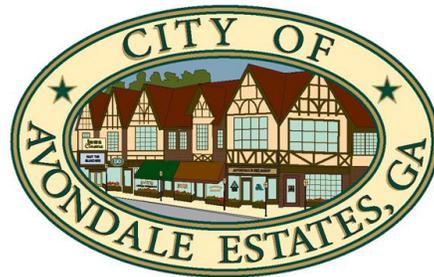


PROJECT MANUAL

for

**DRAINAGE REPAIRS – MAJESTIC
CIRCLE**

Avondale Estates-
Avondale Estates, Georgia
CPL 2022-001



January 28, 2022

ARCHITECT/ENGINEER



Clark Patterson Lee
ARCHITECTURE | ENGINEERING | PLANNING

3011 Sutton Gate Drive, Suite 130
Suwanee, Georgia 30024
(770) 831-9000

CPL PROJECT NUMBER 16199.00

OWNER

CITY OF AVONDALE ESTATES
21 North Avondale Estates Plaza
Avondale Estates, Georgia 30002

(404) 294-5400
FAX (404) 299-8137

Mr. Patrick Bryant – City Manager

PRIMARY CONSULTANT:

**ARCHITECT &
ENGINEER**

CLARK PATTERSON LEE
3011 Sutton Gate Drive, Suite 130
Suwanee, Georgia 30024

(770) 831-9000
FAX (770) 831-9243

Rich Edinger, P.E. – Vice President
Larry Genn, P.E. – Project Manager

TECHNICAL PROVISIONS

DIVISION 0 - BIDDING/CONTRACT REQUIREMENTS

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END OF SECTION 00 002

**INVITATION TO BID ON THE
AVONDALE ESTATES – DRAINAGE REPAIRS – MAJESTIC CIRCLE
PROJECT BID NO. CIP 2022-001**

The City of Avondale Estates is soliciting competitive sealed bids from qualified contractors for construction of a detention pond and other supporting storm water improvements. Sealed bids will be received by the City of Avondale Estates, 21 North Avondale Estates Plaza, Avondale Estates, Georgia 30002, until 3:00 p.m. local time on **MARCH 31, 2022**, and then publicly opened and read aloud. Any bid received after 3:00 p.m. (noon) will not be accepted. Bid envelope must be marked on the outside with Bid Number, Name of Bidder, date and time of opening and Contractor's License Number. Failure to display Contractor's License Number may result in the bid being returned.

Work required under the Contract will include the removal and upgrading of storm water management systems as indicated on the construction documents. Included elements are removal of existing storm conveyance elements, installation of concrete driveway, removal & replacement of fencing, installation of storm water conveyance piping, manholes/inlets, headwalls, & rip rap, as well as associated erosion control systems throughout the project duration including sod for disturbed areas.

An optional pre-bid meeting will be held at City of Avondale Estates, 21 North Avondale Estates Plaza, Avondale Estates, Georgia 30002 on March 18, 2022, at 10 a.m. local time. Interested parties should contact Beth Farmer at (770) 831-9000 or bmfarmer@cplteam.com to request a bid package.

Clark Patterson Lee
3011 Sutton Gate Drive, Suite 130
Suwanee, GA 30024

Bids shall be entered on a lump sum price basis and as described in the project manual.

One complete set of drawings and specifications shall be provided to General Contractors only. No partial sets of working drawings or specifications shall be issued. Questions shall be emailed to Clark Patterson Lee, Attention: Avondale Estates City Engineer Bid No. 2022-001 at lgenn@cplteam.com. Questions will be received up to March 24, 2022, at 5:00 p.m. Responses will be made through email. Contractor shall provide email address on facsimile and/or at time of bid package request and/or pick up.

Bids in the case of Corporations not chartered in Georgia, must be accompanied by proper certification stating that said Corporation is authorized to do business in the State of Georgia.

No Bidder may withdraw his Bid within ninety (90) days after the actual date of the opening thereof.

All Bidders are required to submit a Bid Bond or a certified check made payable to the City of Avondale Estates in the amount of five percent (5%) of the total amount bid. The successful bidder will be required to furnish a contract performance bond and payment bond in the amount of one hundred percent (100%) of the total amount bid and provide insurance coverage as required by the contract documents. The Bid Bond or certified check must be enclosed in the envelope with the sealed bid.

Bonding Company must be licensed to do business in Georgia, licensed to do business by the Georgia Secretary of State, authorized to do business in Georgia by the Georgia Insurance Department, listed in the Department of the Treasury's Publication of Companies Holding Certificates of Authority as Acceptable Surety on Federal Bonds and as Acceptable Reinsuring Companies and have an A.M. Best rating of A-, Class V or higher.

The Owner will award the Contract to the lowest "qualified" bidder, subject with the Owner's right to reject any or all bids, to waive technicalities, and to make an award deemed in its best interests.

END of 00010 Invitation to Bid

SECTION I
INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS:

- 1.1 The terms used in Instructions to Bidders and defined in General Conditions (Section G) shall have meanings assigned to them in General Conditions.
- 1.2 The term “Successful Bidder” means the Bidder to whom the Owner awards or expects to award the contract.

2. COPIES OF BID DOCUMENTS:

- 2.1 Bid Document Package may be available in advance to contractors and other interested parties at the cost and location stipulated in the INVITATION TO BID.
- 2.2 Complete sets of Bid Documents shall be used in preparing Bids. The Owner assumes no responsibility for errors or misinterpretations resulting from using incomplete sets of Bid Documents.
- 2.3 The Owner, in making Bid Documents available on the above terms, does so only to obtain Bids on Work and does not confer license or grant for any other use.
- 2.4 Any part of the Bid Documents may be modified by Addenda.

Where forms are provided, **THEY MUST BE USED WITHOUT SUBSTITUTION!** Use of forms other than those provided by the City shall constitute a non-responsive Bid and shall be rejected.

NOTE: Bidder must submit one original and one copy of Bid Documents to include: Bid Form; Instructions to Bidders; Bidder’s Affidavit; Non-Collusion Affidavit; and Bid Bond.

3. QUALIFICATIONS OF BIDDERS:

- 3.1 The City may make any investigations deemed necessary to determine Bidder’s ability to perform the Work, and Bidder shall furnish all information and data requested by the City. The City reserves right to reject any bid from any Bidder that the City considers not properly qualified to carry out Contract obligations or able to satisfactorily complete the Work on schedule.
- 3.2 If Bidder does not have offices in the State of Georgia, such Bidder shall designate a proper agent in the State of Georgia on whom service can be made in the event of litigation.

