

INVITATION TO BID
PROPOSAL

BID NO. 11-1-16-5

SALLIE MOOD SOCCER COMPLEX IRRIGATION IMPROVEMENTS

“MANDATORY ON-SITE” PRE-BID CONFERENCE: 10:00AM, AUGUST 19, 2010

LOCATION: 7221 SALLIE MOOD DRIVE

BID OPENING: 2:00PM, (LOCAL TIME) SEPTEMBER 2, 2010

THE COMMISSIONERS OF CHATHAM COUNTY, GEORGIA

PETE LIAKAKIS, CHAIRMAN

COMMISSIONER HELEN J. STONE

COMMISSIONER HARRIS ODELL JR.

COMMISSIONER JAMES J. HOLMES

COMMISSIONER DAVID M. GELLATLY

COMMISSIONER PATRICK O. SHAY

COMMISSIONER DEAN KICKLIGHTER

COMMISSIONER PATRICK J. FARRELL

COMMISSIONER PRISCILLA D. THOMAS

R. JONATHAN HART, COUNTY ATTORNEY

CHATHAM COUNTY, GEORGIA

DOCUMENT CHECK LIST

The following documents, when marked, are contained in and made a part of this Bid Package or are required to be submitted with the bid. It is the responsibility of the bidder to read, complete and sign, where indicated, and return these documents with his/her bid. **FAILURE TO DO SO MAY BE CAUSE FOR DISQUALIFYING THE BID.**

 X GENERAL INFORMATION AND INSTRUCTIONS TO BID WITH ATTACHMENTS

 X SURETY REQUIREMENTS (A Bid Bond of 5% with this ITB)

 X PROPOSAL

 PLANS/DRAWINGS - (**Plans and Specifications are available and must be purchased at the Purchasing Department for \$50 non-refundable**)

 X BID SCHEDULE

 PERFORMANCE BOND - UPON AWARD OF CONTRACT

 PAYMENT BOND - UPON AWARD OF CONTRACT

 CONTRACT

 X LEGAL NOTICE

 X AFFIDAVIT OF PAYMENT

 X ATTACHMENTS: A. DRUG FREE WORKPLACE; B. NONDISCRIMINATION STATEMENT; C. DISCLOSURE OF RESPONSIBILITY STATEMENT; D. IMMIGRATION & SECURITY FORM; E. CONTRACTOR/SUBCONTRACTOR AFFIDAVIT & AGREEMENT; F. BIDDER'S CERT REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY & VOLUNTARY EXCLUSION; F. DEBARMENT STATEMENT; G. NON-COLLUSIVE AFFIDAVIT

 DOCUMENTATION OF ABILITY TO PERFORM BID REQUIREMENTS. THIS MAY BE REQUIRED OF BIDDERS AFTER SUBMISSION OF BIDS.

COUNTY TAX CERTIFICATE REQUIREMENT - Contractor must supply a copy of their Tax Certificate from their location in the State of Georgia, as proof of payment of the occupational tax where their office is located.

CURRENT TAX CERTIFICATE NUMBER

CITY _____

COUNTY _____

OTHER _____

The Chatham County of Commissioners have established goals to increase participation of minority and female owned businesses. In order to accurately document participation, businesses submitting bids or

proposals are encouraged to report ownership status. A minority or female business is defined as a business with 51% or greater minority of female ownership. Please check ownership status as applicable:

African-American _____ Asian American _____ Hispanic _____

Native American or Alaskan Indian _____ Female _____

In the award of "Competitive Sealed Proposals", minority/female participation may be one of several evaluation criteria used in the award process when specified as such in the Request for Proposal.

RECEIPT IS HEREBY ACKNOWLEDGED OF ADDENDA NUMBERS _____

The undersigned bidder certifies that he/she has received the above listed and marked documents and acknowledges that his/her failure to return each, completed and signed as required, may be cause for disqualifying his/her bid.

BY: _____

DATE

SIGNATURE

TITLE: _____

COMPANY: _____

CHATHAM COUNTY, GEORGIA
OFFICE OF THE PURCHASING AGENT
POST OFFICE BOX 15180
SAVANNAH, GEORGIA 31416
(912) 790-1619

Date: July 29, 2010

BID NO. 11-1-16-5

GENERAL INFORMATION FOR INVITATION FOR BID/PROPOSAL

This is an invitation to submit a bid or proposal to supply Chatham County with construction, equipment, supplies and/or services as indicated herein. Sealed bids or proposals will be received at the Office of the Purchasing Agent, at The Chatham County Citizens Service Center, 1117 Eisenhower Drive, Suite C, Savannah, Georgia, up to 2:00 P.M. (LOCAL TIME) SEPTEMBER 2, 2010 at which time they will be opened and publicly read. **The County reserves the right to reject all bids or proposals for any bid or proposal that is non-responsive or not responsible.**

Instructions for preparation and submission of a bid or proposal are contained in this Invitation For Bid/Proposal package. Please note that specific forms for submission of a bid/proposal are required. Bids must be typed or printed in ink. If you do not submit a bid/proposal, return the signed bid invitation sheet and state the reason; otherwise, your name may be removed from our bidders list.

A "Mandatory On-Site" Pre-Bid Conference has been scheduled to be conducted at the Chatham County Soccer Complex, located at 7221 Sallie Mood Drive, Savannah, Georgia, at 10:00 A.M., AUGUST 19, 2010 to discuss the specifications and resolve any questions and/or misunderstanding that may arise. Your attendance is required. Bids **will not** be accepted from any vendors not represented at the "Mandatory On-Site" pre-bid conference.

Any changes to the conditions and specifications must be in the form of a written addendum to be valid; therefore, the Purchasing Agent will issue a written addendum to document each approved change. Generally when addenda are required, the bid opening date will be changed.

Chatham County has an equal opportunity purchasing policy. Chatham County seeks to ensure that all segments of the business community have access to supplying the goods and services needed by County programs. The County affirmatively works to encourage utilization of disadvantaged and minority business enterprises in our procurement activities. The County provides equal opportunity for all businesses and does not discriminate against any persons or businesses regardless of race, color, religion, age, sex, national origin or handicap. The terms "disadvantaged business," "minority business enterprise," and "minority person" are more specifically defined and explained in the Chatham County Purchasing Ordinance and Procedures Manual, Article VII - Disadvantaged Business Enterprises Program.

This project is not a Special Purpose Local Option Sales Tax (SPLOST) Project. See paragraph 2.22 for MBE/WBE participation goals.

INSTRUCTIONS TO BIDDERS/PROPOSERS

- 1.1 **Purpose:** The purpose of this document is to provide general and specific information for use in submitting a bid or proposal to supply Chatham County with equipment, supplies, and/or services as described herein. All bids/proposals are governed by the Code of Chatham County, Chapter 4, Article IV, and the laws of the State of Georgia.

1.2 **How to Prepare Bid Proposals:** All bid proposals shall be:

- a. Prepared on the forms enclosed herewith, unless otherwise prescribed, and **all documents must be submitted.**
- b. Typewritten or completed with pen and ink, signed by the business owner or authorized representative, with all erasures or corrections initialed and dated by the official signing the proposal. **ALL SIGNATURE SPACES MUST BE SIGNED.**

Bidders are encouraged to review carefully all provisions and attachments of this document prior to submission. Each bid constitutes an offer and may not be withdrawn except as provided herein.

1.3 **How to Submit Bid Proposals:** All bid proposals shall be:

- a. **Submitted in sealed opaque envelopes, plainly marked with the bid number and title, date and time of bid opening, and company name.**
- b. Mailed or delivered as follows in sufficient time to ensure receipt by the Purchasing Agent on or before the time and date specified above.
 1. **Mailing Address: Purchasing Agent, Post Office Box 15180, Savannah, Georgia 31416.**
 2. **Hand Delivery: Purchasing Agent, Chatham County Citizens Service Center, 1117 Eisenhower Drive, Suite C, Savannah, Georgia.**

BIDS NOT RECEIVED BY THE TIME AND DATE SPECIFIED WILL NOT BE OPENED OR CONSIDERED.

- 1.4 **How to Submit an Objection:** Objections from bidders to this invitation to bid and/or these specifications should be brought to the attention of the County Purchasing Agent in the following manner:

- a. When a pre-bid conference is scheduled, bidders shall either present their oral objections at that time or submit their written objections at least two (2) days prior to the scheduled pre-bid conference.

- b. When a pre-bid conference is not scheduled, the bidder shall submit any objections he may have in writing not less than five (5) days prior to the opening of the bid.
 - c. The objections contemplated may pertain to form and/or substance of the invitation to bid documents. Failure to object in accordance with the above procedure will constitute a waiver on the part of the business to protest this invitation to bid.
- 1.5 **Failure to Bid:** If a bid is not submitted, the business should return this invitation to bid document, stating reason therefore, and indicate whether the business should be retained or removed from the County's bidders list.
- 1.6 **Errors in Bids:** Bidders or their authorized representatives are expected to fully inform themselves as to the conditions, requirements, and specifications before submitting bids. Failure to do so will be at the bidder's own risk. In case of error in extension of prices in the bid, the unit price will govern.
- 1.7 **Standards for Acceptance of Bid for Contract Award:** The County reserves the right to reject any or all bids and to waive any irregularities or technicalities in bids received whenever such rejection or waiver is in the best interest of the County. The County reserves the right to reject the bid of a bidder who has previously failed to perform properly or complete on time contracts of a similar nature, or a bid from a bidder whom investigation shows is not in a position to perform the contract.
- 1.8 **Bidder:** Whenever the term "bidder" is used it shall encompass the "person," "business," "contractor," "supplier," "vendor," or other party submitting a bid or proposal to Chatham County in such capacity before a contract has been entered into between such party and the County.
- 1.9 **Responsible / Responsive Bidder:** *Responsible Bidder* means a person or entity that has the capability in all respects to perform fully and reliably the contract requirements. *Responsive Bidder* means a person or entity that has submitted a bid or proposal that conforms in all material respects to the requirements set forth in the invitation for bids or request for proposals.
- 1.10 **Compliance with Laws:** The bidder and/or contractor shall obtain and maintain all licenses, permits, liability insurance, workman's compensation insurance and comply with any and all other standards or regulations required by federal, state or County statute, ordinances and rules during the performance of any contract between the contractor and the County. Any such requirement specifically set forth in any contract document between the contractor and the County shall be supplementary to this section and not in substitution thereof.
- 1.11 **Contractor:** Contractor or subcontractor means any person or business having a contract with Chatham County. The Contractor/Vendor of goods, material, equipment or services certifies that they will follow equal employment opportunity practices in connection with the awarded contract as more fully specified in the contract documents.
- 1.12 ***Local Preference:** On 27 March, 1998 the Board of Commissioners adopted a Local Vendor Preference Ordinance. This Ordinance does not apply to construction contracts. However, contractors are encouraged to apply the same method when awarding bids to local and local M/WBE businesses when ever possible in order to promote growth in Chatham County's economy. **NOTE: Local Preference does not apply to Public Works Construction contracts.**

- 1.13 **Debarred Firms and Pending Litigation:** Any potential proposer/firm listed on the Federal or State of Georgia Excluded Parties Listing (Barred from doing business) **will not** be considered for contract award. Proposers **shall disclose** any record of pending criminal violations (Indictment) and/or convictions, pending lawsuits, etc., and any actions that may be a conflict of interest occurring within the past five (5) years. Any proposer/firm previously defaulting or terminating a contract with the County will not be considered. Also, any contractor or subcontractor that has pending litigation with the County will not be considered for contract award.

**** All bidders or proposers are to read and complete the Disclosure of Responsibility Statement enclosed as an Attachment to be returned with response. Failure to do so may result in your solicitation response being rejected as non-responsive.**

Bidder acknowledges that in performing contract work for the Board, bidder shall not utilize any firms that have been a party to any of the above actions. If bidder has engaged any firm to work on this contract or project that is later debarred, Bidder shall sever its relationship with that firm with respect to Board contract.

- 1.14 **Performance Evaluation:** On April 11, 2008, the Chatham County Board of Commissioners approved a change to the County Purchasing Ordinance requiring Contractor/Consultant Performance Evaluations, as a minimum, annually, prior to contract anniversary date.

Should Contractor/Consultant performance be unsatisfactory, the appointed County Project Manager for the contract may prepare a Contractor/Consultant Complaint Form or a Performance Evaluation to the County Purchasing Agent.

- 1.15 **Payment of Taxes:** No contract shall be awarded unless all real and personal property taxes have been paid by the successful contractor and/or subcontractors as adopted by the Board of commissioners on April 8, 1994.

- 1.16 **State Licensing Board for General Contractors:** Pursuant to Georgia law, the following types of contractors **must obtain a license from the State Licensing Board of Residential and General Contractors by July 1, 2008:**

*** Residential - Basic Contractor** (Contractor work relative to detached one-family and two-family residences and one-family townhouses not over three stories in height).

*** Residential - Light Commercial Contractor** (Contractor work or activity related to multifamily and multiuse light commercial buildings and structures).

*** General Contractor** (Contractor work or activity that is unlimited in scope regarding any residential or commercial projects).

A copy of your licence must be a part of your bid documents at the time of the bid opening.

- 1.17 **Immigration:** On July 1, 2008 the Georgia Security and Immigration Compliance Act (SB 529, Section 2) became effective. All contractors and subcontractors with 100 or more employees entering into a contract or performing work must sign an affidavit that he/she has used the E-Verify System.

E-Verify is a no-cost federal employment verification system to insure employment eligibility. Affidavits are enclosed in this solicitation. You may download M-274 Handbook for Employers at <http://www.dol.state.ga.us/spotlight/employment/rules>. You may go to <http://www.uscis.gov>. To find the E-Verify information.

Protection of Resident Workers. Chatham County Board of Commissioners actively supports the Immigration and Nationality Act (INA) which includes provisions addressing employment eligibility, employment verification, and nondiscrimination. Under the INA, employers may hire only persons who may legally work in the United States (i.e., citizens and nationals of the U.S.) and aliens authorized to work in the U.S. The employer must verify the identity and employment eligibility of anyone to be hired, which includes completing the Employment Eligibility Verification Form (I-9). The Contractor shall establish appropriate procedures and controls so no services or products under the Contract Documents will be performed or manufactured by any worker who is not legally eligible to perform such services or employment.

GENERAL CONDITIONS

- 2.1 **Specifications:** Any obvious error or omission in specifications shall not inure to the benefit of the bidder but shall put the bidder on notice to inquire of or identify the same from the County. Whenever herein mention is made of any article, material or workmanship to be in accordance with laws, ordinances, building codes, underwriter's codes, A.S.T.M. regulations or similar expressions, the requirements of these laws, ordinances, etc., shall be construed to be the minimum requirements of these specifications.
- 2.2 **Multiple Bids:** No vendor will be allowed to submit more than one bid. Any alternate proposals must be brought to the Purchasing Agent's attention during the Pre-bid Conference or submitted in writing at least five (5) days preceding the bid opening date.
- 2.3 Not Used.
- 2.4 **Prices to be Firm:** Bidder warrants that bid prices, terms and conditions quoted in his bid will be firm for acceptance for a period of sixty (60) days from bid opening date, unless otherwise stated in the bid.
- 2.5 **Completeness:** All information required by Invitation for Bids/Proposals must be completed and submitted to constitute a proper bid or proposal.
- 2.6 **Quality:** All materials, or supplies used for the construction necessary to comply with this proposal shall be of the best quality, and of the highest standard of workmanship.

Workmanship employed in any construction, repair, or installation required by this proposal shall be of the highest quality and meet recognized standards within the respective trades, crafts and of the skills employed.
- 2.7 **Guarantee/ Warranty:** Unless otherwise specified by the County, the bidder shall unconditionally guarantee the materials and workmanship for one year on all material and/or services. If, within the

guarantee/warranty period any defects occur which are due to faulty material and or services, the contractor at his expense, shall repair or adjust the condition, or replace the material and/or services to the complete satisfaction of the County. These repairs, replacements or adjustments shall be made only at such time as will be designated by the County as being least detrimental to the operation of County business.

- 2.8 **Liability Provisions:** Where bidders are required to enter or go onto Chatham County property to take measurements or gather other information in order to prepare the bid or proposal as requested by the County, the bidder shall be liable for any injury, damage or loss occasioned by negligence of the bidder, his agent, or any person the bidder has designated to prepare the bid and shall indemnify and hold harmless Chatham County from any liability arising therefrom. The contract document specifies the liability provisions required of the successful bidder in order to be awarded a contract with Chatham County.
- 2.9 **Cancellation of Contract:** The contract may be canceled or suspended by Chatham County in whole or in part by written notice of default to the Contractor upon non-performance or violation of contract terms. An award may be made to the next low bidder, for articles and/or services specified or they may be purchased on the open market and the defaulting Contractor (or his surety) shall be liable to Chatham County for costs to the County in excess of the defaulted contract prices. See the contract documents for complete requirements.
- 2.10 **Patent Indemnity:** Except as otherwise provided, the successful bidder agrees to indemnify Chatham County and its officers, agents and employees against liability, including costs and expenses for infringement upon any letters patent of the United States arising out of the performance of this Contract or out of the use or disposal for the account of the County of supplies furnished or construction work performed hereunder.
- 2.11 **Certification of Independent Price Determination:** By submission of this bid, the bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, that in connection with this procurement:
- (1) The prices in this bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
 - (2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly to any other bidder or to any competitor; and
 - (3) No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not be submit a bid for the purpose or restricting competition.
- 2.12 **Award of Contract:** The contract, if awarded, will be awarded to that responsible bidder whose bid/proposal will be most advantageous to Chatham County, price and other factors considered. The Board of Commissioners will make the determination as to which bid or proposal that serves as the best value to Chatham County.

2.13 **Procurement Protests:** Objections and protests to any portion of the procurement process or actions of the County staff may be filed with the Purchasing Agent for review and resolution. The Chatham County Purchasing Procedures Manual, Article IX - Appeals and Remedies shall govern the review and resolution of all protests.

2.14 **Qualification of Business (Responsible Bidder or Proposer):** A responsible bidder or proposer is defined as one who meets, or by the date of the bid acceptance can meet, certifications, all requirements for licensing, insurance, and registrations, or other documentation required by the Design Professional engaged to develop Scope of work, specifications and plans. These documents will be listed in the Special Conditions further on in this solicitation. Chatham County has the right to require any or all bidders to submit documentation of the ability to perform, provide, or carry out the service or provide the product requested.

Chatham County has the right to disqualify the bid or proposal of any bidder or proposer as being unresponsive or irresponsible whenever such bidder/proposer cannot document the ability to deliver the requested product.

2.15 **Chatham County Tax Certificate Requirement:** A current Chatham County Tax Certificate is required unless otherwise specified. Please contact the Building Safety and Regulatory Services (912) 201-4300 for additional information.

2.16 **Insurance Provisions, General:** The selected CONTRACTOR shall be required to procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors. The cost of such insurance shall be included in the Bid. It is every contractor's responsibility to provide the County Purchasing and Contracting Division current and up-to-date Certificates of Insurance for multiple year contracts before the end of each term. **Failure to do so may be cause for termination of contract.**

2.16.1 General Information that shall appear on a Certificate of Insurance:

- I. Name of the Producer (Contractor's insurance Broker/Agent).
- II. Companies affording coverage (there may be several).
- III. Name and Address of the Insured (this should be the Company or Parent of the firm Chatham County is contracting with).
- IV. A Summary of all current insurance for the insured (includes effective dates of coverage).
- V. A brief description of the operations to be performed, the specific job to be performed, or contract number.
- VI. Certificate Holder (This is to always include Chatham County).

Chatham County as an Additional Insured: Chatham County invokes the defense of sovereign immunity. In order not to jeopardize the use of this defense, the County **is not** to be included as an Additional Insured on insurance contracts.

2.16.2 **Minimum Limits of Insurance** to be maintained for the duration of the contract:

- a. **Commercial General Liability:** Provides protection against bodily injury and property damage claims arising from operations of a Contractor or Tenant. This policy coverage includes: premises and operations, use of independent contractors, products/completed operations, personal injury, contractual, broad form property damage, and underground, explosion and collapse hazards. Minimum limits: \$1,000,000 bodily injury and property damage per occurrence and annual aggregate.
- b. **Worker's Compensation and Employer's Liability:** Provides statutory protection against bodily injury, sickness or disease sustained by employees of the Contractor while performing within the scope of their duties. Employer's Liability coverage is usually included in Worker's Compensation policies, and insures common law claims of injured employees made in lieu of or in addition to a Worker's Compensation claim. Minimum limits: \$500,000 for each accident, disease policy limit, disease each employee and Statutory Worker's Compensation limit.
- c. **Business Automobile Liability:** Coverage insures against liability claims arising out of the Contractor's use of automobiles. Minimum limit: \$1,000,000 combined single limit per accident for bodily injury and property damage. Coverage should be written on an Any Auto basis.

2.16.3 **Special Requirements:**

- a. **Claims-Made Coverage:** The limits of liability shall remain the same as the occurrence basis, however, the Retroactive date shall be prior to the coincident with the date of any contract, and the Certificate of Insurance shall state the coverage is claims-made. The Retroactive date shall also be specifically stated on the Certificate of Insurance.
- b. **Extended Reporting Periods:** The Contractor shall provide the County with a notice of the election to initiate any Supplemental Extended Reporting Period and the reason(s) for invoking this option.
- c. **Reporting Provisions:** Any failure to comply with reporting provisions of the policies shall not affect coverage provided in relation to this request.
- d. **Cancellation:** Each insurance policy that applies to this request shall be endorsed to state that it shall not be suspended, voided, or canceled, except after thirty (30) days prior to written notice by certified mail, return receipt requested, has been given to the County.
- e. **Proof of Insurance:** Chatham County shall be furnished with certificates of insurance and with original endorsements affecting coverage required by this request. The certificates and endorsements are to be signed by a person authorized by the insurer to bind coverage on its behalf. All certificates of insurance are to be submitted prior to,

and approved by, the County before services are rendered. The Contractor must ensure Certificate of Insurance are updated for the entire term of the County.

- f. **Insurer Acceptability:** Insurance is to be placed with an insurer having an A.M. Best's rating of A and a five (5) year average financial rating of not less than V. If an insurer does not qualify for averaging on a five year basis, the current total Best's rating will be used to evaluate insurer acceptability.
- g. **Lapse in Coverage:** A lapse in coverage shall constitute grounds for contract termination by the Chatham County Board of Commissioners.
- h. **Deductibles and Self-Insured Retention:** Any deductibles or self-insured retention must be declared to, and approved by, the County. At the option of the County, either: the insurer shall reduce or eliminate such deductibles or self-insured retention as related to the County, its officials, officers, employees, and volunteers; or the Contractor shall procure a bond guaranteeing payment of related suits, losses, claims, and related investigation, claim administration and defense expenses.

2.16.4 **Additional Coverage for Specific Procurement Projects:**

- a. **Professional Liability:** Insure errors or omission on behalf of architects, engineers, attorneys, medical professionals, and consultants.

Minimum Limits:

\$1 million per claim/occurrence

Coverage Requirement:

If claims-made, retroactive date must precede or coincide with the contract effective date or the date of the Notice to Proceed. The professional must state if tail coverage has been purchased and the duration of the coverage.

- b. **Builder's Risk: (For Construction or Installation Contracts)** Covers against insured perils while in the course of construction.
Minimum Limits: All-Risk coverage equal 100% of contract value
Coverage Requirements: Occupancy Clause - permits County to use the facility prior to issuance of Notice of Substantial Completion.

2.17 **Compliance with Specification - Terms and Conditions:** The Invitation to Bid, Legal Advertisement, General Conditions and Instructions to Bidders, Specifications, Special Conditions, Vendor's Bid, Addendum, and/or any other pertinent documents form a part of the bidders proposal or bid and by reference are made a part hereof.

2.18 **Signed Bid Considered Offer:** The signed bid shall be considered an offer on the part of the bidder, which offer shall be deemed accepted upon approval by the Chatham County Board of Commissioners, Purchasing Agent or his designee. In case of a default on the part of the bidder after such acceptance, Chatham County may take such action as it deems appropriate, including legal action for damages or lack of required performance.

- 2.19 **Notice to Proceed:** The successful bidder or proposer shall not commence work under this Invitation to Bid until a written contract is awarded and a Notice to Proceed is issued by the Purchasing Agent or his designee. If the successful bidder does commence any work or deliver items prior to receiving official notification, he does so at his own risk.
- 2.20 **Payment to Contractors:** Instructions for invoicing the County for products delivered to the County are specified in the contract document.
- a. Questions regarding payment may be directed to the Finance Department at (912) 652-7905 or the County's Project Manager as specified in the contract documents.
 - b. Contractors will be paid the agreed upon compensation upon satisfactory delivery of the products or completion of the work as more fully described in the contract document.
 - c. Upon completion of the work or delivery of the products, the Contractor will provide the County or contractor with an affidavit certifying all suppliers, persons or businesses employed by the Contractor for the work performed for the County have been paid in full.
 - d. Chatham County is a tax exempt entity. Every contractor, vendor, business or person under contract with Chatham County is required by Georgia law to pay State sales or use taxes for products purchased in Georgia or transported into Georgia and sold to Chatham County by contract. Please consult the State of Georgia, Department of Revenue, Sales and Use Tax Unit in Atlanta (404) 656-4065 for additional information.
- 2.21 **Indemnification:** The CONTRACTOR agrees to protect, defend, indemnify, and hold harmless Chatham County, Georgia, its commissioners, officers, agents, and employees from and against any and all liability, damages, claims, suits, liens, and judgments, of whatever nature, including claims for contribution and/or indemnification, for injuries to or death of any person or persons, or damage to the property or other rights of any person or persons caused by the CONTRACTOR or its subcontractors. The CONTRACTOR's obligation to protect, defend, indemnify, and hold harmless, as set forth herein above shall include, but not be limited to, any matter arising out of any actual or alleged infringement of any patent, trademark, copyright, or service mark, or any actual or alleged unfair competition, disparagement of product or service, or other business tort of any type whatsoever, or any actual or alleged violation of trade regulations. CONTRACTOR further agrees to investigate, handle, respond to, provide defense for, and to protect, defend, indemnify, and hold harmless Chatham County, Georgia, at his sole expense, and agrees to bear all other costs and expenses related thereto, even if such claims, suits, etc., are groundless, false, or fraudulent, including any and all claims or liability for compensation under the Worker's Compensation Act arising out of injuries sustained by any employee of the CONTRACTOR or his subcontractors or anyone directly or indirectly employed by any of them.

The CONTRACTOR'S obligation to indemnify Chatham County under this Section shall not be limited in any way by the agreed-upon contract price as shown in Article II or to the scope and amount of coverage provided by any insurance maintained by the CONTRACTOR including, without

limitation to, the insurance required to be maintained by the CONTRACTOR pursuant to Section II-4 of the Contract.

