Accessories: Provide clips, hangers, and other accessories required to install project units and to support subsequent construction or finishes.

2.6 GROUT MATERIALS

- A. Cement Grout: Portland cement, ASTM C 150 (Type I), and clean, natural sand, ASTM C 404. Mix at ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum water required for placement and hydration.
- B. Metallic Shrinkage-Resistant Grout: Premixed, factory-packaged ferrous aggregate grouting compound complying with ASTM C 1107, Grade B, with fluid consistency and a 30-minute working time.
- C. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with ASTM C 1107, Grade B, with fluid consistency and a 30-minute working time.
- D. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:
- E. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Metallic Shrinkage-Resistant Grout:
 - a. 100 Non-Shrink Grout (Metallic), Conspec, Inc.
 - b. Firmix, Euclid Chemical Co.
 - c. Vibra-Foil, W.R. Grace.
 - d. Ferrogrount, L & M Construction Chemicals, Inc.
 - e. Embeco 885, Master Builders.
 - f. Portalico, Protex Industries, Inc.
 - g. Kemox G, Sika Chemical.
 - h. Ferrolith G, Sonneborn/Rexnord.
 - 2. Nonmetallic Shrinkage-Resistant Grout:
 - a. 100 Non-Shrink Grout (Non-Metallic), Conspec, Inc.

- b. Supreme Grout, Cormix, Inc.
- c. Sure Grip Grout, Dayton Superior.
- d. Euco N.S., Euclid Chemical Co.
- e. Crystex, L & M Construction Chemicals.
- f. Masterflow 928, Master Builders, Inc.
- g. Sealtight 588 Grout, W.R. Meadows.
- h. Propak, Protex Industries, Inc.
- i. Set Non-Shrink, Set Products, Inc.
- j. Stoncrete NM1, Stonhard, Inc.
- k. Multi-Purpose Grout, Symons Corp.
- l. Portland Expanding Grout (Non-Shrink), Target Products, Ltd.
- m. Five Star Grout, U.S. Grout Corp.

2.7 MIX PROPORTION AND DESIGN

- A. Prepare design mixes for each type of concrete required.
- B. Design mixes may be prepared by independent testing facility or by qualified precast manufacturing plant personnel at precast manufacturer's option.
- C. Proportion mixes by either laboratory trial batch or field experience methods using materials to be employed on the

Project for each type of concrete required complying with ACI 318.
 - 1. Produce standard-weight concrete consisting of specified portland cement, aggregates, admixtures, and water to produce the following properties:
 - a. Compressive strength--5000 psi minimum at 28 days.
 - b. Release strength for prestressed units--3500 psi.
 - 2. Cure compression test cylinders using same methods as for precast concrete work.
- D. Submit written reports to Engineer of proposed mix for each type of concrete at least 15 days prior to start of precast unit production. Do not begin concrete production until mixes and evaluations have been reviewed by Engineer.
- E. Adjusting Concrete Mixes: Mix design adjustments may be requested when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Laboratory test data for revised mix designs and strength results must be submitted to and accepted by Architect before using in the Work.
- F. Admixtures: Use air-entraining admixture in concrete, unless otherwise indicated.

2.8 FABRICATION

- A. General: Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations, and dimensional tolerances of PCI MNL-116 and as specified for types of units required.
- B. Built-in Anchorages: Accurately position built-in anchorage devices and secure to formwork. Locate anchorages where they do not affect the position of the main reinforcement or placing of concrete. Do not relocate bearing plates in units unless acceptable to Engineer.
- C. Cast-in openings larger than 10 inches in diameter or 10 inches square in accordance with final shop drawings. Other smaller holes may be field cut by trades requiring them, as acceptable to Engineer.
- D. Coat surfaces of forms with bond-breaking compound before reinforcement is placed. Provide commercial formula form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces, and that will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's instructions.
- E. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
- F. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers and hangers, as required.
- G. Place reinforcement to obtain at least the minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- H. Pre-tension tendons for prestressed concrete either by single-strand tensioning method or multiple-strand tensioning method. Comply with PCI MNL-116 requirements.
- I. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast units, complying with requirements of ACI 304. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items.
- J. Identify pick-up points and orientation in structure with permanent markings, complying with markings indicated on final shop drawings. Imprint casting date

on each precast unit on a surface that will not show in the finished structure.

- K. Cure by low-pressure steam, steam vapor, radiant heat and moisture, or another similar process to accelerate concrete hardening and to reduce curing time.
- L. Delay detensioning prestressed units until concrete has attained at least 70 percent of the design stress, as established by test cylinders.
 - 1. If concrete has been heat-cured, detension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.
 - 2. Detension pre-tensioned tendons either by gradually releasing tensioning jacks or by heat-cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.
- M. Finish formed surfaces of precast concrete as indicated for each type of unit, and as follows:
 - 1. Standard Finish: Normal plant-run finish produced in forms that impart a smooth finish to concrete. Small surface holes caused by air bubbles, normal color variations and form joint marks, and minor chips and spalls will be tolerated. Major or unsightly imperfections, honeycomb, or structural defects are not permitted.
 - 2. Commercial Finish: Remove fins and large protrusions and fill large holes. Rub or grind ragged edges. Faces are to be true, well-defined surfaces.
- N. Finish unformed surfaces by trowel unless otherwise indicated. Consolidate concrete, bring to proper level with straightedge, float, and trowel to a smooth uniform finish.
 - 1. Apply scratch finish to precast units that will receive concrete topping after installation. Following initial strikeoff, transversely scarify surface to provide ridges approximately 1/4-inch deep.

2.9 HOLLOW SLAB UNITS

- A. Type: Precast, prestressed concrete units with open voids running full length of slabs.
- B. Furnish units that are free of voids or honeycomb, with straight true edges and surfaces.
- C. Provide standard finish units unless otherwise indicated.
- D. Fabricate units of concrete materials that will provide a minimum 3500 psi

compressive strength at the time of initial prestress and a 28-day compressive strength of 5000 psi.

- E. Adequately reinforce slab units to resist transportation and handling stresses.
- F. Include cast-in weld plates where required for anchorage or lateral bracing to structural steel members.
- G. Coordinate with other trades for installation of items to be cast-in hollow slab units.
- H. Provide solid, monolithic precast slab units indicated to be an integral part of hollow slab unit system. Design and fabricate solid units to dimensions and details indicated as specified for hollow slab units.
- I. Provide headers of cast-in-place concrete or structural steel shapes for openings larger than one slab width in accordance with hollow slab unit manufacturer's recommendations.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Bearing Pads: Install flexible bearing pads where indicated as precast units are being erected. Set pads on level, uniform bearing surfaces and maintain in correct position until precast units are placed.
- B. Welding: Perform welding in compliance with AWS D 1.1 and D 1.4, including qualification of welders.
 - 1. Protect units from damage by field welding or cutting operations and provide non-combustible shield as required.
 - 2. Repair damaged metal surfaces by cleaning and applying a coat of liquid galvanizing repair compound to galvanized surfaces and a compatible primer to painted surfaces.
- C. Erection Tolerances: Install precast units without exceeding tolerance limits specified in PCI MNL-127, "Recommended Practice for Erection of Precast Concrete."
 - 1. Grouting Connections and Joints: After precast concrete units have been placed and secured, grout open spaces at connection and joints as follows:
 - 2. Cement grout consisting of 1 part portland cement, 2-1/2 parts sand, and only enough water to properly mix and hydrate.
 - 3. Shrinkage-resistant grout consisting of premixed compound and water to

- provide a flowable mixture without segregation or bleeding.
4. Provide forms or other acceptable method to retain grout in place until sufficiently hard to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, plumb, and level with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it hardens.

END OF SECTION 03410

PART 1 - GENERAL**1.1 DESCRIPTION OF WORK**

The Contractor shall furnish and install all gate valves, plug valves, check valves, and other special valves and piping accessories as shown on the drawings and as specified herein.

1.2 SUBMITTALS

- A. Submit shop drawings on all valves.

PART 2 - PRODUCTS**2.1 GENERAL REQUIREMENTS**

- A. All valve operators shall be designed as not to require over 80 pounds pull to meet the required torque to operate the valves.
- B. All manually operated, shut-off or isolation valves, below grade, shall be furnished with AWWA 2-inch square actuating nuts and valve boxes. Valve boxes shall consist of cast iron base and adjustable top section with cover which shall be marked "SEWER". Two T-handle wrenches shall be furnished.

2.2 GATE VALVES

- A. Resilient seat gate valves shall be cast or ductile iron bodied, bronze mounted, with wedge type disk and rubber seat. Valves shall be manufactured in accordance with AWWA C509. Valves shall be suitable for buried service, be designed for 200 psi working pressure, shall be of O-ring type, with non-rising stem and opening counterclockwise. Valves shall have mechanical joint ends unless otherwise noted on the plans. Valves shall be coated in accordance with AWWA C550.
- B. Gate valves smaller than 3-inches in diameter shall be all bronze, screwed gate valves meeting the requirements of Fed Spec WW-V-54C, as manufactured by Crane, or Walworth, or equal, and suitable for the service required.
- C. Prior to shipment from the factory, each valve shall be tested by applying to it a hydraulic pressure equal to twice the specified working pressure.

2.3 CHECK VALVES

Check valves shall be non-slam type, swing check, cast iron body, flanged, as manufactured by APCO or Valmatic. Pressure rating shall be 100 psi minimum.

2.4 AIR RELEASE VALVE

Air release valves for water mains shall be 1-inch for 14-inch diameter pipe and smaller and 2-inch for 16-inch diameter pipe and larger and shall be the automatic type installed in a concrete box as shown on the drawings. Box and lid shall be of the necessary size to enclose the valve. The valve shall have the ability to open while the pipeline is under pressure and allow accumulated air to escape. To connect the air valve, a corporation stop shall be tapped into the main using the procedures as recommended by the ductile iron pipe manufacturer. The corporation stop shall be Mueller H-10045 or approved equal. The valve shall be Type N, Crispin pressure air valve, as manufactured by Multiplex Manufacturing Company, or APCO, as manufactured by Valve and Primer Corporation.

2.5 PRESSURE GAUGE

A. Valve vault shall be equipped with tapped connection with pressure gage, necessary elbow, pipe nipples and shut-off valve. All materials shall be stainless steel.

B. Gages shall have 3 ½ inch dial, 0-30 psig range, with stainless steel casing.

2.6 VALVE BOXES

Valve boxes shall be provided for all buried valves. Valve boxes shall consist of cast iron base and adjustable top section with cover which shall be marked "water" or "Sewer" as applicable. Cast iron extensions shall be provided as required to meet grade.

2.7 REDUCED PRESSURE ZONE BACKFLOW PREVENTER

The Reduced Pressure Zone Backflow Preventer assembly shall be Watts Regulator Company Series 009 with integrated strainer and check or approved equal. The assembly shall consist of an internal pressure differential relief valve located in a zone between two positive seating check modules with captured springs and silicone seat discs. Seats and seat disks shall be replaceable in both check modules and the relief valve. There shall be no threads or screws in the water way exposed to line fluids. Service of all internal components shall be through a single access cover secured with stainless steel bolts. The assembly shall also include two resilient seated isolation valves, four resilient seated test cocks and an air gap drain fitting. The assembly shall meet the requirements of: USC Manual 8th Edition, ASSE Standard 1013, AWWA Standard C511, CSA B64.4

2.8 WATER SERVICES CONNECTIONS

A. Service connection price shall include service lines from the junction fittings at the main to the limits shown on the drawings. In the event the meter cannot be located at the property line due to a problem it may create for the customer. The meter shall be moved at the discretion of the Inspector at no additional cost to the Owner. All fittings shown or described herein shall be included in the price bid for the item as stated in the Bid Schedule, except jacked service lines which are paid for separately.

B. The service line shall be 3/4" in size from the tap to the road right-of-way.

C. An EMS marker, Scotchmark #1257, shall be buried behind the buried angle meter valves. A 2 inch PVC pipe will be set vertically atop the angle meter valve and shall extend 2 feet above grade.

D. The angle meter valves shall be Mueller B-24273 or Ford AV94-323G.

E. Service taps shall have a minimum 7/8" (opening cut) in the saddle clamp. Saddle clamps shall be Romac Style 202N, double strap, nylon saddle with stainless steel straps, with cc tap. (Single strap saddle clamps prohibited).

F. Corporation stop shall be 3/4" minimum, bronze with Mueller cc threads and compression joint outlet, or approved equal.

G. Service lines shall have a minimum of 30" cover in the roadway areas and 30" cover in the ditches.

H. Service take-off from mains shall be made from the top quadrant of the main axis no more than 45 degree incline from the vertical.

PART 3 - EXECUTION

3.1 SETTING VALVES AND BOXES

Valves and valve boxes as specified in the preceding paragraphs shall be installed where shown on the drawings unless otherwise directed. Valves shall be set plumb with the base of the valve box centered over the valve and resting on compacted backfill. The top section of the box shall be set to allow equal movement above and below finished grade. After being correctly positioned, fill shall be carefully tamped around the valve box for a distance of 4-feet on all sides of the box. In paved areas, top of the cover shall be flush with the finished paving. In off-street areas, the cover shall be set 1-inch above existing grade unless otherwise directed by the Engineer and a concrete pad shall be poured around the top of the box as shown in the standard details.

END OF SECTION 04640

(THIS PAGE INTENTIONALLY LEFT BLANK)

SECTION 03200

PRESTRESSED CONCRETE STORAGE TANK

Section 13200 – Prestressed Concrete Storage Tank.

The following sections within this document may appear shaded and may be changed or modified as necessary:

- The Heading & Footer
- 1.2 Related Sections (A thru C)
- 1.3 References (H)
- 1.5B Prequalification (3d)
- 2.1 Performance (B thru E)
- 2.9 Tank Accessories (A thru F)
- 2.10 Painting (A and B)
- 3.4 Cleaning & Disinfection (B)

The remaining sections within the specification are protected. If changes to the remaining sections are required they should be coordinated with your representative from The Crom Corporation.

SECTION 03200

PRESTRESSED CONCRETE STORAGE TANK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Prestressed concrete storage tank.
- B. Accessories for prestressed concrete storage tank.

1.2 RELATED SECTIONS

- A. Section 03300 – Concrete.
- B. Section 03200 – Steel Reinforcement.
- C. Section 09900 – Painting.

1.3 REFERENCES

- A. ACI 372R-03 – Design and Construction of Circular Wire- and Strand-Wrapped Prestressed Concrete Structures.
- B. AWWA D110-04 – Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks.
- C. ACI 506R – Guide to Shotcrete.
- D. ASTM A 821/A 821M – Standard Specification for Steel Wire, Hard Drawn for Prestressing Concrete Tanks.
- E. ASTM A 1008/A 1008M – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy With Improved Formability.
- F. ASCE Standard 7-05 – Minimum Design Loads for Buildings and Other Structures.
- G. ASTM C 881/C 881M – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- H. AWWA C652 – Disinfection of Potable Water Storage Tanks.

1.4 SUBMITTALS

- A. Shop Drawings: Provide complete plan, elevation, and sectional views showing critical dimensions including:
 - 1. Size, location and number of all reinforcing bars.

2. Thickness of all parts of the tank structure including floor, core wall, dome, and covercoat.
 3. Prestressing schedule including number and placement of prestressing wires on the tank wall and total applied force per foot of wall height.
 4. Location and details of all accessories required.
 5. Minimum size of shop drawings shall be 18" by 24".
- B. Product Data: Submit concrete design mixes including ingredient proportions, minimum cementitious content, and water/cementitious ratio in accordance with these specifications.
- C. Design Data: Submit structural calculations for the tank, signed and sealed by a professional engineer in accordance with Section 1.5 A..3 of these specifications.
- D. Test Reports: Submit concrete strength reports for 7-day and 28-day breaks.
- E. Warranty Document: Submit warranty document in Owner's name in accordance with Section 1.6A of these specifications.
- F. Project Record Documents: Record actual location layout and final configuration of tank and accessories on shop drawings and submit to engineer after construction of the tank is complete.

1.5 QUALITY ASSURANCE

A. Qualifications and Experience:

1. Tank Construction Company: Shall be a firm with ten years of experience in the design and construction of wire-wound, circular prestressed composite tanks with satisfactory evidence that it has the skill, reliability, and financial stability to build and guarantee the tank in accordance with the quality required by these specifications. The company constructing the tank shall have built completely in its own name in the past five years, and be presently responsible for, a minimum of ten (10) dome-covered prestressed composite tanks of equal or greater size than that required for this project which meet these specifications and are now providing satisfactory service.
2. Construction: The entire tank, including all portions of the floor, wall, and roof shall be built by the tank construction company, using its own trained personnel and equipment.
3. Design: All design work for the tank shall be performed by a professional engineer with no less than five years of experience in the design and construction of circular prestressed composite tanks. The professional engineer shall be a full-time staff member of the tank construction company and shall be licensed to work in the state where the project is located.
4. The steel shell design and epoxy injection procedure (covered by U.S. Patent 5,150,551) shall have been used in the ten tanks required in the tank construction company's experience record.

B. Prequalification:

1. The Crom Corporation is the prequalified tank construction company for the prestressed concrete tank.
2. Additional tank construction companies wanting to be prequalified and meeting the criteria as stated in Section 1.5 A. Qualifications and Experience shall make a complete prequalification submittal to the Engineer for review fourteen (14) days prior to the date set for receipt of the bids.
3. Prequalification submittal by tank construction companies who are not previously prequalified shall include the following items:
 - a. Preliminary design drawings and calculations showing the dimensions of the tank, details of the type of construction, wire wound prestressing methods and principal sizes and thicknesses of structural members.
 - b. Complete experience record for the tanks that have been designed and built in the tank construction company's own name. The record shall include the size of the tank, name and address of the Owner, the year of construction and the name of the Engineer for the project.
 - c. The name of the tank designer and his/her experience as the designer of record for prestressed concrete tanks.

1.6 WARRANTY

- A. Provide warranty for workmanship and materials on the complete structural portion of the tank for a five-year period from date of acceptance of the work. In case leakage or other defects appear within the five-year period, the tank construction company shall promptly repair the tank at its own expense upon written notice by the Owner that such defects have been found. Leakage is defined as a stream flow of liquid appearing on the exterior of the tank, the source of which is from the inside of the tank. The tank construction company shall not be responsible for, nor liable for, any subsurface condition. This warranty shall not apply to any accessory, equipment or product that is not a structural part of the tank and is manufactured by a company other than the tank construction company.