4. EXAMINATION OF BID DOCUMENTS AND SITE:

- 4.1 Before submitting Bid, each Bidder shall: (a) examine the Bid Document Package thoroughly; (b) visit the site to become familiar with local conditions affecting cost or Work progress or performance; (c) become familiar with federal, state, and local laws, ordinances, rules, and regulations affecting cost or Work progress or performance; (d) study and carefully correlate Bidder's observations with the Bid Document Package; and, (e) notify The Engineer concerning conflicts, errors, or discrepancies in Bid Document Package.
- 4.2 On request, The Engineer may provide each Bidder access to the site to conduct investigations and tests that Bidder deems necessary in order to submit Bid subject to easement acquisitions and existing conditions.
- 4.3 Bid submission will constitute **incontrovertible** representation that Bidder understands and has complied with requirements contained in this Article 4, and that Bidder has read and understood the Bid Document Package and hereby stipulates that the documents are sufficient in scope and detail to indicate and convey understanding for terms and conditions in order to perform Work.

5. ADDENDA AND INTERPRETATIONS:

- 5.1 Questions concerning meaning or intent of Bid Document Package shall be directed in email to Larry Genn at lgenn@cplteam.com . Replies will be issued by Addenda mail or delivered to parties recorded by the Department as having received Bid Document Package. Questions after the end of questions date and time will not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 5.2 Addenda may be issued to modify Bid Document Package as deemed necessary by the City.

6. BID SECURITY:

- 6.1 Each bid shall be accompanied by Bid Security made payable to Owner in the amount equal to five percent (5%) of the Bidder's maximum Bid Price. Bid Security shall be cashier's check or Bid Bond issued by Surety meeting requirements contained in paragraph 24 below. Bid bond must be on City provided form found in bid package. Failure to use City forms may constitute a non-responsive bid and may be rejected.
- 6.2 Bid Security for Successful Bidder will be retained until Bidder has executed Agreement and furnished required payment and performance bonds. If Successful Bidder fails to furnish the qualifications submittals or fails to execute and deliver Agreement and furnish required Payment and Performance Bonds within fifteen (15) calendar days after Notice of Award, Owner may annul Notice of Award and Bidder's Bid Security will be forfeited.

Bid Security, for any Bidder that the City believes to have reasonable chance to receive award, may be retained by Owner until the ninety-first (91st) day after Bid opening. If Notice of Award is issued within ninety (90) calendar days after Bid opening, Bid Security for Bidder receiving Notice of Award may be retained by Owner up to ninety (90) calendar days after Notice of Award.

- 6.3 Bid Bond shall be issued by company having a registered agent in State of Georgia and shall comply with the additional requirements of paragraph 23 below.

7. CONTRACT TIME:

The Work shall be completed within ninety (90) consecutive calendar days.

8. EXAMINATION OF BID PLANS AND SPECIFICATIONS:

Bidders are advised to carefully examine the Bid Plans and Specifications for the proposed Work. The Bid Plans indicate the surface and underground structures likely to affect the prosecution of the Work insofar as they have been determined, but the information indicated is not guaranteed as being correct and complete. Bidders are expected to examine the Bid Plans and the location of the Work, verify all information with authorities concerned, and judge for themselves all the circumstances affecting the cost of the Work and the time required for its completion, and shall assume all patent and latent risks in connection therewith.

9. BID BOND FORFEITURE:

The Successful Bidder, upon his failure or refusal to execute and deliver the Contract and Bonds required within fifteen (15) calendar days after receipt of Notice of Award, shall forfeit to the Owner, as penalty for such failure or refusal, the security deposited with Bid.

Provisions for penalty are set forth in the Advertisement for Bid, Bid Documents, and Specifications (including General Conditions).

10. SUBSTITUTE OR “OR EQUAL” TERMS:

- 10.1 The Contract, if awarded, will be based on material and equipment described in Plans or specified in Specifications without consideration for possible substitute or “or equal” items. Where indicated in Plans or specified in Specifications, substitute or “or equal” material or equipment may be furnished or used by Contractor, **if acceptable to the Engineer**. Application for substitute or “or equal” items will be considered by the Owner until seven (7) calendar days **prior** to date for opening Bids.

Procedure for submitting application and consideration by the Engineer is set forth in General Conditions and may be supplemented in Paragraphs 11.2 and 11.3 following.

- 10.2 Materials or equipment specified or described in Bid Document Package by proprietary name or by naming a particular supplier are intended to establish type, function, and quality required. Unless name is followed by words indicating no substitution is permitted, materials or equipment from other suppliers may be accepted by the Engineer **if sufficient information is submitted by Bidder** to allow the Engineer to determine material or equipment proposed is equivalent or equal to named material or equipment. Bidders shall make written application to the Engineer for proposed substitute material or equipment and shall certify that the proposed substitute material or equipment will perform adequate functions and achieve results called for by general design, be similar and equal substance to item specified, and be suited to same use as specified material or equipment. Application shall state that the Engineer's acceptance of proposed substitute will not prejudice Contractor's achieving Substantial Completion on time, will or will not require changes to Contract Documents to adapt design to proposed substitute, and will or will not require payment for license fee or royalty. Bidder shall indicate acceptance of responsibility for all costs of redesign, which will be required through approval of Bidder's application.

Variations for proposed substitute from item specified will be identified in application and available maintenance, repair, and replacement service will be indicated.

- 10.3 Bidders may propose substitute construction means, methods, sequences, techniques, or procedures for specific construction means, methods, techniques, sequences, or procedures indicated in or required by Bid Document Package. Bidders shall submit sufficient information to allow the Engineer to determine substitute proposed is equivalent to means, method, sequence, technique, or procedure indicated or required by Bid Document Package. Procedure for review by the Engineer will be similar to method provided in Paragraph 11.2 above.
- 10.4 The Engineer will be allowed reasonable time to evaluate each proposed substitute. No application for substitute will be considered later than seven (7) calendar days prior to bid opening date. The Engineer will be sole judge concerning proposed substitute acceptability.