- 2.22 The Chatham County Board of Commissioners has adopted an aggressive program that establishes goals for minority/female, small and disadvantaged business participation in construction, professional services, and general procurement.
- a. The Chatham County Board of Commissioners under Georgia law may reject any bid as non-responsive if they feel a bidder did not exercise “**Good Faith Effort**” in obtaining the goal established for M/WBE participation.
 - b. The Chatham County Board of Commissioners adopted a policy establishing goals oriented to increase participation of minority and female owned businesses, through MBE/FBE certification and development. In order to accurately document participation, businesses submitting bids, quotes or proposals are encouraged to report ownership status. A bidder or vendor that is certified by any agency of the Federal Government or State of Georgia may submit a copy of their certification with their bid as proof of qualifications. Bidders that intend to engage in joint ventures or utilize subcontractors must submit to the County Contracts Administrator, a report on Minority/Female Business Enterprise participation.

Goals established for this project is 12% MBE and 5% WBE.

- c. A Minority/Female Business Enterprise (M/FBE) is a business concern that is at least 51% owned by one or more minority/female individuals (2) and whose daily business operations are managed and directed by one or more of the minority/female owners.
- 2.23 Bidders or proposers are required to make a **Good Faith Effort**, where subcontracting is to be utilized in performing the contract, to subcontract with or purchase supplies from qualified M/WBEs. Bidders or proposers are required to state if they intend to subcontract any part of the work. Goals will be established for each contract at the onset. **Forms** requiring the signatures of bidders or proposers are enclosed as **Attachments** and must be completed and returned with your bid response. If forms are not completed and submitted, the bid may be considered non-responsive.

Each bidder or proposer is required to maintain records of such efforts in detail adequate to permit a determination of compliance with these requirements. All contracts will reflect **Good Faith Efforts** and reporting requirements for the term of the contract. The County particularly urges general contractors to give emphasis to subcontracting with local area firms. **For all questions regarding M/WBE participation and Good Faith Effort only**, contact : Arneja Riley, Chatham County M/WBE Coordinator, 124 Bull Street, Suite 310 Savannah, Ga. 31401. Ph 912-652-7860; fax 912-652-7849; e-mail alriely@chathamcounty.org or <http://purchasing.chathamcounty.org>

- 2.24 **GEORGIA OPEN RECORDS ACT** - The responses will become part of the County’s official files without any obligation on the County’s part. Ownership of all data, materials and documentation prepared for and submitted to Chatham County in response to a solicitation, regardless of type, shall belong exclusively to Chatham County and will be considered a record prepared and maintained or received in the course of operations of a public office or agency and subject to public inspection in

accordance with the Georgia Open Records Act, Official Code of Georgia Annotated, Section 50-18-70, et. Seq., unless otherwise provided by law.

Responses to RFPs shall be held confidential from all parties other than the County until after the contract is awarded by the Board of Commissioners.

The vendor and their bid price in response to IFBs will be read aloud at public bid openings. After Bid Tabulations, the IFB shall be available for public viewing.

Chatham County shall not be held accountable if material from responses is obtained without the written consent of the vendor by parties other than the County, at any time during the solicitation evaluation process.

- 2.25 **GEORGIA TRADE SECRET ACT of 1990-** In the event a Bidder/Proposer submits trade secret information to the County, the information must be clearly labeled as a Trade Secret. The County will maintain the confidentiality of such trade secrets to the extent provided by law.
- 2.26 **CONTRACTOR RECORDS** - The Georgia Open Records Act is applicable to the records of all contractors and subcontractors under contract with the County. This applies to those specific contracts currently in effect and those which have been completed or closed for up to three (3) years following completion. Again, this is contract specific to the County contracts only.
- 2.27 **EXCEPTIONS** - All proceedings, records, contracts and other public records relating to procurement transactions shall be open to the inspection of any citizen, or any interested person, firm or corporation, in accordance with the Georgia Open Records Act except as provided below:
- a. Cost estimates relating to a proposed procurement transaction prepared by or for a public body shall not be open to public inspection.
 - b. Any competitive sealed bidding bidder, upon request, shall be afforded the opportunity to inspect bid records within a reasonable time after the opening of all bids but prior to award, except in the event that the County decides not to accept any of the bids and to rebid the contract. Otherwise, bid records shall be open to public inspection only after award of the contract. Any competitive negotiation offeror, upon request, shall be afforded the opportunity to inspect proposal records within a reasonable time after the evaluation and negotiations of proposals are completed but prior to award except in the event that the County decides not to accept any of the proposals and to reopen the contract. Otherwise, proposal records shall be open to the public inspection only after award of the contract except as provided in paragraph "c" below. Any inspection of procurement transaction records under this section shall be subject to reasonable restrictions to ensure the security and integrity of the records.
 - c. Trade secrets or proprietary information submitted by a bidder, offeror or contractor in connection with a procurement transaction shall not be subject to public disclosure under the Georgia Open Records Act; however, the bidder, offeror or contractor must invoke the protections of this section prior to or upon submission of the data or other materials, and must

identify the data or other materials to be protected and state the reasons why protection is necessary.

- d. Nothing contained in this section shall be construed to require the County, when procuring by "competitive negotiation" (Request for Proposal), to furnish a statement of the reasons why a particular proposal was not deemed to be the most advantageous to the County.

2.28 **REFERENCES - \$500,000 or more:** On July 25, 2003 the Board of Commissioners directed that all construction projects with a bid of \$500,000 or more, for bidders to be responsive each must provide information on the most recent five (5) projects with similar scope of work as well as other information to determine experience and qualifications as follows:

- a. Project Name: _____
Location: _____
Owner: _____
Address: _____
City and State: _____
Contact: _____
Phone & Fax: _____
*Architect or Engineer: _____
Contact: _____
Phone & Fax: _____
Email: _____
- b. The awarded bid amount and project start date.
c. Final cost of project and completion date.
d. Number of change orders.
e. Contracted project completion in days.
f. Project completed on time. Yes____ No____ Days exceeded_____
g. List previous contracts your company performed for Chatham County by Project Title, date and awarded/final cost.
h. Has contractor ever failed to complete a project? If so, provide explanation.
i. Have any projects ever performed by contractor been the subject of a claim or lawsuit by or against the contractor? If yes, please identify the nature of such claim or lawsuit, the court in which the case was filed and the details of its resolution.

\$499,000 and less: Provide references from owners of at least three (3) projects of various sizes for which contractor was the prime contractor. Include government owners if possible. If the contractor has performed any work for the Chatham County Board of Commissioners within the last five (5) years, at least one (1) of the three (3) owner references must be from the appropriate party within the Chatham County Government provide in the format as in (a) above on the attached form.

Failure to provide the above information may result in your firm's bid being rejected and ruled as non-responsive.

NOTE: FORMS FOR YOU TO FILL OUT FOR YOUR REFERENCES ARE ATTACHED TO THE BACK OF THIS BID PACKAGE.

ADDITIONAL CONDITIONS

- 3.1 **Price Change:** Preference shall be given to the bidder submitting the lowest and best firm price as his bid. Should it be found that due to unusual market conditions it is to the best interest of the County to accept a price with an escalation clause, the following shall apply:

The contract price shall be frozen for a specified period. This period must be shown on your bid 11-1-16-5. Cost data to support any proposed increase must be submitted to the Purchasing Agent not less than ten (10) days prior to the effective date of any such requested price increase.

Any adjustment allowed shall consist of bona fide material cost increases which may be passed on to the consumer.

No adjustment shall be made to compensate a supplier for inefficiency in operation, or for additional profit.

Bids indicating "price in effect at time of shipment" will be considered invalid.

- 3.2. **METHOD OF COMPENSATION.** The compensation provided for herein shall include all claims by the CONTRACTOR for all costs incurred by the CONTRACTOR in the conduct of the Project as authorized by the approved Project Compensation Schedule and this amount shall be paid to the CONTRACTOR after receipt of the invoice and approval of the amount by the COUNTY. The COUNTY shall make payments to the CONTRACTOR within thirty (30) days from the date of receipt of the CONTRACTOR's acceptable statement on forms prepared by the CONTRACTOR and approved by the COUNTY.

Should the Project begin within any one month, the first invoice shall cover the partial period from the beginning date of the Project through the last day of the month (or on a mutually agreeable time) in which it began. The invoices shall be submitted each month until the Project is completed. Invoices shall be itemized to reflect actual expenses for each individual task; also refer to the requirements concerning changes, delays and termination of work under Sections I-8, 9, and 10 of the contract. Each invoice shall be accompanied by a summary progress report which outlines the work accomplished during the billing period and any problems that may be inhibiting the Project execution. The terms of this contract are intended to supersede all provisions of the Georgia Prompt Pay Act.

As long as the gross value of completed work is less than 50% of the total contract amount, or if the contractor is not maintaining his construction schedule to the satisfaction of the engineer, the County shall retain 10% of the gross value of the completed work as indicated by the current estimate approved by the engineer.

After the gross value of completed work becomes to or exceed 50% of the total contract amount within a time period satisfactory to the County, then the total amount to be retained

may be reduced to 5% of the gross value of the completed work as indicated by the current estimate approved by the engineer, until all pay items are substantially completed.

When all work is completed and time charges have ceased, pending final acceptance and final payment the amount retained may be further reduced at the discretion of the County.

The CONTRACTOR may submit a final invoice to the County for the remaining retainage upon COUNTY'S acceptance of the Certificate of Substantial Completion. Final payment constituting the entire unpaid balance due shall be paid by the COUNTY to the CONTRACTOR when work has been fully completed and the contract fully performed, except for the responsibilities of the CONTRACTOR which survive final payment. The making of final payment shall constitute a waiver of all claims by Chatham County except those arising from unsettled liens, faulty or defective work appearing after substantial completion, failure of the work to comply with the requirements of the Contract Documents, or terms of any warranties required by the Contractor Documents or those items previously made in writing and identified by the COUNTY as unsettled at the time of final application for payment. Acceptance of final payment shall constitute a waiver of all claims by the CONTRACTOR, except those previously made in writing and identified by the CONTRACTOR as unsettled at the time of final application for payment.

3.2.1. **FORCE ACCOUNT:** When no agreement is reached for additional work to be done at Lump Sum or Unit Prices, then such additional work shall be done based on the following Cost-Plus-Percentage basis of payment. The Georgia Department of Transportation specifications for the use of a force account will not be used.

- a. For work performed by the prime contractor/general contractor, the contractor shall be reimbursed for actual cost incurred in doing the work, and an additional payment of 15% to cover overhead and profit.
- b. For work performed by a sub-contractor, the sub-contractor shall be reimbursed for actual cost incurred in doing the work, and an additional payment of 10% to cover overhead and profit. The contractor shall be allowed an overhead and profit mark-up not to exceed 7% on the subcontractor's price. The County shall not recognize subcontractors of subcontractors.
- c. The term "Actual Cost" shall include the cost of material and labor as follows:
 - i. Material cost - Direct cost of material, sales tax, freight and equipment rental.
 - ii. Labor cost - Man hour cost listed separately by trade, payroll costs including workman's compensation, social security, pension and retirement.
- d. The term "Overhead and Profit" shall include bonds (Payment & Performance, Roof & Wall), insurance (Liability, Builders Risk), permits, supervision costs (cost of subcontractor to supervise own work, cost of contractor to supervise work of sub-contractor), proposal preparation and all administrative costs.

3.2.2. **LIQUIDATED DAMAGES:** Failure to complete the work within the duration of N/A plus any extension authorized in writing by the County Engineer shall entitle the County to deduct as

"Liquidated Damages" from the monies due the Contractor the amount of N/A for each calendar day in excess of the authorized construction time.

3.3 SURETY REQUIREMENTS and Bonds: (Check where applicable)

- X A.** Such bidder shall post a bid bond, certified check or money order made payable to the Chatham County Finance Department in the amount of 5% of the bid price.
- X B.** Contractor(s) shall post a payment/performance bond, certified check or money order made payable to the Chatham County Finance Department in the amount of 100% of the bid price if awarded the purchase. Such bond(s) are due prior to contract execution as a guarantee that goods meet specifications and will be delivered per contract. Such bonds will also guarantee quality performance of services and timely payment of invoices to any subcontractors.
- X C.** Whenever a bond is provided, it shall be executed by a surety authorized to do business in the State of Georgia and approved by Chatham County.
- X D.** Bidder acknowledges Chatham County's right to require a Performance and Payment Bond of a specific kind and origin. "Performance Bond" means a bond with good and sufficient surety or surities for the faithful performance of the contract and to indemnify the governmental entity for any damages occasioned by a failure to perform the same within the prescribed time. Such bond shall be payable to, in favor of, and for the protection of the governmental entity for which the work is to be done. "Payment Bond" means a bond with good and sufficient surety or sureties payable to the governmental entity for which the work is to be done and intended for the use and protection of all subcontractors and all persons supplying labor, materials, machinery, and equipment in the prosecution of the work provided for in the public works construction contract.
- X E.** Forfeit the amount of the Bid Bond if he/she fails to enter into a contract with Chatham County to do and/or furnish everything necessary to provide service and/or accomplish the work stated and/or specified in this bid proposal for the bid amount, and;

3.4 Warranty Requirements: (Check where applicable):

- a. Provisions of item 2.7 apply.
- b. Warranty required.
 - 1. Standard warranty shall be offered with bid.
 - 2. Extended warranty shall be offered with bid. The cost of the extended warranty will be listed separately on the bid sheet.

3.5 Terms of Contract: (check where applicable):

- a. Annual Contract

- b. One-time Purchase
- X c. Other ONE TIME CONTRACT

CONVERSATIONS OR CORRESPONDENCE REGARDING THIS SOLICITATION OR REPORT BETWEEN PROSPECTIVE OFFERORS AND PERSONS OUTSIDE THE CHATHAM COUNTY PURCHASING OFFICE WILL NOT BE CONSIDERED OFFICIAL OR BINDING UNLESS OTHERWISE SPECIFICALLY AUTHORIZED WITHIN THIS DOCUMENT.

The undersigned bidder or proposer certifies that he/she has carefully read the preceding list of instructions to bidders and all other data applicable hereto and made a part of this invitation; and, further certifies that the prices shown in his/her bid/proposal are in accordance with all documents contained in this Invitation for Bids/ Proposals package, and that any exception taken thereto may disqualify his/her bid/proposal.

This is to certify that I, the undersigned bidder, have read the instructions to bidder and agree to be bound by the provisions of the same.

This _____ day of _____ 20 ____.

BY _____
SIGNATURE

TITLE

COMPANY

PHONE / FAX NO'S.

CHATHAM COUNTY, GEORGIA
SURETY REQUIREMENTS

A Bid Bond for five percent (5%) of the amount of the bid is required to be submitted with each bid.

A Performance Bond for one hundred percent (100%) of the bid will be required of the successful bidder.

The Bidder certifies that he/she has examined all documents contained in this bid package, and is familiar with all aspects of the proposal and understands fully all that is required of the successful bidder. The Bidder further certifies that his/her bid shall not be withdrawn for thirty (30) days from the date on which his bid is publicly opened and read.

The Bidder agrees, if awarded this bid, he/she will:

- A. Furnish, upon receipt of an authorized Chatham County Purchase Order, all items indicated thereon as specified in this bid proposal for the bid amount, or;
- B. Enter a contract with Chatham County to do and/or furnish everything necessary to provide the service and/or accomplish the work as stated and/or specified in this bid proposal for the bid amount, and;
- C. Furnish, if required, a Performance Bond, and acknowledges Chatham County's right to require a Performance Bond of a specific kind and origin, and;
- D. Forfeit the amount of the Bid Bond if he/she fails to enter a contract with Chatham County as stated in (B) above, within fifteen (15) days of the date on which he/she is awarded the bid, and/or;
- E. Forfeit the amount of the Performance Bond if he/she fails to execute and fulfill the terms of the contract entered. The amount of forfeiture shall be:
 - 1. The difference between his/her bid and the next lowest, responsible bid that has not expired or been withdrawn, or;
 - 2. The difference between his/her bid and the amount of the lowest, responsible bid received as a result of rebidding, including all costs related to rebidding.

COMPANY

DATE

SIGNATURE

TITLE

TELEPHONE NUMBER

INVITATION TO BID

SPECIFICATIONS FOR:

BID NO. 11-1-16-5

SALLIE MOOD SOCCER COMPLEX IRRIGATION IMPROVEMENTS

GENERAL INFORMATION:

The general purpose of this solicitation is to obtain a contractor to make improvements to the irrigation system at the Chatham County Soccer Complex located on Sallie Mood Drive. The revision is to have the primary source of irrigation water come from the on-site lake (in the rear of Public Works and Park Services) instead of the City water system. The City's system connections will remain and be used when lake levels are too low to provide for an adequate water supply. The current system supply water to eight (8) soccer fields, as well as other trees and vegetation.

Note: This shall be a "LUMP SUM" price contract.

COMMENCEMENT AND COMPLETION:

WORK SHALL BEGIN WITHIN 10 DAYS AFTER RECEIPT OF "NOTICE TO PROCEED". ALL WORK SHALL BE COMPLETED WITHIN 90 CALENDAR DAYS AFTER THE TEN DAY PERIOD.

BID SHEET

BID NO. 11-1-16-5

**SALLIE MOOD SOCCER COMPLEX
IRRIGATION IMPROVEMENTS**

Item No.	Description	Quantities	Units	Unit Cost	Total Price
1	Mobilization, Bonds, Insurance, Testing	1	LS	\$	\$
2	Sedimentation & erosion Control & Dust Control	1	LS	\$	\$
3	NPDES Permit Requirement	1	LS	\$	\$
4	6" Suction Piping	75	LF	\$	\$
5	8" Force Main	600	LF	\$	\$
6	Canal Crossing	1	EA	\$	\$
7	Irrigation Pump	1	LS	\$	\$
8	Connection to Existing System	1	EA	\$	\$
9	Miscellaneous Concrete	1	LS	\$	\$
10	Fittings	1650	LBS	\$	\$
11	Fence Modifications	1	LS	\$	\$

TOTAL COST \$ _____

BID PRICE TO INCLUDE ALL ASPECTS OF THE WORK. THE COUNTY RESERVES THE RIGHT TO DELETE PROJECT SITES BASED UPON AVAILABLE FUNDING.

NOTE: (ROUND ALL AMOUNTS TO THE NEAREST DOLLAR)

COMPANY NAME

NAME/TITLE

ADDRESS

CITY/STATE/ZIP

PHONE

FAX

LIST OF SUBCONTRACTORS

I do _____, do not _____, propose to subcontract some of the work on this project. I propose to subcontract work to the following subcontractors: **NOTE: MBE/WBE status.**

[illegible]

SIGNED: _____ **CONTRACTOR**

CHECKLIST FOR SUBMITTING BID

Sign below and submit this sheet with Bid

NOTE: All of the following items must be submitted with your Bid to be considered “responsive”.

1. ACKNOWLEDGMENT OF ANY/ALL ADDENDUMS (Page 3 of ITB)
2. **ORIGINAL SURETY BOND** (5% OF BID) ALONG WITH **SURETY REQUIREMENTS SHEET** FILLED OUT (Page 15 of ITB)
3. BID SHEET COMPLETELY FILLED OUT AND SIGNED.
4. **“LIST OF SUBCONTRACTORS”** SHEET FILLED OUT WITH ALL SUBCONTRACTORS AND SUPPLIERS.
5. **“% TO MBE SUBCONTRACTORS/SUPPLIERS”** SHEET COMPLETELY FILLED OUT SHOWING \$ AMOUNT AS WELL AS % OF PROJECT THAT IS PROJECTED TO GO TO M/WBE SUBCONTRACTORS / SUPPLIERS.
6. SECTION 2.28 OF ITB (page 15) **REFERENCES:** Read this section and submit the correct number of “References” (based on total dollar amount of project) Note: Supply ALL the information that is requested for each Reference. NOTE: *Forms for Reference Information are attached to this Bid Package.*
7. **COMPLETE AND SUBMIT ALL ATTACHMENTS TO THE ITB** (Attachments A thru G). *E-2 MUST BE FILLED OUT FOR EACH SUBCONTRACTOR.
8. SUBMIT A COPY OF YOUR **STATE OF GEORGIA CONTRACTORS LICENSE**.

NAME / TITLE

COMPANY

ADDRESS

PHONE / FAX NO'S.

SECTION 02317 TRENCH EXCAVATION AND BACKFILL

PART 1 GENERAL

1.01 SCOPE

- A. The work under this Section consists of furnishing all labor, equipment and materials and performing all operations in connection with the trench excavation and backfill required to install the site utilities, including all pipelines, electrical conduits, and duct banks as shown on the plans and as specified.
- B. Excavation shall include the removal of any tree stumps, brush, debris or other obstacles which remain after the clearing and grubbing operations, which may obstruct the work, and the excavation and removal of all earth, or other materials to the extent necessary to install the pipe and appurtenances in conformance with the lines and grades shown on the plans and as specified.
- C. Backfill shall include the filling and compaction of the trenches and excavations up to the surrounding ground surface or road grade at crossing.
- D. The trench is divided into five specific areas:
 - 1. Foundation: The area beneath the bedding, sometimes also referenced to as trench stabilization.
 - 2. Bedding: The area above the trench bottom (or foundation) and below the bottom of the barrel of the pipe.
 - 3. Haunching: The area above the bottom of the barrel of the pipe up to a specified height above the bottom of the barrel of the pipe.
 - 4. Initial Backfill: The area above the haunching material and below a plane 12-inches above the top of the barrel of the pipe.
 - 5. Final Backfill: The area above a plane 12-inches above the top of the barrel of the pipe.
- E. The Contractor shall select the method and equipment for trench excavation and backfill depending upon the type of material to be excavated and backfilled, the depth of excavation, the amount of space available for operation of equipment, storage of excavated material, proximity of man-made improvements to be protected, available easement or right-of-way and prevailing practice in the area.

1.02 RELATED SECTIONS

- A. Section 02370 - Erosion and Sedimentation Control

1.03 GENERAL

- A. The elevations shown on the Drawings as existing are taken from the best existing data and are intended to give reasonably accurate information about the existing

elevations. They are not precise and the Contractor shall become satisfied as to the exact quantities of excavation and fill required.

- B. Earthwork operations shall be performed in a safe and proper manner with appropriate precautions being taken against all hazards.
- C. All excavated and filled areas for structures, trenches, fills, topsoil areas, embankments, and channels shall be maintained by the Contractor in good condition at all times until final acceptance by the Owner. All damage caused by erosion or other construction operations shall be repaired by the Contractor using material of the same type as the damaged material.
- D. The Contractor shall control grading in a manner to prevent surface water from running into excavations. Obstruction of surface drainage shall be avoided and means shall be provided whereby storm water can be uninterrupted in existing gutters, other surface drains, or temporary drains. Free access must be provided to all fire hydrants and meters.
- E. All earthwork operations shall comply with the requirements of OSHA Construction Standards, Part 1926, Subpart P, Excavations, Trenching, and Shoring, and Subpart O, Motor Vehicles, Mechanized Equipment, and Marine Operations, and shall be conducted in a manner acceptable to the Engineer.
- F. It is understood and agreed that the Contractor has made a thorough investigation of the surface and subsurface conditions of the site and any special construction problems which might arise as a result of nearby watercourses and floodplains. The Contractor shall be responsible for providing all services, labor, equipment, and materials necessary or convenient to the Contractor for completing the work within the time specified in these Contract Documents.
- G. SAFETY

Perform all trench excavation and backfilling activities in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596), as amended. The Contractor shall pay particular attention to the Safety and Health Regulations Part 1926, Subpart P "Excavation, Trenching & Shoring" as described in OSHA publication 2226.

PART 2 PRODUCTS

2.01 SOILS CLASSIFICATIONS

Bedding materials listed here include a number of processed materials plus the soil types defined according to the Unified Soil Classification System (USCS) in ASTM D 2487, Standard Method for Classification of Soils for Engineering Purposes. (See below for description of soil classification). These materials are grouped into five broad categories according to their suitability for this application:

- A. Class I - Angular, 1/4 to 1 1/2 inches (6 to 40 mm) graded stone, including such as coral, slag, cinders, crushed shells and crushed stone. Note - The size range and resulting high voids ratio of Class I material make it suitable for use to dewater trenches during pipe installation. This permeable characteristic dictates that its use be limited to locations where pipe support will not be lost by migration of other embedment materials into the Class I material. When such migration is possible, the material's minimum size range should be reduced to finer than 1/4 inch (6 mm) and the gradation properly designed to limit the size of the voids.
- B. Class II - Coarse sands and gravels with maximum particle size of 1 1/2 inch (40 mm), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW and SP are included in this class. Note - Sands and gravels which are clean or borderline between clean and with fines should be included. Coarse-grained soils with less than 12% but more than 5% fines are neglected in ASTM D2487 and the USCS and should be included. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material may be critical to the pipe support and stability of the foundation and embedment if the material is imported and is not native to the trench excavation. A gradation other than well graded, such as uniformly graded or gap graded, may permit loss of support by migration into void spaces of a finer grained natural material from the trench wall and foundation.
- C. Class III - Fine sand and clayey (clay filled) gravels, including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil Types SM, GC, SM, and SC are included in this class.
- D. Class IV - Silt, silty clays and clays, including inorganic clays and silts of not to high plasticity and liquid limits. Soil Types MH, ML, CH, and CL are included in this class. Note- Caution should be used in the design and selection of the degree and method of compaction for Class IV soils because of the difficulty in properly controlling the moisture content under field conditions. Some Class IV soils with medium to high plasticity and with liquid limits greater than 50% (CH, MH, CH-MH) exhibit reduced strength when wet and should only be used for bedding, haunching and initial backfill in arid locations where the pipe embedment will not be saturated by ground water, rainfall and/or exfiltration from the pipeline system. Class IV soils with low to medium plasticity and with liquid limits lower than 50% (CL, ML, CL-ML) also require careful consideration in design and installation to control moisture content but need not be restricted in use to arid locations.
- E. Class V - This class includes the organic soils OL, OH, and PT as well as soils containing frozen earth, debris, rocks larger than 1 1/2 inch (40 mm) in diameter, and other foreign materials. These materials are not recommended for bedding, haunching or initial backfill.

DESCRIPTION OF EMBEDMENT MATERIAL CLASSIFICATIONS

SOIL CLASS	SOIL TYPE	DESCRIPTION MATERIAL CLASSIFICATION
Class I Soils *	---	Manufactured angular, granular material, 3/4 to 1 1/2 inches (6 to 40 mm) size, including materials having regional significance such as crushed stone, or rock, broken coral, crushed slag, cinders, or crushed shells.
Class II Soil **	GW	Well-graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean..
	GP	Poorly graded gravels and gravel-sand mixtures, little or no fines. 50% or more retained on No. 4 sieve. More than 95% retained on No. 200 sieve. Clean
	SW	Well-graded sands and gravelly sands, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
	SP	Poorly graded sands and gravelly sand, little or no fines. More than 50% passes No. 4 sieve. More than 95% retained on No. 200 sieve. Clean.
Class III Soil ***	GM	Silty gravels, gravel-sand-silt mixtures. 50% or more retained on No. 200 sieve.
	GC	Clayey gravels, gravel-sand-clay mixtures. 50% or more retained on No. 4 sieve. More than 50% retained on No. 200 sieve.
	SM	Silty sands, sand-silt mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.
	SC	Clayey sands, sand-clay mixtures. More than 50% passes No. 4 sieve. More than 50% retained on No. 200 sieve.
Class IV Soils	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.
	CH	Inorganic clays of high plasticity, fat clays. Liquid limit greater than 50%. 50% or more passes No. 200 sieve.