PART 2 PRODUCTS

2.1 PERFORMANCE

- A. The design shall be in conformance with applicable portions of American Concrete Institute (ACI) 372R-03 Design and Construction of Circular Wire- and Strand-Wrapped Prestressed Concrete Structures, AWWA D110-04 Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks, and currently accepted engineering principles and practices for the design of such structures.
- B. Capacity: 250,000 Gallons
- C. Dimensions: 45' Inside Diameter
21' Sidewall Depth
- D. Roof Design Loads: Consideration shall be given to all applicable roof design loads in accordance with AWWA D110, Section 3.3 and ASCE 7. The minimum roof live load for the structure shall be 12 psf.

- E. Earthquake Design: Fixed percentage method as specified in AWWA D110, Section 4.1.
- F. The thickness of the core wall shall be calculated so as to accept the initial compressive forces applied by prestressing, hydrostatic stresses induced by contents, and other applicable loads such as soil backfill and wind.
- G. Backfill loads shall not be used in the design of the core wall to counteract hydraulic loads or provide residual compression in the wall.
- H. Concrete:
 - 1. Use Type I / II cement.
 - 2. A maximum of 20% of cementitious material may be fly ash for all concrete mixes.
 - 3. Floor Concrete: Minimum 4000 psi compressive strength at 28 days, maximum $\frac{3}{4}$ " aggregate, 5% +/-1% air content, 4" +/-1" slump.
 - 4. Dome Concrete: Minimum 4000 psi compressive strength at 28 days, maximum $\frac{3}{8}$ " aggregate, maximum 5% +/-1% air content, 4" +/-1" slump.
- I. Shotcrete:
 - 1. Use Type I / II cement.
 - 2. A maximum of 20% of cementitious material may be fly ash for all shotcrete mixes.
 - 3. Core Wall Shotcrete: Minimum 4000 psi compressive strength at 28 days, 4" +/-1" slump.
 - 4. Covercoat Shotcrete: Minimum 3500 psi compressive strength at 28 days, 4" +/-1" slump.
 - 5. Allowable compressive stress due to final prestressing force, f_g :
 - a. 1250 psi + 75t psi/in. with 0.45 f'_g maximum (where f'_g is defined as compressive strength required for final prestressing force and t is the thickness of the core wall in inches).
 - b. Maximum of 2000 psi.
 - 6. Allowable compressive stress due to initial prestressing force, f_{gi} :
 - a. 1250 psi + 75t psi/in. with 0.5 f'_{gi} maximum or less (where f'_{gi} is defined as compressive strength at time initial prestressing force is applied and t is the thickness of the core wall in inches).
 - b. Maximum of 2250 psi.
- J. Prestressing Wire:
 - 1. The prestressing wire shall conform to the requirements of ASTM A821, Type B.
 - 2. Wire size shall be 0.162" (8 gauge), 0.192" (6 gauge) or larger, but no larger than 0.250".
 - 3. Working stress for the tank wall, f_s shall be a maximum of 115,000 psi.
 - 4. Working stress for the dome ring, f_{sd} shall be a maximum of 120,000 psi.
 - 5. Allowable design tensile stress before losses, f_{si} shall be 145,600 psi or no greater than 0.63 f_u .

6. Ultimate tensile strength, f_u shall be, 231,000 psi or greater for 8 gauge wire, 222,000 psi or greater for 6 gauge.

K. Non-prestressed Mild Reinforcing Steel:

1. Allowable design tensile stress, f_s shall be a maximum of 18,000 psi.
2. Yield strength of reinforcing steel, f_y shall be 60,000 psi.

2.2 FLOOR

- A. Concrete membrane floors shall be a minimum of 4" thick and have a minimum thickness of 8" of concrete over all pipe encasements and around sumps.
- B. A minimum percentage of 0.60% reinforcing steel shall be used in the membrane floor. The minimum percentage shall apply to all thickened sections and shall extend a minimum of 2' into the adjacent membrane floor.

2.3 CORE WALL

- A. The core wall shall be constructed of shotcrete, encasing a steel diaphragm continuous the full wall height without horizontal splices.
- B. The thickness of the core wall shall be calculated so as to accept the initial compressive forces applied by prestressing, backfill, and other applicable loads, but in no case be less than 3½" thick.
- C. Horizontal sections of the wall shall form true circles without flat areas, excessive bumps or hollows.
- D. Interior and exterior surfaces of the core wall shall be water cured for a minimum of 7 days or until prestressing begins.
- E. To compensate for bending moments, shrinkage, differential drying, and temperature stresses, the following reinforcing steel shall be incorporated in the core wall.
 1. The top 2' of core wall shall have not less than 1% circumferential reinforcing.
 2. The bottom 3' of core wall shall have not less than 1% circumferential reinforcing.
 3. Inside Face:
 - a. 26 gauge steel shell diaphragm continuous the full wall height without horizontal splices.
 - b. Additional vertical and horizontal reinforcing steel bars as required by design computations.
 4. Outside Face:
 - a. Vertical reinforcing steel: Minimum of #4 bars at 12" center to center.
 - b. Additional vertical and horizontal reinforcing steel bars as required by design computations.

2.4 STEEL SHELL DIAPHRAGM

- A. A 26 gauge steel tank shell, complying with ASTM A 1008, shall be used throughout the core wall, providing a waterstop. The steel shell diaphragm shall be encased and protected with shotcrete no less than 1" thick at all places.
- B. The steel shell is to be formed and erected so that a mechanical key is created between the shotcrete and diaphragm.
- C. The sheets of steel diaphragm shall be continuous from top to bottom of wall; horizontal joints or splices will not be permitted.
- D. All vertical joints in the diaphragm shall be sealed watertight by epoxy injection in accordance with U.S. Patent No. 5,150,551.
- E. Epoxy injection shall be carried out from bottom to top of wall, using a pressure pumping procedure, after the steel shell has been fully encased, inside and outside, with shotcrete.
- F. The sealant shall conform to the requirements of ASTM C881, Type III, Grade 1, and shall be 100% solids, moisture insensitive, low modulus epoxy system. When pumped, maximum viscosity of the epoxy shall be 10 poises at 77°F.
- G. The epoxy sealant shall be suitable for bonding to concrete, shotcrete, and steel.
- H. In all tanks designed to use a waterstop at the floor/wall joint, the steel shell diaphragm shall be epoxy bonded to this waterstop.

2.5 SHOTCRETE

- A. All shotcrete shall be applied by or under direct supervision of experienced nozzlemen certified by the American Concrete Institute (ACI) as outlined in ACI certification publication CP-60.
- B. Shotcrete mixes shall have a minimum of 1 part cementitious material to 3 parts of sand.
- C. Each shotcrete layer shall be broomed prior to final set to effect satisfactory bonding of the following layer.
- D. No shotcrete shall be applied to reinforcing steel or diaphragm that is encrusted with overspray.
- E. No less than 1/8" thick shotcrete shall separate reinforcing steel and prestressing wire.

2.6 DOME ROOF

- A. The dome roof shall be constructed of reinforced concrete and circumferentially prestressed.

- B. Dome shell reinforcement shall consist of reinforcing bars or welded wire fabric meeting ASTM A185, not galvanized. Bolsters for wire fabric and reinforcing bars shall be plastic tipped. Wire ties shall be galvanized.
- C. The dome ring girder shall be prestressed with sufficient wire to withstand the dome dead load and design live loads. The ring girder shall have cross section suitable to accept the applied prestressing forces.
- D. The high water level in the tank shall be permitted to encroach on the dome shell no higher than the upper horizontal plane of the dome ring girder.
- E. Overflow outlets or the overflow pipe shall be capable of providing an overflow open area three times the area of the largest tank pipe.
- F. The dome roof shall be cured for a minimum of 7 days or until prestressing is complete.
- G. The dome shall be designed as a free-span, spherical thin shell with one-tenth rise in accordance with the following:
 - 1. Typical Dome Design: The typical dome thickness and steel reinforcement shall meet the requirements of AWWA D110-04, Section 3.6.3. "Thickness and reinforcement". In all cases, the thickness of the dome shall be no less than 3".
 - 2. Dome Edge Design: The dome edge and upper wall shall be designed to resist the moments, thrusts, and shears that occur in this region due to dome and wall prestressing and loading conditions. The following design parameters shall be used.

a. Dome Edge Thickness:

- (1) A determination of the buckle diameter shall be made, as defined by:

$$d_b = 2.5 \cdot \sqrt{r_d \cdot t_d} \text{ rounded up to the next foot}$$

Where: d_b = buckle diameter in feet

r_d = dome radius in feet

t_d = typical dome thickness in feet

- (2) Dome edge thickening shall begin at a radial location on the dome, defined as s_2 which is at least one buckle diameter away from the tank wall.
- (3) A springline haunch shall be provided, which extends radially from the inside face of the tank wall to radial location s_1 which is defined as:

$$s_1 = 0.6 \cdot \sqrt{1.5 \cdot r_d \cdot t_d} \text{ rounded up to the next foot}$$

This springline haunch shall begin at the inside face of the tank wall with a springline thickness as required by paragraph (6) below and shall end at radial location s_1 with the following thickness:

$$t_{d1} = 1.33 \cdot t_d$$

Where: t_{d1} = minimum thickness at s_1 in feet

t_d = typical dome thickness in feet at one buckle diameter from tank wall

- (4) Beginning at s_1 and continuing to s_2 the dome shell shall be a straight line taper.
- (5) Parameters (2), (3), and (4) above are not required for domes where the calculated typical dome thickness is less than 75% of the actual typical dome thickness.
- (6) Sufficient concrete thickness at the springline of the dome shall be provided so that no more than 2' of the springline haunch is considered in calculating the effective dome edge ring cross sectional area. Compressive stress in this area shall not exceed 1000 psi when subjected to initial prestressing, offset by dead load only.

b. Dome Edge Steel Reinforcement

- (1) Throughout the dome edge, the percentage of steel reinforcement, both radially and circumferentially, shall be no less than 0.25% of the gross cross sectional area of concrete.
- (2) Along the dome edge, steel reinforcement shall be distributed between the upper and lower layers unless finite element analysis calculations indicate that tensile stress does not exist in the concrete along the bottom face of the dome edge. In that case, only top bars are required radially and circumferentially. In addition, radial and circumferential reinforcing bars will not be required along the bottom face of the dome edge where the calculated typical dome thickness is less than 75% of the actual typical dome thickness.
- (3) Where reinforcing bars are required in the bottom layer, they shall be anchored near the tank wall to insure adequate development at the intersection between dome and wall.
- (4) In all cases, the percentage of circumferential steel reinforcement in the first 2' of the dome edge shall be no less than one percent of the gross cross sectional area of concrete.
- (5) Where bottom dome edge steel reinforcement is required, vertical steel reinforcement along the inside face of the tank wall shall be no less than 0.5% of the cross sectional area of wall shotcrete.

2.7 HORIZONTAL PRESTRESSING

- A. Circumferential prestressing of the tank shall be achieved by the application of cold-drawn, high-carbon steel wire complying with ASTM 821 Type B, placed under high tension. A substantial allowance shall be made for prestressing

losses due to shrinkage and plastic flow in the shotcrete and due to relaxation in the prestressing steel.

- B. Placement of the prestressing steel wire shall be in a continuous and uniform helix of such pitch as to provide in each lineal foot of core wall height an initial force and unit compressive stress equal to that shown on the design drawings. Splicing of the wire shall be permitted only when completing the application of a full coil of wire or when removing a defective section of wire.
- C. Areas to be prestressed will contain not less than 10 wires per foot of wall for 8 gauge and 8 wires per foot of wall for 6 gauge. A maximum of 24 wires per layer per foot for 8 gauge and 20 wires per layer per foot for 6 gauge will be allowed. Shotcrete shall be used to completely encase each individual wire and to protect it from corrosion. To facilitate this encasement, the clear space between adjacent wires is to be no less than one wire diameter.
- D. Prestressing shall be accomplished by a machine capable of continuously inducing a uniform initial tension in the wire before it is positioned on the tank wall. Tension in the wire shall be generated by methods not dependent on cold working or re-drawing of the wire. In determining compliance with design requirements, the aggregate force of all tensioned wires per foot of wall shall be considered rather than the force per individual wire, and such aggregate force shall be no less than that required by the drawings.
- E. The tank construction company shall supply equipment at the construction site to measure tension in the wire after it is positioned on the tank wall. The stress measuring equipment shall include: electronic direct reading stressometer accurate to within 2%, calibrated dynamometers and a test stand to verify the accuracy of the equipment.
- F. After circumferential prestressing wires have been placed, they shall be protected by encasement in shotcrete. This encasement shall completely encapsulate each wire and permanently bond the wire to the tank wall.
- G. When multiple layers of wire are required, shotcrete cover between layers shall be no less than $\frac{1}{8}$ " thick.
- H. After all circumferential prestressing wires have been placed, a shotcrete cover having a thickness of no less than 1" shall be placed over the prestressing wires.

2.8 WALL OPENINGS

- A. When it is necessary for a pipe to pass through the tank wall, the invert of such pipe or sleeve shall be no less than 18" above the floor slab, and the prestressing wires required at the pipe elevation shall be distributed above and below the opening leaving an unbanded strip around the entire tank.
- B. Unbanded strips shall have a vertical dimension of no more than 36" unless an axi-symmetric shell analysis is performed to account for shear and moments caused by displacement of the prestressing wires into adjacent bands.

- C. All wall pipes and sleeves passing through the wall shall be sealed to the steel shell diaphragm by epoxy injection.

2.9 TANK ACCESSORIES

- A. The tank construction company shall furnish and install the tank accessories.
- B. The tank shall have a minimum of one, 1' 3" x 4' 4" rectangular Type 316 stainless steel wall manhole for access to the interior of the tank. The cover and the bolts shall be of Type 316 stainless steel.
- C. Exterior T6061 aluminum ladder with Type 316 stainless steel fasteners and safety cage and gate or safety climbing device conforming to applicable OSHA standards.
- D. Interior fiberglass ladder with Type 316 stainless steel fasteners and safety cage or climbing device conforming to applicable OSHA standards.
- E. Roof hatch cover, roof ventilator, and liquid level indicator shall be made of fiberglass with Type 316 stainless steel fasteners.
- F. Through-wall pipe sleeves shall be Type 316 stainless steel sleeves with neoprene modular-seal units using stainless steel tightening bolts.

2.10 PAINTING

- A. Exterior paint system shall consist of the following system:
 - 1. Two coats of Tnemec Series156 Enviro-Crete Modified Waterborne Acrylate.
- B. Paint shall be applied a minimum of 28 days after final application of shotcrete. All application procedures for paint shall be in accordance with manufacturer's recommendations.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify elevations, placement and grading for tank prior to starting tank construction.

3.2 INSTALLATION

A. Tank Floor:

- 1. The floor shall be vibratory screeded to effect consolidation of concrete and proper encasement of floor reinforcing steel.
- 2. The floor shall be continuously water cured until tank construction is completed.

B. Tank Wall:

1. The wall shall be constructed in a predesigned manner utilizing steel shell diaphragm, layers of shotcrete and prestressing wire.
2. The diaphragm shall be protected against damage before, during, and after erection. Nail or other holes shall not be made in the steel shell for erection or other purposes except for inserting wall pipes or sleeves, reinforcing steel, bolts, or other special appurtenances. Such penetrations shall be sealed with an approved epoxy sealant.
3. Interior and exterior portions of the shotcrete wall shall be water cured for a minimum of 7 days or until prestressing is started.

C. Roof:

1. All concrete shall be consolidated by means of a vibrator for proper encasement of reinforcing steel and welded wire fabric.
2. All surfaces at the joint between the wall and the dome shall be coated with an approved bonding epoxy.
3. Dome shall be water cured for 7 days after casting or until prestressing is completed.

D. Prestressing: The initial tension in each wire shall be read and recorded to verify that the total aggregate force is no less than that required by the design. Averaging or estimating the force of the wire on the wall shall not be considered satisfactory evidence of correct placement of prestressing wires.

3.3 FIELD QUALITY CONTROL

A. Inspection and Testing:

1. Hydrostatic Testing: Test completed tank for liquid tightness by filling tank to its overflow elevation with water provided by Owner.
2. Concrete and Shotcrete Testing: Test all concrete and shotcrete used in the tank structure in accordance with Section 03300.

3.4 CLEANING AND DISINFECTION

- A. Clean interior and exterior of tank to remove debris, construction items, and equipment.
- B. Disinfection Procedure: Use AWWA C652 Method 2 or 3.

END OF SECTION 13200

All structural areas, including 7.0-ft outside their limits, should be stripped, excavated, and undercut to a depth of 2.5 feet below existing ground surface. All obstructions, topsoil, and other organic or deleterious materials shall be removed. In localized areas where organics/roots or other deleterious materials extend to greater depths, further excavation and backfilling may become necessary. Fill should not be placed until the excavated surface has been inspected by the Engineer and approved for compaction and placement of structural backfill operations.

All stripped or undercut areas should be proof-rolled with appropriate compaction equipment for site and soil conditions. This would typically consist of a vibratory drum type compactor for sandy soils. The moisture content should be adjusted as necessary to aid compaction efforts.

Care should be taken to avoid damage to any nearby or adjacent structures while compaction operations are ongoing. Prior to initiating compaction operations occupants of nearby or adjacent structures should be notified and the existing conditions of the structures should be documented with photographs and survey (if deemed necessary). Compaction should cease if deemed potentially detrimental to nearby or adjacent structures. It is recommended a vibratory roller maintain a minimum separation of 30-ft from existing structures. Within this zone use of a track-mounted bulldozer or a vibratory roller operating in a static mode is recommended.

In any areas observed to be “yielding” or “pumping” during compaction operations, localized cuts or trenches may be made to evaluate the conditions of the soils. As indicated above, localized unstable areas or areas containing organics/roots or other deleterious materials discovered during stripping and compaction may require excavation and backfilling.

Foundation bearing soils within the structural footprint should be excavated to the proposed bottom of footing elevations utilizing every effort to minimize disturbance of the soils resting at the bearing surface.

Next, the foundation bearing soils should be tested for compaction to a target of 95 percent of the maximum dry density determined from ASTM D 1557, *Test Method for Compaction Characteristics Using Modified Effort* or 98 percent of the maximum dry density determined from ASTM D 698, *Test Method for Compaction Characteristics Using Standard Effort*. The bearing surface, including all areas within the structural footprint, must be inspected and tested to 1.0-ft below the prepared undercut elevation and approved by the Engineer.