11. SUBCONTRACTORS, SUPPLIERS AND OTHERS:

- 11.1 Each Bid shall identify names and addresses for subcontractors, suppliers, and other persons and organizations furnishing material and equipment, or Bid will be considered non-responsive. The Bidder is cautioned that any person, firm or other party to whom it is proposed to award a subcontract under this Contract must meet the same conditions of experience, competent personnel and workman's compensation insurance as the Bidder.

If requested by the Engineer, the Successful Bidder and any other Bidder shall, within seven (7) calendar days after request, submit to the Engineer experience statement with pertinent information for similar projects and other qualifications for each subcontractor, supplier, person, and organization. If the Engineer, after due investigation has reasonable objection to any proposed subcontractor, supplier, person, or organization, the Engineer may, before giving Notice of

Award, request Successful Bidder to submit acceptable substitute without increase in Contract Price or Contract Time. If Successful Bidder declines to make substitution, the Engineer may elect not to award contract to Bidder. Bidder's declining to make substitution will not constitute grounds for sacrificing Bid Security.

- 11.2 Procedures for approving Subcontractors after executing Agreement are described in the General Conditions. No subcontractors may be employed without the specific written authorization of the Engineer.
- 11.3 No Contractor will be required to employ subcontractor, supplier, person, or organization against whom Contractor has reasonable objection.

12. NOTICE OF SPECIAL CONDITIONS:

Attention is particularly called to those parts of the Specifications (including General Conditions) which deal with the following:

- a. Insurance Requirements

13. BID FORM:

- 13.1 Bid Form is included in the Bid Document package purchased by the Bidders.
- 13.2 Bid Forms shall be completed and submitted in duplicate.
- 13.3 Bids by corporations shall be executed in corporate name by president or vice-president (or other corporate officer accompanied by evidence indicating officer has authority to sign) and corporate seal shall be affixed and attested by secretary or assistant secretary. Corporate address and state of incorporation shall be shown below signature. If Bid is executed by someone other than president or vice-president, attach to Bid certified corporate resolution by board of directors authorizing person to execute Bid for Corporation.
- 13.4 Bids by partnerships shall be executed in partnership name and signed by partner, whose title shall appear under signature and official partnership address shall be shown below signature.
- 13.5 If requested, person signing Bid for corporation or partnership shall produce evidence satisfactory to Owner indicating person's authority to bind corporation or partnership.
- 13.6 Names shall be typed or printed below signature.
- 13.7 Bid shall contain acknowledgement Bidder has received Addenda (Addenda numbers shall be filled in on Bid Form).
- 13.8 Address and telephone number for communications regarding Bid shall be shown.

- 13.9 Bidder must furnish, in his Bid (if not furnished with Pre-Qualification Package), summary information relative to the facilities, ability, and financial resources available for the fulfillment of the Contract.

14. QUANTITIES OF WORK:

The quantities of Work shown on the drawings are approximate and are assumed solely for comparison of the proposals. They are not guaranteed to be accurate statements or estimates of quantities of Work that are to be performed under the Contract, and any departure, therefrom will not be accepted as valid grounds for any claim for damages, for extension of time or for loss of profits; nor will any additional payments other than that bid, be made regardless of the actual quantities required or ordered to complete the Work.

15. SUBMISSION OF BIDS:

- 15.1 Bids shall be submitted before time and at place indicated in Advertisement for Bid and shall be submitted in sealed envelope with the following notation on the face:

BID NUMBER: CIP 2017-001
STORMWATER IMPROVEMENTS – PHASE 1
NAME OF BIDDER
DATE AND TIME OF OPENING

If Bid is sent through mail or other delivery system, sealed envelope shall be enclosed in separate envelope with same notations as above on face.

- 15.2 Each Bid shall contain following documents in completed form (City forms must be used without substitution):

1. Bid Form
2. Bidder's Affidavit
3. Non-Collusion Affidavit
4. Bid Security (Surety Bond on City provided Form or Certified or Cashier's Check)
5. Power of Attorney (Surety Bonds only)
6. Corporate authority to execute Bid (required for any corporate officer other than president or vice-president)

- 15.3 More than one Bid received for same work from individual, firm, partnership, corporation, or association under same or different names will not be considered. Reasonable grounds for believing any Bidder is interested in more than one Bid for same work will cause Owner to reject all Bids from Bidder. If Owner believes collusion exists among Bidders, Bids from participants in collusion will not be considered.

- 15.4 Conditions, limitations, or provisions attached by the Bidder to the Bid Forms may cause its rejection. Bids containing Items not included in the form of Bid will be considered irregular.

16. MODIFICATION AND WITHDRAWAL OF BIDS:

- 16.1 Withdrawal Prior to Time for Receiving Bids: Bids may be modified or withdrawn by appropriate document duly executed (in manner Bid must be executed) and delivered to place where Bids are to be submitted at any time prior to deadline for submitting Bids. Bid Withdrawal will not prejudice Bidder's rights to submit new Bid prior to Bid Date and Time.
- 16.2 Withdrawal After Time for Receiving Bids: After period for receiving Bids has expired, no Bid may be withdrawn, modified, or explained except as provided for in paragraph 18 below.

17. OPENING OF BIDS:

Bids will be opened publicly at the time and place set forth in the INVITATION TO BID and read aloud. Abstract listing amount for Base Bids and major alternates will be made available after Bid opening.

- 17.1 After Bid opening Bidder has up to twenty-four (24) hours to notify the City that Bidder made an obvious error in Bid calculation. Bid Bond withdrawal for this reason shall be requested in writing within this same twenty-four (24) hour period. Said written request shall be accompanied by sufficient documentation to demonstrate the origin and composition of the "obvious error." Bid Bond may not be withdrawn for any other reason.

18. BIDS TO REMAIN OPEN:

Bids shall remain open for acceptance by Owner for ninety (90) calendar days after Bid opening. Owner may, at its sole discretion, release any Bid prior to that date.

19. AWARD OF CONTRACT:

- 19.1 To extent permitted by applicable state and federal laws and regulations, Owner reserves the right to reject any and all Bids, to waive any and all informalities, and to disregard nonconforming, non-responsive, or conditional Bids. Bids may be considered irregular and subject to rejection if they show serious omission, unauthorized form alterations, use unauthorized forms, unauthorized alternate bids, incomplete or unbalanced unit prices, or other irregularities. Discrepancies between words and figures will be resolved in favor of correct sum. Any mistake which is obviously a clerical one, such as an error in price extension, or in placement of decimal points, reversal of prices, FOB destination, FOB point of origin, etc., may be corrected by the purchasing authority after verification is made by the bidder. However, under no circumstances can unit prices be changed.
- 19.2 Contract will be awarded by Owner pursuant to applicable law. Nothing contained herein shall place duty upon Owner to reject bids or award contract based upon anything other than Owner's sole discretion as described herein.