Class V Soils	OL	Organic silts and organic silty clays of low plasticity. Liquid limit 50% or less. 50% or less. 50% or more passes No. 200 sieve.
	OH	Organic clays of medium to high plasticity. Liquid limit 50% or less. 50% or more passes No. 200 sieve.
	PT	Peat, muck and other highly organic soils.
	*	Soils defined as Class I materials are not defined in ASTM D2487.
	**	In accordance with ASTM D2487, less than 5% pass No. 200 sieve.
	***	In accordance with ASTM D2487, more than 12% pass No. 200 sieve. Soils with 5% to 12% pass No. 200 sieve fall in borderline classification, e.g. GP-GC.

2.02 PIPE BEDDING CLASSES

- A. Class A Bedding shall consist of a continuous concrete cradle as determined by the Engineer.
- B. Class B Bedding: The pipe shall be bedded with No. 57 stone bedding material placed on the trench foundation. The bedding shall have a minimum thickness beneath the pipe of 4 inches or one-eighth of the outside diameter of the pipe, whichever is greater, and shall extend up the side to the springline. Initial backfill from the pipe horizontal centerline to a level not less than 12 inches above the top of the pipe and shall be bedding material or carefully placed native soil, compacted to 90% of Standard Proctor Density. The final backfill of the soil to ground surface shall be compacted to the specified density.
- C. Class C Bedding: The pipe shall be bedded in No. 57 stone bedding material placed on the trench foundation. The bedding shall have a minimum thickness beneath the pipe of 4 inches or one-eighth of the outside diameter of the pipe, whichever is greater, and shall extend up the sides of the pipe one-sixth the outside diameter of the pipe. Initial backfill between the top of haunching and a point 12 inches above the top of pipe shall be compacted to 90% of Standard Proctor Density. The final backfill of the soil to ground surface shall be compacted to the specified density.
- D. Class D Bedding is when the trench is excavated to grade and the bell holes are dug, and the pipe bears uniformly upon the trench foundation. Soil is tamped to 90% of Standard Proctor Density around the pipe and to a point 12 inches above the pipe. The final backfill of the soil to ground surface shall be compacted to the specified density.
- E. Crushed stone utilized for bedding and haunching shall meet the requirements of the Georgia Department of Transportation Specification 800.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite or gneiss). Stone size shall be between No. 57 and No. 4, inclusive.

2.03 TRENCH FOUNDATION MATERIALS

When unsuitable material is encountered and extends more than 6 inches below the pipe. Crushed stone shall be utilized for trench foundation (trench stabilization) and shall meet the requirements of the Georgia Department of Transportation Specification 800.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite or gneiss). Stone size shall be between No. 57 and No. 4, inclusive or Class I material.

2.04 FILTER FABRIC

- A. Filter fabric associated with bedding shall be a UV stabilized, spunbonded, continuous filament, needle punched, polypropylene, nonwoven geotextile.
- B. The fabric shall have an equivalent open size (EOS or AOS) of 120 - 70. The fabric shall also conform to the minimum property values listed in the following table:

Fabric Property	Unit	Test Procedure	Average Value	
			Typical	Minimum
Weight	oz/yd ²	ASTM D 3776	8.3	
Thickness	mils	ASTM D 1777	105	
Grab Strength	lbs.	ASTM D 4632	240	210
Grab Elongation	%	ASTM D 4632	>50	50
Tear Strength	lbs.	ASTM D 4533	100	85
Mullen Burst	psi	ASTM D 3786	350	320
Puncture Resistance	lbs.	ASTM D 4833	115	100
Permittivity	sec ⁻¹	ASTM D 4491	1.7	
Water Permeability	cm/sec	ASTM D 4491	0.4	
Water Flow Rate	gpm/ft ²	ASTM D 4491	120	

UV Resistance (500 hrs)	%	ASTM D 4355	>85	
PH			2 – 13	

- C. If ordered by the Engineer, the filter fabric manufacturer shall furnish the services of a competent factory representative to supervise and/or inspect the installation of pipe. This service will be furnished for a minimum of 10 days during initial pipe installation.
- D. Filter fabric shall be Polyfelt TS 700, Trevira 1125 or SuPac 7-MP.

2.05 BEDDING AND HAUNCHING MATERIALS

- A. Crushed stone utilized for bedding and hunching shall meet the requirements of the Georgia Department of Transportation Specification 800.01, Group I (limestone, marble or dolomite) or Group II (quartzite, granite or gneiss). Stone size shall be between No. 57 and No. 4, inclusive.
- B. Earth materials shall be suitable materials selected from the trench excavation. Suitable materials shall be clean and free of rock larger than 2-inches at its largest dimension, organics, cinders, stumps, limbs, frozen earth or mud, man-made wastes and other unsuitable materials. Should the material excavated from the trench be saturated, the saturated material may be used as earth material, provided it is allowed to dry properly and it is capable of meeting the specified compaction requirements. When necessary, earth bedding and haunching materials shall be moistened to facilitate compaction by tamping.

2.06 INITIAL BACKFILL

- A. Initial backfill material shall be earth materials or crushed stone as specified for bedding and haunching materials. Soil shall be tamped to 90% of Standard Proctor Density (ASTM D698).
- B. Earth materials utilized for initial backfill shall be suitable materials selected from materials excavated from the trench. Suitable materials shall be clean and free of rock larger than 2-inches at its largest dimension, organics, cinders, stumps, limbs, frozen earth or mud, man-made wastes and other unsuitable materials. Should the material excavated from the trench be saturated, the saturated material may be used as earth material, provided it is allowed to dry properly and it is capable of meeting the specified compaction requirements. When necessary, initial backfill materials shall be moistened to facilitate compaction by tamping. If materials excavated from the trench are not suitable for use as initial backfill material, provide select material conforming to the requirements of this Section.

2.07 FINAL BACKFILL

- A. Final backfill material shall be general excavated earth materials, shall not contain rock larger than 2-inches at its greatest diameter, cinders, stumps, limbs, man-made wastes and other unsuitable materials. If materials excavated from the trench are not suitable for use as final backfill material, provide select material conforming to the requirements of this Section.
- B. In areas not used for streets or driveways, carefully refill in layers not exceeding 8 inches in thickness and thoroughly tamp with hand tamps to one foot above the top of the pipe. Finish filling by machine without tamping. As trench settles, bring back to grade by adding more material. Maintain trenches in safe condition at all times. Restore all special grassing and shrubbery, fences, etc., to original condition. The remaining backfill shall be thoroughly compacted in 8 inch layers to at least 95% (percent) of the Standard Proctor Density (ASTM D698).
- C. In streets, roadways and driveways, carefully refill in layers not exceeding 8 inches in thickness and thoroughly tamp with hand tamps to one foot above the top of the pipe. The remaining backfill shall be thoroughly compacted in 8 inch layers to at least 98% (percent) of the Standard Proctor Density (ASTM D698).
- D. Backfilling and tamping work in state highway right-of-ways and streets under jurisdiction of the State Highway Department will be in accordance with the State of Georgia Department of Transportation "Policy and Procedure for Accommodation of Utilities".

2.08 CONCRETE

Concrete for bedding, haunching, initial backfill or encasement shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5-inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.

2.09 FLOWABLE FILL

Flowable fill, where required for trench backfill, shall meet the requirements of Georgia Department of Transportation Standard Specifications, Section 600 for Excavatable or Non-Excavatable type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Locate, identify, and protect utilities that remain and protect from damage. The contractor is required to contact the Utilities Protection Center, Inc. in the State of Georgia call 1-800-282-7411 prior to any excavation or construction. Additional information is available at www.gaupc.com.

- C. Notify utility company to remove and relocate utilities.

3.02 TRENCH EXCAVATION

- A. Notify of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches O.D of pipe plus two feet minimum or O.D. of pipe plus four feet maximum wide enough to allow installation and inspection of utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove large stones and other hard matter which could damage piping or impede consistent backfilling or compaction.
- G. Remove excavated material that is unsuitable for re-use from site.
- H. Remove excess excavated material from site.
- I. In areas not used for streets and in unpaved streets, maximum trench width shall be the pipe diameter plus 24 inches. Protect all trees, shrubs and structures. Protect all fences and replace those damaged/removed with like kind. Keep work and equipment within easement limits. Repair and replace any damage.
- J. Paved streets shall have a maximum trench width of pipe diameter plus 24 inches. Shore and brace trench walls as necessary to prevent damage to existing paving. Do not cut existing sidewalk, or curb and gutter without approval by the Engineer. Use rubber tired equipment only on streets. Repair and replace all damage. Saw cut all pavements for smooth edge on replacement.

3.03 DEWATERING REQUIREMENT

- A. The Contractor may use any dewatering method he deems feasible so long as it results in working in the dry and stable soil conditions.
- B. The Contractor shall conform and meet all conditions, obtain necessary permits and requirements of the regulatory agencies that have jurisdiction.
- C. It is the intent of these specifications that an adequate dewatering system be installed to lower and control the groundwater in order to permit excavation, construction, grading and the placement of fill materials, all to be performed under dry conditions. The dewatering system shall be adequate to pre-drain the water-bearing strata above and below the bottom of the excavation.

- D. The Contractor shall be solely responsible for the arrangement, location and depths of dewatering system necessary to accomplish the work described under this section of the specifications. The dewatering shall be accomplished in a manner that will reduce the hydrostatic head below any excavation to the extent that the water level in the construction area are a minimum of two (2) feet below the prevailing excavation surface and any surface to be compacted; will prevent the loss of fines, seepage, boils, quick conditions, or softening of the foundation strata; will maintain stability of the sides and bottom of the excavation; and will result in all construction operations being performed in the dry.
- E. The Contractor shall promptly dispose of all water removed from the excavations in such a manner as will not endanger public health, damage public or private property, or affect adversely any portion of the work under construction or completed by him or any other Contractor. Contractor shall obtain written permission from the Owner for any property involved before digging ditches or constructing water courses for the removal of water.
- F. The disposal of water from the dewatering system shall meet the requirements of all regulatory agencies having jurisdiction.
- G. If the dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system, then loosening of the foundation strata, or instability of the slopes, or damage to the foundations or structures may occur. The supply of all labor and materials, and the performance of all work necessary to carry out additional work for reinstatement of the structures of foundation soil resulting from such inadequacy or failure shall be undertaken by the Contractor subject to the approval of the Engineer, and at no additional expense to the Owner.

3.04 SHEETING, BRACING AND SHORING

- A. Trench Shield: A trench shield or box may be used to support the trench walls. The use of a trench shield does not necessarily preclude the additional use of bracing and sheeting. When trench shields are used, care must be taken to avoid disturbing the alignment and grade of the pipe or disrupting the haunching of the pipe as the shield is moved. When the bottom of the trench shield extends below the top of the pipe, the trench shield will be raised in 6-inch increments with specified backfilling occurring simultaneously. At no time shall the trench shield be "dragged" with the bottom of the shield extending below the top of the pipe or utility.
- B. Remove bracing and sheeting in units when backfill reaches the point necessary to protect the utility and adjacent property. Leave sheeting in place when in the opinion of the Engineer it cannot be safely removed or is within three feet of an existing structure, utility, or pipeline. Cut off any sheeting left in place at least two feet below the surface.
- C. Sheet piling within three feet of an existing structure or utility shall remain in place, unless otherwise directed by the Engineer.

3.06 TRENCH FOUNDATION AND STABILIZATION

- A. The bottom of the trench shall provide a foundation to support the utility and its specified bedding. The trench bottom shall be graded to support the utility and bedding uniformly throughout its length and width.
- B. If, after dewatering as specified above, the trench bottom is spongy, or if the trench bottom does not provide firm, stable footing and the material at the bottom of the trench will still not adequately support the utility, the trench will be determined to be unsuitable.
- C. If in the opinion of the Engineer the undisturbed material at the trench bottom constitutes an unstable pipe foundation, then the Contractor shall replace such unstable materials with crushed stone.
- D. If the crushed stone does not provide adequate foundation, then the trench shall be excavated to a depth of at least two feet below the specified trench bottom. The over excavation shall be filled with No. 4 foundation stone to the bottom of the bedding stone or the over excavation shall be lined with filter fabric, with the fabric being supported along the sides of the trench to a point above the top of the utility. The trench shall then be filled with No. 57 foundation stone to the top of the pipe and the filter fabric shall be overlapped above the pipe and stone.

3.07 BEDDING AND HAUNCHING

- A. Prior to placement of bedding material, the trench bottom shall be free of any water, loose rocks, boulders or large dirt clods.
- B. Bedding material shall be placed to provide uniform support along the bottom of the pipe and to maintain the pipe at the proper elevation. The initial layer of bedding placed to receive the pipe shall be brought to the grade and dimensions indicated on the Drawings. All bedding shall extend the full width of the trench bottom. The pipe shall be placed and brought to grade by tamping the bedding material or by removal of the excess amount of the bedding material under the pipe. Adjustment to grade line shall be made by scraping away or filling with bedding material. Wedging or blocking up of pipe shall not be permitted. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted. Each pipe section shall have a uniform bearing on the bedding for the length of the pipe, except at joints.
- C. At each joint, excavate bell holes of ample depth and width to permit the joint to be assembled properly and to relieve the pipe bell of any load.
- D. After the pipe section is properly placed, add the haunching material to the specified depth. The haunching material shall be shovel sliced, tamped, vigorously chinked or otherwise consolidated to provide uniform support for the pipe barrel and to fill completely the voids under the pipe, including the bell hole. Prior to placement of

the haunching material, the bedding shall be clean and free of any water, loose rocks, boulders or dirt clods.

- E. Gravity Pipelines and Accessories: Lay PVC (plastic pipe) gravity sewer pipe with minimum Class B bedding. Lay all other gravity sewer pipelines with Class C bedding, unless shown or specified otherwise. All trenches under paving, concrete, etc. shall be placed in Class B bedding only.
- F. Manholes: Excavate to a minimum of 8-inches below the planned elevation of the base of the manhole. Place and compact crushed stone bedding material to the required grade before constructing the manhole.
- G. Pressure Mains

Bedding and haunching for pressure pipe shall be with Class II or III soils compacted to 90% of standard proctor density. All trenches under paving, concrete, etc. shall be placed in Class B bedding only.
- H. Excessive Width and Depth
 - 1. If the trench is excavated in excess of the pipe diameter plus two feet, provide the next higher bedding type.
 - 2. If the trench is excavated to excessive depth, provide foundation stone to the bottom of the bedding material.
- J. Compaction: Bedding and haunching materials under pipe, manholes and accessories shall be compacted to a minimum of 95 percent of the maximum dry density, unless shown or specified otherwise.

3.08 CONCRETE ENCASEMENT FOR PIPELINES

Where concrete encasement is shown on the Drawings for pipelines not under structures, excavate the trench to provide a minimum of 6-inches clearance from the bell of the pipe. Lay the pipe to line and grade on concrete blocks. In lieu of bedding, haunching and initial backfill, place concrete to the full width of the trench and to a height of not less than 6-inches above the pipe bell. Do not backfill the trench for a period of at least 24 hours after concrete is placed.

3.09 CONCRETE ENCASEMENT FOR ELECTRICAL DUCT BANKS

- A. Install top of duct bank minimum 18-inches below finished grade with plastic warning tape 12-inches below finished grade.
- B. Terminate conduit in end bell at manhole entries.
- C. Stagger conduit joints in concrete encasement 6-inches minimum.

- D. Provide minimum 3-inch concrete cover at bottom, top, and sides of duct bank. Use suitable separators and chairs installed not greater than four feet on center to provide conduit spacing as indicated. Securely anchor conduit to prevent movement during concrete placement.
- E. Where duct bank passes beneath footings or slabs, excavate to provide a minimum of 6-inches clearance between the conduits and the structure. Backfill to the base of the structure with concrete.

3.10 INITIAL BACKFILL

- A. Fill up to subgrade elevations unless otherwise indicated.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- G. Correct areas that are over-excavated.
 - 1. Thrust bearing surfaces: Fill with concrete.
 - 2. Other areas: Use general fill, flush to required elevation, compacted to minimum 98 percent of standard proctor dry density.
- H. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving, slabs-on-grade, and similar construction: 90 percent of standard proctor density.
 - 2. At other locations: 90 percent of standard proctor density.

3.11 FINAL BACKFILL

- A. Backfill to contours and elevations indicated using suitable materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction

density.

- E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Compaction Density Unless Otherwise Specified or Indicated:
 - 1. Under paving, slabs-on-grade, and similar construction: 98 percent of standard proctor density.
 - 2. At other locations: 95 percent of standard proctor density.
- I. Reshape and re-compact fills subjected to vehicular traffic.

3.12 TOLERANCES

- A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.
- B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.13 CLEAN-UP

- A. Leave unused materials in a neat, compact stockpile.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 02370 EROSION AND SEDIMENTATION CONTROL

PART 1 – GENERAL

1.01 SCOPE

- A. This section covers the control measures required but not limited to during construction until final acceptance to control water run-off, erosion, sedimentation, and unreasonable amounts of dust. Measures to adequately control erosion and siltation throughout project construction are required whether or not they are shown on the plans. This control shall be accomplished through the use of berms, dikes, sediment basins and barriers, slope drains, grassing, and other devices as outlined in the Georgia Erosion and Sedimentation Control Act of 1975 and any additional federal or local ordinances. All erosion and control measures shall be designed for a 25 year storm event and installed according to the Manual for Erosion and Sediment Control in Georgia (1975 and as amended in the latest edition) and/or The Department of Transportation, State of Georgia, Standard Specifications Construction of Roads and Bridges Latest Edition. Also, Storm Water Discharge(s) will be in strict compliance with State of Georgia Department of Natural Resources Environmental Protection Division General Permit No. GAR 100001, 100002, OR 100003 (as applicable).
- B. The section also specifies the subsequent removal of temporary erosion and sedimentation controls.
- C. Grassing in accordance with this Specification is considered a temporary measure to prevent soil erosion until the permanent grassing can be established. See Section 02920 Lawns and Grassing for permanent grassing requirements.
- D. Land disturbance activity shall not commence until the Commercial Development Permit/Land Disturbance Permit has been issued.
- E. The LDP/Land disturbance permit shall be obtained and paid for by the Owner.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200 – Site Preparation.
- B. Section 02920 - Lawns and Grassing.

1.03 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of these Specifications as if incorporated herein, except as modified herein to the extent referenced. Referenced standards and recommended practices shall be the latest versions of any such documents. The contractor shall be responsible for complying with requirements of these regulations.

- B. Environmental Protection Agency (EPA) Regulations:
1. 40 CFR 112 Oil Pollution Prevention
 2. 40 CFR 116 Designation of Hazardous Substances
 3. 40 CFR 122 EPA Administered Permit Programs: The National Pollutant Discharge Elimination System (NPDES)
 4. 40 CFR 136 The National Pollutant Discharge Elimination System (NPDES)
 5. 40 CFR 257 Criteria for Classification of Solid Waste Disposal Facilities and Practices
 6. 40 CFR 258 Criteria for Municipal Solid Waste Landfills (Effective 10-9-93)
 7. 40 CFR 261 Identification and Listing of Hazardous Waste
 8. EPA 833-B-92-001 "NPDES Storm Water Sampling Guidance Document"
- C. Georgia Environmental Protection Division (EPD) Rules:
1. Chapter 391-3-4 Solid Waste Management Rules

1.04 QUALITY ASSURANCE

- A. The temporary and permanent erosion and sedimentation control measures shown on the Drawings are minimum requirements. Any additional erosion and sedimentation control measures required by the Contractor's means, methods, techniques and sequence of operation will be installed by the Contractor at the unit price bid indicated on the Bid Schedule.
- B. **The Contractor shall be required to meet the requirements of the National Pollution Discharge Elimination System (NPDES) GAR 100001, 100002, or 100003 (as applicable).** The Contractor will be required to follow all BMPs (Best Management Practices) as shown on the Erosion, Sedimentation and Pollution Control Plan and shall inspect, monitor and maintain those BMPs as required by the above permit. The Contractor will be required to notify the storm water sampling subcontractor whenever there is a storm occurrence and to make required reports to EPD General Permit.
- C. Basic Principles
1. Coordinate the land disturbance activities to fit the topography, soil types and conditions.
 2. Minimize the disturbed area and the duration of exposure to erosive elements.
 3. Provide temporary or permanent stabilization to disturbed areas immediately after rough grading is complete.
 4. Safely convey run-off from the site to a stable outlet to prevent flooding and damage to downstream facilities resulting from increased runoff from the site.
 5. Retain sediment on-site that was generated on-site.
 6. Minimize encroachment upon watercourses.

D. Implementation:

1. The Contractor is solely responsible for the control of erosion within the Project site and the prevention of sedimentation from leaving the Project site or entering waterways.
2. The Contractor shall install temporary and permanent erosion and sedimentation controls, which will ensure that runoff from the disturbed area of the Project site, shall pass through a filter system before exiting the Project site.
3. The Contractor shall provide temporary and permanent erosion and sedimentation control measures to prevent silt and sediment from entering the waterways.
4. The Contractor shall limit land disturbance activity to those areas shown on the Drawings.
5. The Contractor shall maintain erosion and sedimentation control measures within disturbed areas on the entire site at no additional cost to the Owner until the acceptance of the Project. Maintenance shall include mulching, re-seeding, re-sodding, clean-out of sediment barriers and sediment ponds, replacement of washed-out or undermined rip rap and erosion control materials, to the satisfaction of the Engineer.
6. All fines imposed for improper erosion and sedimentation control shall be paid by the Contractor.

PART 2 – PRODUCTS

2.01 BEST MANAGEMENT PRACTICES

The vegetative measures and structural practices shall be in accordance with chapter six of the "Manual for Erosion and Sediment Control in Georgia" as currently amended.

2.02 NPDES STORMWATER SAMPLING

Please refer to Part IV.D.5 of the specifications for NPDES Permit No. GAR 100001, 100002 or 100003 (as Applicable). Also, refer to the Erosion, Sediment and Pollution Control Narrative and Comprehensive Monitoring Program general notes on the construction plans. Monitoring locations are shown on the plans and shall be sampled with the following Automatic Sampler.

The Global Water Stormwater Sampler, SS505 or approved equal, is designed specifically to meet federal and state storm water sampling requirements. The Global Stormwater Sampler shall consist of a rugged, rainproof lockable carrying enclosure. Inside the enclosure shall be a 1.0 liter polyethylene sample bottle, a peristaltic sampling pump, a logic timer/controller, and a rechargeable 5 Ah gel cell battery. Electronic circuits shall be fully encapsulated in epoxy eliminating failure due to moisture. The sampler shall include an auto-drain rain gauge, sampler pickup hose and a battery charger.

PART 3 EXECUTION

3.01 GENERAL

REV. 10/15/09

Sallie Mood Soccer Complex - Irrigation Improvements

V0080902

02370-3

Erosion and Sedimentation Control

- A. All erosion and sedimentation control devices and structures shall be inspected by the Contractor at least once a week and immediately after each rainfall occurrence. Any device or structure found to be damaged will be repaired or replaced by the end of the day.
- B. All erosion and sedimentation control measures and devices shall be constructed and maintained as indicated on the Drawings or specified herein until adequate permanent disturbed area stabilization has been provided and accepted by the Engineer. Once adequate permanent stabilization has been provided and accepted by the Engineer, all temporary erosion and sedimentation control structures and devices shall be removed.

3.02 INSTALLATION

A. Construction Exit

- 1. Construction exit(s) shall be placed as shown on the Drawings and as directed by the Engineer. A construction exit shall be located at any point traffic will be leaving a disturbed area to a road, driveway, sidewalk or parking area.
- 2. Placement of Construction Exit Material: The ground surface upon which the construction exit material is to be placed shall be prepared to a smooth condition free from obstructions, depressions or debris. The plastic filter fabric shall be placed to provide a minimum number of overlaps and a minimum width of one foot of overlap at each joint. The stone shall be placed with its top elevation conforming to the surrounding roadway elevations. The stone shall be dropped no more than three feet during construction.
- 3. Construction Exit Maintenance: The Contractor shall regularly maintain the exit with the top dressing of stone to prevent tracking or flow of soil onto public rights-of-way and paved surfaces as directed by the Engineer.
- 4. Construction Exit Removal: Construction exit(s) shall be removed and properly disposed of offsite when the disturbed area has been properly stabilized, the tracking or flow of soil onto public rights-of-way or paved surfaces has ceased and as directed by the Engineer.

B. Sediment Barriers

- 1. Sediment barriers shall include, but are not necessarily limited to, silt fences, hay bales, rock check dams, inlet sediment traps or any other device which prevents sediment from exiting the disturbed area.
- 2. Silt fences, hay bales and rock check dams shall not be used in any flowing stream, creek or river.
- 3. Sediment barriers shall be installed as shown on the Drawings and as required by the Contractor's construction sequence and methods.
- 4. Sediment barriers shall be maintained to ensure the depth of impounded sediment is no more than one-half of the original height of the barrier. Torn, damaged, destroyed or washed-out barriers shall be repaired, reinforced or replaced with new material.

5. Sediment Barrier Removal

- a. Sediment barrier shall be removed once the disturbed area has been stabilized with a permanent vegetative cover and the sediment barrier is no longer required.
- b. Accumulated sediment shall be removed from the barrier and spread over excess soil disposal area.
- c. All non-biodegradable parts of the barrier shall be disposed of properly. Used bales may be spread evenly across the disposal area as a mulching material.
- d. The disturbed area created by barrier removal shall be permanently stabilized.

C. Temporary Sediment Basins and Water Quality Ponds

1. Pond maintenance shall follow the following outline.

- a. Initial Cleaning.
Clean all ponds of accumulated silt to low level elevation shown on drawings. Initial cleaning shall be accomplished within 90 days of the Notice to Proceed.
- b. Intermediate Cleanings.
Whenever silt accumulation reaches the maximum level shown on drawings, silt shall be removed to the low level as shown in the drawings. Intermediate cleanings shall be done as often as necessary to keep silt accumulation below the maximum level.
- c. Final Cleaning.
After all utility work, final grading, sidewalks and roads, and soil stabilization is complete, the Contractor shall clean the ponds of accumulated silt to their low level.
- d. After final cleaning of ponds, the slopes and bottoms shall be seeded for a permanent grass establishment. The contractor shall schedule the cleaning to coincide with the proper planting season for the permanent grass.