If any foundation bearing soils are determined to be deficient, then the footing bottoms should be compacted utilizing hand-held compaction equipment to achieve the compaction criterion outlined above. Over excavation and re-compaction may be

necessary to fulfill the compaction criterion. It is important to note that the moisture content should be strictly controlled during any compaction procedures.

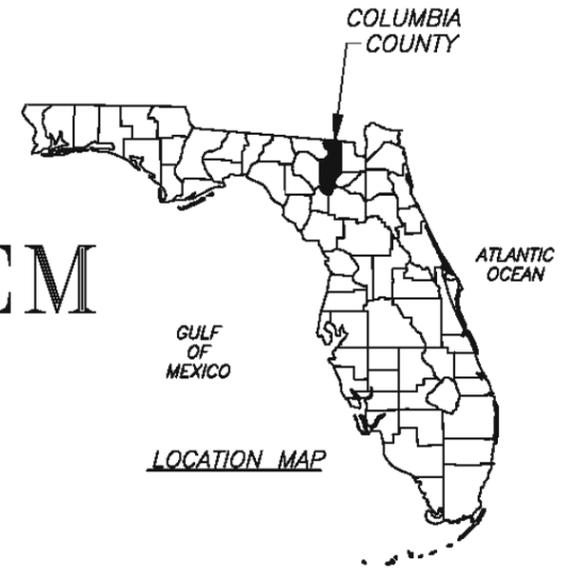
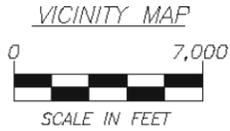
Place fill materials, lift thicknesses not greater than 12-in. Each lift should be placed and compacted, prior to placement of the next lift. Field density tests should be performed to at least 1.0-ft below the stripped, excavated, proof-rolled, and compacted surface of natural soils. Additional field density tests should be performed for each 1.0-ft lift of fill placed. Any areas not in compliance with the compaction requirements should be reworked and retested prior to placement of the next lift of fill. All fill material in the proposed structural areas should be compacted to 95 percent of the maximum dry density determined from ASTM D 1557, *Test Method for Compaction Characteristics Using Modified Effort* or 98 percent of the maximum dry density determined from ASTM D 698, *Test Method for Compaction Characteristics Using Standard Effort*.

Fill materials should preferably consist of select fill containing less than 10 percent fines (i.e., less than 10 percent passing the # 200 sieve). It is noted that select fill towards the upper end of this limit (i.e., 7 to 10 percent fines) may require strict moisture control during compaction. Additionally, select fill would be free of organics and other deleterious materials.

CONSTRUCTION PLANS

COLUMBIA COUNTY ELLISVILLE PUBLIC WATER SYSTEM

U.S.441/41, STATE ROAD 25 12" WATER MAIN CONSTRUCTION



PREPARED FOR

COLUMBIA COUNTY BOARD OF COUNTY COMMISSIONERS

DALE WILLIAMS, COUNTY MANAGER
135 N.E. Hernando Ave., Suite 203
LAKE CITY, FLORIDA 32055
(386) 758-1005

PREPARED BY



EUTAW UTILITIES, INC.

Project Development...Concept to Completion

415 St. Francis Street
Unit 114
Tallahassee, Florida 32301
Office Phone: (850) 383-0400
Office Fax: (888) 878-2939
Certification of Authorization No: 9961

RAYMOND MICHAEL CHASE, P.E.
FLA. PROFESSIONAL ENGINEER NO. 56768

PRINT DATE: 13 NOV 08

GENERAL NOTES

1. THE CONTRACTOR IS CAUTIONED TO VISIT THE SITE AND COMPLETELY FAMILIARIZE THEMSELVES WITH THE PROJECT PRIOR TO SUBMITTING A BID.
2. ALL SITE WORK MATERIAL AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH UTILITY, FDEP, AND THE LATEST EDITION OF THE FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS UNLESS OTHERWISE NOTED. IN THE EVENT OF CONFLICTS OR OMISSIONS FROM THE CONSTRUCTION DOCUMENTS, UTILITY STANDARDS SHALL PREVAIL.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF EXISTING UTILITIES AND TO DETERMINE IF OTHER UTILITIES WILL BE ENCOUNTERED DURING THE COURSE OF THE WORK AND TAKE WHATEVER STEPS NECESSARY TO PROVIDE FOR THEIR PROTECTION. ANY DAMAGE BY THE CONTRACTOR TO EXISTING UTILITIES SHALL BE REPAIRED/REPLACED BY THE CONTRACTOR AT NO COST TO THE OWNER.
4. CONTRACTOR SHALL NOTIFY THE APPROPRIATE UTILITY COMPANIES 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.
5. ALL NEW PRESSURE MAINS SHALL HAVE A MINIMUM COVER OF 30 INCHES UNLESS OTHERWISE NOTED.
6. TRAFFIC FLOW TO BE MAINTAINED DURING CONSTRUCTION. ANY TRAFFIC BLOCKAGE OR DETOURS TO BE COORDINATED WITH THE ADJACENT PROPERTY OWNERS AND FDOT, CITY OR COUNTY AS APPLICABLE. PROPER BARRICADES TO BE PROVIDED AT ALL TIMES.
7. EROSION AND SEDIMENTATION CONTROLS SHALL BE PROVIDED BY THE CONTRACTOR AT ALL TIMES AS PER FDEP REQUIREMENTS.
8. THE ENGINEER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS IN ADVANCE OF THE PRESSURE AND LEAKAGE TEST. THE PRESSURE TEST SHALL BE PERFORMED IN ACCORDANCE WITH AWWA STANDARDS.
9. CONSTRUCTION OBSERVATION WILL BE PROVIDED BY THE ENGINEER'S/OWNER'S REPRESENTATIVE. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION AND AT LEAST 48 HOURS BEFORE REQUIRING OBSERVATION ON EACH AND EVERY PHASE OF WORK. NO FINAL TESTING OR PRESSURE TESTING WILL BE ACCEPTED UNLESS WITNESSED BY THE ENGINEER'S/OWNER'S REPRESENTATIVE.
10. NO WORK SHALL BE PERFORMED ON SATURDAY OR SUNDAY WITHOUT WRITTEN NOTIFICATION AND APPROVAL OF THE UTILITY.
11. ALL VALVE BOXES SHALL BE SET FLUSH AND TO FINISH GRADE. ALL BOXES SHOULD BE MARKED AS "WATER" WHERE APPLICABLE.
12. IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL REQUIRED PERMITS ARE OBTAINED AND IN HAND BEFORE BEGINNING ANY CONSTRUCTION. NO CONSTRUCTION OR FABRICATION OF ANY ITEM SHALL BEGIN UNTIL THE CONTRACTOR HAS RECEIVED ALL PLANS AND ANY OTHER DOCUMENTATION FROM ALL OF THE PERMITTING AND ANY OTHER REGULATORY AUTHORITIES. ANY PENALTIES, STOP WORK ORDERS OR ADDITIONAL WORK RESULTING FROM THE CONTRACTOR BEING IN VIOLATION OF THE REQUIREMENTS ABOVE SHALL BE FULLY BORNE BY THE CONTRACTOR.
13. ALL CONTRACTORS, COUNTY REPRESENTATIVES, AND UTILITY COMPANIES ARE RESPONSIBLE FOR THEIR RESPECTIVE SURVEYING AND LAYOUT FROM BENCHMARK PROVIDED ON CONSTRUCTION PLANS. ANY SURVEY MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE REPLACED UPON COMPLETION OF THE WORK BY A REGISTERED LAND SURVEYOR.
14. PLANS AND SPECIFICATIONS REQUIRE THAT COMPACT BACKFILL BE PLACED ALONG SIDE OF AND OVER ALL UTILITIES. THE ENGINEER MAY REQUIRE THAT COMPACTION TESTS BE TAKEN TO VERIFY BACKFILL COMPACTION. THE COST OF SUCH COMPACTION TESTS WILL BE BORNE BY THE CONTRACTOR.
15. ALL EXCESS FILL FROM SITE SHALL BE STOCKPILED BY THE CONTRACTOR IN A LOCATION DETERMINED BY THE OWNER OR THE OWNER'S REPRESENTATIVE AND THE ENGINEER.
16. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL TREES, MONITORING WELLS, STRUCTURES AND UTILITIES NOT MARKED FOR REMOVAL OR DEMOLITION AND SHALL PROMPTLY REPAIR ANY DAMAGE AS DIRECTED BY THE ENGINEER AT NO COST TO THE OWNER.
17. THE CONTRACTOR SHALL REMOVE ALL UNSALVAGEABLE MATERIALS AND YARD WASTE FROM THE SITE IMMEDIATELY AND DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
18. METERS AND HYDRANTS TO BE RETURNED TO THE OWNER TO BE DISPOSED OF PROPERLY.
19. EXISTING SERVICE LINE TO BE CUT AND REMOVED 2' MIN FROM METER BOX.
20. PIPE JOINT DEFLECTIONS SHALL NOT EXCEED 3°. JOINT DEFLECTIONS GREATER THAN 3° SHALL BE ACCOMPLISHED WITH FACTORY MANUFACTURED FITTINGS
21. PIPE TRENCHES AND OTHER CUT EXCAVATIONS SHALL NOT BE LEFT OPEN OVER NIGHT.
22. ALL PIPE TRENCH EXCAVATION IN EXCESS OF FIVE (5) FEET IN DEPTH SHALL BE IN COMPLIANCE WITH SECTION 553.62, FLORIDA STATUTES.
23. ONE LANE OF TRAFFIC ON BAILEY AND WIRE ROADS SHALL BE MAINTAINED AT ALL TIMES

CONSTRUCTION SEQUENCE

- 1.) AT ALL TIMES DURING CONSTRUCTION ACTIVITIES, ALL ENVIRONMENTAL MANAGEMENT, BUILDING, AND OTHER GENERAL PERMITS WILL REMAIN POSTED IN A CONSPICUOUS LOCATION ONSITE.
- 2.) CONTRACTOR STAGING AREAS WILL BE STABILIZED AND CONTROLLED WITH SILT FENCES AROUND THE PERIMETER OF THE AREA AS NEEDED.
- 3.) THE LIMITS OF CONSTRUCTION SHALL BE FLAGGED AND TREE PROTECTION MEASURES ESTABLISHED PRIOR TO ANY OTHER ACTIVITY.
- 4.) EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES. EROSION AND SEDIMENT CONTROL DEVICES SHOWN IN DETAILS ARE CONSIDERED A MINIMUM. INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED IF DETERMINED NECESSARY BY THE F.D.O.T. INSPECTORS ON-SITE INSPECTION OR ACTUAL FIELD CONDITIONS.
- 5.) IF TRENCHING AND PIPE INSTALLATION PROCEEDS IN PHASES ALONG THE ROUTE, THE CONTRACTOR SHALL WORK IN CLOSE COORDINATION WITH THE OWNERS REPRESENTATIVE, THE F.D.O.T. INSPECTOR, THE ENGINEER, COLUMBIA COUNTY AND ALL UTILITY OWNERS BY "SUNSHINE ONE-CALL OF FLORIDA".
- 6.) WHEN SOIL IS STOCKPILED OR TRENCH EXCAVATION IS STOCKPILED FOR MORE THAN 24 HOURS, OR WHEN RAINFALL IS ANTICIPATED, SILT FENCES WILL BE INSTALLED AROUND THE LIMITS OF THE STOCKPILE TO CONTROL SEDIMENT.
- 7.) INSTALL UNDERGROUND UTILITIES.
- 8.) FINAL GRADE SITE; ALL DISTURBED AREAS WILL BE SODDED OR SEEDED TO PRE-CONSTRUCTION OR BETTER CONDITIONS.
- 9.) A COMPLETE AS-BUILT SURVEY AND DRAWINGS SHALL BE PREPARED BY A FLORIDA REGISTERED LAND SURVEYOR THE CONTRACTOR FOR DELIVERY TO THE ENGINEER.

FLORIDA DEPARTMENT OF TRANSPORTATION SPECIFIC NOTES:

- 1.) ALL CONSTRUCTION MATERIALS AND METHODS, SHALL MEET THE MOST CURRENT ADDITIONS OF THE FDOT DESIGN STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, AND FDOT UTILITY ACCOMMODATION MANUAL.
- 2.) ALL DISTURBED AREAS WITHIN THE DEPARTMENTS RIGHT OF WAY SHALL BE GRADED AND SODDED WITH ARGENTINE BAHIA SOD.
- 3.) ALL MAINTENANCE OF TRAFFIC SHALL ADHERE TO THE REQUIREMENTS OF THE FDOT DESIGN STANDARDS 600 INEXES.
- 20.) THIS PROJECT WILL REQUIRE FDEP NPDES PERMIT. CONTRACTOR SHALL BE RESPONSIBLE FOR FILING THE REQUIRED NOTICE OF INTENT (NOI), STORMWATER POLLUTION PREVENTION PLAN (SWPPP), ALL REQUIRED INSPECTIONS, AND NOTICE OF TERMINATION (NOT). A CERTIFIED FDEP INSPECTOR WILL BE REQUIRED FOR THE DURATION OF THIS PROJECT. ALL EXPENSE RELATED TO THIS REQUIREMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. (SEE ATTACHED SWPP REPORT)

INDEX OF CONSTRUCTION PLANS

SHEET NO.	SHEET DESCRIPTION
01	COVER
02	LOCATION MAP \ GENERAL NOTES
03	OVERALL PLAN AND KEY MAP
04	PLAN - WELL FIELD & WIRE ROAD
05	PLAN - WIRE ROAD, STA.10+00-34+50
06	PLAN - BAILEY ROAD, STA.34+50-60+50
07	PLAN - BAILEY ROAD, STA.60+50-83+94
08	PLAN - S.R.25, STA.83+94-111+00
09	PLAN - S.R.25, STA.111+00-139+00
10	PLAN - S.R.25, STA.139+00-156+30
11	PIPE THRUSTING & RESTRAINING DETAILS
12	EROSION, COMPACTION & BEDDING DETAILS
13	ASBUILT SPECS. & CULVERT CROSSING DETAILS
14	FIRE HYDRANT ASSEMBLY DETAILS & NOTES
15	VALVE DETAILS & SEPARATION NOTES
16	JACK & BORE CASING DETAILS
17	DIRECTIONAL BORE CROSSING DETAILS

ABBREVIATIONS

- N - NORTH
- S - SOUTH
- E - EAST
- W - WEST
- CONC. - CONCRETE
- STY - STORY
- I.P. - IRON PIPE
- REB. - REBAR
- ST. - STREET
- AVE.- AVENUE
- NO ID - NO IDENTIFICATION
- FD. - FOUND
- CM - CONCRETE MONUMENT
- FDOT - FLORIDA DEPARTMENT OF TRANSPORTATION
- P.C. - POINT OF CURVATURE
- P.T. - POINT OF TANGENCY
- P.I. - POINT OF INTERSECTION
- P.R.C. - POINT OF REVERSE CURVATURE
- P.C.C. - POINT OF COMPOUND CURVATURE
- R - RADIUS
- R/W - RIGHT-OF-WAY
- P.C.P. - PERMANENT CONTROL POINT
- P.R.M. - PERMANENT REFERENCE MONUMENT
- E/P - EDGE OF PAVE
- E/G - EDGE OF GRADE
- C/G - CURB AND GUTTER
- ST. M/H - STORM MANHOLE
- SS. M/H - SANITARY SEWER MANHOLE
- ELEV. - ELEVATION
- B.M. - BENCHMARK
- CL - CENTERLINE
- CC - CONCRETE CURB
- G/A - GUY ANCHOR
- NGSM - NATIONAL GEODETIC SURVEY MARKER
- P/P - POWER POLE
- T.C - TERRA COTTA
- SS M/H - SANITARY SEWER MANHOLE
- PVC - POLYVINYLCHLORIDE
- S/G - STORM GRATE
- FL - FLOW LINE
- W/M - WATER METER
- RCP - REINFORCED CONCRETE PIPE
- CMP - CORRUGATED METAL PIPE
- C/O - CLEAN-OUT
- F/O - FBER OPTIC
- J/B - JUNCTION BOX
- RR X-SIGN - RAILROAD CROSSING SIGN
- H/W - HEADWALL
- L/P - LIGHT POLE
- P/P - POWER POLE
- WV - WATER VALVE
- WM - WATER METER

NO.	DATE	REVISION/ACTION TAKEN	DESIGN ENGINEER SIGNATURE:	P. E. NUMBER:	PRINT DATE:	DRAWN BY:	SCALE:	CHECKED BY:



EUTAW UTILITIES, INC.
Project Development - Concept to Completion
415 South Flamingo St., Unit 110, Miami, Florida 33131 | Phone: (800) 365-6000
Tallahassee, Florida 32301 | Office Fax: (860) 679-2539