- 19.3 The Department may consider qualifications and experience for subcontractors, suppliers, persons, and organizations proposed for Work.
- 19.4 The Department may conduct investigations deemed necessary to assist in evaluating Bids and to establish responsibility, qualifications, and financial ability for Bidders, proposed Subcontractors, persons, and organizations to do Work. Owner reserves right to reject Bid from any Bidder not passing evaluation to Owner's satisfaction.
- 19.5 One contract for Work will be awarded, if award is made, based upon Base Bid to lowest responsible, responsive Bidder. Alternate Bids will not be considered as basis for award unless specifically stated on the Bid Form. Successful Bidder will be required to perform Work as Prime Contractor. Work performed by Contractor shall be 50% minimum. No Contract assignment or subcontracting will be allowed without written permission from the Engineer.
- 19.6 The Successful Bidder will be required to furnish a Performance and Payment Bond, Each in a sum not less than one hundred percent (100%) of the amount of the Contract. The Bonds shall be that of an approved surety meeting the requirements as noted in paragraphs 6 and 24 herein.
- 19.7 If at any time after the execution and approval of the Contract and of the Surety Bonds as required in the Bid Advertisement, the Owner shall deem any of the Sureties upon such Bonds to be unsatisfactory, or such Bonds to be inadequate security for the Owner, the Contractor shall, within five (5) calendar days after notice from Owner to do so, furnish new or additional Contract Bonds, in form and sum, and signed by such Sureties who all shall be satisfactory to the Owner. No further payment will be deemed due nor will any further payment be made to the Contractor unless such new or additional Bonds are furnished and approved. The premium on such Bonds shall be paid by the Contractor.

Failure of the Contractor to submit approved Performance and Payment Bonds within the required five (5) calendar days shall, at the discretion of the Owner, constitute a forfeiture of the Bid Bond.

20. SUBMITTALS BY SUCCESSFUL BIDDER:

- 20.1 Owner intends to award contract to Bidder competent to perform and complete Work in satisfactory manner. Owner will require Successful Bidder to submit, within seven (7) calendar days after receiving written request from the Engineer and prior to contract award, Preliminary Progress Schedule and Schedule of Values, as set forth below.
- 20.2 Preliminary Progress Schedule shall be submitted in triplicate and include time-scaled schedule and narrative in accordance with appropriate formats established in the Engineers' written request for schedules. Activities in schedule shall show order Successful Bidder proposes to perform Work within constraints and sequencing conditions set forth in Specification (including General Conditions) and shall indicate starting and completion dates for key milestones and Work pertaining to each Specifications division within each major structure or geographical area on site. Activities shall identify significant submittals and

approvals, major equipment deliveries, equipment testing, Owner's responsibilities, affected utilities, and other similarly involved third parties.

- 20.3 Schedule of Values shall include Bid itemization by major structures or Work areas.
- 20.4 Successful Bidder and surety, if any, agree any delays within Bidder's control in delivering submittals shall constitute request by Bidder for time extension and Bid shall remain open for Owner's acceptance. If Owner agrees to time extension, Bidder shall comply with Submittal Requirement within five (5) additional calendar days. At Owner's option, failure by Successful Bidder to deliver submittals within extended period will void Bid evaluation and will constitute proof Successful Bidder has abandoned Bid, Bid Security may be declared forfeited to Owner as liquidated damages, and Work may be awarded to Another Bidder.

21. BUSINESS LICENSE:

Successful Bidder's submittals shall include a copy of Bidder's business license.

22. TAXES:

Contractor shall pay applicable sales, consumer, use, and other similar taxes required by law. Contractor is responsible for reviewing pertinent state statutes involving sales tax and complying with requirements.

The Contract prices for articles, materials, or equipment names herein are subject to increase by the amount of any additional tax or taxes affecting the articles, materials or equipment involved in the Contract imposed by or under the authority of the Federal or State Government and passed or taking effect after the receipt of Bids, and shall continue in effect during such time as such tax or taxes are lawfully collectible; provided, however, that in the event of such increase in cost, the claim shall be presented within thirty (30) days and supported by evidence of such additional tax, satisfactory to the City Attorney.

23. QUALIFICATIONS OF SURETY COMPANIES:

In order to be acceptable to Owner, surety company issuing Bid Guaranty Bonds or 100% Performance/Payment bonds as required in Bid Advertisement shall meet and comply with following minimum standards:

- 23.1 Bonding Company must be licensed to do business in Georgia by the Georgia Secretary of State, authorized to do business in Georgia by the Georgia Insurance Department, listed in the Department of the Treasury's Publication of Companies Holding Certificates of Authority as Acceptable Surety on Federal Bonds and as Acceptable Reinsuring Companies and have an A.M. Best rating of A-, Class VI or higher.
- 23.2 All bonds must be submitted on forms provided by the City and agencies providing bonds and insurance must provide proof that they meet the criteria outlined in the bid and contract documents.

-
- 23.3 Surety shall be admitted to do business in State of Georgia and shall be registered to provide such surety the State of Georgia Insurance Commissioner.
 - 23.4 Attorneys-in-fact who sign bid bonds or performance/payment Bonds shall file with bond certified power of attorney to sign bond.
 - 23.5 Surety company agents shall list name, address, and telephone number on bonds.
 - 23.6 Performance and payment Bonds shall extend twelve (12) months beyond date of final payment and shall contain waiver for alteration to Contract terms, time extensions, or forbearance on Owner's part.

24. EXECUTION OF WRITTEN CONTRACT

Successful Bidder will be required to sign written contract identified in bid package as Agreement. Unsigned Agreement will be submitted to Successful Bidder either prior to or along with the Notice of Award. The Contractor shall sign and deliver the fully executed Agreements to Owner with all required bonds within ten (10) calendar days following receipt of Agreement forms, (unless otherwise stipulated by the Owner).

25. AREA OFFICE:

If required by the Engineer, the Contractor will be required to establish an office and an equipment and spare parts storage yard within Gwinnett County to conduct this work and must arrange to cope with any emergency that may arise in connection with the Work on a twenty-four (24) hour per day, seven (7) day per week basis.