D. Rip Rap

1. Rip rap shall be placed as shown on the Drawings and as directed by the Engineer. Rip rap shall be placed at all points where natural vegetation is disturbed on the banks of streams or drainage ditches. Compact backfill and place rip rap to prevent subsequent settlement and erosion. This requirement applies equally to construction along side a stream or drainage ditch as well as crossing a stream or drainage ditch.
2. When trenching across a stream or drainage ditch, rip rap to be placed shall be brought to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers. Unless at creek banks or otherwise shown or specified, rip rap shall begin in a toe ditch constructed in original ground, and the side next to the fill or cut shall have that same slope. After the rip rap

is placed, the toe ditch shall be backfilled and the excess dirt hauled off of the site and disposed of properly.

E. Filter Fabric

1. Plastic filter fabric shall be placed under all rip rap unless shown or specified otherwise.
2. Filter fabric shall not be placed under rip rap on stream or drainage ditch crossings.
3. The surface to receive filter fabric shall be prepared to a smooth condition free from obstructions, depressions and debris. The filter fabric shall be installed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The fabric shall be placed to provide a minimum width of one foot of overlap at each joint. The fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3-inches of the centerline of the overlap. The fabric shall be placed loosely to avoid stretching and tearing during the placement of the stone. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals or other contaminants. Contaminated fabric or fabric damaged during installation or during placement or rip rap shall be removed and replaced with uncontaminated and undamaged fabric at no additional cost to the Owner.

F. Temporary Stream Crossing

Construction operations in rivers, streams, and impoundments shall be restricted to those areas, which must be entered for the construction of temporary or permanent structures. As soon as conditions permit, rivers, streams, and impoundments shall be promptly cleared of all false work, piling which are to be removed, debris, and other obstructions placed therein or caused by the construction operations. Frequent fording of live streams with construction equipment will not be permitted; therefore, temporary bridges or other structures shall be used whenever an appreciable number of stream crossings are necessary. Mechanized equipment shall not be operated in live streams except as may be required to construct channel changes and temporary or permanent structures, and to remove temporary structures.

3.03 INSTALLATION (VEGETATIVE MEASURES)

A. Mulching

Temporary mulching or grassing may be required by the Engineer where construction or conditions prohibit completion in a continuous manner and surface erosion is probable. See Section 02920 - Lawns and Grassing and Section 02921 - Sodding for additional requirements.

B. Grassing

1. Seed rate, fertilization and other requirements shall be provided as shown on

- the Drawings.
2. Temporary stabilization: Temporary stabilization shall be provided as shown on the Drawings and conforming to these specifications to control erosion on the site. Temporary stabilization shall be provided to any area which will not receive permanent stabilization within the next 14 calendar days. Partial payment requests may be withheld for those portions of the Project not complying with this requirement.
 3. Permanent Stabilization
 - a. Permanent stabilization shall be provided as shown on the Drawings and conforming to specification Sections 02920 and 02921 to control erosion on the site. Permanent stabilization shall be provided to all areas of land disturbance within seven calendar days of the completion of land disturbance for any area greater than 0.25 acre. Partial payment requests may be withheld for those portions of the Project not complying with requirement.
 - b. Where permanent stabilization cannot be immediately established because of an inappropriate season, the Contractor shall provide temporary stabilization. The Contractor shall return to the site at the appropriate season to provide permanent stabilization in areas that received only temporary stabilization.

C. Matting and Blankets

Matting and Blankets (Mb) shall be installed on all slopes four horizontal to one vertical and steeper. The Mb shall be installed immediately after slope is final graded and seeding is complete. The matting shall be secured with staples one per square yard.

3.04 FIELD QUALITY CONTROL

All erosion and sedimentation control devices and structures shall be inspected by the Contractor at least once a week and immediately prior to each rainfall occurrence. Any device or structure found to be damaged will be repaired or replaced by the end of the day. Sediment ponds shall be cleaned out prior to the silt reaching the height or elevation shown on the Drawings.

3.05 CLEAN-UP

- A. Dispose of all excess erosion and sedimentation control materials in a manner satisfactory to the Engineer.
- B. Final clean-up shall be performed in accordance with the requirements of these Specifications.

END OF SECTION

SECTION 02670 IRRIGATION MAIN

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 SCOPE:

- A. Furnish all labor, equipment, materials for the construction of all irrigation main(s) shown on the drawings, including pipe, bends, connections, valves, and all other appurtenances specified and/or required.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 02317 - Trench Excavation and Backfill
- B. Section 03300 - Concrete

1.04 QUALITY ASSURANCE:

A. REFERENCES:

This section contains references to the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ASTM A536-93	Ductile Iron Castings
ASTM D698-91	Laboratory Compaction Characteristics of Soil Using Standard Effort
ASTM D1784-92	Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D2241-94	Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR)
ASTM D2412-93	Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel Plate Loading

ASTM D3261-93	Butt heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM D3350-96	Polyethylene Plastics Pipe and Fitting Materials
ASTM F714-94	Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
ASTM F1055-95	Electrofusion Type Polyethylene Fittings For Outside Diameter Controlled Polyethylene Pipe and Tubing
AWWA C110-87	Ductile-Iron and Gray-Iron Fittings, 3 Inch through 48 Inch, for Water and Other Liquids
AWWA C111-85	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
AWWA C151-91	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids
AWWA C600-87	Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C605-94	Underground Installation of Poly Vinyl Chloride (PVC) Pressure Pipe and Fittings for Water
AWWA C900-89	Polyvinyl Chloride (PVC) Pressure Pipe, 4 Inches through 12 Inches, for Water
AWWA C905-88	Polyvinyl Chloride (PVC) Water Transmission Pipe, 14 Inches through 36 Inches
AWWA C906-99	Polyethylene (PE) Pressure Pipe and Fittings, 4 In. Through 63 In. for Water Distribution and Transmission

1.05 SUBMITTALS:

Complete product data and engineering data, including shop drawings, shall be submitted to the Engineer in accordance with the requirements of Section 01800 of the Contract Documents.

1.06 TRANSPORTATION AND HANDLING:

- A. Unloading: Furnish equipment and facilities for unloading, handling, distributing and storing pipe, fittings and accessories. Make equipment available at all times for use in unloading. Do not drop or dump materials. Any materials dropped or dumped will be subject to rejection without additional justification. Pipe handled on skids shall not be rolled or skidded against

the pipe on the ground.

- B. Handling: Handle pipe, fittings, valves and accessories carefully to prevent shock or damage. Handle pipe by rolling on skids, forklift, or front end loader. Do not use material damaged in handling. Slings, hooks or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior coatings or internal lining of the pipe. Do not use chains in handling pipe, fittings and appurtenances.

1.07 STORAGE AND PROTECTION:

- A. Store all pipe which cannot be distributed along the route. Make arrangements for the use of suitable storage areas.
- B. Stored materials shall be kept safe from damage. The interior of all pipe, fittings and other appurtenances shall be kept free from dirt or foreign matter at all times. Valves shall be drained and stored in a manner that will protect them from damage by freezing.
- C. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tier shall be kept off the ground on timbers, rails or concrete. Pipe in tiers shall be alternated: bell, plain end; bell, plain end. At least two rows of timbers shall be placed between tiers and chocks, affixed to each other in order to prevent movement. The timbers shall be large enough to prevent contact between the pipe in adjacent tiers.
- D. Stored mechanical and push-on joint gaskets shall be placed in a cool location out of direct sunlight. Gaskets shall not come in contact with petroleum products. Gaskets shall be used on a first-in, first-out basis.
- E. Mechanical-joint bolts shall be handled and stored in such a manner that will ensure proper use with respect to types and sizes.

PART 2 – PRODUCTS

2.01 IRRIGATION MAIN:

Provide pipes of one of the following materials, of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated. The Design Working Pressure for the Irrigation Main is 120 PSIG. All irrigation pipe shall have a cast iron outside dimension (CIOD). Gasket materials shall meet the requirements of ASTM D3139. Pipe shall be supplied in standard nominal lengths of 20 feet. All irrigation pipe shall be color-coded using sunlight stable pigment Pantone Purple 522.

- A. Polyvinyl Chloride Pipe (PVC):

PVC Pressure pipe shall conform to ASTM D2241, latest designation, be extruded from a compound which conforms to ASTM D1784, latest designation, Type I, Grade I (12454 A

or 12454 B) and have the color purple throughout.

1. Each joint of pipe shall be marked with the manufacturer's name, nominal size, type of plastic and pressure rating. Pipe shall have "ring-tite" joints and gaskets. Contractor shall furnish manufacturer's affidavit certifying that the pipe meets ASTM D1784 and ASTM D2241, latest designation, standards.
 - a. For pipes with outside diameters of 4-inches through 12-inches, AWWA C900 DR18 with a pressure class of 150 psi or AWWA C909 CIOD with a pressure class of 150 psi will be acceptable. Each length of pipe must be hydro-tested at 4 times the rated-class pressure.
 - b. For pipes with outside diameters of 14-inches and greater, AWWA C905 DR25 with a pressure rating of 165 psi or AWWA C909 CIOD with a pressure rating of 165 psi will be accepted. Each length of pipe must be hydro-tested at twice the pressure rating.

B. Ductile Iron Pipe:

1. Ductile Iron Pipe – DIP shall be pressure class 350 for 4" thru 12", and class 250 for 14" thru 24". The pipe shall be coated on the interior with cement mortar lining complying with AWWA C104. Ductile Iron Pipe designed and manufactured in accordance with ANSI A21.51 centrifugally cast in metal or sand lined molds. Exterior surface shall be seal coated with 1 mil thick approved asphaltic coating in accordance with ANSI/AWWA C151/A21.51. Ductile iron pipe conveying irrigation water must be marked with purple paint compatible with asphaltic coating. Upon installation, the top one-third of the pipe should be coated and allowed to dry before backfilling.

C. High Density Polyethylene Pipe:

High density polyethylene pipe in sizes 4" and above shall be joined by means of zero leak-rate heat-fusion, and approved mechanical joints, meeting the specifications and requirements of American Water Works Association Standard C906 and ASTM F714.

The polyethylene pipe and fittings shall be made from virgin resins exhibiting a cell classification of PE 345464C for black and a cell classification of PE 345464E for stripes per ASTM D3350; and shall be Listed in the name of the pipe and fitting Manufacturer in PPI (Plastics Pipe Institute) TR-4, *Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds*, with a standard grade HDB rating of 1600 psi at 73°F.

The wall thickness shall follow the Dimension Ration (DR) system prescribed in AWWA C906. Laying lengths are 40 ft standard. The pipe is to be joined by heat fusion, flanges or other mechanical joint systems proven for HDPE pipes. The longitudinal color stripe

pattern shall have three equally spaced pairs of **PURPLE** color stripes extruded into the pipe OD. The pipe shall be Driscopipe Prisma 4000 or approved equal.

2.02 JOINTS AND GASKETS:

A. Push-On Joints:

1. DIP Push-on joints shall conform to AWWA C111/ANSI A21.11 (latest revision) - Rubber Gasket Joints for Cast Iron Pressure Pipe and Fittings. Details of the joint design shall be in accordance with the manufacturer's standard practice such as "Fastite", "Bell-Tite," "Tyton," or equal joints. Gasket material shall be standard styrene butadiene copolymer (SBR).

Whenever the pipe is cut in the field, the cut end shall be conditioned so it can be used in making up a joint by filing or grinding the cut end to remove burrs or sharp edges that might damage the gasket.

2. PVC Push-on joints shall be an elastomeric gasketed joint. Insertion and lubrication of the elastomeric gasket in the annular groove must be as recommended by the manufacturer.

B. Restrained Joints:

Restrained joints for DIP shall be obtained by the installation of "Field Lok", "TR Flex", "Fast-Grip", "Flex-Ring", MEGALUG by EBAA Iron, Inc. or approved equal. These restraint glands shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1.

Tyton Joint Pipe with "Field Lok Gaskets", Fastite Pipe with "Fast-Grip Gaskets" or DIP or PVC Pipe with EBAA Iron, Inc. pipe restraints or approved equal.

All underground creek crossings and jack and bores with steel casing shall use "Field Lok" or "Fast-Grip" restrained joints.

C. Flexible Joints:

Flexible joints shall be American Pipe "Flex-Lok", Clow "Ball and Socket", U. S. Pipe "Usiflex", EBAA Iron Inc. FLEX-900 or approved equal. Piping shall have a minimum working pressure rating of 250 PSI and a minimum allowable joint deflection of 15°.

D. Mechanical Joints:

Mechanical joints for DIP and PVC shall consist of a bolt joint of the stuffing box type as detailed in AWWA C110/ANSI A21.10 (latest revision) and described in AWWA

C111/ANSI A21.11 (latest revision) - Rubber Gasket Joints shall be SBR rubber and conform to AWWA C111/ANSI A21.11 (latest revision).

E. Flanged Joints:

Flanged joints shall conform to AWWA C110/ANSI A21.10 (latest revision). Gaskets shall be SBR rubber per ANSI/AWWA C111/A21.11. This rubber compound is NSF 61 certified for contact with potable water or other approved quality shall be used in all flanged joints. The bolts and nuts shall conform in dimensions to the American Standard heavy series.

F. Fusion Joints:

1. Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All welds will be made using a Data Logger to record temperature, fusion pressure, with a graphic representation of the fusion cycle shall be part of the Quality Control records.
2. Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE Pipe and Fitting Manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.
3. Mechanical joining will be used where the butt fusion method can not be used. Mechanical joining will be accomplished by either using a HDPE flange adapter with a Ductile Iron back-up ring or HDPE Mechanical Joint adapter with a Ductile Iron back-up ring.
4. Socket fusion, hot gas fusion, threading, solvents, and epoxies will not be used to join HDPE pipe.

- G. Transition Couplings – Couplings shall be ductile iron conforming to ASTM A-536. Coupling shall be as manufactured by Ford, Dresser, JCM or approved equal.

2.03 PIPE FITTINGS, SPECIALS AND MISC.:

A. DIP Fittings And Specials:

Shall be manufactured in the USA. Mechanical joint fittings 4 inches through 24 inches shall conform to either AWWA C110 or AWWA C153 (Compact Fittings). Minimum pressure rating for fittings shall be 350 psi. All other fittings shall conform to AWWA C110. Unless otherwise noted on the plans, fittings for underground installation shall be mechanical joint conforming to AWWA C111, and fittings for above ground installation shall be flanged conforming to ANSI B16.1 Class 125. Minimum pressure rating for fittings shall be 250 psi. Fittings and specials shall be completed with rings, bolts, gaskets, etc., for joints. Interior lining shall be cement mortar lining complying with AWWA C104.

B. Polyethylene Pipe (HDPE):

1. Butt Fusion Fittings - Fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350. Butt Fusion Fittings shall have a manufacturing standard of ASTM D3261. Molded & 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 (WPR) of the fitting.
2. Electrofusion Fittings - Fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350. 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 (WPR) of the fitting.
3. Flanged and Mechanical Joint Adapters - Flanged and Mechanical Joint Adapters shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D3261. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans.

2.04 IDENTIFICATION:

A. Tracing Wire:

Tracing wire shall be installed on all mains directly on top of the pipe line. The wire shall be secured to the pipe with tape or other acceptable methods at no more than 36" spacing. The insulated wire must maintain electrical continuity. This tracing wire system shall be checked and tested by the contractor in the presence of the Resident Project Representative.

2.05 VALVES:

A. Butterfly Valves:

Butterfly valves shall be rubber seated and shall conform to requirements of AWWA C504, 150 psi working pressure. Valve bodies shall be cast iron conforming to ASTM A126, Class B or ASTM A48, Class 40, in thickness as specified in AWWA C504 for the class required. Valves shall be the 2 flange connection type unless noted otherwise. Flanges shall be drilled to conform to 125# ANSI B16.1. Rubber seats ("Hycar" or BUNA "N") shall be chemically bonded to the valve body. The mating seat, in either case, shall be 18-8 Stainless Steel or Monel Metal.

Valve discs shall be of cast iron conforming to ASTM A48, Class 40. The seating edges shall be 18-8 Stainless Steel or Monel Metal for the full width of the disc seating edge and shall be smooth polished. Valve discs of alloy cast iron conforming to ASTM A436, Type I, with smooth polished seating edge will be permitted. The valve shaft shall be Type 304 or 316 Stainless Steel and shall extend through a packing gland for attachment to the operator. Valve bearings shall be of "self-lubricated" materials conforming to Section 10.4 of AWWA C504.

Valve operators shall be equipped with adjustable stop-limiting devices for both the open and closed position. Valves shall be equipped with a 2" standard operating nut and operator suitable for buried conditions. Gearing and material requirements shall conform to requirements of Section 12.2 of AWWA C504. Operators shall be self-locking to hold in any position. All operators shall be designed to be opened or closed with a force of not more than 40 pounds. All valves shall open counterclockwise.

1. Manufacturers: Subject to compliance with requirements, provide butterfly valves of one of the following:

Pratt Valve Co.
Dezurik Valve Co. Inc.
Keystone Valve; Div. of Keystone International Inc.

B. Two Inch Ball Valves:

Shall be designed for a working pressure of not less than 125 psi. End connections shall be flanged or threaded.

1. Manufacturers: Subject to compliance with requirements, provide check valves of one of the following:

Ford Meter Box Company, Inc., B41-777.

C. Combination Air Valves:

Two-inch size unless noted otherwise. Body shall be close grained cast iron with all internal parts and float of stainless steel. The valves shall be capable of venting air from the pipeline

while the pipeline is pressurized up to 300 psi. The combination air valve shall be single body, double orifice design. The valve shall be provided with a cast iron cowl covering the discharge opening of the valve to prevent dirt and other debris from falling into the seated area while allowing free discharge of air.

Corporation stops for combination air/vacuum valves shall be Mueller or approved equivalent. Tapping saddles for combination air/vacuum valves shall be Smith-Blair or approved equivalent.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering combination air valves which may be incorporated in the work include, but are not limited to, the following:

APCO Model 145C.
Valmatic Model 202C.

D. Cast Iron Valve Box:

Cast iron valve boxes shall be a three piece adjustable screw cast iron type and shall have suitable bases which do not damage the pipe. The valve box shall have a 5-1/4 inch shaft diameter. Shaft extension sections shall cover and protect the valve and permit easy access and operation. The cover shall be cast iron and shall be marked appropriately. The box and any extensions shall have a crushing strength of 1,500 psi. The top section shall be the slip type, adjustable for elevation. The valve box top shall be labeled "Reuse Water - Do Not Drink".

PART 3 – EXECUTION

3.01 EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS:

- A. The plans indicate utilities and obstructions that are known to exist according to the best information available to the Owner.
- B. Existing Utility Location: The following steps shall be exercised to avoid interruption of existing utility service.
 1. Expose the facility, for a distance of at least 100 feet in advance of pipeline construction, to verify its true location and grade. Repair, or have repaired, any damage to utilities resulting from locating or exposing their true location.
 2. Avoid utility damage and interruption by protection with means or methods recommended by the utility owner.
- C. Conflict with Existing Utilities
 1. Horizontal Conflict: Horizontal conflict shall be defined as when the actual horizontal

separation between a utility, main, or service and the proposed piping does not permit safe installation of the piping by the use of sheeting, shoring, tying-back, supporting, or temporarily suspending service of the parallel or crossing facility. The Contractor may change the proposed alignment of the piping to avoid horizontal conflicts if the new alignment complies with regulatory agency requirements and after a written request to and subsequent approval by the Engineer. Where such relocation of the piping is denied by the Engineer, the Contractor shall arrange to have the utility, main, or service relocated.

2. Vertical Conflict: Vertical conflict shall be defined as when the actual vertical separation between a utility, main, or service and the proposed piping does not permit the crossing without immediate or potential future damage to the utility, main, service, or the piping. The Contractor may change the proposed grade of the piping to avoid vertical conflicts if the changed grade maintains adequate cover and complies with regulatory agencies requirements after written request to and subsequent approval by the Engineer.

- D. Electronic Locator: Have available at all times an electronic pipe locator and a magnetic locator, in good working order, to aid in locating existing pipe lines or other obstructions.

3.02 INSTALLATION IN TRENCH:

- A. Proper and suitable tools and appliances for safe and convenient handling and installing of pipe and fittings shall be used. Great care shall be taken to prevent pipe coatings from being damaged, particularly linings on the inside of DIP. pipes and fittings. Any damage shall be remedied as directed. All pipe and fittings shall be carefully examined by the Contractor for defects just before installing and no pipe or fitting shall be installed which is defective.
- B. If any defective pipe or fitting is discovered after having been installed, it shall be removed and replaced in a satisfactory manner with a sound pipe or fitting by the Contractor at his own expense. All pipes and fittings shall be cleaned before they are installed and shall be kept clean until they are used in the completed work. Open ends of pipe shall be kept plugged with a bulkhead during construction.
- C. Force mains shall be installed on a 4" Class II or III select natural material bedding as specified in Section 02221 Trench Excavation and Backfill with O.D./2 haunching. The compaction for bedding and haunching shall be 90% of Standard Proctor Density as determined by (ASTM D698). Pipe shall not be installed within 6 inches of rock. In trench rock conditions, a minimum of 6 inches of sand or approved suitable soil shall be placed on rock prior to pipe installation. Trenches shall be kept free of water.
- D. Where bends and tees occur in pressure mains, restrained joints shall be provided to the limits shown on the plans.

- E. All ductile iron pipe laid underground shall be mechanical joint pipe and fittings or "push-on" type joint unless otherwise shown on the plans or directed by the Engineer.
- F. All irrigation mains laid underground shall have a minimum of 36 inches of cover above the top of the pipe in non GA DOT R/W and a minimum of 48 inches of cover above the top of the pipe in GA DOT R/W unless otherwise shown on the plans, or unless otherwise directed by the Engineer.
- G. All irrigation mains laid under existing water mains, sewers, storm drains, culverts, structures, etc., shall have a minimum clearance of 18 inches between the outside wall of the irrigation main and the outside surface of the existing pipe or structure.
- H. Irrigation mains laid parallel to existing water mains, gravity sewers and sewer force mains shall have a horizontal clearance of 3 feet between the outside wall of the irrigation main pipe and the outside surface of the existing pipe. Irrigation mains laid parallel to storm drains, culverts, and other structures shall have a minimum clearance of 18 inches between the outside wall of the irrigation main and the outside surface of the existing pipe or structure.

3.03 PIPE JOINTING:

A. Mechanical And Restrained Joints:

Clean spigot and bell of foreign material and apply soapy water containing chlorine solution before slipping gasket and gland over spigot end of pipe. Small side of gasket and lip of gland must face the socket. Paint gasket with soapy solution and place spigot end of pipe securely home in socket. Push gasket evenly into position in socket, slide gland into position and tighten bolts with fingers.

Tighten bolts to uniform tightness with ratchet wrench by tightening bottom bolt and then top bolt. Thereafter, all bolts shall be tightened in sequence of 180 degrees apart until all bolts are within the range of torque recommended by the manufacturer.

B. Push-On Joints:

Jointing shall be made with rubber gaskets and lubricant furnished by the manufacturer in strict accordance with the manufacturer's recommendations. Prepare field cut pipe by filing 1/8 inch 30 degree bevel on pipe end to avoid injuring gasket.

C. Threaded Flange Joint:

Insert recommended manufacturer's gasket and tighten bolts to uniform tightness with ratchet wrench by tightening bottom bolt and then top bolt. Thereafter, all bolts shall be tightened in sequence of 180 degrees apart until all bolts are within the range of torque recommended by the manufacturer.

D. Polyvinyl Chloride Pipe:

Do not thread PVC pipe. When threads are necessary, adaptors will be used. Use strap wrenches to couple threaded PVC pipe fittings and use lubricant recommended by pipe manufacturer.

Avoid excessive torque and do not score pipe. Use couplings furnished with pipe for fittings and install in strict accordance with the manufacturer's recommendations.

E. Polyethylene Pipe (HDPE):

Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All welds will be made using a Data Logger to record temperature, fusion pressure, with a graphic representation of the fusion cycle shall be part of the Quality Control records.

3.04 INSTALLATION OF IDENTIFICATION:

A. General:

All Irrigation Mains located within public easements or rights-of-way shall have a #14 gauge insulated single strain copper wire installed directly on top of the water line. The wire shall be secured to the pipe with tape or other approved method. The insulated wire must maintain electrical continuity. This tracing wire system shall be checked and tested by the Contractor, prior to acceptance of the water main installation. Install continuous underground-type plastic line markers, located directly over buried lines at 12" above the pipeline.

3.05 INSTALLATION OF ACCESSORIES:

A. Combination Air Valves:

Shall be installed in accordance with the manufacturer's instructions in manholes as shown.

B. Valves:

Irrigation water valves shall be labeled with aluminum tags to avoid confusion with potable water valves. The tag should read, "Reuse Water - Do Not Drink" Install valves as indicated with stems pointing up. The top of manholes outside of roads, streets and highways shall be built

to grade three inches above ground surface unless otherwise shown on the Plans. Manholes in roads, streets, highways or parking lots shall be built to grades designated on the Plans or as directed by the Engineer.

3.06 PRESSURE TESTING:

A. Hydrostatic testing shall be performed on lines after pipe has been laid and backfilled between joints, all newly laid pipe, or any valved section thereof. The pipe shall be subjected to a hydrostatic gauge pressure of at least (150%) of the rated working pressure of the pipe for two hours and not less than (125%) at the high point per AWWA C600 (DIP) and AWWA C605 (PVC). Working pressure is defined as maximum anticipated sustained operating pressure. In no case shall the test pressure be allowed to exceed the design pressure for pipe, appurtenances, or thrust restraints.

1. The Contractor shall have the responsibility to ensure that all outlets are closed by valves or plugged and braced to prevent blowouts. Pressurizing equipment shall be constantly monitored or include a regulator or relief valve to avoid over pressurizing and damaging an otherwise acceptable line. No one shall be allowed in manholes, wet wells, valve pits, etc. during testing.
2. To prepare the line for testing, the contractor shall backfill all pipe and provide all reaction blocking before hydrostatic testing. The Engineer may direct the Contractor to leave certain joints and connections uncovered until testing has been completed. All pipe outlets shall be secured to resist the test pressure. Clean out all debris in the pipe.

The section of pipe under test shall be slowly filled with water and all air shall be expelled from the pipe. If blow-offs are not available at high places, taps at points of highest elevation shall be made before the test and plugged during and after test.

3. Procedure; the specified test pressure, based on the elevation of the lowest point of the line or lowest point of the section under test and corrected to the elevation of the test gauge, shall be applied by means of a gasoline driven test pump connected to the pipe in a manner satisfactory to the Engineer. The Contractor shall meter the amount of water used during the test. The duration of the test shall be at least two consecutive hours.

The Contractor shall locate and repair any and all leaks that may develop. All exposed pipe, fittings, valves, hydrants, and joints will be carefully examined during the test. Any cracked or defective pipe, fittings or valves discovered as a result of this test shall be removed and replaced with sound material, and the test shall be repeated until satisfactory to the Engineer.