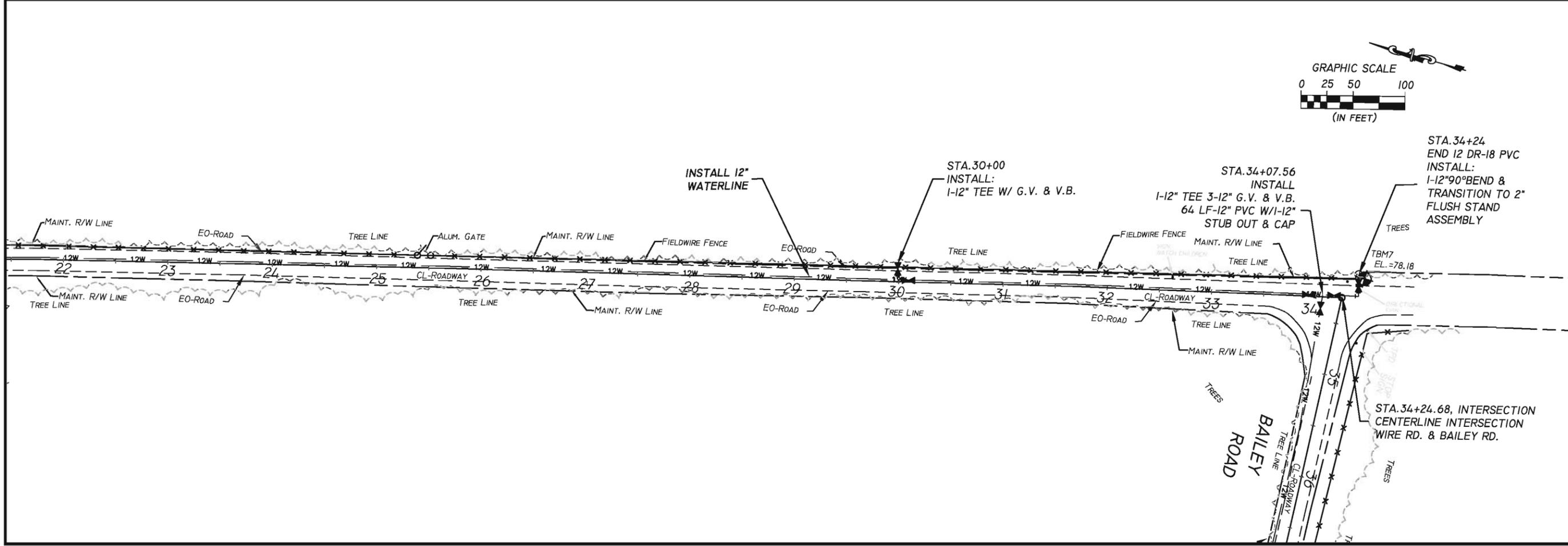
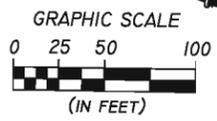
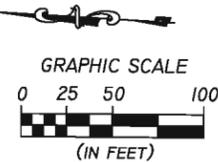
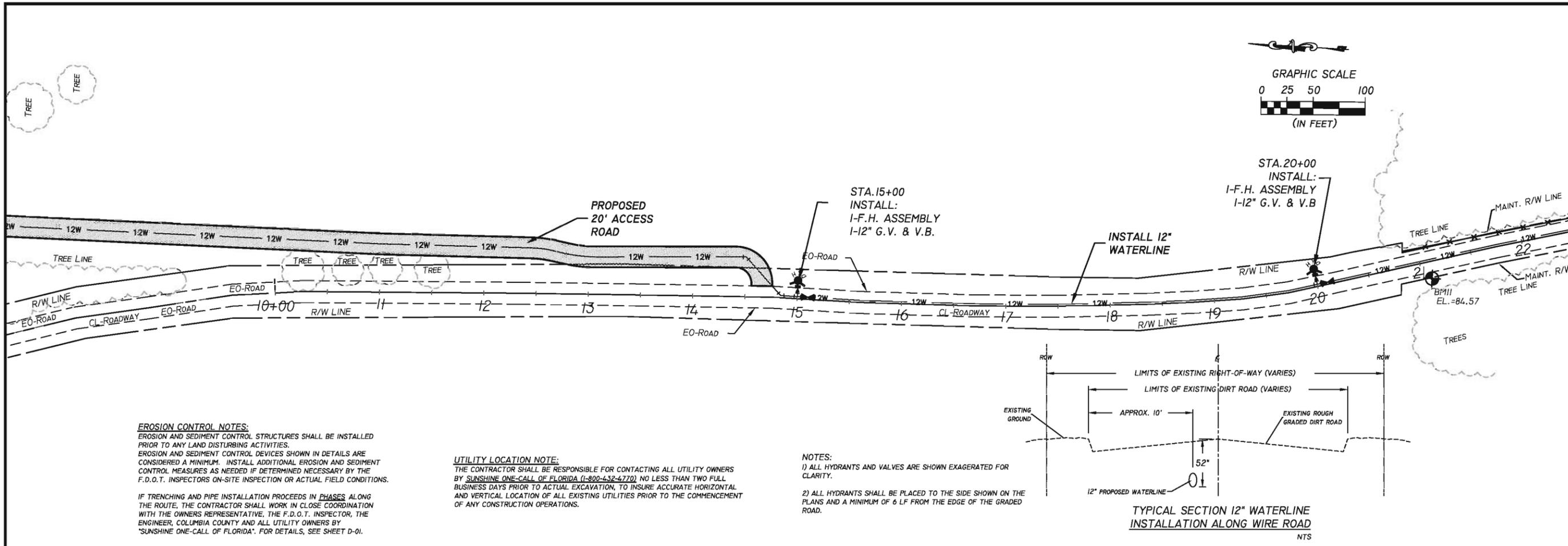
**COLUMBIA COUNTY,
ELLISVILLE PUBLIC WATER SYSTEM**

**GENERAL NOTES AND
INDEX OF CONSTRUCTION PLANS**

COLUMBIA COUNTY, FLORIDA

PRINT DATE: 17 Nov 2008
SHEET NUMBER 2

CWP Nov 17, 2008 - 1:50PM S:\WORKSHOP\COLUMBIA COUNTY\COLUMBIA CO LDP PROJECTS\USA WATER PLANS\DWG\DWG\OVERALL\KEY-2.DWG

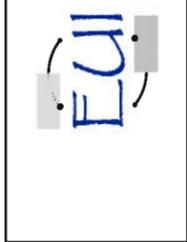


DESIGN ENGINEER	NO.	DATE
SIGNATURE	NO.	DATE
P. E. NUMBER	NO.	DATE
DATE	NO.	DATE
DRAWN BY	NO.	DATE
CHECKED BY	NO.	DATE

REVISION/ACTION TAKEN

DATE

NO.

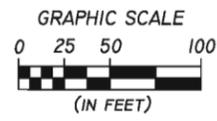
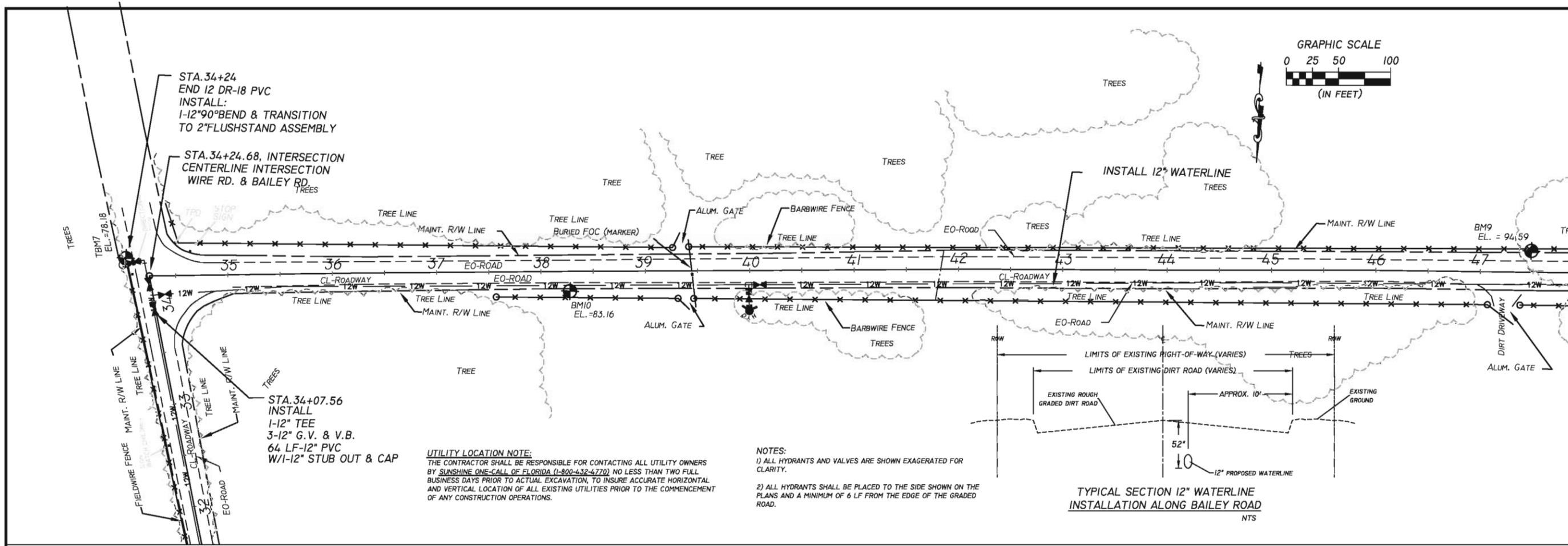


COLUMBIA COUNTY, FLORIDA
ELLISVILLE PUBLIC WATER SYSTEM
WIRE ROAD WATER MAIN CONSTRUCTION
PLANS STA. 10+00 THRU STA. 34+50
COLUMBIA COUNTY, FLORIDA

PRINT DATE:
17 NOV 2008

SHEET NUMBER
5

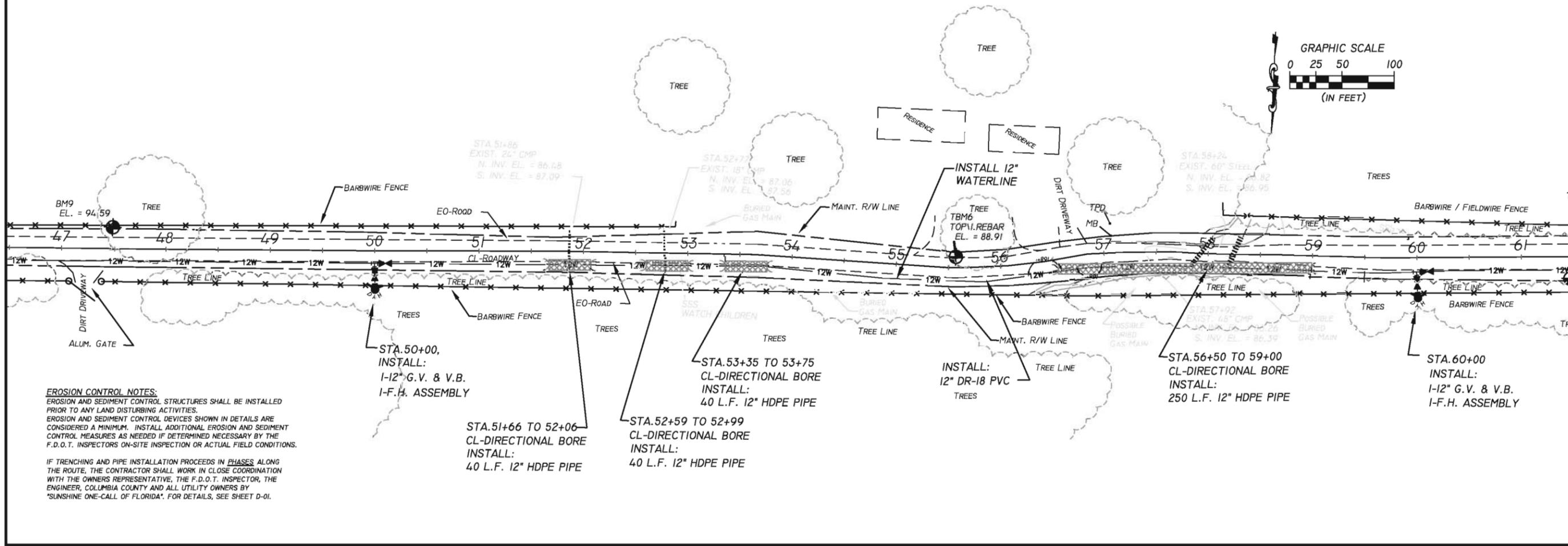
C:\p\17_2008 - 3.33\17 S:\MACDUFF\COLUMBIA COUNTY\COLUMBIA CO LDP PROJECTS\WATER PLANS\WIRE PLANS BAILEY WIRE.PWG



UTILITY LOCATION NOTE:
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS BY SUNSHINE ONE-CALL OF FLORIDA (1-800-432-4770) NO LESS THAN TWO FULL BUSINESS DAYS PRIOR TO ACTUAL EXCAVATION, TO INSURE ACCURATE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION OPERATIONS.

NOTES:
 1) ALL HYDRANTS AND VALVES ARE SHOWN EXAGGERATED FOR CLARITY.
 2) ALL HYDRANTS SHALL BE PLACED TO THE SIDE SHOWN ON THE PLANS AND A MINIMUM OF 6 LF FROM THE EDGE OF THE GRADED ROAD.

TYPICAL SECTION 12" WATERLINE INSTALLATION ALONG BAILEY ROAD
 NTS



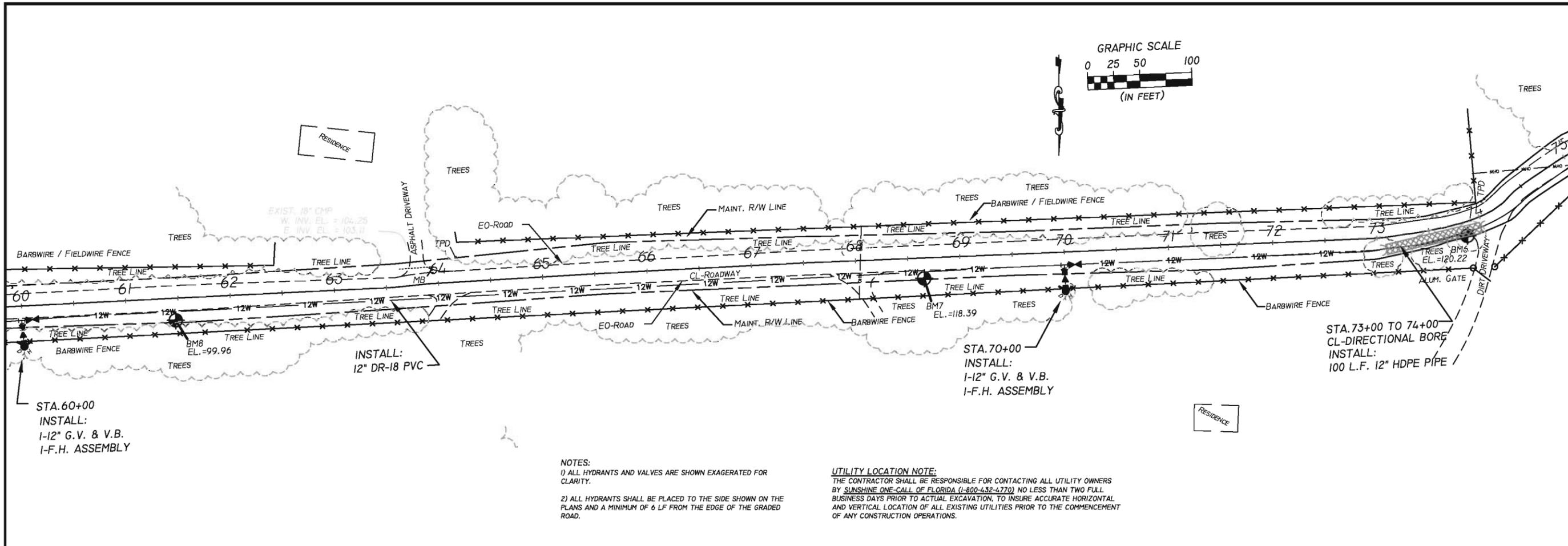
EROSION CONTROL NOTES:
 EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES. EROSION AND SEDIMENT CONTROL DEVICES SHOWN IN DETAILS ARE CONSIDERED A MINIMUM. INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED IF DETERMINED NECESSARY BY THE F.D.O.T. INSPECTORS ON-SITE INSPECTION OR ACTUAL FIELD CONDITIONS.
 IF TRENCHING AND PIPE INSTALLATION PROCEEDS IN PHASES ALONG THE ROUTE, THE CONTRACTOR SHALL WORK IN CLOSE COORDINATION WITH THE OWNERS REPRESENTATIVE, THE F.D.O.T. INSPECTOR, THE ENGINEER, COLUMBIA COUNTY AND ALL UTILITY OWNERS BY "SUNSHINE ONE-CALL OF FLORIDA". FOR DETAILS, SEE SHEET D-01.

DESIGN ENGINEER:	REVISION/ACTION TAKEN:
SIGNATURE:	NO.:
P. E. NUMBER:	DATE:
DATE:	DATE:
DRAWN BY:	CHECKED BY:
SCALE:	SCALE:

EUTAW UTILITIES, INC.
 Project Development - Concept to Completion
 415 South Palmetto St., Unit 110, Ft. Pierce, Florida 34949
 Phone: (888) 383-6000
 Fax: (888) 879-2539

COLUMBIA COUNTY, FLORIDA
ELLISVILLE PUBLIC WATER SYSTEM
BAILEY ROAD WATER MAIN CONSTRUCTION
PLANS STA. 34+50 THRU STA. 60+50
COLUMBIA COUNTY, FLORIDA

PRINT DATE:
 17 Nov 2008
 SHEET NUMBER
 6



STA. 60+00
INSTALL:
1-12" G.V. & V.B.
I-F.H. ASSEMBLY

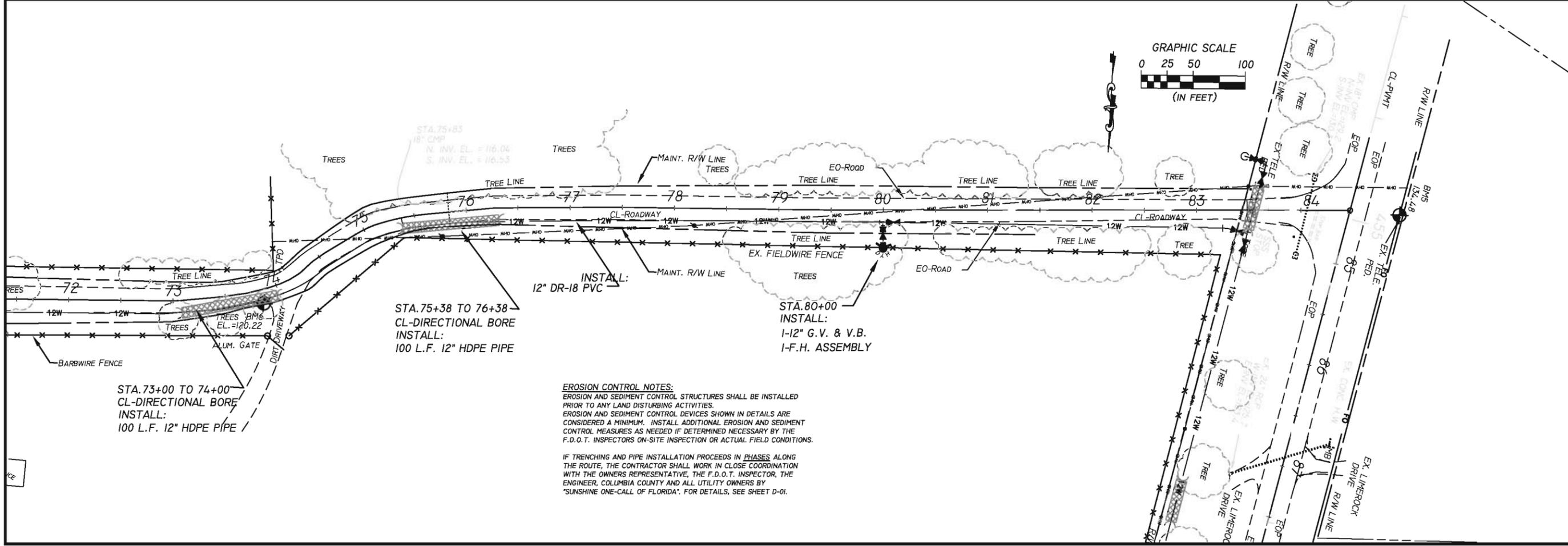
INSTALL:
12" DR-18 PVC

STA. 70+00
INSTALL:
1-12" G.V. & V.B.
I-F.H. ASSEMBLY

STA. 73+00 TO 74+00
CL-DIRECTIONAL BORE
INSTALL:
100 L.F. 12" HDPE PIPE

NOTES:
1) ALL HYDRANTS AND VALVES ARE SHOWN EXAGGERATED FOR CLARITY.
2) ALL HYDRANTS SHALL BE PLACED TO THE SIDE SHOWN ON THE PLANS AND A MINIMUM OF 6 LF FROM THE EDGE OF THE GRADED ROAD.