26. PROTESTS:

Owner is responsible for resolving protests concerning contract award, claims, disputes, alleged license fees, and other related procurement matters in accordance with sound business judgment and good administrative practice. Following procedures shall be used for this purpose:

- 26.1 Any party with direct financial interest adversely affected by Owner's procurement decision shall file protest under this article, or be barred further relief.
- 26.2 Protest shall: (a) be made in writing, oral protests will not be permitted; (b) adequately state basis for protest and relief requested; and (c) be received by Owner within seven (7) calendar days from date basis for protest was, or should have been, known.
- 26.3 Owner may defer protested procurement upon receiving procedurally adequate protests, provided in any even awarding contract, subcontract, or procurement for sub item may be permitted, at Owner's sole discretion, where award will not materially affect resolving protest.
- 26.4 Protest shall be limited to: (a) issues arising from procurement provisions contained in Specifications; and (b) state or local law. No protest may be filed with respect to basic project design.

26.5 City Attorney will establish procedures for resolving protests. Owner will rely for protest resolution on decisions issued under Georgia law, as well as decisions issued under Georgia law, as well as decisions issued by other states, Federal courts, U.S. Comptroller General, or other Federal agencies with extensive procurement expertise, if state law is not clearly established.

27. BIDDER'S ACKNOWLEDGEMENT:
The undersigned bidder acknowledges all requirements outlined in the above "Instructions to Bidders Package" and all documents referred to therein. This signed form must accompany the completed bid form submitted at the time of bid.

SIGNATURE: _____ DATE: _____
(President, Vice President or
Corporate Officer)

PRINTED NAME: _____ TITLE: _____

ATTESTED BY: _____ DATE: _____
(Secretary of Corporation)

PRINTED NAME: _____ TITLE: _____

SEAL

(Corporate Seal Required if Bidder is a Corporation)

COMPANY NAME:

ADDRESS:

CITY: _____ STATE: _____ ZIP: _____

TELEPHONE NO:

END OF SECTION 00 100

BID FORM

AVONDALE ESTATES— DRAINAGE REPAIR – MAJESTIC CIRCLE

BID NUMBER: CIP 2022-001

BID DATE: March 31, 2022 – 3:00 PM

SUBMITTAL DATE: _____

BY: _____
(Bidder)

PROJECT DESCRIPTION: Work required under the Contract will include the removal and upgrading of storm water management systems as indicated on the construction documents. Included elements are removal of existing storm conveyance elements, installation of concrete driveway, removal & replacement of fencing, installation of storm water conveyance piping, manholes/inlets, headwalls, & rip rap, as well as associated erosion control systems throughout the project duration including sod for disturbed areas.

THIS BID IS SUBMITTED TO: City of Avondale Estates, Georgia (hereinafter called Owner) acting through its City Council.

- A. Undersigned Bidder offers and agrees to enter into Agreement with Owner, in accordance with the instructions, requirements and forms included in Bid Document Package (including the Invitation to Bid and Instructions to Bidders Package), and to complete all Work for the Bid Price and within required calendar days, all in accordance with the Bid Document Package.

Bidder accepts terms and conditions contained in Bid Document Package including without limitation those dealing with Owner’s time for accepting Bid and disposition of Bid Security.

In submitting this Bid, Bidder makes representations required by Instructions to Bidders and further warrants and represents:

Bidder has examined Bid Document Package, including Invitation for Bids and Instructions to Bidders, and following addenda:

No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____
No. _____	Dated _____	No. _____	Dated _____

Bidder has examined site and locality where the Work is to be performed and legal requirements (federal, state, and local laws, ordinances, rules, and regulations) and conditions affecting Work cost, difficulty, progress, or performance and has made independent investigations as Bidder deems necessary.

BID FORM

BID NUMBER: CIP 2022-001

PROJECT DESCRIPTION: AVONDALE ESTATES—DRAINAGE REPAIRS – MAJESTIC CIRCLE

BID DATE: March 31, 2022

COMPANY NAME: _____

BIDDERS SIGNATURE: _____

- B. Bidder has carefully studied reports and drawings indicating subsurface conditions and drawing depicting physical conditions as identified in General Conditions and accepts determination concerning technical data contained in reports and drawings on which Bidder is entitled to rely.
- C. Bidder has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) examinations, investigations, explorations, tests, and studies (in addition to or to supplement those referred to in “C” above) pertaining to subsurface or physical conditions at site or otherwise affecting cost, progress, performance, or furnishing Work as Bidder considers necessary for performing or furnishing Work at Contract Price, within Contract Time, and in accordance with terms and conditions contained in Bid Document Package, including specifically provisions stated in General Conditions and no additional examinations, investigations, explorations, tests, reports, or similar information or data are or will be required by Bidder.
- D. Bidder has reviewed and checked Plans and data shown or indicated on Bid Document Package with respect to existing underground facilities at or contiguous to site and assumes responsibility for accurately locating underground facilities. No additional examinations, investigations, explorations, tests, reports, or similar information or data concerning underground facilities are or will be required by Bidder in order to perform and furnish Work at Contract Price, within Contract Time, and in accordance with terms and conditions contained in Bid Document Package, including specifically provisions stated in General Conditions.
- E. Bidder has correlated results from observations, examinations, investigations, explorations, tests, reports, and studies with terms and conditions contained in Bid Document Package.
- F. Bidder has given Owner written notice concerning conflicts, errors, or discrepancies discovered in Bid Document Package and written resolution by Owner is acceptable to Bidder.

BID FORM

BID NUMBER: CIP 2022-001

PROJECT DESCRIPTION: AVONDALE ESTATES—DRAINAGE REPAIRS – MAJESTIC CIRCLE

BID DATE: March 31, 2022

COMPANY NAME: _____

BIDDERS SIGNATURE: _____

G. This Bid is genuine and not made in interest of or for any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules produced by any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit false or sham Bid; Bidder has not solicited or induced any person, firm, or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

Bidder submits following lump sum/unit prices identified in Bid Form as part of this Bid:

BID NUMBER: CIP 2022-001

BID DATE: _____

SUBMITTAL DATE: _____

BY: _____

(Bidder)

BIDDERS SIGNATURE: _____

BASE BID-LUMP SUM COMPLETE & FINISHED

_____ Dollars _____ Cents
(Base Bid Includes all work identified
in the contract documents). \$ _____

BID FORM

BID NUMBER: CIP 2022-001

PROJECT DESCRIPTION: AVONDALE ESTATES—DRAINAGE REPAIRS – MAJESTIC CIRCLE

BID DATE: March 31, 2022

Attached prices shall include all labor, materials, balling, shoring, removal, overhead (Direct and Indirect), profit, insurance, bonds, and other costs, to cover all finished Work.