- B. Allowable leakage. The contractor shall furnish the gauges and measuring device for the leakage test, pump, pipe, connections, and all other necessary apparatus, unless otherwise

specified, and shall furnish the necessary assistance to conduct the test. The duration of each leakage test shall be 2 hours, unless otherwise specified. During the test, the pipeline shall be subjected to the pressure stated above. Leakage shall be defined as the quantity of water that must be supplied into the pipe section being tested to maintain a pressure within 5 psi of the specified leakage-test pressure after the pipe has been filled with water and the air in the pipeline has been expelled. No installation will be accepted if the leakage is greater than that determined by the formula per AWWA C600 (DIP) and AWWA C605:

1) For DIP and HDPE use:

$$L = \frac{SD \sqrt{P}}{133,200}$$

Where:

L = allowable leakage, in gallons per hour

S = length of pipe tested, in feet

D = nominal diameter of the pipe, in inches

P = average test pressure during the leakage test, in pounds per square inch (gauge)

This formula is based on an allowable leakage of 11.65 gpd/mi/in. of nominal diameter at a pressure of 150 psi.

2) For PVC use:

$$L = \frac{ND \sqrt{P}}{7,400}$$

Where:

L = allowable leakage, in gallons per hour

N = number of joints in the length of pipeline tested

D = nominal diameter of the pipe, in inches

P = average test pressure during the leakage test, in pounds per square inch (gauge)

This formula is based on an allowable leakage of 10.50 gpd/mi/in. of nominal diameter at a pressure of 150 psi.

3.07 CLEANUP:

Remove all surplus materials, tools, excess dirt, rubbish, and debris from the site as installation progresses. Clean as directed by the Engineer. Obtain letter of approval from the State Highway Department covering work installed in areas of State Highway jurisdiction. Contractor to maintain surface of ditches, unpaved streets, road shoulders, sod, grass, and other disturbed surfaces for a period of thirty (30) days thereafter.

END OF SECTION 02670

SECTION 02920 LAWNS AND GRASSING

PART 1 – GENERAL

1.01 SCOPE

This section pertains to seeding work, including preparing the seedbed, furnishing and placing of topsoil, seed and other required materials for a complete installation to the limits of construction and specified herein. Seeding operations shall be performed on all newly graded earth areas not otherwise specified covered by structures, pavements and/or surfacings, riprap, sod, sprigging, walkways, and other items of a similar nature; on all cleared and/or grubbed areas which are to remain as finish grade surfaces and not to be excavated or embankments constructed thereon; on all existing off site and on site turfed earth surfaces which are disturbed by construction operations and which are to remain as finish grade surfaces; and at all other locations which may be designated on the drawings or specified herein. The contractor shall follow the GA DOT Standard Specifications Construction of Roads and Bridges Section 700, 882, 890 and 891 latest edition and/or pages 6-35 thru 6-60 of the Manual for Erosion and Sediment Control in Georgia (1975 and as amended in the latest edition).

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02370 - Erosion and Sedimentation Control

PART 2 – PRODUCTS

2.01 TOPSOIL

Topsoil for planting shall be a rich friable loam containing a large amount of humus and shall be original surface sandy loam, topsoil of good rich, uniform quality, free from any material such as hard clods, stiff clay, hardpan, partially disintegrated stone, pebbles larger than 1/2-inch in diameter, lime, cement, bricks, ashes, cinders, slag, concrete, bitumen or its residue, boards, sticks, chips, or other undesirable material harmful or unnecessary to plant growth. Topsoil shall be reasonably free from perennial weeds and perennial weed seeds, and shall not contain objectionable plant material, toxic amounts of either acid or alkaline elements or vegetable debris undesirable or harmful to plant life. Bermuda grass roots in topsoil will not be accepted, unless otherwise approved by the Engineer.

Topsoil shall be natural topsoil without admixture of subsoil material, and shall be classifiable as loam, silt loam, clay loam, or a combination thereof.

2.02 GRASS SEED

All seeds shall be labeled in accordance with U.S.D.A. Rules and Regulations. Seeds shall be packaged in suitable containers in accordance with the Georgia Seed Laws, Rules and Regulations currently in effect. No seed shall be used which has become molded, wet or

otherwise damaged. Seed shall be tested by the Georgia Department of Agriculture for the purity and germination within six months prior to the date of sowing.

1. Grass seed on level or slightly sloping ground shall consist of the following for the planting dates specified:
 - (a) March 1 to June 30

Common Bermuda (hulled)	10 lbs./acre
Tall Fescue	50 lbs./acre
 - (b) August 1 to November 1

Tall Fescue	50 lbs./acre
Common Bermuda (unhulled)	10 lbs./acre
 - (c) November 1 to March 1

Common Bermuda (unhulled)	10 lbs./acre
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2. Grass seed on slopes 3:1 or steeper and infrequently mowed areas shall consist of the following for the planting dates specified:
 - (a) March 1 to June 15

Weeping Lovegrass	5 lbs./acre
Sericea Lespedeza (scarified)	60 lbs./acre
 - (b) August 1 to November 1

Tall Fescue	50 lbs./acre
Sericea Lespedeza (unscarified)	75 lbs./acre
 - (c) November 1 to March 1

Common Bermuda (unhulled)	10 lbs./acre
Sericea Lespedeza (unscarified)	75 lbs./acre

When as directed by the Engineer, an approved quick growing species of grass seed such as rye, Italian rye, millet or other cereal grass, shall be applied at a rate of 30 lbs./acre in conjunction with and in addition to the seed mixture specified above.

2.03 SPRIGS

Bermuda, common, healthy living stolons native to locality of project. Plant on day of removal from growing location. Plant sprigs from March 15 to July 15.

2.04 MULCH

- A. Dry Mulch: Dry mulch shall be straw or hay, consisting of oat, rye or wheat straw, or of pangola, peanut, coastal Bermuda or Bahia grass hay. Only undeteriorated mulch

which can be readily cut into the soil shall be used. Application rate shall be 2 ½ tons per acre.

- B. Mulch for hydroseeding: This material shall consist of wood cellulose fiber applied at 500 lbs./acre with dye color equal to Weyerhaeuser Company, or Conway Corporation material used for "hydroseeding" and suitable for this purpose.

2.05 FERTILIZER

Fertilizer shall be of an accepted and approved commercial brand. Fertilizer shall be a ready mixed material containing the soil nutrients as specified and in a suitable form compatible with the equipment used to achieve uniform distribution of the fertilizer. The fertilizer mixture shall contain the following nutrients expressed in per cent of the total weight: 6% nitrogen, 12% available phosphoric acid, and 12% water soluble potash (6-12-12) analysis. Container tags shall have the name and address of the manufacturer, the brand name, net weight, and chemical composition of analysis. Fertilizer shall be applied at 1500 lbs./acre.

2.06 LIME

Agricultural lime shall be within the specifications of the Georgia Department of Agriculture. Ground limestone is calcitic or dolomitic limestone ground so that 90 percent of the material shall pass a 10-mesh sieve, not less than 50 percent will pass through a 50-mesh sieve and at least 25% shall pass a 100-mesh sieve. Lime shall be applied as indicated by soil test, or the rate of 1 to 2 tons per acre.

2.07 WATER

The water used in the grassing operations may be obtained from any approved spring, pond, lake, stream, reclaimed water source or municipal water system. The water shall be free of excess and harmful chemicals, acids, alkalies, or any substance which might be harmful to plant growth or obnoxious to traffic.

2.08 SOD

Shall be healthy living, disease and weed free grass that has been freshly cut.

PART 3 EXECUTION

3.01 HYDROSEEDING

- A. The materials for grassing shall consist of a thoroughly mixed slurry of grass seed, fertilizer, lime and mulch as specified. The application rate for wood fiber mulch shall be approximately 500 lbs./acre. All materials shall be discharged within one hour after being combined in the hydroseeder.
- B. Each kind of leguminous seed shall be inoculated separately with the appropriate commercial culture according to instructions of the manufacturer of the material. All

inoculated seed shall be protected from the sun and shall be planted the same day it is inoculated.

- C. Equipment for mixing and applying the slurry shall be especially designed for this purpose. It shall be capable of applying a uniform mixture over the entire area to be seeded. The slurry mixture shall be agitated during application to keep the ingredients thoroughly mixed. A suitable metering device to determine the rate of application and assist in obtaining uniform coverage of the grassed areas shall be incorporated as part of the equipment.
- D. Ground preparation for hydroseeding shall be the same as for conventional seeding.
- E. Hydroseeding shall not be performed when windy weather prevents even distribution; when the prepared surface is crusted; or when the ground is frozen, wet or otherwise in a non-tillable condition.

3.02 CONVENTIONAL SEEDING

A. Grading and Shaping

Grade and shape to finish contours and to allow practical use of equipment.

B. Seedbed Preparation

1. Broadcast plantings:

- a. Tillage as a minimum shall: adequately loosen the soil to a depth of 4 to 6 inches; alleviate compaction; incorporate lime and fertilizer; smooth and firm the soil; allow for the proper placement of seed, sprigs, or plants; and allow for the anchoring of straw or hay mulch if a disk is to be used.
- b. Tillage may be done with any suitable equipment.
- c. Tillage may be done on the contour where feasible.
- d. On slopes too steep for the safe operation of tillage equipment, the soil surface will be pitted or trenched across the slope with appropriate hand tools to provide a place 6 to 8 inches apart in which seed may lodge and germinate.

2. Individual plants:

- a. Where individual plants are to be set, the soil will be well prepared by excavating holes, opening furrows, or dibble planting.
- b. For nursery stock plants, holes shall be large enough to accommodate roots without crowding.

3.03 SPRIGS

Separate or shred and broadcast over area prepared for planting at 40 cu. ft. per acre. Harrow into ground with disc turned straight.

3.04 LIME/FERTILIZER APPLICATION

Lime and fertilizer will be applied uniformly during land preparation so that it will be mixed with the soil during seedbed preparation. On steep surfaces, scarify slope prior to broadcasting lime and fertilizer.

3.05 PLANTING

- A. Seeding will be done on a freshly prepared and firmed seedbed. For broadcast planting, use a cultipacker-seeder, drill, rotary seeder, other mechanical seeder, or hand seeding to distribute the seed uniformly over the area to be treated. Cover the seed lightly with a cultipacker or other suitable equipment.
- B. No-till seeding is permissible into annual cover crops when planting is done following maturity of the cover crop or if the temporary cover stand is sparse enough to allow adequate growth of the permanent species.
- C. No-till seeding must be done with appropriate no-till seeding equipment. The seed must be uniformly distributed and planted at the proper depth.

3.06 MULCHING

All seeded areas shall be mulched. Soil retention blankets, erosion control netting, and other manufactured materials may be required in addition to mulch on unstable soils and concentrated flow areas. Mulch shall be spread uniformly within 24 hours after seeding.

3.07 WATER, MAINTENANCE AND RESEEDING

- A. Contractor shall be responsible for maintaining the proper moisture content of the soil to insure adequate plant growth until a satisfactory stand of grass is obtained. Watering shall be performed to maintain an adequate water content in the soil.
- B. **The Contractor shall mow and maintain all seeded areas without additional payment until final acceptance of the work by the Owner, and any regrading, refertilizing, reliming, reseeding or remulching shall be done at his own expense.** Seeding work shall be repeated on defective areas until a satisfactory uniform stand of grass is accomplished. A satisfactory stand of grass is defined as grass that covers at least 98% of the total area with no bare spots larger than one square foot and bare spots shall be scattered such that bare areas do not comprise more than 1/100 of any given area. **Damage resulting from erosion, gulleys, washouts, or other causes shall be repaired by filling with topsoil, compacting, and repeating the seeding work at the Contractor's expense.**

3.08 SODDING

See Section 02921 Sodding for additional sod requirements. Smooth grade the specified area to be planted. Apply amendments and fertilizer requirements as determined in soil test. Planting area shall be free of stumps, roots, large stone over 4" diameter, and any other

debris. Apply fertilizer and rake into the soil surface. Lightly wet soil surface if dry. Lay the sod at right angles to any major water flow. Sod shall be pinned and secured on slopes greater than 6:1. Sod joints shall be staggered between rows. Sod shall be watered after installation each day.

END OF SECTION

SECTION 03300 CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 SECTION INCLUDES

This section specifies cast-in place structural concrete.

1.02 RELATED SECTIONS

- A. Section 02775 - Concrete Sidewalks, Curbs and Gutters.
- B. Section 03100 - Concrete Forms and Accessories
- C. Section 03200 - Concrete Reinforcement
- D. Section 07160 – Concrete Waterproofing Admixture
- E. Section 07190 – Vapor Retarders

1.03 REFERENCES

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 1997).
- B. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; American Concrete Institute International; 1998.
- C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 1996.
- D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 1996.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 1989 (Reapproved 1997).
- F. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1991.
- G. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988.
- H. ACI 308 - Standard Practice for Curing Concrete; American Concrete Institute International; 1992 (Reapproved 1997).

- I. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; American Concrete Institute International; 1999.
- J. ACI350R – Environmental Engineering Concrete Structures; American Concrete Institute International; 1989.
- K. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement; 1997.
- L. ASTM A 497 - Standard Specification for Steel Welded Wire fabric, Deformed, for Concrete Reinforcement; 1997.
- M. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 1996a.
- N. ASTM A 767/A 767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 1997.
- O. ASTM A 775/A 775M - Standard Specification for Epoxy-Coated Reinforcing Steel Bars; 1997.
- P. ASTM A 884/A 884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Fabric for Reinforcement; 1996a.
- Q. ASTM C 33 - Standard Specification for Concrete Aggregates; 1999a.
- R. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 1999.
- S. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2000.
- T. ASTM C 150 - Standard Specification for Portland Cement; 1999a.
- U. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete; 1997a.
- V. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 1994a.
- W. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 1998.
- X. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 1998a.
- Y. ASTM C 330 - Standard Specification for Lightweight Aggregates for Structural Concrete; 1999.
- Z. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for

Concrete; 1999a.

- AA. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete; 1999.
- AB. ASTM C 685 - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 1998a.
- AC. ASTM C 881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 1999.
- AD. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 1999.
- AE. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 1999.
- AF. ASTM D 994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 1998.
- AG. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 1999.
- AH. ASTM D 3963/D 3963M - Standard Specification for Fabrication and Job-Site Handling of Epoxy Coated Reinforcing Steel Bars; 1999.
- AI. ASTM E 1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 1996.

1.04 SUBMITTALS

- A. Concrete mixture proportions shall be determined by the Contractor and submitted for review. The concrete mixture quantities of all ingredients per cubic meter yard and nominal maximum coarse aggregate size that will be used in the manufacture of each quality of concrete shall be stated. Proportions shall indicate the mass of cement, pozzolan and ground granulated blast-furnace (GGBF) slag when used, and water; the mass of aggregates in a saturated surface-dry condition; and the quantities of admixtures. The submission shall be accompanied by test reports from a laboratory complying with ASTM C 1077 which show that proportions thus selected will produce concrete of the qualities indicated. No substitution shall be made in the source or type of materials used in the work without additional tests to show the quality of the new material and concrete are satisfactory.
- B. Statements that the concrete testing technicians and the concrete inspectors meet the specified requirements, in sections 01450.

- C. The method and equipment proposed for joint cleanup and waste disposal shall be submitted for review and approval
- D. The curing medium and methods to be used shall be submitted for review and approval.
- E. If concrete is to be placed under cold-weather conditions, the proposed materials, methods, and protection shall be submitted for approval.
- F. If concrete is to be placed under hot-weather conditions, the proposed material and methods shall be submitted for review and approval.
- G. Aggregate quality tests shall be submitted at least 30 days prior to start of concrete placement.
- H. The results of the initial mixer uniformity tests shall be submitted at least 5 days prior to the initiation of placing.
- I. Cementitious materials, including cement and pozzolan, (and Ground Granulated Blast Furnace Slag) will be accepted on the basis of the manufacturer's certification of compliance, accompanied by mill test reports that materials meet the requirements of the specification under which they are furnished. Certification and mill test reports shall be from samples taken from the particular lot furnished. No cementitious materials shall be used until notice of acceptance has been given by the Contracting Officer. Cementitious material will be subject to check testing from samples obtained at the source, at transfer points, or at the project site, as scheduled by the Contracting Officer, and such sampling will be by or under the supervision of the Owner at its expense. Material not meeting specifications shall be promptly removed from the site of work.
- J. Impervious-Sheet Curing materials shall be certified for compliance with all specification requirements.
- K. Air-Entraining Admixture shall be certified for compliance with all specification requirements.
- L. Other chemical admixtures shall be certified for compliance with all specification requirements.
- M. Membrane-Forming curing compound shall be certified for compliance with all specification requirements.
- N. Epoxy Resin and Latex Bonding Compound shall be certified for compliance with all specification requirements.
- O. Descriptive literature of the Nonshrink Grout proposed for use shall be furnished together with a certificate from the manufacturer stating that it is suitable for the application or exposure for which it is being considered.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Portland Cement: ASTM C150 Type I or III.
- B. Fly Ash: ASTM C618, Class C or F including supplementary optional requirements relating to reactive aggregates and alkalis, and loss on ignition (LOI) not to exceed 5 percent.
- C. Coarse Aggregate: ASTM C33.
 - 1. Size 67. Size 467 may be used for footings and walls over 12 inches thick.
 - 2. Coarse aggregate for applied topping, encasement of steel columns, and metal pan stair fill shall be Size 7.
 - 3. Maximum size of coarse aggregates not more than one-fifth of narrowest dimension between sides of forms, one-third of depth of slabs, nor three-fourth of minimum clear spacing between reinforcing bars.
- D. Lightweight Aggregates for Structural Concrete: ASTM C330, Table 1. Maximum size of aggregate not larger than one-fifth of narrowest dimension between forms, nor three-fourth of minimum clear distance between reinforcing bars. Contractor to furnish certified report to verify that aggregate is sound and durable, and has a durability factor of not less than 80 based on 300 cycles of freezing and thawing when tested in accordance with ASTM C666.
- E. Fine Aggregate: ASTM C33. Fine aggregate for applied concrete floor topping shall pass a No. 4 sieve, 10 percent maximum shall pass a No. 100 sieve.
- F. Mixing Water: Fresh, clean – potable or reclaimed.
- G. Admixtures:
 - 1. Water Reducing Admixture: ASTM C494, Type A and not contain more chloride ions than are present in municipal drinking water.
 - 2. Water Reducing, Retarding Admixture: ASTM C494, Type D and not contain more chloride ions than are present in municipal drinking water.
 - 3. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C494, Type F or G, and not contain more chloride ions than are present in municipal drinking water.
 - 4. Non-Corrosive, Non-Chloride Accelerator: ASTM C494, Type C or E, and not contain more chloride ions than are present in municipal drinking water. Admixture manufacturer must have long-term non-corrosive test data from an independent testing laboratory of at least one year duration using an acceptable accelerated corrosion test method such as that using electrical potential measures.

5. Air Entraining Admixture: ASTM C260.
 6. Microsilica: Use only with prior review and acceptance of the Resident Engineer. Use only in conjunction with high range water reducer.
 7. Calcium Nitrite corrosion inhibitor: ASTM C494 Type C.
 8. Concrete Waterproofing Admixture shall be included for the designated structures as specified in Section 07160.
 9. Prohibited Admixtures: Calcium chloride, thiocyanate or admixtures containing more than 0.05 percent chloride ions are not permitted.
 10. Certification: Written conformance to the requirements above and the chloride ion content of the admixture prior to mix design review.
- R. Expansion Joint Filler: ASTM D1751.
- S. Sheet Materials for Curing Concrete: ASTM C171.
- T. Liquid Membrane-forming Compounds for Curing Concrete: ASTM C309, Type I, with fugitive dye. Compound shall be compatible with scheduled surface treatment, such as paint and resilient tile, and shall not discolor concrete surface.
- U. Abrasive Aggregate: Aluminum oxide grains or emery grits.
- V. Liquid Hardener and Dustproofer: Fluosilicate solution of magnesium fluosilicate or zinc fluosilicate. Magnesium and zinc may be used separately or in combination as recommended by manufacturer.
- W. Liquid Densifier/Sealer: 100% active colorless aqueous siliconate solution.
- X. Non-Shrink Grout:
1. ASTM C1107, pre-mixed, produce a compressive strength of at least 2500 psi at three days and 5000 psi at 28 days. Furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95 percent bearing under a 4 foot by 4 foot base plate.
 2. Where high fluidity or increased placing time is required, furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95 percent under an 18 inch by 36 inch base plate.

2.02 CONCRETE MIX DESIGN

- A. Mix Designs: Proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318. The concrete compressive strength F_c' shall be 4,000 psi unless otherwise indicated on the drawings.
1. If trial mixes are used, make a set of at least 6 cylinders in accordance with ASTM C192 for test purposes from each trial mix; test three for compressive strength at 7 days and three at 28 days.

2. Submit a report of results of each test series, include a detailed listing of the proportions of trial mix or mixes, including cement, fly ash, admixtures, weight of fine and coarse aggregate per cubic yard measured dry rodded and damp loose, specific gravity, fineness modulus, percentage of moisture, air content, water-cement -fly ash ratio, and consistency of each cylinder in terms of slump. Include dry unit weight of lightweight structural concrete.
 3. Prepare a curve showing relationship between water-cement-fly ash ratio at 7-day and 28-day compressive strengths. Plot each curve using at least three specimens.
 4. If the field experience method is used, submit complete standard deviation analysis.
- B. After approval of mixes no substitution in material or change in proportions of approval mixes may be made without additional tests and approval of Resident Engineer or as specified. Making and testing of preliminary test cylinders may be carried on pending approval of cement and fly ash, providing Contractor and manufacturer certify that ingredients used in making test cylinders are the same. Resident Engineer may allow Contractor to proceed with depositing concrete for certain portions of work, pending final approval of cement and fly ash and approval of design mix.
- C. Cement Factor: Maintain minimum cement factors in Table I regardless of compressive strength developed above minimums. Fly ash may be substituted for up to 20 percent of the minimum cement factor at option of Contractor, except fly ash may not be used in concrete designated as architectural concrete.

TABLE I - CEMENT AND WATER FACTORS FOR CONCRETE

Concrete Strength	Water/Cement Ratio
Min. 28 Day Comp. Str. psi	Max. Water Cement Ratio
4000 ^{1,3}	0.46

1. If trial mixes are used, the proposed mix design shall achieve a compressive strength 1200 psi in excess of f_c.
 2. Lightweight Structural Concrete. Pump mixes may require higher cement values.
 3. For concrete exposed to high sulfate content soils maximum water cement ratio is 0.44.
- D. Maximum Slump: Maximum slump, as determined by ASTM C143 with tolerances as established by ASTM C94, for concrete to be vibrated shall be as shown in Table II.

TABLE II - MAXIMUM SLUMP, INCHES

Type of Construction	Normal Weight Concrete
Reinforced Footings and Substructure Walls	3 inches
Slabs, Beams, Reinforced Walls, and Building Columns	4 inches

- * Slump may be increased by the use of the approved high-range water-reducing admixture (superplasticizer). Tolerances as established by ASTM C94. Concrete containing the high-range-water-reducing admixture may have a maximum slump of 9 inches. The concrete shall arrive at the job site at a slump of 2 inches to 3 inches. This should be verified, and then the high-range-water-reducing admixture added to increase the slump to the approved level.

- E. Air-Entrainment: Air-entrainment of normal weight concrete shall conform with Table III. Air-entrainment of lightweight structural concrete shall conform with Table IV. Determine air content by either ASTM C173 or ASTM C231.

TABLE III - TOTAL AIR CONTENT

Location	Air Content
Concrete Exposed to Weather	4.5% to 7.5%
Interior normal weight concrete slabs	2% to 3%

- F. High early strength concrete, made with Type III cement or Type I cement plus non-corrosive accelerator, shall have a 7-day compressive strength equal to specified minimum 28-day compressive strength for concrete type specified made with standard Portland cement.
- G. Concrete slabs placed at air temperatures below 50 degrees Fahrenheit use non-corrosive, non-chloride accelerator. Concrete required to be air entrained use approved air entraining admixture. Pumped concrete, synthetic fiber concrete, architectural concrete, concrete required to be watertight, and concrete with a water/cement ratio below 0.50 use high-range water-reducing admixture (superplasticizer).
- H. Durability: Use air entrainment for exterior exposed concrete subjected to freezing and thawing and other concrete shown or specified. Air content as shown in Table III.
- I. Enforcing Strength Requirements: Test as specified in Section 01450, TESTING LABORATORY SERVICES, during the progress of the work. Seven-day tests may be used as indicators of 28-day strength. Average of any three 28-day consecutive strength tests of laboratory-cured specimens representing each type of

concrete shall be equal to or greater than specified strength. No single test shall be more than 500 psi below specified strength. Interpret field test results in accordance with ACI 214. Should strengths shown by test specimens fall below required values, Resident Engineer may require any one or any combination of the following corrective actions, at no additional cost to the Owner:

1. Require changes in mix proportions by selecting one of the other appropriate trial mixes or changing proportions, including cement content, of approved trial mix.
2. Require additional curing and protection.
3. If five consecutive tests fall below 95 percent of minimum values given in Table I or if test results are so low as to raise a question as to the safety of the structure, Resident Engineer may direct Contractor to take cores from portions of the structure. Use results from cores tested by the Contractor retained testing agency to analyze structure.
4. If strength of core drilled specimens falls below 85 percent of minimum value given in Table I, Resident Engineer may order load tests, made by Contractor retained testing agency, on portions of building so affected. Load tests in accordance with ACI 318 and criteria of acceptability of concrete under test as given therein.
5. Concrete work, judged inadequate by structural analysis, by results of load test, or for any reason, shall be reinforced with additional construction or replaced, if directed by the Resident Engineer.

PART 3 – EXECUTION

3.01 PREPARATION

A. Mixing

1. All concrete shall be ready-mixed concrete and shall be mixed and delivered in accordance with the requirements of "Specifications for Ready-Mixed Concrete", ASTM C94 and ACI 318 to produce concrete with the required strength, slump and air content.
2. The concrete producer shall furnish with each load of concrete a numbered delivery ticket showing name of Contractor, name and location of project, date and time batched, truck number, number of cubic yards in load, specified strength, slump, and mix design number.
3. In the event concrete is mixed at a central batching plant, the delivery shall be arranged so that intervals between batches are kept at a minimum, and in any event not more than thirty (30) minutes. Trucks shall be in first class condition and kept in constant rotation during delivery.
4. When concrete is delivered in a truck mixer or agitator, no water from the truck water system or elsewhere shall be added after the initial introduction of mixing water for the batch, except when on arrival at the job site the slump of the concrete is less than that specified. Such additional water to bring the slump within required limits shall be injected into the mixer, provided the maximum water-cement ratio specified is not

exceeded. The drum or blades shall be turned an additional 30 revolutions or more at mixing speed until the concrete is within the proper slump limits.

- B. Discharge of concrete after initial batching shall be completed within 90 minutes, or before the drum has revolved 300 revolutions, whichever comes first, after the introduction of the mixing water to the cement and aggregates. In hot weather (as defined by ACI) the discharge of the concrete shall be completed within 60 minutes.
- C. Maximum delivery temperature of concrete shall be 100°F. Minimum delivery temperature as follows.