UTILITY LOCATION NOTE:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS BY SUNSHINE ONE-CALL OF FLORIDA (1-800-432-4770) NO LESS THAN TWO FULL BUSINESS DAYS PRIOR TO ACTUAL EXCAVATION, TO INSURE ACCURATE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION OPERATIONS.



STA. 73+00 TO 74+00
CL-DIRECTIONAL BORE
INSTALL:
100 L.F. 12" HDPE PIPE

STA. 75+38 TO 76+38
CL-DIRECTIONAL BORE
INSTALL:
100 L.F. 12" HDPE PIPE

INSTALL:
12" DR-18 PVC

STA. 80+00
INSTALL:
1-12" G.V. & V.B.
I-F.H. ASSEMBLY

EROSION CONTROL NOTES:
EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES. EROSION AND SEDIMENT CONTROL DEVICES SHOWN IN DETAILS ARE CONSIDERED A MINIMUM. INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED IF DETERMINED NECESSARY BY THE F.D.O.T. INSPECTORS ON-SITE INSPECTION OR ACTUAL FIELD CONDITIONS.

IF TRENCHING AND PIPE INSTALLATION PROCEEDS IN PHASES ALONG THE ROUTE, THE CONTRACTOR SHALL WORK IN CLOSE COORDINATION WITH THE OWNERS REPRESENTATIVE, THE F.D.O.T. INSPECTOR, THE ENGINEER, COLUMBIA COUNTY AND ALL UTILITY OWNERS BY "SUNSHINE ONE-CALL OF FLORIDA". FOR DETAILS, SEE SHEET D-01.

DESIGN ENGINEER:	REVISION/ACTION TAKEN:
SIGNATURE:	NO.
P. E. NUMBER:	DATE
DATE:	DATE
DRAWN BY:	DATE
CHECKED BY:	DATE

EUTAW UTILITIES, INC.
Project Development - Concept to Completion
415 South Fowkes St, Unit 110 West Palm Beach, Florida 33411
TALLAHASSEE, FLORIDA 32301 OFFICE FAX: (888) 678-2539

CU

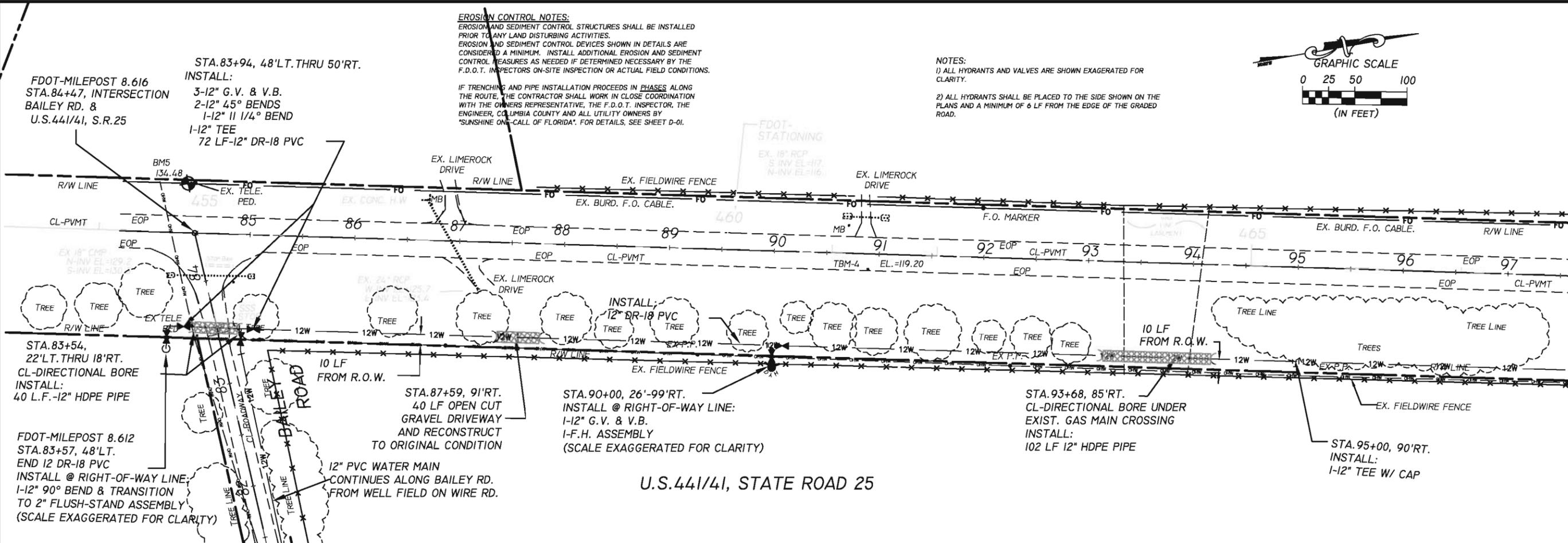
COLUMBIA COUNTY, FLORIDA
ELLISVILLE PUBLIC WATER SYSTEM
BAYLEY ROAD WATER MAIN CONSTRUCTION
PLANS, STA. 60+50 THRU STA. 83+94
COLUMBIA COUNTY, FLORIDA

PRINT DATE:
17 NOV 2008

SHEET NUMBER
7

EROSION CONTROL NOTES:
 EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
 EROSION AND SEDIMENT CONTROL DEVICES SHOWN IN DETAILS ARE CONSIDERED A MINIMUM. INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED IF DETERMINED NECESSARY BY THE F.D.O.T. INSPECTORS ON-SITE INSPECTION OR ACTUAL FIELD CONDITIONS.
 IF TRENCHING AND PIPE INSTALLATION PROCEEDS IN PHASES ALONG THE ROUTE, THE CONTRACTOR SHALL WORK IN CLOSE COORDINATION WITH THE OWNERS REPRESENTATIVE, THE F.D.O.T. INSPECTOR, THE ENGINEER, COLUMBIA COUNTY AND ALL UTILITY OWNERS BY "SUNSHINE ONE-CALL OF FLORIDA". FOR DETAILS, SEE SHEET D-01.

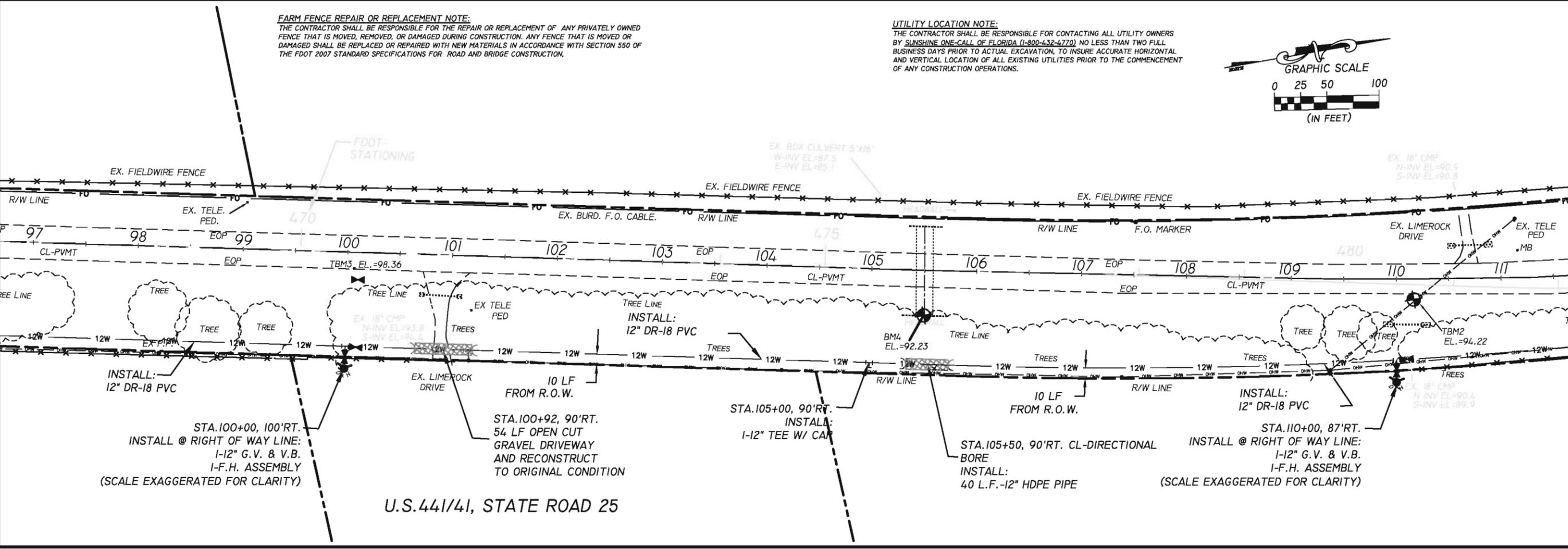
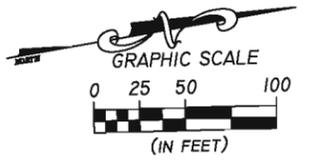
NOTES:
 1) ALL HYDRANTS AND VALVES ARE SHOWN EXAGGERATED FOR CLARITY.
 2) ALL HYDRANTS SHALL BE PLACED TO THE SIDE SHOWN ON THE PLANS AND A MINIMUM OF 6 LF FROM THE EDGE OF THE GRADED ROAD.



U.S. 441/41, STATE ROAD 25

FARM FENCE REPAIR OR REPLACEMENT NOTE:
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY PRIVATELY OWNED FENCE THAT IS MOVED, REMOVED, OR DAMAGED DURING CONSTRUCTION. ANY FENCE THAT IS MOVED OR DAMAGED SHALL BE REPLACED OR REPAIRED WITH NEW MATERIALS IN ACCORDANCE WITH SECTION 550 OF THE FDOT 2007 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

UTILITY LOCATION NOTE:
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS BY SUNSHINE ONE-CALL OF FLORIDA (1-800-432-4770) NO LESS THAN TWO FULL BUSINESS DAYS PRIOR TO ACTUAL EXCAVATION, TO INSURE ACCURATE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION OPERATIONS.



U.S. 441/41, STATE ROAD 25

DESIGN ENGINEER:	DATE:
SIGNATURE:	SCALE:
P. E. NUMBER:	DATE:
PRINT DATE:	DATE:
DRAWN BY:	CHECKED BY:
DATE:	DATE:
NO.	REVISION/ACTION TAKEN:

EUTAW UTILITIES, INC.
 Project Development - Concept to Completion
 415 South Powers St., Unit 110, Palm Bay, Florida 32909
 Phone: (888) 352-6600
 Fax: (888) 679-2539

EUI

COLUMBIA COUNTY, COLUMBIA COUNTY PUBLIC WATER SYSTEM, S.R. -25 WATER MAIN CONSTRUCTION, PLANS STA. 83+47 THRU STA. 111+00, COLUMBIA COUNTY, FLORIDA

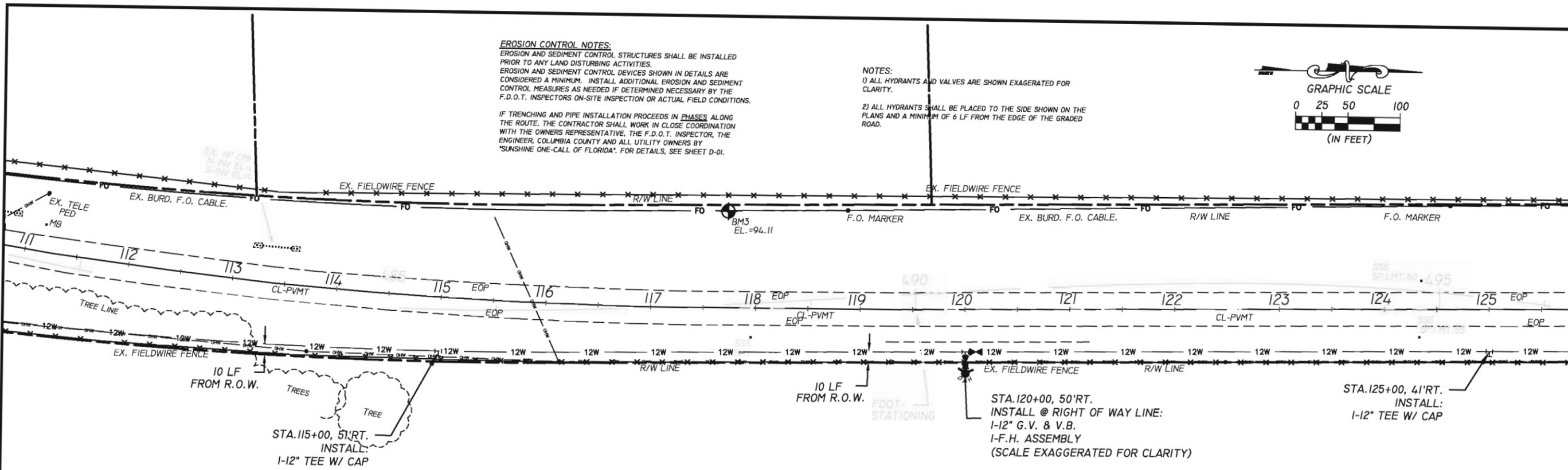
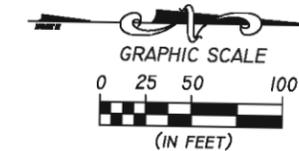
PRINT DATE: 17 NOV 2008
 SHEET NUMBER: 8

CWP Nov 17, 2008 - 3:51PM S:\MACOS\PLANS\COLUMBIA CO LDP PROJECTS\COLUMBIA COUNTY\COLUMBIA CO LDP PROJECTS\COLUMBIA COUNTY PLANS\441\41

EROSION CONTROL NOTES:
 EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES.
 EROSION AND SEDIMENT CONTROL DEVICES SHOWN IN DETAILS ARE CONSIDERED A MINIMUM. INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED IF DETERMINED NECESSARY BY THE F.D.O.T. INSPECTORS ON-SITE INSPECTION OR ACTUAL FIELD CONDITIONS.

IF TRENCHING AND PIPE INSTALLATION PROCEEDS IN PHASES ALONG THE ROUTE, THE CONTRACTOR SHALL WORK IN CLOSE COORDINATION WITH THE OWNERS REPRESENTATIVE, THE F.D.O.T. INSPECTOR, THE ENGINEER, COLUMBIA COUNTY AND ALL UTILITY OWNERS BY 'SUNSHINE ONE-CALL OF FLORIDA'. FOR DETAILS, SEE SHEET D-01.

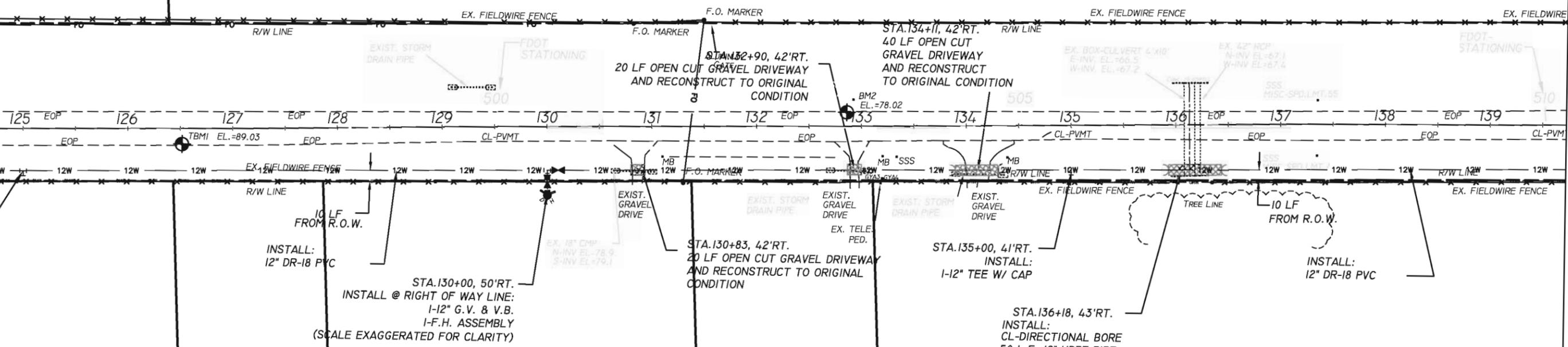
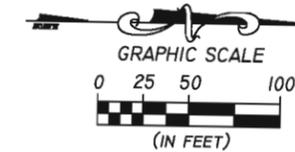
NOTES:
 1) ALL HYDRANTS AND VALVES ARE SHOWN EXAGGERATED FOR CLARITY.
 2) ALL HYDRANTS SHALL BE PLACED TO THE SIDE SHOWN ON THE PLANS AND A MINIMUM OF 6 LF FROM THE EDGE OF THE GRADED ROAD.



U.S.441/41, STATE ROAD 25

FARM FENCE REPAIR OR REPLACEMENT NOTE:
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY PRIVATELY OWNED FENCE THAT IS MOVED, REMOVED, OR DAMAGED DURING CONSTRUCTION. ANY FENCE THAT IS MOVED OR DAMAGED SHALL BE REPLACED OR REPAIRED WITH NEW MATERIALS IN ACCORDANCE WITH SECTION 550 OF THE FDOT 2007 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

UTILITY LOCATION NOTE:
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS BY SUNSHINE ONE-CALL OF FLORIDA (1-800-432-4770) NO LESS THAN TWO FULL BUSINESS DAYS PRIOR TO ACTUAL EXCAVATION, TO INSURE ACCURATE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION OPERATIONS.