Bidder agrees this Bid shall be good and may not be withdrawn for a period of 90 calendar days after scheduled closing time for receiving bids.

There is enclosed herewith a certified or cashier's check or a Bid Bond to the order of City of Avondale Estates, Georgia, in the sum of \$ _____ Dollars.

Check or Bid Bond shall be equal to, not less than, the amount stipulated in INVITATION TO BID and it is understood and agreed that said check or Bid Bond shall be subject to terms and conditions stipulated in Bid Document Package.

Undersigned Bidder hereby agrees to each and every stipulation in Bid Document Package pertaining to the submission of Bids and further, if awarded the Contract, duly agrees to execute and secure the required Contract and Bid Document Package within ten (10) days from service of Notice of Award and deliver a surety bond or bonds as required by General Conditions. The name and business address of Bidder to which all formal Notices shall be sent:

Company: _____

Address: _____

BID FORM

BID NUMBER: CIP 2022-001

PROJECT DESCRIPTION: AVONDALE ESTATES—DRAINAGE REPAIRS – MAJESTIC CIRCLE

BID DATE: March 31, 2022

COMPANY NAME: _____

BIDDERS SIGNATURE: _____

Undersigned Bidder states the names and addresses of persons interested as principals in this Bid are as follows: (Write first name in full):

Bidder shall state on line below, if a corporation, the name of State in which incorporated and the date of said incorporation:

Undersigned Bidder states (he/she/they) (is a/are) citizen(s) of the United States and all partners, associates, or principals interested herein are citizens of the United States, except: (Give full names and addresses):

Undersigned Bidder submitting this Bid certifies and affirms that such Bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any Bidder or person, to put in a sham Bid, or that such other person shall refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person to fix the Bid Price of affiant or any other Bidder, or to fix any overhead, profit, or cost element of said Bid Price, or of that of any other Bidder, or to secure any advantage against the City of Avondale Estates or any person interested in the proposed Contract; and that all statements contained in said Bid are true, and further, that such Bidder has not directly or indirectly submitted this Bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof; and, that no member of Owner or other officers or employees of said Owner is interested directly or indirectly in the Bid or in any portion of the Bid nor the Contract or any part of the Contract which may be awarded the undersigned Bidder on the basis of such Bid.

The undersigned bidder acknowledges the requirements of the Plans and Specifications for this project. It is further understood that quantities are approximate, are solely for the purpose of comparing proposals, and are not represented by the Owner as an accurate statement of the actual work to be performed under the Contract.

The Bidder agrees to complete the Contract awarded within the “allowable calendar days for completion” from the date of the “Notice to Proceed” and he further agrees that the owner may retain from the monies which may become due the amount of five hundred dollars per day for each and every day that the completion of the work may be delayed.

NOTE: See paragraph 13 of “Instruction to Bidders” for requirements in completing signature block below and remainder of this page.

SIGNATURE: _____
(President, Vice President or Corporate Office)

DATE: _____

PRINTED NAME: _____

TITLE: _____

ATTESTED BY: _____
(Secretary of Corporation must attest)

DATE: _____

PRINTED NAME: _____

TITLE: _____

(Corporate Seal Required if Bidder is a Corporation)

BIDDER'S AFFIDAVIT

BID NUMBER: CIP 2022-001

BID DATE: March 31, 2022

PROJECT DESCRIPTION: AVONDALE ESTATES—DRAINAGE REPAIRS – MAJESTIC CIRCLE

STATE OF _____)

COUNTY OF _____)

(Name Printed)

being duly sworn, deposes and says that he resides at _____

that he is the

(Title)

(Name of Bidder)

who signed the above Bid Form, that he was duly authorized to sign and that the Bid is the true offer of the Bidder, that the seal attached is the seal of the Bidder and that all the declarations and statements contained in the Bid are true to the best of his knowledge and belief.

(Affiant)

Sworn to and subscribed before me this _____ day of _____, 2022.

(Notary Public in and for

County

My Commission expires _____.
(SEAL)

FORM OF NON-COLLUSION AFFIDAVIT

(This Non-Collusion Affidavit is Part of the Bid Documents)

BID NUMBER: CIP 2022-001

BID DATE: March 31, 2022

PROJECT DESCRIPTION: AVONDALE ESTATES—DRAINAGE REPAIRS – MAJESTIC CIRCLE

STATE OF _____)
) SS
COUNTY OF _____)

(Name Printed)

being duly sworn, deposes and says that he is

(sole owner, partner, president, secretary, etc.)

the party making the foregoing Proposal or Bid; that such Bid is genuine and not collusive or sham; that said Bidder has not colluded, conspired, connived, or agreed, directly or indirectly, with any Bidder or person, to put in a sham Bid, or that such other person shall refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person to fix the Bid Price of affiant or any other Bidder, or to fix any overhead, profit, or cost element of said Bid Price, or of that of any other Bidder, or to secure any advantage against the City of Avondale Estates, or any person interested in the proposed Contract; and that all statements contained in said Proposal or Bid are true, and further, that such Bidder has not, directly or indirectly submitted this Bid, or the contents thereof, or divulged information or data relative thereto to any association or to any member or agent thereof; and, that no member of Owner or other officers or employees of said Owner is interested directly or indirectly in the Bid or in any portion of the Bid nor the Contract or any part of the Contract which may be awarded the undersigned Bidder on the basis of such Bid.

(Affiant)
Sworn to and subscribed before me this _____ day of _____, 2022.