Atmospheric Temperature	Minimum Concrete Temperature
30 degrees to 40 degrees F	60 degrees F
0 degrees to 30 degrees F	70 Degrees F

3.02 VAPOR BARRIER

- A. Except where membrane waterproofing is required, interior concrete slab on grade shall be placed on a continuous vapor barrier as specified in Section 07190.
 - 1. Vapor barrier joints lapped 6 inches and sealed with compatible waterproof pressure-sensitive tape.
 - 2. Patch punctures and tears.

3.03 CONSTRUCTION JOINTS

- A. Unless otherwise shown, location of construction joints to limit individual placement shall not exceed 80 feet in any horizontal direction, except slabs on grade which shall have construction joints shown. Allow 48 hours to elapse between pouring adjacent sections unless this requirement is waived by Resident Engineer.
- B. Locate construction joints in suspended floors near the quarter-point of spans for slabs, beams or girders, unless a beam intersects a girder at center, in which case joint in girder shall be offset a distance equal to twice width of beam. Provide keys and inclined dowels as shown. Provide longitudinal keys as shown.
 - Place concrete for columns slowly and in one operation between joints. Install joints in concrete columns at underside of deepest beam or girder framing into column.
- D. Allow 2 hours to elapse after column is cast before concrete of supported beam, girder or slab is placed. Place girders, beams, grade beams, column capitals, brackets, and haunches at the same time as slab unless otherwise shown.
- E. Install polyvinyl chloride or rubber water seals, as shown in accordance with manufacturer's instructions, to form continuous watertight seal. Waterstops

selection shall be defined in specification section 03100 Concrete Forms and Accessories.

3.04 EXPANSION JOINTS

- A. Clean expansion joint surfaces before installing premolded filler and placing adjacent concrete.
- B. Install polyvinyl chloride or rubber water seals, as shown in accordance with manufacturer's instructions, to form continuous watertight seal and as specified in section 03100.

3.05 PLACING CONCRETE

- A. Preparation:
 - 1. Remove hardened concrete, wood chips, shavings and other debris from forms.
 - 2. Remove hardened concrete and foreign materials from interior surfaces of mixing and conveying equipment.
 - 3. Have forms and reinforcement inspected and approved by Resident Engineer before depositing concrete.
 - 4. Provide runways for wheeling equipment to convey concrete to point of deposit. Keep equipment on runways which are not supported by or bear on reinforcement. Provide similar runways for protection of vapor barrier on coarse fill.
- B. Bonding: Before depositing new concrete on or against concrete which has been set, thoroughly roughen and clean existing surfaces of laitance, foreign matter, and loose particles.
 - 1. Preparing surface for applied topping:
 - a. Remove laitance, mortar, oil, grease, paint, or other foreign material by sand blasting. Clean with vacuum type equipment to remove sand and other loose material.
 - b. Broom clean and keep base slab wet for at least four hours before topping is applied.
 - c. Use a thin coat of one part Portland cement, 1.5 parts fine sand, bonding admixture; and water at a 50: 50 ratio and mix to achieve the consistency of thick paint. Apply to a damp base slab by scrubbing with a stiff fiber brush. New concrete shall be placed while the bonding grout is still tacky.
- C. Conveying Concrete: Convey concrete from mixer to final place of deposit by a method which will prevent segregation. Method of conveying concrete subject to approval of Resident Engineer.
- D. Placing: For special requirements see Paragraphs, HOT WEATHER and COLD WEATHER.

1. Do not place concrete when weather conditions prevent proper placement and consolidation, or when concrete has attained its initial set, or has contained its water or cement content more than 1 1/2 hours.
 2. Deposit concrete in forms as near as practicable in its final position. Prevent splashing of forms or reinforcement with concrete in advance of placing concrete.
 3. Do not drop concrete freely more than 10 feet for concrete containing the high-range water-reducing admixture (superplasticizer) or 5 feet for conventional concrete. Where greater drops are required, use a tremie or flexible spout (canvas elephant trunk), attached to a suitable hopper.
 4. Discharge contents of tremies or flexible spouts in horizontal layers not exceeding 20 inches in thickness, and space tremies such as to provide a minimum of lateral movement of concrete.
 5. Continuously place concrete until an entire unit between construction joints is placed. Rate and method of placing concrete shall be such that no concrete between construction joints will be deposited upon or against partly set concrete, after its initial set has taken place, or after 45 minutes of elapsed time during concrete placement.
 6. On bottom of members with severe congestion of reinforcement, deposit 1 inch layer of flowing concrete containing the specified high-range water-reducing admixture (superplasticizer). Successive concrete lifts may be a continuation of this concrete or concrete with a conventional slump.
 7. Concrete on metal deck:
 - a. Concrete on metal deck shall be minimum thickness shown. Allow for deflection of steel beams and metal deck under the weight of wet concrete in calculating concrete quantities for slab.
 - 1) The Contractor shall become familiar with deflection characteristics of structural frame to include proper amount of additional concrete due to beam/deck deflection.
- E. Consolidation: Conform to ACI 309. Immediately after depositing, spade concrete next to forms, work around reinforcement and into angles of forms, tamp lightly by hand, and compact with mechanical vibrator applied directly into concrete at approximately 18 inch intervals. Mechanical vibrator shall be power driven, hand operated type with minimum frequency of 5000 cycles per minute having an intensity sufficient to cause flow or settlement of concrete into place. Vibrate concrete to produce thorough compaction, complete embedment of reinforcement and concrete of uniform and maximum density without segregation of mix. Do not transport concrete in forms by vibration.
1. Use of form vibration shall be approved only when concrete sections are too thin or too inaccessible for use of internal vibration.
 2. Carry on vibration continuously with placing of concrete. Do not insert vibrator into concrete that has begun to set.

3.06 HOT WEATHER

Follow the recommendations of ACI 305 or as specified to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete. Methods proposed for cooling materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by Resident Engineer.

3.07 COLD WEATHER

Follow the recommendations of ACI 306 or as specified to prevent freezing of concrete and to permit concrete to gain strength properly. Use only the specified non-corrosive, non-chloride accelerator. Do not use calcium chloride, thiocyanates or admixtures containing more than 0.05 percent chloride ions. Methods proposed for heating materials and arrangements for protecting concrete shall be made in advance of concrete placement and approved by Resident Engineer.

3.08 PROTECTION AND CURING

- A. Conform to ACI 308: Initial curing shall immediately follow the finishing operation. Protect exposed surfaces of concrete from premature drying, wash by rain and running water, wind, mechanical injury, and excessively hot or cold temperatures. Keep concrete not covered with membrane or other curing material continuously wet for at least 7 days after placing, except wet curing period for high-early-strength concrete shall be not less than 3 days. Keep wood forms continuously wet to prevent moisture loss until forms are removed. Cure exposed concrete surfaces as described below. Other curing methods may be used if approved by Resident Engineer.
1. Liquid curing and sealing compounds: Apply by power-driven spray or roller in accordance with the manufacturer's instructions. Apply immediately after finishing. Maximum coverage 400 square feet per gallon on steel troweled surfaces and 300 square feet per gallon on floated or broomed surfaces for the curing/sealing compound.
 2. Plastic sheets: Apply as soon as concrete has hardened sufficiently to prevent surface damage. Utilize widest practical width sheet and overlap adjacent sheets 2 inches. Tightly seal joints with tape.
 3. Paper: Utilize widest practical width paper and overlap adjacent sheets 2 inches. Tightly seal joints with sand, wood planks, pressure-sensitive tape, mastic or glue.

3.09 REMOVAL OF FORMS

- A. Remove in a manner to assure complete safety of structure after the following conditions have been met.
1. Where structure as a whole is supported on shores, forms for beams and girder sides, columns, and similar vertical structural members may be removed after 24 hours, provided concrete has hardened sufficiently to prevent surface damage and curing is continued without any lapse in time as specified for exposed surfaces.

2. Take particular care in removing forms of Architectural exposed concrete to insure surfaces are not marred or gouged, and that corners and arises are true, sharp and unbroken.
- B. Control Test: Use to determine if the concrete has attained sufficient strength and curing to permit removal of supporting forms. Cylinders required for control tests taken in accordance with ASTM C172, molded in accordance with ASTM C31, and tested in accordance with ASTM C39. Control cylinders cured and protected in the same manner as the structure they represent. Supporting forms or shoring not removed until strength of control test cylinders have attained at least 70 percent of minimum 28-day compressive strength specified. For post-tensioned systems supporting forms and shoring not removed until stressing is completed. Exercise care to assure that newly unsupported portions of structure are not subjected to heavy construction or material loading.
- C. Reshoring: Reshoring is required if superimposed load plus dead load of the floor exceeds the capacity of the floor at the time of loading. In addition, for flat slab/plate, reshoring is required immediately after stripping operations are complete and not later than the end of the same day. Reshoring accomplished in accordance with ACI 347 at no additional cost to the Owner.

3.10 CONCRETE SURFACE PREPARATION

- A. Metal Removal: Unnecessary metal items cut back flush with face of concrete members.
- B. Patching: Maintain curing and start patching as soon as forms are removed. Do not apply curing compounds to concrete surfaces requiring patching until patching is completed. Use cement mortar for patching of same composition as that used in concrete. Use white or gray Portland cement as necessary to obtain finish color matching surrounding concrete. Thoroughly clean areas to be patched. Cut out honeycombed or otherwise defective areas to solid concrete to a depth of not less than 1 inch. Cut edge perpendicular to surface of concrete. Saturate with water area to be patched, and at least 6 inches surrounding before placing patching mortar. Give area to be patched a brush coat of cement grout followed immediately by patching mortar. Cement grout composed of one part Portland cement, 1.5 parts fine sand, bonding admixture, and water at a 50:50 ratio, mix to achieve consistency of thick paint. Mix patching mortar approximately 1 hour before placing and remix occasionally during this period without addition of water. Compact mortar into place and screed slightly higher than surrounding surface. After initial shrinkage has occurred, finish to match color and texture of adjoining surfaces. Cure patches as specified for other concrete. Fill form tie holes which extend entirely through walls from unexposed face by means of a pressure gun or other suitable device to force mortar through wall. Wipe excess mortar off exposed face with a cloth.
- C. Upon removal of forms, clean vertical concrete surface that is to receive bonded applied cementitious application with wire brushes or by sand blasting to remove

unset material, laitance, and loose particles to expose aggregates to provide a clean, firm, granular surface for bond of applied finish.

3.11 CONCRETE SLAB FINISHES

A. General

1. Finish slab concrete per the requirements of ACI 302.1R.
2. Use manual screeds, vibrating screeds, or roller compacting screeds to place concrete level and smooth.
3. Do not use "jitterbugs" or other special tools designed for purpose of forcing coarse aggregate away from surface and allowing layer of mortar, which will be weak and cause surface cracks or delamination, to accumulate.
4. Do not dust surfaces with dry materials.
5. Round off edges of slabs with steel edging tool, except where cove finish is shown. Steel edging tool radius shall be 1/4 inch for slabs subject to wheeled traffic.

B. Type S-1 (Bull Float Finish):

1. Finish slab to receive fill and mortar setting bed by screeding with straightedges to bring surface to required finish plane.
2. Wood float finish to compact and seal surface.
3. Remove laitance and leave surface clean.
4. Coordinate with other finish procedures.

C. Type S-2 (Steel Troweled Finish):

1. Finish by screeding and floating with straightedges to bring surfaces to required finish elevation. Use evaporation retardant.
2. While concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, wood float to true, even plane with no coarse aggregate visible.
3. Use sufficient pressure on wood floats to bring moisture to surface.
4. After surface moisture has disappeared, hand trowel concrete to produce smooth, impervious surface, free from trowel marks.
5. Burnish surface with an additional troweling. Final troweling shall produce ringing sound from trowel.
6. Do not use dry cement or additional water during troweling, nor will excessive troweling be permitted.
7. Power Finishing:
 - a. Approved power machine may be used in lieu of hand finishing in accordance with directions of machine manufacturer.
 - b. Do not use power machine when concrete has not attained necessary set to allow finishing without introducing high and low spots in slab.
 - c. Do first steel troweling for slab S-1 finish by hand.

- D. Type S-3 (Underside Elevated Slab Finish): When forming is removed, grind off projections on underside of slab and patch defective areas, including small shallow air pockets where schedule of concrete finishes requires:

1. Prepare surfaces for painting as specified in Section 09900, Coatings.

- E. Type S-4 (Broomed Finish):

1. Finish as specified for Type S-1 floor finish, except omit final troweling and finish surface by drawing fine-hair broom lightly across surface.
2. Broom in same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to slope, except for round roof slab, broom surface in radial direction.

- F. Type S-5 (Grout-Cleaned Finish)

1. Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours. This finish shall be applied to all exterior walls and non-wetted interior walls.

3.12 CONCRETE SLAB TOLERANCES

- A. Concrete Thickness Tolerances shall be 3/8" greater or 1/4" less than specified as specified in ACI code section 117.
- B. Concrete Level Tolerances shall be F_F25 as defined in ACI code section 117 or 1/4" gap under an unleveled 10 ft. straightedge.
- C. Slope slabs to floor drain and gutter, and shall adequately drain regardless of tolerances.

3.13 CONCRETE WALL FINISHES

- A. Type W-1 (Ordinary Wall Finish):

1. Point & Patch tie holes.
2. Knock off projections.
3. Patch defective areas.

- B. Type W-2 (Smooth Wall Finish):

1. Point & Patch tie holes.
2. Grind off projections, fins, and rough spots.

3. Patch defective areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.

C. Type W-3 (Finish for Painting):

1. Point & Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch and repair defective areas as specified for Type W-2.
4. Leave surface ready for painting as specified in Section 09900, COATINGS.

D. Type W-4 (Smooth Rubbed Wall Finish):

1. Only water curing will be permitted on walls being rubbed.
2. Patch and repair defective areas as specified for Type W-2.
3. Perform rubbing while green concrete can be physically worked and smoothed without adding other materials, if structurally possible, the day following placement. Finish no later than 3 days after placement has been completed.
4. Remove forms at such a rate that all finishing, form tie filling, fin removal, and patching can be completed on same day forms are removed while curing wall.
5. After pointings have set sufficiently to permit working on surface, thoroughly saturate entire surface with water for period of 3 hours and rub until uniform surface is obtained.
6. Rub either by hand with carborundum stone of medium-coarse grade or abrasive of equal quality, or mechanically operated carborundum stone.
7. Mechanically operated carborundum stones shall be approved by ENGINEER before concrete finishing.
8. No cement grout, other than cement paste drawn from the concrete itself by the rubbing process shall be used.
9. Finish Paste Formed by Rubbing by Either Brushing or Floating as Follows:
 - a. Brushing:
 - 1) Carefully strike with clean brush.
 - 2) Brush in long direction of surface being finished.
 - b. Floating:
 - 1) Spread uniformly over surface and allow to reset.
 - 2) Finish by floating with canvas, carpet face, or cork float, or rub down with dry burlap.
9. Continue water curing of wall during finishing operation in areas not being rubbed.
10. Move water curing onto rubbed areas as soon as water will not erode rubbed surface.

E. Type W-5 (Cementitious water-proof coating)

1. Patch and repair defective areas as specified for Type W-2.

2. Substrate must be clean, sound, and free of surface contaminants. Remove dust, laitance, grease, oils, curing compounds, form release agents and all foreign particles by mechanical means. An open-textured, sandpaper-like substrate is ideal. Substrate shall be in accordance with ICRI Guideline No. 03732 for coatings and fall within CSP4. All surfaces must be saturated surface dry (SSD), with no standing water at time of application.
3. Apply cementitious water proof coating identified as Thoroseal by ChemRex, Inc., Sealcoat 1000 by Dayton Superior, or SikaTop 144 by the Sika Corporation (contractor selection) per the manufacturers recommendation and as described below:
 - a. Thoroseal by ChemRex Inc.
 1. Prepare a mixing solution of 1 part Acryl 60 and 3 parts water.
 2. Mix one 50-pound bag of Thoroseal with 8 quarts of mixing solution from item 1 above.
 3. 1st coat shall be applied at a rate of 225 sq. feet per 50lb bag.
 4. 2nd coat shall be applied at a rate of 450 sq. feet per 50lb bag.
 - b. Sealcoat 1000 by Dayton Superior
 1. Prepare a mixing solution of 1 part Ad Bond (J-40) to 3 parts clean water.
 2. Mix one 50lb bag of Sealcoat 1000 with 8 quarts of mixing solution from item 1 above.
 3. 1st coat shall be applied at a rate of 225 sq. feet per 50lb bag.
 4. 2nd coat shall be applied at a rate of 450 sq. feet per 50lb bag.
 - c. Sikatop 144 by Sika Corporation
 1. Mix components A and B at a 1:1.647 by weight ratio
 2. 1st coat 100 sq. feet per gallon
 3. 2nd coat 150 sq. feet per gallon

3.14 CONCRETE WALL TOLERANCES

Concrete Wall Tolerances shall be as defined in specification section "03100 Concrete Forms and Accessories" and as indicated in ACI code section 301.

3.15 CONCRETE BEAM AND COLUMN TOLERANCES

Concrete Beam and Column Tolerances shall be as defined in specification section "03100 Concrete Forms and Accessories" and as indicated in ACI code section 301.

3.16 BACKFILL AGAINST WALLS

- A. Do not backfill against walls until concrete has obtained specified 28 day compressive strength.

- B. Place backfill simultaneously on both sides of wall, where required, to prevent differential pressures.

3.17 FIELD QUALITY CONTROL

A. General:

1. Provide adequate facilities for safe storage and proper curing of concrete test cylinders onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
2. Provide concrete for testing of slump, air content, and for making cylinders from the point of discharge into forms. When concrete is pumped, Samples used shall be taken from discharge end of pump hose.
3. Evaluation will be in accordance with ACI 301, Chapter 17 and Specifications.
4. Specimens shall be made, cured, and tested in accordance with ASTM C31 and ASTM C39.
5. Frequency of testing may be changed at discretion of ENGINEER.
6. Pumped Concrete: Take concrete samples for slump (ASTM C143) and test cylinders (ASTM C31 and C39) and shrinkage specimens (ASTM C157) at placement (discharge) end of line.
7. Reject concrete represented by cylinders failing to meet strength and air content specified.

END OF SECTION

SECTION 11063 PACKAGED IRRIGATION PUMP STATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.02 SCOPE:

- A. Furnish all labor, equipment, materials for the installation of an automatic, prefabricated, self-enclosed, pump station for irrigation purposes. Design, fabrication, testing and service shall be the sole responsibility of the pump station manufacturer. The pump station shall provide water to the irrigation system while simultaneously maintaining a constant discharge pressure by using a prefabricated pump station with variable frequency drive (VFD) pumps for pressure regulation, under varying flow conditions up to the maximum specified capacity. Construction shall include a fabricated steel plate and skid assembly to support all components during shipping and to serve as the installed mounting base.

1.03 SUBMITTALS:

Complete product data and engineering data, including shop drawings, shall be submitted to the Engineer in accordance with the requirements of Section 01800 of the Contract Documents.

1.04 GENERAL:

- A. The prefabricated pumping station shall have a minimum capacity and discharge pressure at skid edge as stated herein.
- B. The station shall be completely wired, piped, hydraulically and electrically tested prior shipment.
- C. The discharge manifold from the pump station shall terminate at or near the pump station skid edge and be provided by the pump station manufacturer.

1.05 MANUFACTURER:

- A. The pumping station shall be model number WaterMax S3 as manufactured by WATERTRONICS, INC. 525 Industrial Drive, P.O. Box 530, Hartland, Wisconsin 53029-0530, www.watertronics.com.

Contact: Greg Salisbury (901) 497-0060 - gsalisbury@watertronics.com

The following information must be furnished by the contractor or manufacturer's representative within 10 days before bid date to the Consultant/Engineer for consideration as an equal brand:

- A. A complete specification and submittal of all major components for the proposed pump station with individual pump performance verification.
- B. A detailed pumping station proposal drawing complete with component location, sizes and dimensions specific to the installation.
- C. A complete electrical schematic for all high and low voltage circuits showing breaker/ fuse sizing, wire numbering and color.
- D. Pump station manufacturers U.L. file number for the electrical controls and pump station.
- E. A copy of the manufacturer's certificate of insurance.
- F. Product support technicians shall be capable of accessing all information pertaining to the pumping equipment, e.g. electrical schematics, pump curves, program data, bill of materials, etc. The manufacturer shall have no less than two technicians on call seven days a week.
- G. The pump station manufacturer shall provide factory authorized or factory direct service personnel for the set, start-up, preventative maintenance and general service of the pump system. A factory authorized or factory direct service technician must be located within one-hundred (100) mile radius of the project site. The pump systems technician must have a minimum of 5 years experience. The pump station manufacturer shall provide technical phone support twenty-four hours a day seven days a week.
- H. Construction shall be of modular form utilizing a steel base structurally adequate to support pumps, piping, tanks, and electrical equipment as a single integral assembly, a lockable, vented enclosure and cover. All nuts, bolts washers, and fasteners shall be zinc or cadmium plated for corrosion resistance.

Third Party Listing

Starting Equipment	U.L. Listed as and Industrial Control Device
Controls	U.L. Listed as and Industrial Control Assembly
VFD Controls	U.L. Listed as and Industrial Control Assembly

Total Design Criteria

Zone	Flow (GPM)	Pressure (PSI)
1	480	112

Incoming Power

DEVICE	Amps	Fault Amps	KVA	Voltage	Phase	Hertz
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Main Pump (50HP)/VFD	69	200,000		480	3	60
Sustain Pump (5HP)	6.8	200,000				
Accessories	3					
Total Full Load Amps	79					

Pump Station Main Disconnect

	Amps	Volts
Disconnect Panel	100	600

Operator Interface

Color	Touch Screen
STN	7.5"

Variable Frequency Drive

Operating Temperature	0 to 40°C (32° -104°F)
Humidity	Non-Condensing
Minimum Efficiency	98% (full load, base speed)
Frequency Rating	100% continuous drive rating, Intermittent 111% Drive rating for one minute

Safeties

Safety	Setting
Incoming Phase Failure and Low Voltage and Phase Reversal	10% +/-
Individual Power Phase Failure and Low Voltage	10% +/-
Low Discharge Pressure Shut down	25 PSI Below Setpoint
High Discharge Pressure Shutdown	15 PSI Above Setpoint
Individual High Pump Temp	120 F Above Setpoint
Low Inlet Pressure/Loss of Prime	0 PSI at Intake

Motor and Pump Data

	PMP	Pump
Motor HP	5 HP	50 HP
Motor/Pump RPM	3600	3600
Motor Service Factor	1.15	1.15
Motor Efficiency	86%	91%
Motor Power Factor	93%	86.4%
Motor Type	TEFC	ODP
Motor Disconnect Volts	600	600
Motor Full Load Amps	7.0	60
Locked Rotor Amps	59.5	331
Motor Fuse AIC Rating	200,000	200,000
Motor O.L. Rating, Amps	5.5	60
Motor Starter Type	XL	VFD/XL
Motor De-rate For Altitude	N/A	N/A
Pump GPM	30	400
Pump TDH	290'	300'
Pump Efficiency at Design	65%	75%
Pump Shut Off Head, FT	392'	345'
Pump Suction Iso Valve Size	2"	4"
Pump Check Valve Size	2"	4"
Check Valve Rating, PSI	200	200
Check Valve Drop at Capacity, PSI	.75	1.5

Pump Discharge Iso Valve Size	2"	4"
Isolation Valve Rating, PSI	200	200
Electronic Butterfly Valve	N/A	N/A
Station Relief Valve Size	N/A	

All Motors to be VFD rated, Motor Starting Code G, Class F Insulation

Station Suction Information

Z Pipe
6" FL x 6" FL

Station Discharge Information

Zone	Isolation Valve	Meter Run Size	Flow Meter Type	Z Pipe	TOL's
1	4"	4"	Electromagnetic DI-220B	4" FL x 6" FL	1-1.5"

Filtration

Manufacturer	Size	Quantity	Model	Micron
Valve & Filter	4"	1	V500	100
Bypass	4"	1	N/A	N/A

Manufacturer shall provide an Auto Flush System

Pump Station Heater

Size (Watts)	Voltage
500	120

PART 2 – PRODUCTS

2.01 PUMPS

Pumps shall be electric motor driven, horizontal centrifugal with mechanical shaft seal, volute case and impeller.

The shaft seal shall be a self-adjusting mechanical type to prevent leakage and eliminate the need for drain piping. The volute case shall be precision machined from gray cast iron and engineered to modern hydraulic standards. It shall be possible to rotate the discharge connection to any of four positions. A heavy cast iron bracket shall maintain alignment between the motor and volute cast.

The impeller shall be an enclosed type and balanced to provide smooth operation. The impeller is to be keyed to the shaft and locked with a special cap screw and washer. The motor shaft is to be manufactured from high grade steel and of reduced length to increase shaft rigidity, extend bearing life, and reduce the overall length of the pump and motor assembly. The motor shaft shall be protected with a replaceable stainless steel sleeve.

2.02 MOTORS

Each pump motor shall be a squirrel cage induction horizontal solid shaft type. The pump impeller shall be direct mounted and keyed to the motor shaft with a stainless steel protective sleeve. The temperature rise of the motor shall be to NEMA Standard MG-1- Class F insulation.

Radial and thrust bearings of ample capacity to accommodate the hydraulic thrust of the pump shall be incorporated into the motor. The motor shall be of proper size to drive the pump at any point on its operation curve without exceeding the service factor nameplate rating.

2.03 SKID CONSTRUCTION

Pump station skid shall be formed from a single sheet of stainless steel. Continuous welded and smooth ground at all corners resulting in a seamless, one piece structure with rounded edges and corners. If required, the skid shall be strategically reinforced underneath with structural channel iron to support pumps, manifold control enclosure and periphery. Flat steel, diamond or checker plate welded over structural steel shall not be permitted. The skid shall be drilled and tapped for mounting of pumps, manifolds, relief valves and other equipment. All tolerances shall permit direct bolting of pump station components to skid. The exterior of the skid will have drilled holes for anchor bolts. There will be two holes at each corner for lifting. The skid shall be primed and painted per enclosed specifications on both top and bottom.

2.04 FABRICATED PIPING

All fabricated piping shall conform to ASTM specifications A53 for Grade B welded or seamless pipe.

Discharge piping 6" and smaller shall be Schedule 40. All welding flanges shall be forged steel slip-on or welding neck type. All welding fittings shall be seamless, conforming to ASTM Specification A234, with pressure rating not less than 150 PSI.