U.S.441/41, STATE ROAD 25

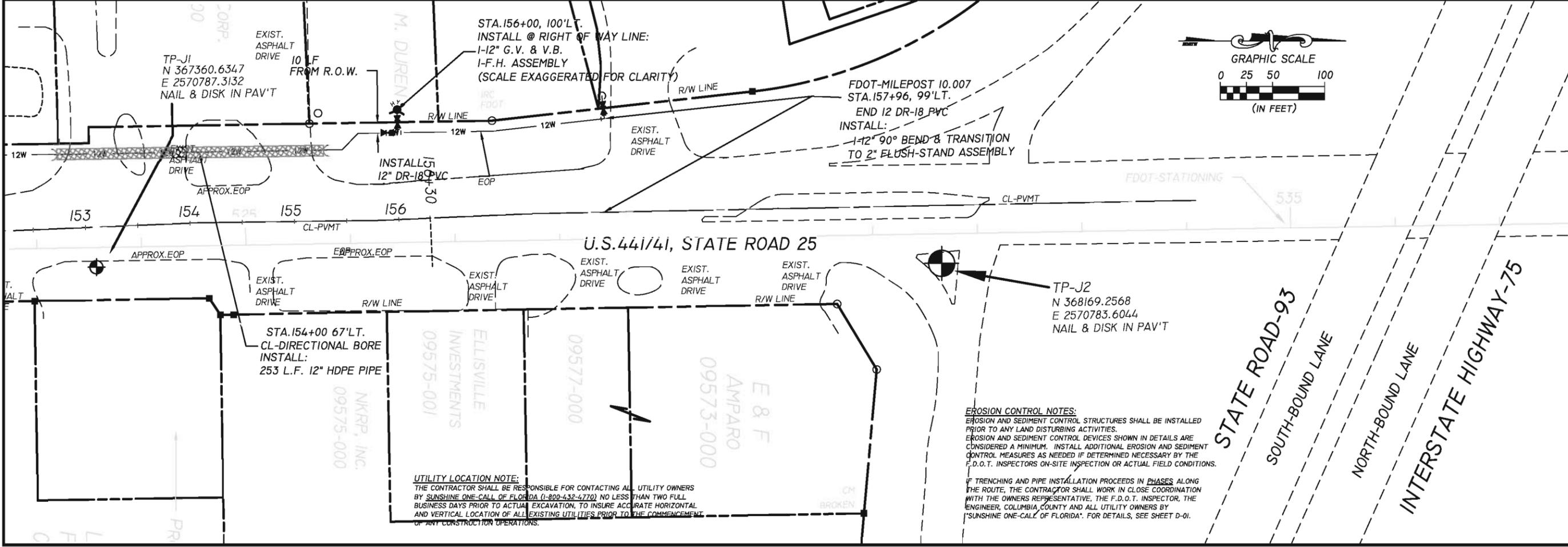
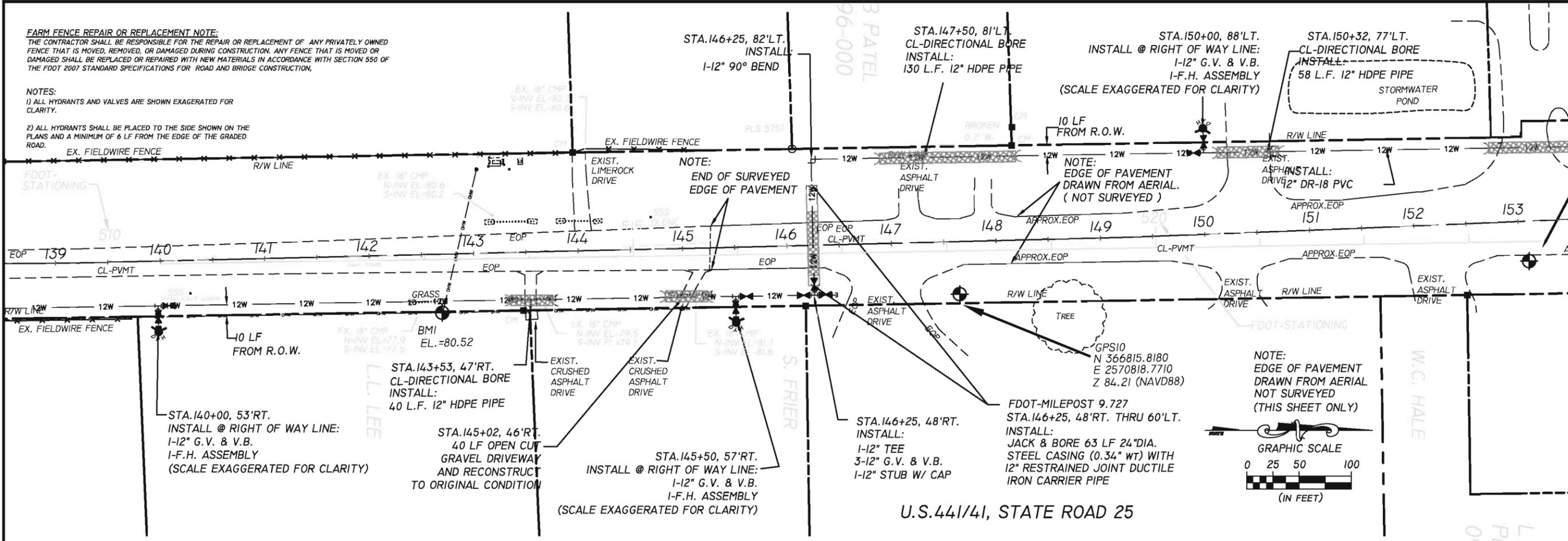
DESIGN ENGINEER	SIGNATURE	P. E. NUMBER	PRINT DATE	DRAWN BY	DATE	CHECKED BY	DATE
REVISION/ACTION TAKEN							
NO.	DATE						

EUTAW UTILITIES, INC.
 Project Development - Concept to Completion
 4158 Jeff Francis St., Unit 110, Orange Park, FL 32067
 Telephone: (850) 305-0400
 Fax: (850) 305-0400

COLUMBIA COUNTY, FLORIDA
 COLUMBIA COUNTY PUBLIC WATER SYSTEM
 S.R. - 25 WATER MAIN CONSTRUCTION
 PLANS, STA. 111+00 THRU STA. 139+00
 COLUMBIA COUNTY, FLORIDA

FARM FENCE REPAIR OR REPLACEMENT NOTE:
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY PRIVATELY OWNED FENCE THAT IS MOVED, REMOVED, OR DAMAGED DURING CONSTRUCTION. ANY FENCE THAT IS MOVED OR DAMAGED SHALL BE REPLACED OR REPAIRED WITH NEW MATERIALS IN ACCORDANCE WITH SECTION 550 OF THE FDOT 2007 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

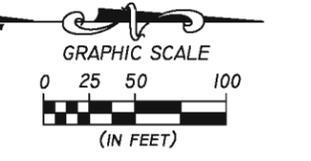
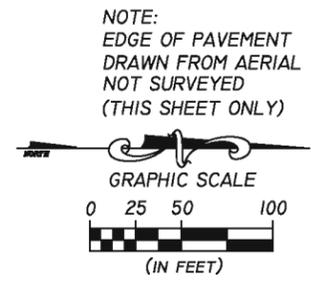
NOTES:
 1) ALL HYDRANTS AND VALVES ARE SHOWN EXAGGERATED FOR CLARITY.
 2) ALL HYDRANTS SHALL BE PLACED TO THE SIDE SHOWN ON THE PLANS AND A MINIMUM OF 6 LF FROM THE EDGE OF THE GRADED ROAD.



UTILITY LOCATION NOTE:
 THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY OWNERS BY SUNSHINE ONE-CALL OF FLORIDA (1-800-432-4770) NO LESS THAN TWO FULL BUSINESS DAYS PRIOR TO ACTUAL EXCAVATION, TO INSURE ACCURATE HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION OPERATIONS.

EROSION CONTROL NOTES:
 EROSION AND SEDIMENT CONTROL STRUCTURES SHALL BE INSTALLED PRIOR TO ANY LAND DISTURBING ACTIVITIES. EROSION AND SEDIMENT CONTROL DEVICES SHOWN IN DETAILS ARE CONSIDERED A MINIMUM. INSTALL ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES AS NEEDED IF DETERMINED NECESSARY BY THE F.D.O.T. INSPECTORS ON-SITE INSPECTION OR ACTUAL FIELD CONDITIONS.

IF TRENCHING AND PIPE INSTALLATION PROCEEDS IN PHASES ALONG THE ROUTE, THE CONTRACTOR SHALL WORK IN CLOSE COORDINATION WITH THE OWNERS REPRESENTATIVE, THE F.D.O.T. INSPECTOR, THE ENGINEER, COLUMBIA COUNTY AND ALL UTILITY OWNERS BY "SUNSHINE ONE-CALL" OF FLORIDA. FOR DETAILS, SEE SHEET D-01.



DESIGN ENGINEER	SIGNATURE	P. E. NUMBER	PRINT DATE	DRAWN BY	DATE	SCALE
REVISION/ACTION TAKEN						
NO.	DATE					

EUTAW UTILITIES, INC.
 Project Development - Concept to Completion
 415 State Parkway SE, Unit 110, Marietta, Georgia 30067
 Tallahassee, Florida 32301 Phone: (800) 352-6600
 Fax: (904) 699-2539

COLUMBIA COUNTY,
 ELLISVILLE PUBLIC WATER SYSTEM
 S.R. - 25 WATER MAIN CONSTRUCTION
 PLANS STA. 139+00 THRU STA. 156+30
 COLUMBIA COUNTY, FLORIDA

PRINT DATE:
 17 Nov 2008

SHEET NUMBER
 10

CMP Nov 17, 2008 - 3:52PM S:\MACDUFF\COLUMBIA COUNTY\COLUMBIA CO LDP PROJECTS\WATER MAINS\PLANS 441.RWG

PUSH ON JOINT PIPE RESTRAINT REQUIREMENTS AT FITTINGS, VALVES AND DEAD ENDS

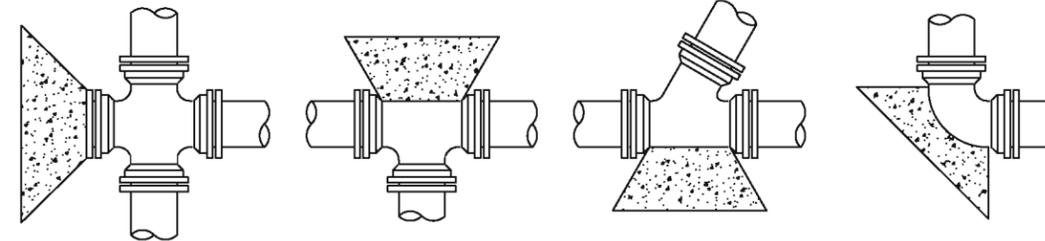
PIPE SIZE	90° BEND	45° BEND	22½° BEND	11¼° BEND	TEE	REDUCER	VALVE	DEAD END
4"	54'	54'	36'	36'	54'	54'	72'	72'
6"	54'	54'	36'	36'	54'	54'	72'	72'
8"	54'	54'	36'	36'	54'	54'	72'	72'
10"	54'	54'	36'	36'	54'	54'	108'	108'
12"	72'	72'	54'	54'	72'	72'	108'	108'
14"	72'	72'	54'	54'	72'	72'	108'	108'
16"	72'	72'	54'	54'	72'	72'	154'	154'
18"	72'	72'	54'	54'	72'	72'	154'	154'
20"	90'	90'	54'	54'	90'	90'	154'	154'
24"	90'	90'	54'	54'	90'	90'	172'	172'
30"	90'	90'	54'	54'	90'	90'	180'	180'
36"	90'	90'	54'	54'	90'	90'	270'	270'
42"	108'	108'	54'	54'	108'	108'	270'	270'
48"	108'	108'	54'	54'	108'	108'	270'	270'
54"	108'	108'	54'	54'	108'	108'	270'	270'

MINIMUM LENGTH OF PUSH ON JOINT PIPE WITH SPECIAL RESTRAINING GASKETS

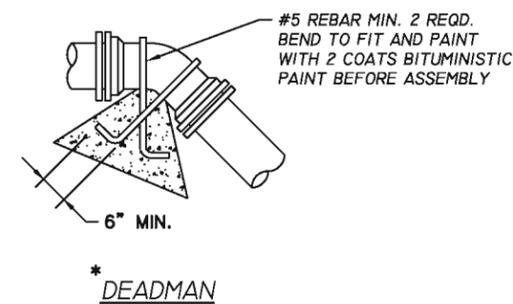
NOTES: (PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

- ALL BURIED PRESSURE MAINS SHALL INCLUDE A RESTRAINED JOINT SYSTEM. THE CONTRACTOR SHALL USE A DUCTILE IRON RESTRAINING SYSTEM AS MANUFACTURED BY EBAA IRON, INC. (MEGALUG) FOR FITTINGS AND VALVES AND FAST GRIP GASKETS (AMERICAN) OR FIELD LOK GASKETS (U.S. PIPE) FOR PUSH ON JOINT PIPE.
- RESTRAINING LENGTHS SHOWN ARE THE MINIMUM LENGTH REQUIRED BASED ON A TEST PRESSURE OF 150 P.S.I.G. WITH A MINIMUM COVER OF 30".
- THRUST BLOCKS SHALL ALSO BE REQUIRED AT ALL TIE-INS TO EXISTING LINES, ALL TAPPING TEES ON EXISTING LINES, ALL NEW HYDRANTS, ALL ABOVE GROUND ASSEMBLIES 3" AND LARGER AND MAINS GREATER THAN 12".
- IF LENGTH BETWEEN MECHANICAL JOINT FITTINGS AND OR VALVES IS LESS THAN THE MINIMUM LENGTHS SHOWN IN THIS TABLE THE CONTRACTOR SHALL RESTRAIN THE ENTIRE LENGTH.

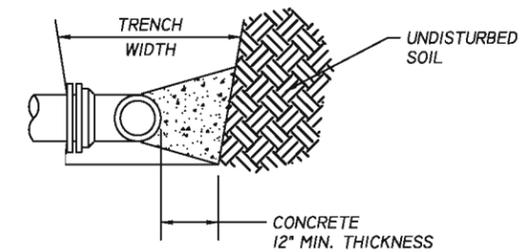
PIPE RESTRAINING REQUIREMENTS



CROSS WITH PLUG TEE WYE BEND



* DEADMAN



TYPICAL SECTION

ALL THRUST BLOCKS SHALL BE FORMED. LAID FORMS SHALL BE INSPECTED BY SUA PRIOR TO THE POURING OF CONCRETE AND SHALL ALSO BE INSPECTED BY SUA PRIOR TO COVERING. TYPICAL LOCATIONS WHICH REQUIRE CONCRETE REACTIONS (THRUST) BLOCKS, FOR PRESSURE MAINS FOUR INCHES (4") AND GREATER CONCRETE SHALL HAVE 2500 P.S.I. MINIMUM STRENGTH AT TWENTY EIGHT (28) DAYS AND BEAR AGAINST UNDISTURBED STABLE SOILS, AREA OF CONTACT SHALL BE GOVERNED BY PIPE SIZE, MAXIMUM PRESSURE IN PIPE, AND BEARING CAPACITY OF SOIL. PROTECT FITTINGS, BOLTS, ETC. BY COVERING WITH VISQUEEN OR OTHER ACCEPTABLE MATERIAL. CONCRETE SHALL BE A MINIMUM OF TWELVE INCHES (12") THICK.

(PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

PIPE	THRUST BLOCK SOIL BEARING AREA REQUIRED	PIPE	THRUST BLOCK SOIL BEARING AREA REQUIRED	REMARKS
4"	2.0 SQ. FT.	18"	30.0 SQ. FT.	VALUES ARE FOR 90° BEND, BASED ON 2000 P.S.F. SAFE BEARING LOAD AND PIPE PRESSURE OF 150 P.S.I. PLUS 33% SAFETY FACTOR FOR OTHER SOILS AND PRESSURES.
6"	4.0 SQ. FT.	20"	37.0 SQ. FT.	
8"	6.6 SQ. FT.	24"	53.0 SQ. FT.	
10"	10.0 SQ. FT.	27"	80.0 SQ. FT.	
12"	14.0 SQ. FT.	30"	98.0 SQ. FT.	
14"	18.0 SQ. FT.	36"	127.0 SQ. FT.	
16"	24.0 SQ. FT.			

* THE ENGINEER OF RECORD SHALL CALCULATE THE SIZE OF THE DEADMAN REQUIRED AS WELL AS ANY INSTALLATION WHICH IS NOT COVERED BY THE ABOVE.

THRUST BLOCK SCHEDULE

NOT TO SCALE

DESIGN ENGINEER: SIGNATURE: _____ P. E. NUMBER: 86788 DATE: _____ DRAWN BY: _____ CHECKED BY: _____ SCALE: AS SHOWN	REVISION/ACTION TAKEN _____ _____ _____	NO. _____ DATE _____ _____ _____	<p style="font-size: small;">EUTAW UTILITIES, INC. Project Development - Concept to Completion 415 SAINT FRANCIS ST., UNIT 110/TREX PHONE: (850) 384-0400 TALLAHASSEE, FLORIDA 32301 OFFICE FAX: (866) 878-2039 PAGE 004/004</p> <p style="font-size: small;">COLUMBIA COUNTY, ELLISVILLE PUBLIC WATER SYSTEM PIPE THRUSTING INSTALLATION AND RESTRAINING DETAILS COLUMBIA COUNTY, FLORIDA</p>
PRINT DATE April 10, 2008 SHEET NUMBER 11			

**BARRIER FOR UNPAVED DITCHES
TYPE I**



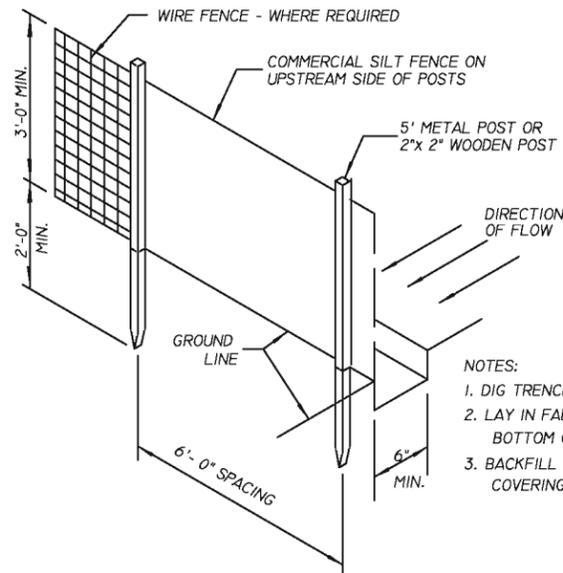
ANCHOR BALES WITH 2 - 2" X 2" X 4' STAKES PER BALE

APPLICATION AND SPACING:

THE USE OF TYPE I BALE BARRIERS SHOULD BE LIMITED TO THE CONDITIONS OUTLINED IN CHART I, SHEET 1 OF 3, INDEX NO. 102 DOT DESIGN STANDARDS, JAN. 1988.