(Notary Public in and for

County My Commission expires
(SEAL)

BID BOND

(This Bid Bond is part of the Bid Documents)

BID NUMBER: CIP 2022-001

BID DATE: March 31, 2022

PROJECT DESCRIPTION: AVONDALE ESTATES—DRAINAGE REPAIRS – MAJESTIC CIRCLE

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contract)

a _____
(Corporation, Partnership or individual)

hereinafter called Principal, and

(Name of Surety)

(Address of Surety)

a Corporation of the State of _____, and a surety authorized by law to do business in the State of Georgia, hereinafter called Surety, are held and firmly bound unto

City of Avondale Estates
(Name of Obligee)

21 North Avondale Estates Plaza
Avondale Estates, GA 30002
(Address of Obligee)

hereinafter referred to as Obligee, in the penal sum of:

_____ Dollars (\$ _____)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

BID FORM

BID NUMBER: CIP 2022-001

PROJECT DESCRIPTION: AVONDALE ESTATES—DRAINAGE REPAIRS – MAJESTIC CIRCLE

BID DATE: March 31, 2022

Page 2

WHEREAS, the Principal is about to submit, or has submitted, to the City of Avondale Estates, Georgia, a proposal for furnishing materials, labor, and equipment for: _____

WHEREAS, the Principal desires to file this Bond in accordance with law in lieu of a certified Bidder's check otherwise required to accompany this Proposal.

NOW, THEREFORE, the conditions of this obligation are such that if the proposal be accepted, the Principal shall within ten days after receipt of notification of the acceptance, execute a Contract in accordance with the Proposal and upon the terms, conditions, and prices set forth in the form and manner required by the City of Avondale Estates, Georgia, and execute a sufficient and satisfactory Performance Bond and Payment Bond payable to the City of Avondale Estates, Georgia, each in the amount of 100% of the total Contract Price, in form and with security satisfactory to said City of Avondale Estates, Georgia, and otherwise, to be and remain in full force and virtue in law, and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the City of Avondale Estates, Georgia, upon demand, the amount hereof in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

PROVIDED, FURTHER, that Principal and Surety agree and represent that this bond is executed pursuant to and in accordance with the applicable provisions of the Official Code of Georgia Annotated, as Amended, including, but not limited to, O.C.G.A. 13-10-1, et. sea. And 36-86-101, et. seg. and is intended to be and shall be constructed as a bond in compliance with the requirements thereof.

(SIGNATURES NEXT PAGE)

BID FORM

BID NUMBER: CIP 2022-001

PROJECT DESCRIPTION: AVONDALE ESTATES—DRAINAGE REPAIRS – MAJESTIC CIRCLE

BID DATE: March 31, 2022

Page 3

Signed, sealed, and dated this _____ day of _____ A.D.,
_____.

ATTEST:

(Principal Secretary)

(Principal)

(SEAL)

By: _____

(Witness as to Principal)

(Address)

(Address)

ATTEST:

(Surety)

(Attorney-in-fact)

By: _____

(SEAL)

(Attorney-in-Fact and Resident Agent)

(Witness as to Surety)

(Address)

(Address)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

AGREEMENT FOR

AVONDALE ESTATES- DRAINAGE REPAIRS – MAJESTIC CIRCLE
BID NUMBER: CIP 2022-001

THIS AGREEMENT, made and executed in Avondale Estates, Georgia, this _____th day of _____, 2022, by and between the City of Avondale Estates situated in the State of Georgia, hereinafter called the "City" and

_____,
an individually owned company with principal offices at _____,
_____, Georgia, _____, hereinafter called the "Contractor".

WITNESSETH: That the said Contractor has agreed and by these presents does agree with the City for the prices stipulated in the Bid Form herein contained or hereunto annexed and under the penalty expressed in a bond bearing even date with these presents, and herein contained or hereunto annexed to furnish at his own cost and expense all materials, supplies, machinery, equipment, tools, apparatus, and other means of construction, maintenance and repair, and all management, supervision and labor, and perform all the work necessary to construct, maintain, repair, and complete the work within the scope of this Contract as outlined in the "Invitation to Bid", "Instructions to Bidders", "General Conditions", "Project Plans" and "Specifications" herein contained, including material furnished by the City (if any), all of which documents are expressly incorporated herein by reference and made a part of this agreement, commencing the Work within seven (7) calendar days from the date of "Notice to Proceed" from the City, and commencing emergency work within four (4) hours after notification by the City, in the manner specified and in conformity with the requirements set forth in the Project Plans and Specifications herein contained.

The Contractor shall proceed with the said work in a prompt and diligent manner at such times and in such order as the City may direct. Further, he shall complete the work to the satisfaction of the City and within 90 calendar days, and in default of completion within the time fixed, this Contract will be subject to termination as stipulated in the Bid Document Package.

The City shall not be liable to the Contractor for any neglect, default, delay or interference of or by any other contractor, nor shall any such neglect, default, delay, or interference of any other contract, or alteration which may be required in the work, release the Contractor from the obligation to finish the work within the time allowed.

It is further mutually agreed by the parties hereto that the work will be performed in accordance with Project Plans and Specifications together with any supplementary instructions as prepared or approved by the City and other contract documents, except in the case of emergency the work will be undertaken by the Contractor immediately upon notification by the City and will be performed in accordance with the contract documents and orders of the City.

AGREEMENT

Page 2

It is hereby mutually agreed that the City of Avondale Estates is to pay and the Contractor is to receive the prices bid in the Bid Form herein contained () or hereto annexed, as full compensation for furnishing all materials, supplies, machinery, equipment, tools, apparatus and other means of construction, maintenance and repairs, and all management, supervision, and labor, and perform all construction maintenance, and repair necessary to complete the work under the conditions herein specified, and for fully complying with the terms and conditions of this Contract; provided that any increased cost to the Contractor due to any subsequent levy of Federal or State taxes against any item entering into the work of this Contract exclusive of profits may be reimbursed to the Contractor by the City as provided hereunder.

Subject to the applicable provisions of law, this Contract shall be in full force and effect as a Contract, from the date on which a fully executed and approved counterpart hereof is delivered to the Contractor and shall remain and continue in full force and effect until after the expiration of the guarantee period and the Contractor and his Sureties are finally released by the City.

The Contractor shall remain responsible for performing, in accordance with the terms of the contract, all work assigned prior to the expiration of the allowable calendar days for completion period even if the work is not completed until after the expiration of the allowable calendar day for completion term.

The Bidder agrees to complete the Contract awarded within the "allowable calendar days for completion" from the date of the "Notice to Proceed" and he further agrees that the owner may retain from the monies which may become due the amount of five hundred dollars per day for each and every day that the completion of the work may be delayed.

(SIGNATURES NEXT PAGE)

IN WITNESS WHEREOF: The parties have executed this agreement the day and year above mentioned.