2.05 DRAIN VALVES

Drains are to be provided from any possible low point in the system and are to consist of 1/4" brass petcocks. They include, but are not limited to, the following:

Drain for each pump discharge check valve

Drain in discharge manifold

A wash-down 3/4" brass hose bib shall be provided downstream of the control valves, upstream of the main station isolation valve

2.06 PUMP CHECK VALVES

Pump check valve shall be of the silent operating type that begins to close as forward velocity diminishes and be fully closed at zero velocity preventing flow reversal. Valve bodies shall be cast from ASTM-126C cast-iron or better and shall be free from blow holes, sand holes, and other impurities. The valve design shall incorporate a center guided, spring loaded poppet, guided at opposite ends and having a short linear stroke that generates a flow area equal to the pipe diameter. Internals shall be machined bronze disc, seat, and stem guide. Valves shall be sized to permit full pump capacity to discharge through them without exceeding a pressure drop of 2.5 PSI. Valves 4" and smaller to be pressure rated for 250 PSI, and 6" to be pressure rated to 150 PSI.

2.07 ISOLATION VALVES

Isolation valves shall be butterfly type with ten position lever for sizes 4" and smaller and gear operators for sizes above 4". All shall be rated at 200 PSI WOG working pressure. Trim shall include stainless steel stem, bronze or nickel coated iron streamlined disc, and full faced resilient seat designed to eliminate need for flange gaskets.

2.08 PRESSURE GAUGES

A pressure gauge shall be located on the discharge manifold for the purpose of measuring regulated, downstream pressure. Pressure gauge shall be 304 stainless steel case and bezel construction. Gauge shall be 2-1/2" diameter, liquid filled. Pressure sensing connection shall be 1/4" NPT lower gauge connection.

2.09 U.L. LISTED CONTROL PANEL, LOGIC AND SENSORS

The pumping station electrical controls shall be mounted in a self-containing NEMA 3R enclosure fabricated from not less than 12 gauge steel. Door gasket seals shall be neoprene sponge, sufficient to protect interior components from weather and dust. The electrical panel door(s) shall be constructed from 12 gauge steel with integral latches.

All external operating devices shall be dust and weather proof. All internal components of the enclosure shall be mounted on a removable back panel. Mounting screws for components shall not be tapped into the enclosure wall.

All internal wiring within, and interconnecting between, the panels shall be complete and no field wiring within the panels shall be required. Wiring troughs and cable raceways shall be self-contained within the enclosure and no external cable trays or wiring roughs are permitted.

No pressure gauges, pressure switches, water activated devices, or water lines of any sort shall be installed in any electrical control panel.

The control panel shall be designed, built, tested and U.L. listed by the pump station manufacture.

The pump station discharge pressure shall be regulated to provide surge-free constant pressure as programmed via the control panel operator interface. The control system will have the following features:

- A. Gradual entry of water from the pump into the discharge manifold to allow for complete purging of air to eliminate pressure surging.
- B. Maintain programmed downstream pressure regardless of discharge flow.
- C. Up to six, user adjustable PID control settings to ensure accurate pressure regulation at all flows, programmed pressure, or connected pump combination.
- D. Adjustable pressure ramp-up and ramp-down to assure surge free pressure regulation.
- E. After a drop in pressure, gradually increase system pressure over a user adjustable period of time to eliminate surging.
- F. Rate of change of pressure control to anticipate and eliminate rapid pressure changes caused by changing system demand.

2.10 VARIABLE FREQUENCY DRIVE (VFD)

Discharge pressure regulation shall be by a Variable Frequency Drive. Adjustment of regulated downstream pressure shall be accomplished through the control panel operator interface. Hydraulic type, pilot controlled pressure reducing valves shall not be accepted.

The variable frequency drive shall be IGBT based with selectable carrier frequency up to 15 KHZ. The VFD shall include terminals for incoming power, motor output power and control terminals.

The VFD shall generate a sine-coded, variable voltage/frequency, three phase output for optimum speed control. The VFD shall incorporate power loss ride-through for a minimum of 2 seconds. VFD protective features shall include current limit, auto restart, short circuit protection, electronic motor overload protection and ground fault protection. The VFD shall have a push button programming display for easy access to operation parameters. The VFD shall be protected on the primary side by fuses of the appropriate amperage.

Overload capacity: 120% rated output current for one minute. Voltage Fluctuation: +10%, -15%. Sine wave PWM with full range, automatic torque boost. Frequency Control Range: 0.1 to 400Hz. Frequency Accuracy: Digital, 0.01Hz, Analog, .1%. Motor overload protection, Instantaneous Over current of 180% of rated output current. Over voltage at 820VDC if 460V input. Under voltage: user adjustable. Momentary Power Loss: up to 2 second ride through. Electronic Ground Fault. LED capacitor charge indicator. Input Phase

loss alarm. Ambient temperature range of + 14 to 104 degrees F. Humidity of 95% non-condensing.

2.11 MAIN SERVICE DISCONNECT

A three-pole, main service rated disconnect shall be contained within the NEMA 4 Dead Front control enclosure. An externally mounted service disconnect shall not be acceptable. Disconnect shall isolate all power to the control enclosure. The disconnect shall have an operating handle mounted in the enclosure door, mechanically interlocked to prevent entry while disconnect is in the ON position.

2.12 MOTOR COMBINATION STARTER - BREAKER

Each motor shall be protected by a MSP combination starter and breaker. Device will be UL 508 Type F. Motor starter protector and contactor are electrically and mechanically linked by means of a link module and adapter plate. All starters are suitable for use in group installation applications according to NEC-430-53(c).

2.13 CONTROL TRANSFORMER

A control transformer shall provide 120 volt power to the pump station controls. The control transformer shall be protected on the primary and secondary sides with appropriately sized fuses. No load other than the pump station controls shall be supplied by the control transformer.

2.14 CONTROL LOGIC

The pump sequence controller shall be an industrial grade PLC with diagnostic LED's for monitoring of discrete inputs and outputs. Not less than two additional analog inputs and outputs shall be standard for monitoring and control purposes. The PLC shall contain two communication ports for monitoring and programming purposes. The PLC shall contain an EEPROM, battery backed RAM and non-volatile memory for storage of critical configuration data.

2.15 ALARMS

Controls shall shut down the pump station in the event of the following alarm conditions. The controls shall attempt to restart the system after alarm shutdown or loss of power to minimize loss of irrigation. After a user adjustable number of attempts to re-pressurize the system, the controls will go into hard shut down and remain there until manually reset.

- A. Low discharge pressure cutout. Pressure remains 20 PSI below regulated set point for a set time delay.

- B. High discharge pressure cutout. Pressure remains 11 PSI above regulated set point for set time delay.
- C. Phase / voltage cutout; High or low voltage; loss of phase or phase reversal.
- D. High pump volute temperature cutout. Pump temperature stays above 120 degrees F. for a set time delay.
- E. Starter fail cutout. Output to starter is not met with corresponding running input for set time delay. Indicates overload, phase imbalance or control fuse.
- F. Low water level hard shutdown with (ship loose) float switch

2.16 OPERATOR INTERFACE

Operator interface shall be a full color STN active matrix LCD display unit mounted in the enclosure door. Operator interface shall be used for logical display of all pump station functions. The operator interface shall be NEMA 4 rated. The operator interface shall be touch sensitive with intuitive on-screen user instruction for ease of operator use. The use of buttons or keys or off-screen user instructions shall not be permitted. The operator interface shall be LCD color display type with no less than 240 x 320 pixel resolution, with viewing area measuring not less than 5.7" diagonal. User memory for storing critical pump operation data shall not be less than required for up to 1 year of data.

The operator interface shall allow the user to view and modify all pertinent operation parameters. The operator interface shall incorporate password protection for modification of critical pump station parameters. The operator interface capabilities shall include but are not limited to the following:

- A. Overview screen showing pump system configuration. Screen shall show if each individual pump is enable or disabled, the number of hours on each pump, station full flow and pressure design criteria
- B. System screen with information on current regulation pressure, set point, regulation pressure, System status, restarts remaining, VFD reference speed, pressure regulation method (VFD or EBV modes) and adjust settings button. Adjust settings button will allow changing parameters etc after entering password.
- C. Settings menu to allow changes to pressure regulation settings, pipe saver mode, VFD manual mode, analog calibration, flow calibration, program or register settings.
- D. Flow screen will display pressure in PSI, flow in GPM and total gallons pumped in thousands of gallons. Separate display for total gallons pumped since last reset.
- E. Alarm status with time stamping, display of pump station conditions at shutdown and

restart. Alarms will be displayed in red when activated and a separate listing will be displayed in green when the alarm is reset. Alarms will be logged to a compact flash disk allowing the service technician to upload data to a spreadsheet type program.

- F. Full control of and capability of monitoring, adjusting and viewing any options present such as water level, inlet strainer, wye strainer, filtration, chemical injection, or liquid tank levels. Adjustment of automatic/manual pressure regulation set points.
- G. Graphing capability for up to 1 full year detailing flow rate and pressure. Graphing function shall give option to graph and plot a point every minute. The graph function will be selectable by day, month and year as well as the time of desired graph. All data will be logged to a compact flash disk allowing the service technician to upload data to a spreadsheet type program.

2.17 PRESSURE TRANSDUCER:

A solid state pressure transducer shall provide a noise free, linear output proportional to discharge pressure. Transducer shall be solid-state, strain gauge type with integral voltage regulating and output accuracy not less than 0.25%. Transducer shall be constructed of stainless steel and rated for the maximum pump station discharge pressure.

2.18 FLOW SENSOR:

The pump station discharge manifold shall incorporate an insertion type, pulse frequency output flow sensor for continuous output to the pump station controls. The flow sensor output pulse shall be conditioned and fed directly to the PLC interrupt input for conversion and display in Gallons Per Minute. For accuracy and security considerations, conversion to an analog signal prior to PLC input shall not be accepted. Flow sensor accuracy shall be no less than 2% for flow velocities ranging from 1-30 feet per second.

2.19 LIGHTNING ARRESTER

The main power supply feeding the pumping station shall be equipped with a 3 phase secondary surge arrester having a breakdown current rating of not less than 80,000 amps. Duty cycle testing: 2500, 10KA (8x20 μ s) impulses with less than 10% drift. Sine wave tracking, EMI/RFI noise rejection and <5ns response time. U.L. category C, approvals 1449 2nd addition. Arrester will meet IEEE standard 587.

2.20 SECONDARY CONTROL CIRCUIT FUSES

Single-pole secondary distribution fuses with appropriate ratings shall supply power to each pump starter coil circuit, the control system and to other circuits as specified.

2.21 PHASE MONITOR

The incoming power and each motor shall be protected by a phase loss/low voltage system dropout relay to de-energize the pump station control circuit or motor contactor if either a phase failure, phase reversal or low voltage condition occurs. If, after attempted automatic re-starts the phase failure/low voltage alarm condition remains, the alarm must be manually reset. Individual motor overloads will also act as phase monitors for each motor.

2.22 CORROSION INHIBITING MODULES

Corrosion inhibiting modules shall be installed in all electrical enclosures in accordance with the manufacture's recommendations.

2.23 SKID WIRING

Skid wiring shall conform to National Electrical Code Standards. All wiring from control panels to motors shall be in metal reinforced, water tight, flexible conduit with copper conductors rated not less than 600 volts and of proper size to carry the full load amperage of the motors without exceeding 70% capacity of the conductors. A grounding cable sized to National Electrical Code requirements shall be included in the flexible conduit. There shall be no splices between the motor starters and the motor connection boxes.

Wiring to flow sensors and pressure transducer shall be multi-conductor, shielded cable suitable for Class II low voltage controls. Wiring to motor operated valves shall be in flexible conduit with TFFN #18 gauge copper conductors rated not less than 600 volt.

2.24 ENCLOSURE

Construction shall include a weather resistant, 14 gauge, all marine grade aluminum enclosure with welded lockable lid guides on top and bottom. The front side of the enclosure shall have oversized cooling vents and be easily removable for servicing. The enclosure is to be supplied with twin internally mounted, heavy duty gas filled lift struts to keep the access door open. All components are to be accessible from top and front sides with the lid completely open. Enclosure is to be suitable for mounting to the pump station base and shall include openings for suction and discharge piping. Enclosure to be supplied unpainted.

2.25 EXHAUST FAN

For the purpose of cooling the pump motor, switchgear and control logic, an exhaust fan shall be located inside the pump enclosure, mounted to the enclosure. The exhaust fan shall be activated upon pump start and shall run until the pump stops. The fan shall be black die-cast aluminum construction with UL94V-0 rated polycarbonate propeller and rated for not less than 240 CFM. Fan motor shall be permanent split capacitor type with stainless steel ball bearings, class B insulation and automatic thermal protection.

2.26 STATION HEATER

The pump station manufacturer shall provide a 500 watt thermostatically controlled heater. The heater will be mounted inside the pump station enclosure and powered by the station controls.

PART 3 – EXECUTION

3.01 PAINTING

Painting of the internal pump station components shall consist of a multi-step coating system which includes metal preparation, and a two part polyurethane finish having a total dry film thickness of not less than 5 mils. Paint shall be ultraviolet insensitive. Pump station components shall be painted Watertronics green.

3.02 TESTING

The pump station manufacture shall conduct a complete factory dynamic test of the pump station prior to shipment. Pump station shall be tested throughout the entire operating range at the net discharge pressure called for in the technical specifications. Individual pump pressure, flow, RPMs, volts, amps, KW and power factor shall be documented for verification by the consulting engineer or owners' representative prior to delivery upon request.

3.03 ON-SITE START UP

Shipping, off-loading and setting of pump station to be by purchaser. Technical start up shall be furnished by the pump station manufacturer or a qualified service agency. Location and mounting details shall be furnished by the pump station manufacturer. Electrical connection by purchaser, shall consist of a single conduit from owners disconnect to the pump station main disconnect. Further electrical service by purchaser shall include bumping manual motor starter controls to prove correct rotation and securing local inspection / approval.

Technical start up procedures by the pump station manufacturer shall include the following:

- A. Station start up and pressurization
- B. Pressure, flow and programming adjustments
- C. Monitoring of complete golf course irrigation cycle when possible
- D. Customer training and presentation of owner manual

3.04 WARRANTY

The manufacturer shall warrant the pumping station to be free of defects and product malfunctions for a period of one year from date of start up or fifteen months after shipment,

whichever occurs first. Failures caused by, lighting strikes, power surges, vandalism, flooding, operator abuse, or acts of God are excluded from warranty coverage. All warranties implied or otherwise shall not exceed those warranties extended by major or sub-component suppliers.

3.05 SITE PREPARATION DRAWINGS

Drawings shall be furnished by the manufacturer within two weeks after receipt of order. Drawings shall indicate pump station alignment, discharge piping size, and electrical services required from local contractor. The owner shall return one set of drawings marked approved or corrected within one week of receipt.

3.06 OPERATION AND MAINTENANCE MANUALS

An operation and maintenance manual shall be furnished at time of start up.

END OF SECTION

SECTION 15062 DUCTILE IRON PIPE

PART 1 – GENERAL

1.01 SCOPE

- A. Provide all labor, materials, equipment and incidentals necessary to construct and disinfect, if required, all ductile iron pipe and appurtenances located inside and under buildings and structures, and test as shown on the Drawings and as specified herein.
- B. Ductile iron pipe and appurtenances covered under this Section shall include all interior pipe and accessories to the outside face of structures and buildings, except where there is no joint at the outside face. Where there is no joint at the exterior face, this Section shall include all ductile iron pipe and accessories within two feet of the exterior face of the structure or building.
- C. This Section includes piping and fittings in utility vaults and manholes.

1.02 SUBMITTALS

- A. Complete shop drawings and product data on all piping and fittings shall be submitted to the Engineer in accordance with the requirements of Section 01330 of these Specifications.
- B. Shop drawings shall indicate piping layout in plan and/or elevations and shall include a complete schedule of all pipe, fittings, specials, hangers and supports. Special castings shall be detailed showing all pertinent dimensions. Special coatings shall be clearly identified.
- C. The Contractor shall furnish the Inspector with lists of all pieces of pipe and fittings in each shipment received. These lists shall give the serial or mark number, weight, class, size and description of each item received.
- D. The Contractor shall submit written evidence to the Engineer that the products furnished under this Section will conform with the material and mechanical requirements specified herein. Certified copies of independent laboratory test results or mill test results from the pipe supplier may be considered evidence of compliance provided such tests are performed in accordance with the appropriate testing standards by experienced, competent personnel. In case of doubt as to the accuracy or adequacy of mill tests, the Engineer may require that the Contractor furnish test reports from an independent testing laboratory on samples of pipe materials.

PART 2 – PRODUCTS

2.01 DUCTILE IRON PIPE (DIP)

Ductile iron pipe shall be manufactured in accordance with AWWA C115. All pipe, except specials, shall be furnished in nominal lengths of 18 to 20 feet. Sizes will be as shown on the Drawings. All pipe shall have a minimum pressure rating as indicated in the following table, and corresponding minimum wall thickness, unless otherwise specified or shown on the Drawings:

Pipe Sizes (inches)	Special Thickness Class
4 - 54 Flanged	53
4 - 16 Grooved	53
18 Grooved	54
24 - 30 Grooved	56

2.02 FITTINGS AND ACCESSORIES

- A. Fittings, 48-inches and smaller, shall be ductile iron and shall conform to AWWA C110/ANSI A21.10 with a minimum rated working pressure of 250 psi. Fittings, 54 inches and larger, shall be ductile iron and shall conform to AWWA C153/ANSI A15.30 and shall have a minimum rated working pressure of 150 psi. AWWA C153 compact ductile fittings in sizes 4' though 36" are an acceptable substitute unless otherwise specified.
- B. Flanged elbow fittings shall be ANSI pattern using short radius elbows except where noted differently on the Drawings. Special fittings, ductile iron wall pipes and sleeves shall conform to the dimensions and details as shown on the Drawings.
- C. Thrust Collars: Thrust collars shall be welded-on ductile iron body type capable of withstanding a thrust due to 250 psi internal pressure on a dead end from either direction on that pipe size. The welded-on collars shall be continuously welded to the pipe by the pipe manufacturer.
- D. Solid sleeves shall permit the connection of plain end ductile iron pipe. Solid sleeves shall meet the requirements of ANSI/AWWA C110 for long pattern and have a minimum pressure rating of 250 psi. Solid sleeves shall have mechanical or restrained joints as specified in this Section and as shown on the Drawings. Solid sleeves shall be used only in locations shown on the Drawings or at the direction of the Engineer. Solid sleeves shall be manufactured by ACIPCO, U.S. Pipe or McWane (Clow).
- E. Tapping Saddles: Tapping saddles shall be ductile iron body type with O-ring gasket and alloy steel straps. Connection shall be flanged or mechanical joint as detailed on the Drawings. Tapping saddles shall be equal to ACIPCO A-10920 (mechanical joint) or ACIPCO A-30920 (flange joint).

- F. Flange Adapter Coupling: The flange adapter coupling shall permit the connection of unthreaded, ungrooved, open-ended ductile iron pipe to ANSI/ASME B16.1, Class 125 flanges. The flange adapter coupling shall meet the test requirements of ANSI/ASME B16.1 for Class 125 flanges. The adapter shall be a ductile iron casting incorporating gripping wedges and gasket. The gasket shall provide a compression seal between the adapter, the pipe and the adjacent flange. Flange adapter couplings are to be used only in locations specifically shown on the Drawings and shall be installed in accordance with the manufacturer's recommendations. The flange adapter coupling shall be EBAA Iron Megaflange-Flange Adapter Series 2100.
- G. Grooved joint fittings shall be manufactured of ductile iron, conforming to ASTM A395 and A536 or cast iron, conforming to ASTM A48 with grooved ends in conformance with ANSI/AWWA C606. Grooved joint fittings shall conform to ANSI A21.10/AWWA C110.

2.03 JOINTS

A. General

1. Unless shown or specified otherwise, joints for buried service shall be push-on or restrained joint type for pipe and standard mechanical, push-on or restrained joints for fittings. Joints for exposed service shall be flanged for pipe and fittings, unless shown otherwise. Grooved joint fittings are allowable subject to the specified requirements in this section.
2. Provide the necessary bolts for connections. All bolts and nuts shall be threaded in accordance with ANSI B1.1, Coarse Thread Series, Class 2A external and 2B internal fit. All bolts and nuts shall be made in the U.S.A.
3. In all cases, gaskets shall be made of material that will not be damaged by the fluid being transported nor by the environment in which the pipe is installed.

B. Mechanical Joints

1. Joints shall conform to AWWA C111/ANSI A21.11.
2. Bolts and nuts shall be Tee Head bolts and nuts of high strength low-alloy steel in accordance with ASTM A 242 to the dimension shown in AWWA C111/ANSI A21.11.
3. Gaskets shall be in accordance with AWWA C111/ANSI A21.11 and shall be constructed of neoprene unless otherwise shown on the Drawings.
4. Mechanical joint glands shall be ductile iron.
5. Retainer Glands: Retainer glands shall be Megalug Series 1100, as manufactured by EBAA Iron.

- C. Push-On Joints: Push-on joints and gaskets shall conform to AWWA C111/ANSI A21.11. Details of the joint design shall be in accordance with the manufacturer's standard practice such as ACIPCO "Fastite", McWane (Clow) "Bell-Tite", or U.S. Pipe "Tyton" joints.
- D. Flanged Joints
1. Flanged joints shall conform to AWWA C115/ANSI A21.15. Flanges shall be ductile iron and shall be furnished by the pipe manufacturer.
 2. Flanged joints shall be bolted with through stud or tap bolts of required size as directed. Bolt length and diameter shall conform to ANSI/AWWA C115 for Class 125 flanges shown in ANSI/ASME B16.1.
 - a. Bolts for exposed service shall be zinc plated, cold pressed, steel machine bolts conforming to ASTM A 307, Grade B. Nuts for exposed service shall be zinc plated, heavy hex conforming to ASTM A 563. Zinc plating shall conform to ASTM B 633, Type II.
 - b. Bolts for submerged service shall be stainless steel machine bolts conforming to ASTM A 193, Grade B8. Nuts shall be heavy hex, stainless steel conforming to ASTM A 194, Grade 8.
 3. Gaskets shall be made of 1/8-inch thick, Neoprene. Gaskets may be ring type or full face type.
 4. Flanged ductile iron pipe shall have flanges cast solidly or threaded to the pipe barrel. Pipe threads shall be of such length that with flanges screwed home, the end of the pipe shall project beyond the face line of the flange. Flange and pipe shall then be machined to give a flush finish to the pipe and the flange and surface shall be normal to the axis of the pipe. Ductile iron flanges shall be of such design that the flange neck completely covers the threaded portion of the pipe to protect same against corrosion. All pipe with threaded type flanges shall be assembled, faced, and drilled at the point of manufacture, unless otherwise approved by the Engineer.
 5. Flange filler shall conform to AWWA C110/ANSI A21.10. Joint bolt length shall be increased by the thickness of the flange filler.
 6. Where tap or stud bolts are required, flanges shall be drilled and tapped accordingly.
- E. Restrained Joints
1. Restrained joints shall be ACIPCO "FLEX-RING" or U.S. Pipe "TR-FLEX" for piping larger than 36-inches.
 2. For piping 36-inches and less, restraining gaskets shall be ACIPCO "Fast-Grip" or U.S. Pipe "Field-Lok Gasket".

3. Bolts, nuts, and joint accessories shall be in accordance with manufacturer's recommendation.
4. Gaskets shall be in accordance with manufacturer's recommendation.

F. Grooved Joints

1. Grooved joints may be used in lieu of flanged or threaded piping systems.
2. Grooved joint couplings shall consist of ductile iron housings, conforming to ASTM A395 and A536, complete with pressure responsive synthetic rubber gasket (grade to suit the intended service). This synthetic rubber is NSF 61 certified for contact with portable water. Victaulic Style 31 with Grade M Gasket.

2.04 WALL SLEEVES AND WALL PIPES

- A. Where piping passes through concrete structures, furnish and install wall sleeves unless wall pipes or other provisions are specifically shown on the Drawings.

B. Wall Sleeves

1. For pipe sizes smaller than 3-inches, wall sleeves shall be steel oversize sleeves furnished with a full circle, integral or continuously welded waterstop collar. The sleeve seal shall be the mechanically expanded, synthetic rubber type. Provide all associated bolts, seals and seal fittings, pressure clamps or plates necessary to achieve a watertight installation. Sleeves shall extend the full thickness of the concrete. All hardware shall be 316 stainless steel. Sleeves and seal shall be Link Seal.
2. For larger pipe sizes, wall sleeves shall be statically cast ductile iron mechanical joint wall sleeves. Unless specified or shown otherwise for a specific situation, wall sleeves shall be mechanical joint bell-plain end type with waterstop/thrust collar. Sleeves shall be constructed with studs and mechanical joint retainer gland on the air side of the concrete structure.

Provide retainer gland where shown on the Drawings. Where the concrete structure is exposed to dirt on one side and is wet on the other side, construct with studs and glands on the dirt side. Wall sleeves shall be equal to ACIPCO A-10771.

C. Wall Pipes

1. Wall pipes shall be either statically cast ductile iron with integral waterstop/thrust collar or centrifugally cast ductile iron with a continuously welded waterstop/thrust collar. The welded-on collar shall be attached to the pipe by the manufacturer. The collar shall be capable of withstanding a thrust force caused by a 250 psi dead end load from either direction on that size pipe. Wall pipes shall be furnished uncoated on the outside and cement

lined on the inside.

2. Where shown on the Drawings, provide wall pipes (flange by restrained joint) which shall bolt to a Type C wall thimble provided by the sluice gate manufacturer. Class 125 flanges shall be provided.
3. Wall pipes shall be cast and/or fabricated and lined in one manufacturer's facility and delivered to the job site ready for use.
4. Wall pipe flanges shall be located 9-inches from wall to face of flange unless otherwise noted on the Drawings.

2.05 COATINGS

The exterior of pipe and fittings for buried service shall be factory coated with an asphaltic coating conforming to AWWA C151/ANSI 21.51 for ductile iron pipe, AWWA C115/ANSI 21.15 for flanged pipe and AWWA C110/ANSI 21.10 for fittings. Pipe and fittings which shall be exposed or submerged shall be factory coated with a general purpose rust inhibitive primer compatible with the type of paint which will be field applied in accordance with the requirements of Section 09900 of these Specifications.

2.06 PIPE LININGS

- A. Cement Linings: Unless shown or specified otherwise, ductile iron pipe and fittings shall be cement lined in accordance with AWWA C104/ ANSI A21.4, standard thickness.
- B. Interior Lining: Ductile iron piping and fittings shall be epoxy lined where shown on the drawings.
- C. Epoxy Lining:
 1. Linings shall cover all exposed surfaces of pipe and fittings. The lining of the pipe barrel shall extend from spigot end through the socket to the edge of the gasket sealing area or recess for pipe using push-on gaskets, and to the edge of the gasket seat for mechanical joints. The lining shall also cover the exterior of the spigot end from the end of the pipe to beyond the gasket sealing area. The lining in fittings shall cover the interior surfaces including the socket areas as defined above. All linings shall be hermetically sealed at the ends.
 2. Lining Material: The lining material shall be Protecto 401 Ceramic Epoxy, a two component, modified epoxy formulated for corrosion control with the following minimum requirements:
 - a. A permeability rating of 0.0 perms when measured by ASTM E 96, Procedure A. Duration of the test shall be six weeks.
 - b. A direct impact resistance of 125 inch-pounds with no cracking when measured by ASTM D 2794.
 - c. The ability to build at least 50 mils dry in one coat.