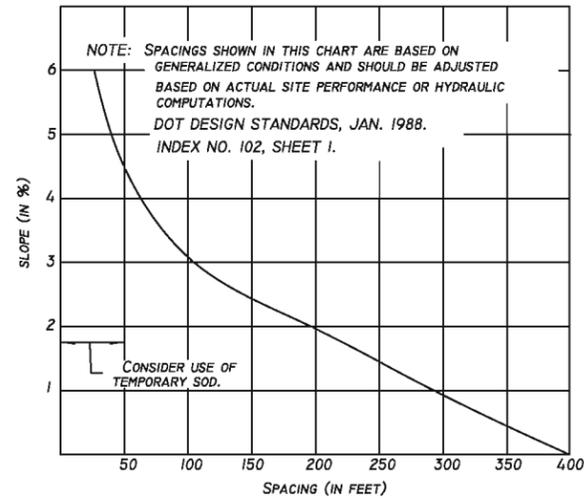
TYPICAL HAYBALE PLACEMENT

NOT TO SCALE



SILT FENCE DETAIL

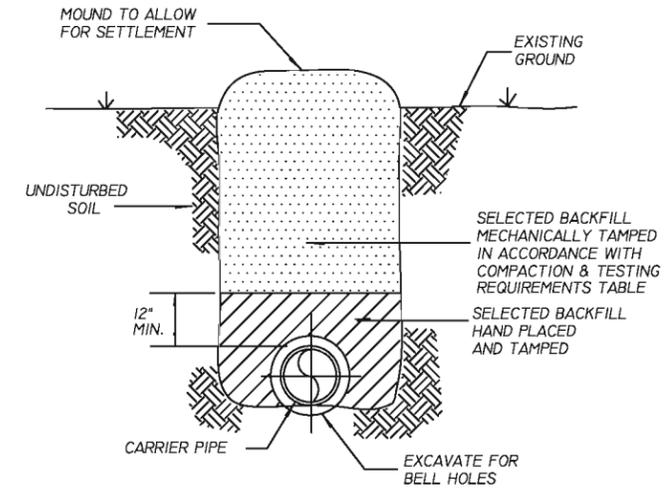
NOT TO SCALE



RECOMMENDED SPACING FOR TYPE I HAY BALE BARRIERS.

EROSION CONTROL

- ALL SLOPES STEEPER THAN 4:1 SHALL BE SODDED.
- ALL SLOPES STEEPER THAN 3:1 SHALL BE STAPLED SOD.
- ALL DISTURBED AREAS NOT SODDED SHALL BE SEEDED WITH A MIXTURE OF LONG-TERM VEGETATION AND QUICK-GROWING SHORT-TERM VEGETATION FOR THE FOLLOWING CONDITIONS. FOR THE MONTHS FROM SEPTEMBER THROUGH MARCH, THE MIX SHALL CONSIST OF 70 POUNDS PER ACRE OF LONG-TERM SEED AND 20 POUNDS PER ACRE OF WINTER RYE. FOR THE MONTHS OF APRIL THROUGH AUGUST, THE MIX SHALL CONSIST OF 70 POUNDS PER ACRE OF LONG-TERM SEED AND 20 POUNDS PER ACRE OF MILLET.
- CONTRACTOR IS RESPONSIBLE FOR THE CONSTRUCTION AND MAINTENANCE DURING CONSTRUCTION OF ALL SEDIMENTATION CONTROLS.
- LONGITUDINAL DITCH/SWALE SLOPES STEEPER THAN 3% WILL BE INSPECTED IN THE FIELD BY NWFWM D TO DETERMINE IF ADDITIONAL EROSION CONTROL IS NEEDED.
- CONTRACTOR SHALL USE SILT SCREEN AND/OR HAY BALES TO PREVENT SILT AND ERODED SOILS FROM LEAVING SITE



TYPICAL BEDDING DETAIL

NOT TO SCALE

COMPACTION OF BACKFILL

- BACKFILL PLACED IN TRENCHES WHICH ARE UNDER THE PAVEMENT, OR WITHIN 4 FEET OF THE EDGE OF PAVING OR WITHIN 2 FEET OF THE BACK OF THE CURBLINES OR WITHIN 2:1 SLOPE OF THESE LIMITS, SHALL EACH BE COMPACTED IN ACCORDANCE WITH THE FOLLOWING:
 - ROADWAY BASE AND SUB-BASE TO 98% AASHTO T-180 (MODIFIED PROCTOR)
 - DEPTH BELOW SUBGRADE:

0 - 3'	100% AASHTO T-99 STANDARD PROCTOR
3' - 10'	98% AASHTO T-99 STANDARD PROCTOR
10' +	95% AASHTO T-99 STANDARD PROCTOR
- THE ENTIRE DEPTH OF BACKFILL PLACED IN TRENCHES THAT ARE OUTSIDE THE AREAS DESCRIBED IN THE ABOVE SCHEDULE MAY BE COMPACTED TO A DENSITY WHICH MATCHES THAT OF UNDISTURBED MATERIALS LOCATED IN IMMEDIATELY ADJACENT AREAS.

TESTING

TEST	STANDARD	FREQUENCY
A. PROCTOR LAB DENSITY	AASHTO T-99, T-180, ASTM D 698, ASTM D 1557	ONE PER MATERIAL TYPE
B. DENSITY (INSITU) ALONG PIPELINE	ASTM D2922 ASTM D1556	ONE PER EVERY 12-INCH DEPTH AND 400 LF OF PIPELINE OR BETWEEN STRUCTURES
C. DENSITY (INSITU) AT SERVICES	ASTM D2922 ASTM D1556	1 FOR EACH 12" DEPTH OF EACH SERVICE
D. DENSITY (INSITU) AROUND	ASTM D2922 ASTM D1556	1 FOR EACH 12" DEPTH OF STRUCTURE

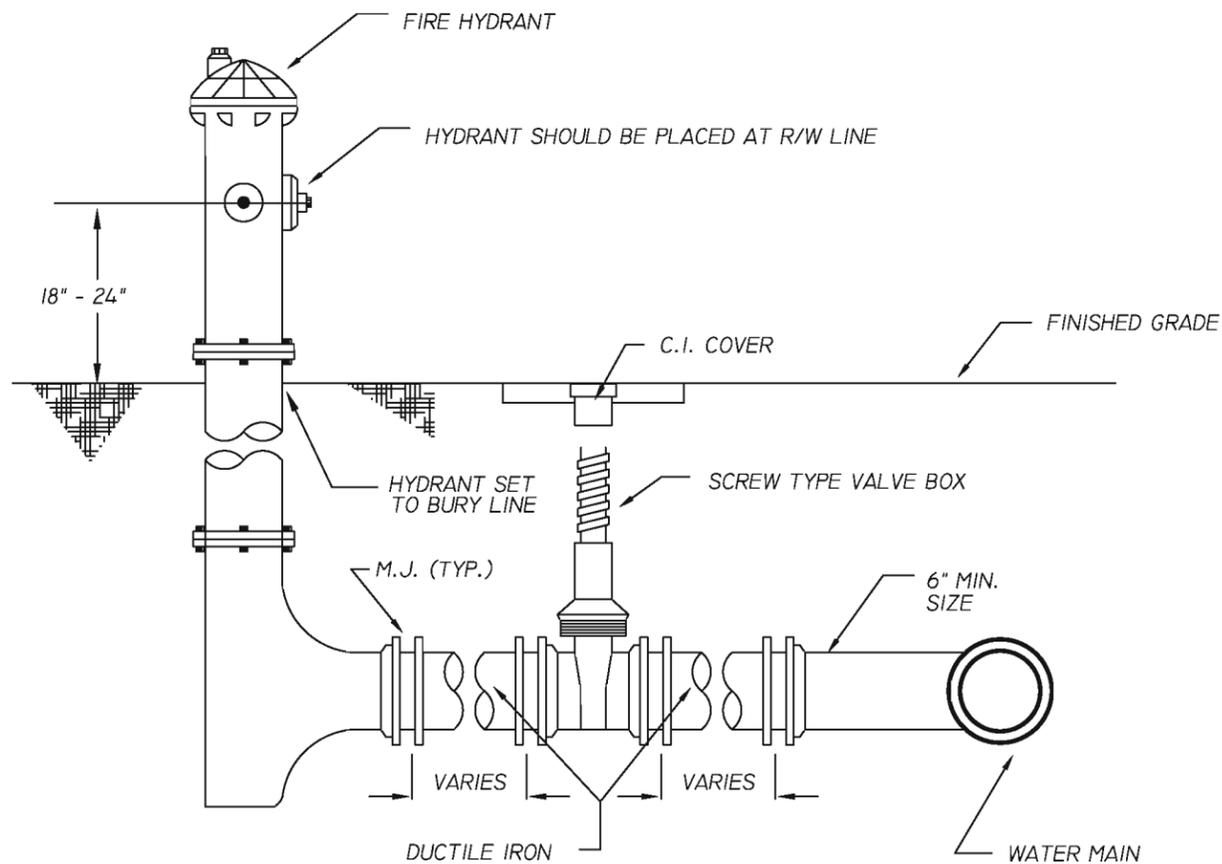
COMPACTION & TESTING REQUIREMENTS

NOT TO SCALE

DESIGN ENGINEER: Signature	REVISION/ACTION TAKEN	NO.	DATE
P. E. NUMBER: 86788			
DATE:			
DRAWN BY:			
CHECKED BY:			
SCALE:			
AS SHOWN			

ELTAW UTILITIES, INC.
 Project Development Consultant to Columbia County
 401-C Office Plaza Drive
 415 Saint Francis St., Elev: 1100
 Tallahassee, Florida 32301 | Office Fax: (888) 878-2939
 Certification of Public Utility No. 9961

**COLUMBIA COUNTY,
ELLISVILLE PUBLIC WATER SYSTEM
EROSION PROTECTION AND
COMPACTION & BEDDING DETAILS
COLUMBIA COUNTY, FLORIDA**



ALL JOINTS MUST BE RESTRAINED

NOTES:

1. HYDRANT TO BE PLACED WITH PUMPER NOZZLE FACING STREET.
2. APPROVED MODULES ARE MUELLER A423, CLOW MEDALLION, M.H. RELIANT 929. NO SUBSTITUTES WILL BE ALLOWED.
3. VALVE OPENING 5 1/4" MINIMUM.
4. ASSEMBLY LINE BURY MINIMUM OF 4 FEET.
5. SIX INCH M.J. CONNECTION TO MAIN.
6. HOSE NOZZLES: SPECIAL TALLAHASSEE THREADS WITH TWO 2 1/2" HOSE NOZZLES AND ONE STEAMER NOZZLE WITH 4 1/2" OPENING.
7. ALL PIPE FROM MAIN TO HYDRANT SHALL BE DUCTILE IRON. NO SUBSTITUTES.
8. HOSE THREAD SHALL BE SPECIAL TALLAHASSEE THREADS, SIX THREADS TO ONE INCH, V-TYPE, .288 PITCH, 3" O.D..
9. STEAMER THREADS SHALL BE SPECIAL TALLAHASSEE THREADS, SIX THREADS TO ONE INCH, V-TYPE, .288 PITCH, 5.376" O.D..
10. HYDRANT PLACEMENT:
CURB & GUTTER STREET -- BEHIND SIDEWALK AS NOTED PER PLAN.
OPEN DITCH STREET -- TOP OF BACKSLOPE OF DITCH, ON THE R/W LINE
11. IF HYDRANT IS CLOSE TO THE MAIN, MECHANICAL JOINTS MAY BE RESTRAINED WITH CLOW F-1058 RETAINER GLANDS GALV. THREADED RODS WITH EYE BOLTS OR ROMAC GRIP RINGS.
12. ALL JOINTS FROM HYDRANT VALVE TO MAIN SHALL BE RESTRAINED AS PROVIDED IN NOTE II.
13. FIRE HYDRANT TEE MAY BE USED IN LIEU OF RESTRAINED TEE.
14. PROPER COMPACTION FOR BREAKAWAY WILL MEET 100% STANDARD PROCTOR.

FIRE HYDRANT ASSEMBLY

NOT TO SCALE

INSTALLATION NOTES

1. ALL PIPE IS TO BE LAID IN A CLEAN DRY TRENCH.
2. ALL MUCK AND UNSUITABLE MATERIALS ENCOUNTERED IN TRENCH BOTTOM SHALL BE REMOVED AND REPLACED WITH COMPACTED GRANULAR MATERIAL TO 95% OF MAXIMUM DENSITY PER AASHTO T-180. PROCTOR AND DENSITY TEST RESULTS SHALL BE SUBMITTED TO EOR WITH A COPY TO AUTHORITY.
3. ALL BACKFILL WITHIN ROAD RIGHTS-OF-WAY SHALL BE PLACED IN 12 INCH LIFTS AND COMPACTED BY MECHANICAL MEANS TO 98% OF MAXIMUM DENSITY PER AASHTO T-180 OR AS OTHERWISE REQUIRED BY THE PERMITTING AGENCY.
4. UTILITIES CROSSING ROAD RIGHTS-OF-WAY SHALL BE INSTALLED PRIOR TO ROAD CONSTRUCTION AND BACKFILLED AND COMPACTED WITHIN RIGHT-OF-WAY LIMITS IN STRICT ACCORDANCE WITH THE DIRECTIONS OF THE EOR AND REQUIREMENTS OF ALL AGENCIES OF JURISDICTION.
5. EMBEDMENT MATERIALS BELOW PIPE SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION SYSTEM (U.S.C.S.) SOIL CLASSIFICATION CLASS I OR II AS NOTED IN A.S.T.M. D2321
6. ALL LINES UNDER CONSTRUCTION SHALL BE PLUGGED WITH A WING PLUG, AND ALL PRESSURE PIPES ARE TO BE PLUGGED WITH A MECHANICAL PLUG OR CAP AT THE END OF THE WORKING DAY TO PREVENT GROUND WATER AND POTENTIAL CONTAMINANTS FROM ENTERING COMPLETED LINES AND LINES UNDER CONSTRUCTION.
7. ABOVE GROUND PIPING, INCLUDING BUT NOT LIMITED TO, AERIAL CROSSINGS, LIFT STATION PIPING, FIRE LINES, METER/BACKFLOW PREVENTION DEVICE ASSEMBLIES, ETC. SHALL BE FLANGED AND BE COATED IN THE FOLLOWING MANNER:
SANDBLAST AND REMOVE ALL PAINT AND ANY LOOSE MATERIAL IN ACCORDANCE WITH SSPC-SP10. SANDBLASTING SHALL BE PERFORMED USING NON-SILICA MEDIA. PAINT ALL EXTERIOR FERROUS METAL SURFACES. THE MANUFACTURER'S RECOMMENDATIONS FOR SURFACE PREPARATION, PRIMING, RECOATING, ETC. SHALL BE STRICTLY FOLLOWED. DO NOT PAINT OR COAT ANY NAMEPLATES, BRASS OR STAINLESS STEEL SURFACES. CONTRACTOR SHALL USE THE FOLLOWING PAINT SYSTEM OR EQUAL.
TNEMEC
A. PRIMER: TNEMEC-ALUMINUM MASTIC #135 (3.0 TO 5.0 MILS DFT)
B. INTERMEDIATE COAT: SERIES 66 EPOXOLINE HI-BUILD EPOXY (4.0 TO 6.0 MILS DFT)
C. FINISH COAT: SERIES 73 ENDURA-SHIELD III URETHANE OR EQUAL (2.0 TO 3.0N MILS DFT)
THE FINISHED COAT OF PAINT SHALL BE GREEN IN COLOR FOR SANITARY SEWER, LAVENDER FOR RECLAIMED APPURTENANCES AND BLUE FOR POTABLE WATER APPURTENANCES.
8. ALL FLANGED PIPE SHALL BE CAULKED BETWEEN EACH FLANGE AND THREADS WITH SIKA I A URETHANE CAULK.
9. ALL TIE RODS, BOLTS, NUTS, ETC. INSTALLED UNDERGROUND MUST BE COR TEN AND SHALL BE PAINTED WITH KOPPERS 300-M OR AN AUTHORITY APPROVED EQUAL. BRASS AND STAINLESS STEEL HARDWARE IS EXEMPT FROM THIS REQUIREMENT.
10. COATINGS AND LININGS DAMAGED DURING CONSTRUCTION DUE TO FIELD CUTTING, MISHANDLING OR OTHERWISE MUST BE REPAIRED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, CEMENT MORTAR AND POLYETHYLENE PIPE LININGS, PROTECTO 401, GALVANIZED COATINGS, PVC FENCE COATINGS AND OTHER PAINT TYPE COATINGS. SPECIFIC APPROVAL MUST BE OBTAINED FROM AUTHORITY PRIOR TO PERFORMING COATING AND LINING REPAIRS.
11. ALL STAINLESS STEEL NUTS, BOLTS AND HARDWARE REFERENCED IN THESE STANDARDS, SHALL BE SS 316 GRADE AND SHALL BE SO STAMPED BY THE MANUFACTURER TO VERIFY ALLOY. THE USE OF ANY OTHER STAINLESS STEEL ALLOY WILL REQUIRE SPECIFIC APPROVAL BY AUTHORITY. IN GENERAL, STAINLESS STEEL NUTS, BOLTS AND HARDWARE ARE REQUIRED IN AND AROUND LIFT STATIONS AND FOR FACILITIES INSTALLED OVER OR UNDER BRACKISH OR MARINE WATERS. THIS REQUIREMENT APPLIES TO FLANGE BOLTS AND NUTS ON FLANGED PIPING, MOUNTING BRACKETS, ALL THREAD ROD, ANCHOR BOLTS, WASHERS, CLAMPS AND OTHER MISCELLANEOUS HARDWARE. ANTI-GALLING COMPOUND ANTI-SEIZE LUBRICANT SHALL BE APPLIED TO THE THREADS OF ALL STAINLESS STEEL BOLTS PRIOR TO INSTALLATION. ANTI-SEIZE LUBRICANT SHALL BE GRAPHITE 50 ANTI-SEIZE BY LOCTITE CORPORATION, 1000 ANTI-SEIZE PASTE BY DOW CORNING, 3M LUBE AND ANTI-SEIZE BY 3M.
12. ALL RUBBER AND SYNTHETIC ELASTOMERIC COMPONENTS OF PRODUCTS THAT COME IN CONTACT WITH POTABLE WATER SHALL BE MANUFACTURED WITH CHLORAMINE RESISTANT ELASTOMERS AND SHALL BEAR NSF APPROVAL.
13. ALL MAIN, INCLUDING FITTINGS, SHALL BE EASILY IDENTIFIABLE AS TO THEIR CONTENTS AND SHALL BE COLOR CODED OR MARKED USING THE UNIVERSAL COLOR CODE OF BLUE FOR WATER, GREEN FOR SEWER AND LAVENDER FOR RECLAIMED. PIPE STRIPED DURING MANUFACTURING OF THE PIPE SHALL HAVE CONTINUOUS STRIPES THAT RUN PARALLEL TO THE AXIS OF THE PIPE, THAT ARE LOCATED AT NO GREATER THAN 90-DEGREE INTERVALS AROUND THE PIPE, AND THAT WILL REMAIN INTACT DURING AND AFTER INSTALLATION OF THE PIPE. IF TAPE IS USED TO STRIPE PIPE DURING INSTALLATION OF THE PIPE, THE TAPE SHALL BE APPLIED IN A CONTINUOUS LINE THAT RUNS PARALLEL TO THE AXIS OF THE PIPE AND THAT IS LOCATED ALONG THE TOP OF THE PIPE; FOR PIPES WITH AN INTERNAL DIAMETER OF 24 INCHES OR GREATER, TAPE SHALL BE APPLIED IN CONTINUOUS LINES ALONG EACH SIDE OF THE PIPE AS WELL AS ALONG THE TOP OF THE PIPE.