- d. The material shall be recoatable with itself for at least seven days with no additional surface preparation when exposed to direct summer sun and a temperature of 90 degrees F.
 - e. The material shall contain at least 20 percent by volume of ceramic quartz pigment.
 - f. A test and service history demonstrating the ability of the material to withstand the service expected.
 - g. Possess a minimum solids volume content of 88 percent, \pm one percent.
 - h. Possess a maximum drying time to allow recoating as follows: 50 degrees F - 72 hours; 75 degrees F - 18 hours; 90 degrees F - 8 hours. If recoating cannot be accomplished within seven days, a light brush blast shall be performed to improve intercoat adhesion.
- 3. Surface Preparation: The interior of the pipe exposed to liquids and gases shall be blasted and cleaned to remove all loose laitance, scale, or other loose material. No lining shall take place over grease, oil, etc., that would be detrimental to the adhesion of the compound to the substrate.
 - 4. Application: The lining shall be applied using a centrifugal lance applicator by workers employed by Vulcan Painters, Inc. The workers shall be experienced and competent in the surface preparation, application and inspection of the lining to be applied. The compound shall not be applied when the substrate temperature is below 40 degrees F or in adverse atmospheric conditions which will cause detrimental blistering, pinholing or porosity of the film.
 - 5. Lining of pipe barrel and fittings shall be 40 mils nominal thickness; minimum lining thickness shall be 30 mils. Lining thickness for exterior of spigot and interior of socket shall be 8 to 10 mils.
 - 6. All pipe and fitting linings shall be tested for pinholes in accordance with ASTM G 62, Method B and shall be holiday free.
 - 7. All pipe linings shall be checked for thickness using a magnetic film thickness gauge.
 - 8. Each pipe joint and fitting shall be marked with the date of application of the lining system and with the numerical sequence of application of that date."

2.07 EXPANSION JOINTS

- A. The Expansion Joint shall have a rubber inner tube, a body constructed of multiple piles of fabric impregnated with synthetic rubber, and a protective outer cover of synthetic rubber to provide resistance to deterioration from weather and ozone. Special covers shall be applied when indicated on the drawings to resist weather, ozone, and corrosive fumes. Steel wire shall be imbedded in the body for additional strength.

- B. The elastomer and fabric materials shall be determined by the temperature and chemical compatibility requirements, as indicated on the drawings.
1. Class I - to 108°F: PGR, Neoprene, Buna-N, or Hypalon, with Nylon or Polyester reinforcement.
 2. Class II - to 250°F: Chlorobutyl, EPDM, or Teflon® -lined, with Polyester reinforcement.
 3. Class III - to 400°F: Solid Viton®, with Kevlar® reinforcement.
- C. Flanges shall be constructed integrally with the body to resist stresses. Flanges shall be full-pattern so that gaskets are not necessary. Flanges shall be drilled to ANSI B16.5 Class 150#. Flanges shall be accompanied with Galvanized 3/8" split steel retaining rings and enough control rods installed to achieve a working pressure of 200 psi.
- D. The expansion joint shall be available with a single arch or multiple arches, in open or filled arch (s) construction, and with wide arch (es) as specified on the drawings. Joint dimensions, movement, and spring rates for all variations shall follow Fluid Sealing Association guidelines.
- E. The elastomer construction of the joint acts to absorb vibration, preventing it from being transmitted to the piping, as well as compensation for lateral deflection. The integral arch allows for axial compression and elongation of the joint, to compensate for expansion and contraction of the piping.
- F. All expansion joints shall be Redflex™ Type J-1 as manufactured by the Red alve Company, Inc. of Carnegie, PA 15105 or approved equal.

PART 3 – EXECUTION

3.01 CUTTING

- A. When new or existing pipe is required to be cut, the pipe shall be cut in such a manner as to leave a smooth end normal to the axis of the pipe.
- B. All cutting of ductile iron pipe shall be performed with a cutting saw. All burrs shall be removed from the inside and outside edges of all cut pipe. All damaged linings and coatings shall be repaired.
- C. Lining Repair: Repair linings and recoat spigot ends of cut pipe with a product equal to Protecto 101 in accordance with the manufacturer's recommendations and as specified below:
1. Remove all burrs and areas of loose lining materials by sanding or scraping to bare metal.
 2. Remove oil and lubricants used during field cutting.
 3. Lining shall be stripped back a minimum of 1-inch from the spigot end into

well adhered lined areas.

4. Roughen 1 to 2-inches of good lining with a rough grade (40 grit) emery paper, rasp or small chisel, to allow an overlap between new and existing lining.
5. Apply lining repair material in the number of coats required to match the thickness requirements as specified in Part 2 of this Section and in accordance with the manufacturer's recommendations.

3.02 JOINT ASSEMBLY

- A. General: Ductile iron pipe shall be assembled in accordance with ANSI/AWWA C600.
- B. Push-On Joints: The inside of the bell and the outside of the pipe from the plain end to the guide stripe shall be wiped clean immediately before assembling the pipe joint. Then the rubber gasket shall be inserted into a groove or shaped recess in the bell. Both the bell and spigot ends to be joined shall be wiped again to ensure they are thoroughly clean. A liberal coating of special lubricant furnished by the pipe manufacturer shall be applied to the outside of the pipe. The plain end shall be centered in the bell and the spigot pushed home.
- C. Mechanical Joints
 1. The surfaces with which the rubber gasket comes in contact shall be brushed thoroughly with a wire brush just prior to assembly to remove all loose rust or foreign material which may be present and to provide clean surfaces which shall be brushed with a liberal amount of soapy water or other approved lubricant just prior to slipping the gasket over the spigot end and into the bell. Lubricant shall be brushed over the gasket prior to installation to remove loose dirt and lubricate the gasket as it is forced into its retaining space.
 2. Joint bolts shall be tightened by the use of wrenches and to a tension recommended by the pipe manufacturer. When tightening bolts, the gland shall be brought up toward the pipe bell. If effective sealing is not attained at the maximum torque indicated above, the joint shall be disassembled and reassembled after thorough cleaning. Overstressing of bolts to compensate for poor installation shall not be permitted.
 3. After installation, bolts and nuts in buried piping shall be given two heavy coats of a bituminous paint. Bolts and nuts for exposed or submerged service shall be coated in accordance with the requirements of Section 09900 of these Specifications.
- D. Flanged Joints
 1. All flanges shall be true and perpendicular to the axis of the pipe. Flanges shall be cleaned of all burrs, deformations, or other imperfections before

joining. Flanged joints shall be installed so as to ensure uniform gasket compression. All bolting shall be pulled up to the specified torque by crossover sequence. Where screwed flanges are used, the finished pipe edge shall not extend beyond the face of the flange, and the flange neck shall completely cover the threaded portion of the pipe.

2. Connections to equipment shall be made in such a way that no torque is placed on the equipment flanges. Connecting flanges must be in proper position and alignment and no external force may be used to bring them together properly.
3. After installation, bolts and nuts for exposed or submerged service shall be coated in accordance with the requirements of Section 09900 of these Specifications.
4. Flanged filler shall be used only where shown on the Drawings or approved by the Engineer to make up minor differences in pipe length, less than 3-inches. Joint bolts shall be increased in length by the thickness of the flange filler.

E. Grooved Joints

All grooved couplings, fittings and valves shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components. The gasket style and elastomeric material (grade) shall be verified as suitable for the intended service as specified. Gaskets shall be molded and produced by the grooved coupling manufacturer. Grooved ends shall be clean and free from indentations and projections in the area from pipe end to groove. Grooved coupling manufacturer's factory trained field representative shall provide on-site training for contractor's field personnel in the proper use of grooving tools, application of groove, and installation of grooved piping products. Factory trained representative shall periodically inspect the product installation. Contractor shall remove and replace any improperly installed products.

- F. Joints of Dissimilar Metals: When a flanged joint consists of a ductile iron flange mated to a steel or alloy flange, the steel flanges shall be flat faced and furnished with full-faced gaskets, insulating bushings.

3.03 DRILLING AND TAPPING

- A. Wherever required ductile iron pipe and fittings shall be drilled and tapped to receive drainage or any other piping. All holes shall be drilled accurately at right angles to the axis of any pipe or fitting. Where plugs are drilled, holes shall be at right angles to the face of the plug.
- B. Unless shown otherwise, small diameter pipes, less than 2-inches, shall be connected to ductile iron pipe using one of the following methods:
 1. Direct tap.

2. Direct tap with service saddle.
 3. Direct tap boss.
 4. Tapped plug or flange on tapping saddle.
- C. In no case shall the effective number of threads be less than 4.

3.04 CONSTRUCTING BENEATH AND BEYOND STRUCTURES

- A. Construct beyond buildings and structures in accordance with Section 02221 of these Specifications.
- B. All ductile iron pipe installed under buildings or basins shall be encased and backfilled in accordance with Section 02300 and 02317 of these Specifications.
- C. All ductile iron pipes entering buildings or basins shall be adequately supported between the structure and undisturbed earth to prevent damage resulting from settlement of backfill around the structure.

3.05 CONSTRUCTING WITHIN STRUCTURES

- A. Proper and suitable tools and appliances for safe and convenient handling and laying of pipe and fittings shall be used. Care shall be taken to prevent the pipe coating from being damaged, particularly cement linings on the inside of the pipes and fittings. Any damage shall be remedied as directed by the Engineer.
- B. All pipe and fittings shall be carefully examined by the Contractor for defects just before installing and no pipe or fitting shall be installed if it is defective. If any defective pipe or fitting is discovered after having been installed, it shall be removed and replaced in a satisfactory manner with a sound pipe or fitting by the Contractor at Contractor's own expense.
- C. All pipes and fittings shall be thoroughly cleaned before they are installed and shall be kept clean until they are used in the completed work. Open ends of pipe shall be kept plugged with a bulkhead during construction.
- D. All elbows, tees, brackets, crosses, and reducers in pressure piping systems shall be adequately restrained against thrust.
- E. Wall pipe and wall sleeves shall be accurately located and securely fastened in place before concrete is poured. All wall pipe and sleeves shall have wall collars properly located to be in the center of the wall where the respective pipes are to be installed. Pipe passing through the sleeve shall extend no more than three feet beyond the structure without a piping joint.
- F. Wall pipe and wall sleeves shall be constructed when the wall or slab is constructed. Blocking out or breaking of the wall for later installation shall not be permitted.

- G. Cutting or weakening of structural members to facilitate pipe installation shall not be permitted. All piping shall be installed in place without springing or forcing.
- H. Exposed ductile iron piping shall be supported as shown on the Drawings and specified in Section 15060 of these Specifications.

3.06 FIELD PAINTING

Field painting of exposed and submerged pipe shall be in accordance with the requirements of Section 09900 of these Specifications.

3.07 INSPECTION AND TESTING

All testing shall be in accordance with the requirements of Section 01450 of these Specifications.

3.08 INSULATION AND HEAT TRACING

Provide insulation and heat tracing in accordance with Section 15080 of these Specifications.

3.09 DISINFECTION

Following installation and testing, potable water lines shall be disinfected in accordance with the requirements of Section 02510 of these Specifications.

3.10 CLEANING

In accordance with Section 01740 of these Specifications.

END OF SECTION

ATTACHMENT A

DRUG - FREE WORKPLACE CERTIFICATION

THE UNDERSIGNED CERTIFIES THAT THE PROVISIONS OF CODE SECTIONS 50-24-1 THROUGH 50-24-6 OF THE OFFICIAL CODE TO GEORGIA ANNOTATED, RELATED TO THE **DRUG-FREE WORKPLACE**, HAVE BEEN COMPLIED WITH IN FULL. THE UNDERSIGNED FURTHER CERTIFIES THAT:

1. A Drug-Free Workplace will be provided for the employees during the performance of the contract; and
2. Each sub-contractor under the direction of the Contractor shall secure the following written certification:

_____ (CONTRACTOR) certifies to Chatham County that a Drug-Free Workplace will be provided for the employees during the performance of this contract known as **SALLIE MOOD SOCCER COMPLEX IRRIGATION IMPROVEMENTS** pursuant to paragraph (7) of subsection (B) of Code Section 50-24-3. Also, the undersigned further certifies that he/she will not engage in the unlawful manufacture, sale, distribution, possession, or use of a controlled substance or marijuana during the performance of the contract.

CONTRACTOR

DATE

NOTARY

DATE

ATTACHMENT B

PROMISE OF NON-DISCRIMINATION STATEMENT

Know All Men By These Presence, that I (We), _____
Name

_____, _____
Title Name of Bidder

(herein after Company) in consideration of the privilege to bid/or propose on the following Chatham County project procurement **SALLIE MOOD SOCCER COMPLEX IRRIGATION IMPROVEMENTS** hereby consent, covenant and agree as follows:

- (1) No person shall be excluded from participation in, denied the benefit of or otherwise discriminated against on the basis of race, color, national origin or gender in connection with the bid submitted to Chatham County or the performance of the contract resulting therefrom;
- (2) That it is and shall be the policy of this Company to provide equal opportunity to all business persons seeking to contract or otherwise interested with the Company, including those companies owned and controlled by racial minorities, and women;
- (3) In connection herewith, I (We) acknowledge and warrant that this Company has been made aware of, understands and agrees to take affirmative action to provide minority and women owned companies with the maximum practicable opportunities to do business with this Company on this contract;
- (4) That the promises of non-discrimination as made and set forth herein shall be continuing throughout the duration of this contract with Chatham County;
- (5) That the promises of non-discrimination as made and set forth herein shall be and are hereby deemed to be made a part of and incorporated by reference in the contract which this Company may be awarded;
- (6) That the failure of this Company to satisfactorily discharge any of the promises of non-discrimination as made and set forth above may constitute a material breach of contract entitling the County to declare the contract in default and to exercise appropriate remedies including but not limited to termination of the contract.

Signature

Date

ATTACHMENT C

DISCLOSURE OF RESPONSIBILITY STATEMENT

Failure to complete and return this information will result in your bid/offer/proposal being disqualified from further competition as non-responsive.

1. List any convictions of any person, subsidiary, or affiliate of the company, arising out of obtaining, or attempting to obtain a public or private contract or subcontract, or in the performance of such contract or subcontract.

2. List any indictments or convictions of any person, subsidiary, or affiliate of this company for offenses such as embezzlement, theft, fraudulent schemes, etc. or any other offenses indicating a lack of business integrity or business honesty which affects the responsibility of the contractor.

3. List any convictions or civil judgments under states or federal antitrust statutes.

4. List any violations of contract provisions such as knowingly (without good cause) to perform, or unsatisfactory performance, in accordance with the specifications of a contract.

5. List any prior suspensions or debarments by any governmental agency.

6. List any contracts not completed on time.

7. List any penalties imposed for time delays and/or quality of materials and workmanship.

8. List any documented violations of federal or any state labor laws, regulations, or standards, occupational safety and health rules.

I, _____, as _____
Name of individual Title & Authority

of _____, declare under oath that

Company Name _____

the above statements, including any supplemental responses attached hereto, are true.

Signature

State of _____

County of _____

Subscribed and sworn to before me on this _____ day of _____

20__ by _____ representing him/herself to be

_____ of the company named herein.

Notary Public

My Commission expires:

Resident State: _____

DPC Form #45

ATTACHMENT D
IMMIGRATION AND SECURITY FORM

SB529 (The Ga Security and Immigration and Compliance Act) requires contractors to file an affidavit that the contractor and its subcontractors have registered and participate in a federal work authorization program intended to insure that only lawful citizens or lawful immigrants are employed by the contractor or subcontractor. This requirement of SB529 is a phased-in affidavit filing requirement based on the size of the contractor. Contractors with 500 or more employees are required to file an affidavit of compliance beginning 7/1/07. However, because the requirement is set forth in OCGA 13-10-91 which is a part of Chapter 10 of Title 13 governing public works contracts, the affidavit filing requirements of SB529 therefore only apply to public works contracts.

A. In order to insure compliance with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act OCGA 13-10-90 et.seq., Contractor must initial one of the sections below:

_____ Contractor has 500 or more employees and Contractor warrants that Contractor has complied with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act by registering at <https://www.vis-dhs.com/EmployerRegistration> and verifying information of all new employees; and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-.01 et.seq.

_____ Contractor has 100-499 employees and Contractor warrants that no later than July 1, , Contractor will register at <https://www.vis-dhs.com/EmployerRegistration> to verify information of all new employees in order to comply with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act; and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-.01 et.seq.

_____ Contractor has 99 or fewer employees and Contractor warrants that no later than July 1, 2009, Contractor will register at RLINK"<https://www.vis-ddhs.com/EmployerRegistration>"

<https://www.vis-dhs.com/EmployerRegistration> to verify information of all new employees in order to comply with the Immigration Reform and Control Act of 1986 (IRCA), D.L. 99-603 and the Georgia Security and Immigration Compliance Act; and by executing any affidavits required by the rules and regulations issued by the Georgia Department of Labor set forth at Rule 300-10-1-.01 et.seq.

B. Contractor warrants that Contractor has included a similar provision in all written agreements with any subcontractors engaged to perform services under this Contract.

Signature _____	Title _____
Firm Name: _____	
Street/Mailing Address: _____	
City, State, Zip Code: _____	
Telephone Number: _____	
Email Address: _____	

IS Form 529

ATTACHMENT E

CONTRACTOR AFFIDAVIT AND AGREEMENT

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm, or corporation which is contracting with (name of public employer) has registered with and is participating in a federal work authorization program* [any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603], in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

The undersigned further agrees that, should it employ or contract with any subcontractor(s) in connection with the physical performance of services pursuant to this contract with (name of public employer), contractor will secure from such subcontractor(s) similar verification of compliance with O.C.G.A. 13-10-91 on the Subcontractor Affidavit provided in Rule 300-10-01- 08 or a substantially similar form. Contractor further agrees to maintain records of such compliance and provide a copy of each such verification to the (name of the public employer) at the time the subcontractor(s) is retained to perform such service.

EEV / Basic Pilot Program* User Identification Number

BY: Authorized Officer or Agent
(Contractor Name)

Date

Title of Authorized Officer or Agent of Contractor

Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE
____ DAY OF _____, 200__

Notary Public

My Commission Expires:

* As of the effective date of O.C.G.A. 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

SUBCONTRACTOR AFFIDAVIT

By executing this affidavit, the undersigned subcontractor verifies its compliance with O.C.G.A. 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services under a contract with (name of contractor) on behalf of (name of public employer) has registered with and is participating in a federal work authorization program* [any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or any equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, pursuant to the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603], in accordance with the applicability provisions and deadlines established in O.C.G.A. 13-10-91.

EEV / Basic Pilot Program* User Identification Number

BY: Authorized Officer or Agent
(Subcontractor Name)

Date

Title of Authorized Officer or Agent of Subcontractor

Printed Name of Authorized Officer or Agent

SUBSCRIBED AND SWORN
BEFORE ME ON THIS THE

____ DAY OF _____, 200__

Notary Public

My Commission Expires:

* As of the effective date of O.C.G.A. 13-10-91, the applicable federal work authorization program is the "EEV / Basic Pilot Program" operated by the U. S. Citizenship and Immigration Services Bureau of the U.S. Department of Homeland Security, in conjunction with the Social Security Administration (SSA).

ATTACHMENT F

CHATHAM COUNTY, GEORGIA

**BIDDER'S CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY
AND VOLUNTARY EXCLUSION**

The undersigned certifies, by submission of this proposal or acceptance of this contract, that neither Contractor 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, State of Georgia, City of Savannah, Board of Education or local municipality. Bidder agrees that by submitting this proposal that Bidder will include this clause without modification in all lower tier transactions, solicitations, proposals, contracts and subcontracts. Where the Bidder or any lower tier participant is unable to certify to this statement, that participant shall attach an explanation to this document.

Certification - the above information is true and complete to the best of my knowledge and belief.

(Printed or typed Name of Signatory)

(Signature)

(Date)

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001

END OF DOCUMENT Mod. CC P & C 6/2005

CHATHAM COUNTY PURCHASING DIVISION

NO-BID STATEMENT

In an effort to make the procurement of construction, goods and services for Chatham County as competitive as possible, we are soliciting information from contractors and or vendors who cannot bid. Your "responsiveness" and "constructive" comments will be appreciated.

Completion of this form will assist us in evaluating factors which relate to the competitiveness of our bids. Please check any of the boxes below which may apply. Please explain any issues you feel needs addressing.

- ☐ Specifications - Restrictive, too "tight", unclear, specialty item, geared toward one (1) brand or manufacturer only. (Explain below)
- ☐ Manufacturing - Unique item, production time for model or item has expired, etc.
- ☐ Bid Time - Insufficient time to properly respond to bid or proposal.
- ☐ Delivery Time - Specified delivery time cannot be met.
- ☐ Payment - Delay in payment terms. Please be specific.
- ☐ Bonding - We are unable to meet bonding requirements.
- ☐ Insurance - We are unable to meet insurance requirements.
- ☐ Removal - From bidders list for this particular commodity or service.
- ☐ Keep - Our company on your bidders list for future reference.
- ☐ Project is - Too Large____ Too Small____ Site Location Too Distant_____.
- ☐ Miscellaneous - Do not wish to bid, do not handle this type of item (s), unable to compete, contract clause (s) not acceptable, etc. Please be specific.

CONSTRUCTION PROJECTS: Please provide reason for obtaining a bid package. Check one below.

Interest in this project as a Prime Contractor____, Sub-Contractor____, Supplier_____.

The intent in obtaining this information, is to utilize it to adjust procedures, if appropriate and to obtain maximum participation in the competitive bid process. Vendor comments are not restricted to those items listed. Please submit any statement relative to this bid which you feel has an impact on your inability to bid.

VENDOR STATEMENT

NOTE: RETURN THIS FORM ONLY IF YOU ARE NOT SUBMITTING A BID.

Signature

Firm Name

Bid Number 11-1-16-5

Sallie Mood Soccer Complex Irrigation Improvements

Telephone Number

Fax Number

Purchasing Agent ...Telephone: 912-790-1623 or Fax: 912-790-1627

REFERENCE FORM

REFERENCES - \$499,999 or less: On July 25, 2003 the Board of Commissioners directed that all construction projects with a bid of \$499,999 or less, for bidders to be responsive each must provide information on the most recent three (3) projects with similar scope work as well as other information to determine experience and qualifications as follows. If the contractor has performed any work for the Chatham County Board of Commissioners within the last five (5) years, at least one (1) of the three (3) owner references must be from the appropriate party within the Chatham County Government.

- a. Project Name: _____
 Location: _____
 Owner: _____
 Address: _____
 City and State: _____
 Contact: _____
 Phone & Fax: _____

 *Architect or Engineer: _____
 Contact: _____
 Phone & Fax: _____
 Email: _____
- b. The awarded bid amount and project start date. _____
 c. Final cost of project and completion date. _____
 d. Number of change orders. _____
 e. Contracted project completion in days. _____
 f. Project completed on time. Yes ___ No ___ Days exceeded _____
 g. List previous contracts your company performed for Chatham County by Project Title, date and awarded/final cost.
 h. Has contractor ever failed to complete a project? ___ If so, provide explanation.
 i. Have any projects ever performed by contractor been the subject of a claim or lawsuit by or against the contractor? ___ If yes, please identify the nature of such claim or lawsuit, the court in which the case was filed and the details of its resolution.

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REFERENCES - \$499,999 or less: On July 25, 2003 the Board of Commissioners directed that all construction projects with a bid of \$499,999 or less, for bidders to be responsive each must provide information on the most recent three (3) projects with similar scope work as well as other information to determine experience and qualifications as follows. If the contractor has performed any work for the Chatham County Board of Commissioners within the last five (5) years, at least one (1) of the three (3) owner references must be from the appropriate party within the Chatham County Government.

- a. Project Name: _____
 Location: _____
 Owner: _____
 Address: _____
 City and State: _____
 Contact: _____
 Phone & Fax: _____

 *Architect or Engineer: _____
 Contact: _____
 Phone & Fax: _____
 Email: _____

- b. The awarded bid amount and project start date. _____
 c. Final cost of project and completion date. _____
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Location: _____
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Address: _____
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Contact: _____
Phone & Fax: _____
Email: _____
- b. The awarded bid amount and project start date. _____
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g. List previous contracts your company performed for Chatham County by Project Title, date and awarded/final cost.
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i. Have any projects ever performed by contractor been the subject of a claim or lawsuit by or against the contractor? ___ If yes, please identify the nature of such claim or lawsuit, the court in which the case was filed and the details of its resolution.

LEGAL NOTICE

CC NO. 164289

INVITATION TO BID

Sealed Bids will be received until 2:00 P.M., (LOCAL TIME) on SEPTEMBER 2, 2010 and publicly opened in Chatham County Purchasing & Contracting Department, at The Chatham County Citizens Service Center, 1117 Eisenhower Drive, Suite C, Savannah, Georgia, for: BID NO : 11-1-16-5 SALLIE MOOD SOCCER COMPLEX IRRIGATION IMPROVEMENTS.

"MANDATORY ON-SITE" PRE-BID CONFERENCE: 10:00 AM., AUGUST 19, 2010. A Conference will be held at the Chatham County Soccer Complex, 7221 Sallie Mood Drive, Savannah, Georgia. Your attendance is required. Bids will not be accepted from any vendors not represented at the "Mandatory On-Site" Pre-Bid Conference.

Bid Packages and Plan sheets are available from the office of the Chatham County Purchasing & Contracting Department, at the above address. There is a **\$50 non-refundable charge for this package.**

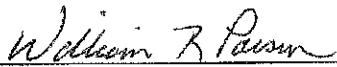
The Bid Package can be downloaded and printed from the County website <http://purchasing.chathamcounty.org> Also, all firms requesting to do business with Chatham County must also register on-line at website <http://purchasing.chathamcounty.org>

The Bid Package and Plans must still be picked up and purchased from the Purchasing & Contracting Office.

Bid Bond shall be required at the time of bid. (5% of total bid)
Payment and Performance Bonds (100% of bid) will be required for this project at the time of contract award.

CHATHAM COUNTY HAS THE AUTHORITY TO REJECT ALL BIDS AND WAIVE MINOR FORMALITIES.

"CHATHAM COUNTY IS AN EQUAL OPPORTUNITY EMPLOYER. M/F/H. ALL BIDDERS ARE TO BE EQUAL OPPORTUNITY EMPLOYERS"



WILLIAM R. PARSON, CPPO, PURCHASING AGENT

SAVANNAH NEWS/PRESS INSERT: August 2; August 16, 2010

Please send affidavit to:
Chatham County Purchasing & Contracting Department
P.O. Box 15180
Savannah, Georgia 31416
(912) 790-1619