DESIGN ENGINEER: MICHAEL CHEN, P.E.	REVISION/ACTION TAKEN	NO.	DATE
SIGNATURE			
P. E. NUMBER: 86788			
DATE:			
DRAWN BY:			
CHECKED BY:			
SCALE:			
AS SHOWN			

EUTAW UTILITIES, INC.
Project Development - Concept to Completion
415 SAINT FRANCIS ST., UNIT 110 PINE HURST, FLORIDA 32909
TALLAHASSEE, FLORIDA 32301 Office FAX: (888) 878-2939
PAPER: COL 896

ECU

COLUMBIA COUNTY, FLORIDA
ELLISVILLE PUBLIC WATER SYSTEM
FIRE HYDRANT ASSEMBLY DETAIL
AND INSTALLATION NOTES
COLUMBIA COUNTY, FLORIDA

PRINT DATE
April 10, 2008
SHEET NUMBER
14

SEPARATION REQUIREMENTS

STANDARD WATER, RECLAIMED WATER, SEWER AND STORM SEPARATION STATEMENT

1. STORM SEWER, GRAVITY WASTEWATER, FORCE MAIN AND RECLAIMED WATER MAIN CROSSING UNDER POTABLE WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF TWELVE (12) INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE STORM/WASTEWATER/FORCE MAIN/RECLAIMED WATER PIPE JOINTS AND POTABLE WATER MAIN JOINTS ARE EQUIDISTANT FROM THE POINT OF CROSSING WITH NO LESS THAN TEN (10) FEET BETWEEN ANY TWO JOINTS, BOTH PIPES SHALL BE D.I.P., AND THE MINIMUM VERTICAL SEPARATION SHALL BE SIX (6) INCHES. WHERE THERE IS NO ALTERNATIVE TO STORM/WASTEWATER/FORCE MAIN/RECLAIMED WATER PIPE JOINTS CROSSING OVER A POTABLE WATER MAIN, THE CRITERIA FOR MINIMUM TWELVE (12) INCH VERTICAL SEPARATION BETWEEN LINES AND JOINT ARRANGEMENT, AS STATED ABOVE, SHALL BE REQUIRED, AND BOTH PIPES SHALL BE D.I.P. IRRESPECTIVE OF SEPARATION EXCEPT THAT D.I.P. IS NOT REQUIRED FOR STORM SEWERS.

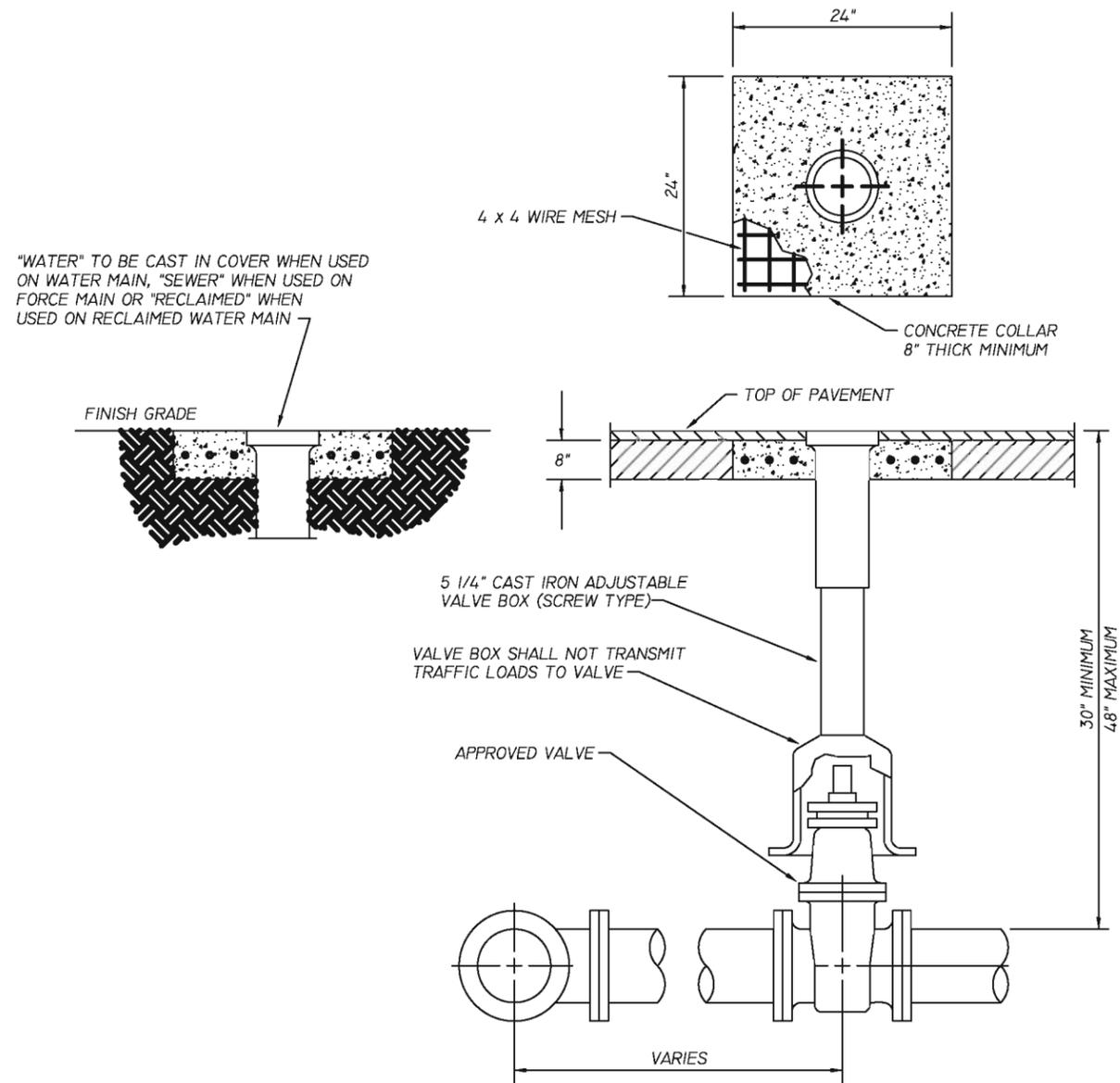
2. FORCE MAIN CROSSING RECLAIMED WATER MAIN OR STORM SEWER SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF TWELVE (12) INCHES BETWEEN THE OUTSIDE OF FORCE MAIN AND THE OUTSIDE OF THE RECLAIMED WATER MAIN OR STORM SEWER AND THE RECLAIMED WATER MAIN SHALL CROSS OVER FORCE MAIN.

3. AT THE UTILITY CROSSING DESCRIBED IN ITEMS 1 AND 2 ABOVE, ONE FULL LENGTH OF DUCTILE IRON WATER MAIN PIPE SHALL BE CENTERED SO THE WATER MAIN JOINTS WILL BE AS FAR AS POSSIBLE FROM THE OTHER PIPELINE JOINTS. WHERE THIS IS NOT POSSIBLE, JOINTS SHALL BE AT LEAST THREE (3) FEET FROM STORM SEWERS AND RECLAIMED WATER MAINS AND SIX (6) FEET FROM GRAVITY SEWER MAINS AND FORCE MAINS.

4. SEWER SERVICE LATERALS SHALL CROSS UNDER WATER MAINS WITH A MINIMUM VERTICAL SEPARATION OF TWELVE (12) INCHES. IF 12" VERTICAL SEPARATION CANNOT BE MAINTAINED, THEN THE WATER MAIN SHALL BE D.I.P. AND THE SEWER SERVICE LATERAL SHALL BE C-900 SDR 18 OR BETTER AND THE MINIMUM SEPARATION SHALL BE SIX (6) INCHES. WHEN IT IS NOT POSSIBLE FOR THE WATER MAIN TO CROSS OVER THE SEWER SERVICE LATERAL A MINIMUM VERTICAL SEPARATION OF AT LEAST TWELVE (12) INCHES MUST BE MAINTAINED, THE WATER MAIN SHALL BE D.I.P. AND THE SEWER LATERAL SHALL BE C-900 SDR 18 OR BETTER.

5. MAINTAIN MINIMUM TEN (10) FEET HORIZONTAL DISTANCE BETWEEN POTABLE WATER MAIN AND STORM SEWER OR GRAVITY WASTEWATER MAIN. ADDITIONAL SEPARATION MAY BE REQUIRED AS OUTLINED IN SECTION II OF SUA STANDARDS.

6. MAINTAIN A MINIMUM OF SIX (6) FEET HORIZONTAL DISTANCE (OUTSIDE TO OUTSIDE) BETWEEN POTABLE WATER MAIN AND FORCE MAIN OR RECLAIMED WATER MAIN.



NOTES: (PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

1. CONCRETE COLLAR MAY NOT BE REQUIRED IN PAVED AREAS IF PAVEMENT SURFACE IS FINISHED PRIOR TO FINAL INSPECTION AND VALVE BOX LID IS AT FINISHED GRADE.

2. WHEN VALVE IS DEEPER THAN 36" AN EXTENSION WILL BE REQUIRED TO BRING OPERATING NUT TO 24" OF FINISHED GRADE. EXTENSION MUST BE SET SCREW TYPE AND ATTACHED TO OPERATING NUT.

3. TWO OF THE FOLLOWING FORMS OF RESTRAINT SHALL BE USED WHEN PIPE IS GREATER THAN 12".

A) APPROVED MECHANICAL JOINT RESTRAINT (I.E. MEGALUG)

B) TIE RODS AND NUTS EQUAL IN DIA. TO TEE BOLTS AND NUTS, COATED WITH KOP-COAT 300 -M OR APPROVED EQUAL.

TYPICAL VALVE INSTALLATION

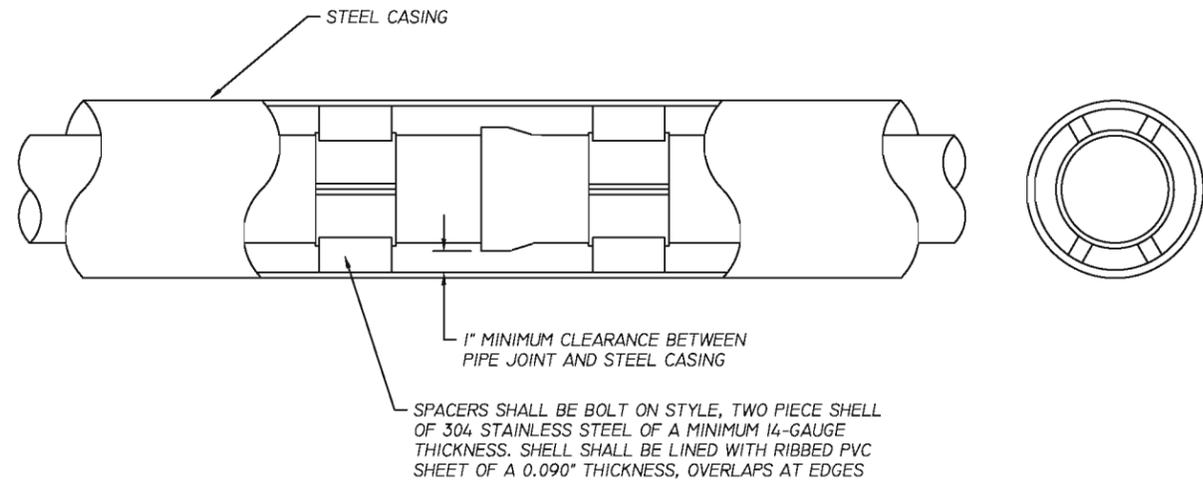
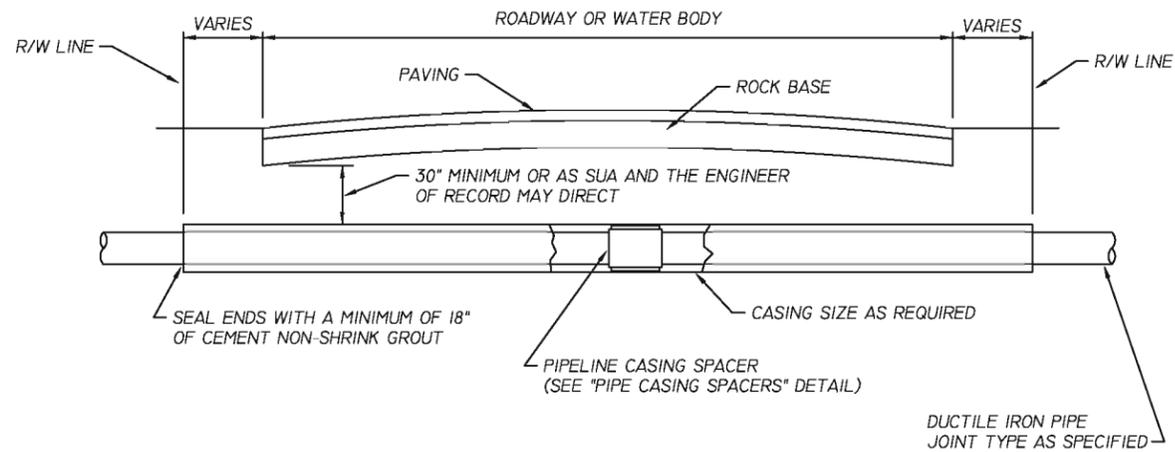
NOT TO SCALE

DESIGN ENGINEER: Signature: _____ Name: Michael Chen, P.E.	REVISION/ACTION TAKEN
P. E. NUMBER: 86788	DATE
DATE: _____	NO.
DRAWN BY: _____	DATE
CHECKED BY: _____	NO.
SCALE: AS SHOWN	DATE



COLUMBIA COUNTY,
ELLISVILLE PUBLIC WATER SYSTEM
TYPICAL VALVE INSTALLATION DETAIL
AND SEPARATION REQUIREMENTS
COLUMBIA COUNTY, FLORIDA

PRINT DATE April 10, 2008
SHEET NUMBER 15



NOMINAL PIPE SIZE	STEEL CASING	THICKNESS SCHEDULE
4"	12"	.375
6"	16"	.375
8"	18"	.375
10"	20"	.375
12"	24"	.375
14"	24"	.375
16"	30"	.375
18"	30"	.375
20"	36"	.375
24"	42"	.500
30"	48"	.500
36"	54"	.500
42"	60"	.500
48"	72"	.500

FIELD LOK GASKET

RESTRAINED JOINT

(PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

TYPICAL CASING INSTALLATION
NOT TO SCALE

NOTES: (PLEASE REFER TO WRITTEN SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS)

- CARRIER PIPE FOR 4" THROUGH 24" DIAMETER PIPE WITHIN CASING SHALL BE MECHANICAL JOINT WITH MEGALUG OR APPROVED EQUAL RESTRAINT GLAND.
- RESTRAINED MECHANICAL JOINTS SHALL BE USED FOR PIPE 30" DIAMETER AND ABOVE AND SHALL HAVE FACTORY WELDED RETAINING RINGS. AMERICAN RESTRAINED JOINT PIPE OR APPROVED EQUAL MAY BE USED.
- FOR PIPE DIAMETERS 4" THROUGH 12" INSTALL STAINLESS STEEL PIPE CASING SPACERS 5' OR LESS FROM EACH END OF PIPE BUT NOT MORE THAN 10' APART (2 PER PIPE). FOR PIPE DIAMETERS 14" AND LARGER INSTALL STAINLESS STEEL PIPE CASING SPACERS 5' OR LESS FROM EACH END OF PIPE AND ONE CENTERED ON PIPE (3 PER PIPE)(CASCADE MFG. CO. OR APPROVED EQUAL).
- PIPE CASING SPACERS SHALL BE CENTER POSITIONED.
- ALTERNATE METHODS OF PIPE SUPPORT WITHIN THE CASING MUST BE APPROVED BY SUA PRIOR TO INSTALLATION.

TYPICAL CASING SPACERS
NOT TO SCALE

DESIGN ENGINEER: Signature	REVISION/ACTION TAKEN	NO.	DATE
P. E. NUMBER: 86789			
DATE:			
ISSUE DATE:			
CHECKED BY: CHL			
SCALE: AS SHOWN			

EUTAW UTILITIES, INC.
Project Development - Concept to Completion
415 SAINT FRANCIS ST., UNIT 1140 PINE PLAZA (650) 383-0400
TALLAHASSEE, FLORIDA 32301 Office FAX: (866) 878-2939
P. 0212.C04.000

ECU

COLUMBIA COUNTY,
ELLISVILLE PUBLIC WATER SYSTEM
TYPICAL CASING INSTALLATION DETAIL
AND CASING SPACERS DETAIL
COLUMBIA COUNTY, FLORIDA

PRINT DATE
April 10, 2008
SHEET NUMBER
16