Signed, sealed, and dated this _____ day of _____ A.D., 20____.

ATTEST:

CITY OF AVONDALE ESTATES,
GEORGIA

By: _____

(Witness)

(Contractor)

(SEAL)

ATTEST:

By: _____

(Secretary)

(Title)

(Witness)

(Address)

APPROVED AS TO FORM:

(City Attorney)

NOTE: City Clerk should attest. If Contractor is a corporation, Secretary of Corporation should attest.

PERFORMANCE AND PAYMENT BONDS:

The City of Avondale Estates requires a performance bond and a payment bond, each having a bond value of one hundred percent (100%) of the total amount bid. The attached performance bond and payment bond must be used for this requirement.

PERFORMANCE BOND

AVONDALE ESTATES- DRAINAGE REPAIRS - MAJESTIC CIRCLE
BID NUMBER: CIP 2022-001

KNOW ALL MEN BY THESE PRESENTS, That

(Name of Contractor)

(Address of Contractor)

a (Corporation, Partnership or Individual)
hereinafter called Principal, and

(Name of Surety)

(Address of Surety)

a Corporation of the State of _____ and a surety authorized by law to do business in
the State of Georgia, hereinafter called Surety, are held and firmly bound unto

City of Avondale Estates

21 North Avondale Estates Plaza,
Avondale Estates, Georgia 30002

(Name of Obligee)

(Address of Obligee)

hereinafter referred to as Obligee, are held and firmly bound unto said Obligee and all persons
doing work or furnishing skill, tools, machinery, supplies, or material under or for the purpose of
the Contract hereinafter referred to, in the penal sum for the base bid of

in lawful money of the United States, for the payment of which sum well and truly to be made,
we bind ourselves, our heirs, executors, administrators and successors, jointly and severally,
firmly by these presents.

The condition of this obligation is such, as whereas the Principal entered into a certain contract,
hereto attached with the Obligee, dated _____, 20____ for _____

PERFORMANCE BOND

Page 2

NOW, THEREFORE THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall well, truly, fully and faithfully perform said contract according to its terms, covenants, conditions, and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the Obligee, with or without notice to the Surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreement of any and all duly authorized modifications of said contract that may hereafter be made, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED FURTHER, that said Surety to this Bond, for value received, hereby stipulates and agrees that no change, extension of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alterations, or additions to the terms of the Contract or to the work to be performed **thereunder**.

PROVIDED, FURTHER, that Principal and Surety agree and represent that this bond is executed pursuant to and in accordance with the applicable provisions of the Official Code of Georgia Annotated, as Amended, including, but not limited to, O.C.G.A. 13-10-1, et. seR. and 36-86-10 L et.sea., and is intended to be and shall be construed as a bond in compliance with the requirements thereof.

(SIGNATURES NEXT PAGE)

Signed, sealed, and dated this _____ day of _____, A.D., 20__

ATTEST:

(Principal Secretary)

(Principal)

By: _____
(SEAL)

(Address)

(Witness as to Principal)

(Address)

(Surety)

ATTEST:
By: _____
(Attorney-in-Fact)

(Attorney in Fact)
And Resident Agent

(SEAL)

(Address)

(Witness as to Surety)

(Address)

NOTE: Date of Bond must not be prior to Date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

PAYMENT BOND

AVONDALE ESTATES- DRAINAGE REPAIRS - MAJESTIC CIRCLE
BID NUMBER: CIP 2022-001

KNOW ALL MEN BY THESE PRESENTS, That

(Name of Contractor)

(Address of Contractor)

a (Corporation, Partnership or Individual)

hereinafter called Principal, and

(Name of Surety)

(Address of Surety)

a Corporation of the State of _____ and a surety authorized by law to do business in the State of Georgia, hereinafter called Surety, are held and firmly bound unto

City of Avondale Estates
(Name of Obligee)

21 North Avondale Estates Plaza, Avondale Estates, Georgia 30002
(Address of Obligee)

hereinafter referred to as Obligee, for the use and protection of all subcontractors and all persons supplying labor, services, skill, tools, machinery, materials and/or equipment in the prosecution of the work provided for in the contract hereinafter referred to in the penal sum for the base bid of _____

in lawful money of the United States, for the payment of which sum, well and truly to be made, the Principal and Surety bind themselves, their, and each of their heirs, executors, administrators and successors, jointly and severally firmly by these presents.

The condition of this obligation is such, as whereas the Principal entered into a certain contract, hereto attached with the Obligee, dated _____, 20____ for _____

PAYMENT BOND

Page 2

NOW, THEREFORE THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall well, truly, and faithfully perform said contract according to its terms, covenants and conditions, and shall promptly pay all persons furnishing labor, materials services, skill, tools, machinery and/or equipment for use in the performance of said Contract, then this obligation shall be void; otherwise it shall remain in full force and effect.

All persons who have furnished labor, materials, services, skill, tools, machinery and/or equipment for use in the performance of said Contract shall have a direct right of action on this Bond provided payment has not been made in full within ninety (90) days after the last day on which labor was performed, materials, services, skill, tools, machinery, and equipment furnished or the subcontract completed.

PROVIDED FURTHER, that said Surety to this Bond, for value received, hereby stipulates and agrees that no change, extension of time, alterations, or additions to the terms of the Contract or to the Work to be performed thereunder shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alterations, or additions to the terms of the Contract or to the work to be performed thereunder.

PROVIDED, HOWEVER, that no suit or action shall be commenced hereunder by any person furnishing labor, materials, services, skill, tools, machinery, and/or equipment having a direct contractual relationship with a subcontractor, but no contractual relationship express or implied with the Principal:

Unless such person shall have given notice to the Principal within ninety (90) days after such person did, or performed the last of the work or labor, or furnished the last of the materials, services, skill, tools, machinery and/or equipment for which claim is made stating with substantial accuracy the amount claimed and the name of the party to whom the materials, services, skill, tools, machinery and/or equipment were furnished, or for whom the work or labor was done or performed. Such a notice shall be served by mailing the same by registered mail, postage prepaid, in an envelope addressed to the Principal, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State in which the aforesaid project is located, save that such service need not be made by a public officer, and a copy of such notice shall be delivered to the Obligee, to the person and at the address provided for in the Contract, within five (5) days of the mailing of the notice to the Principal.

PAYMENT BOND

Page 3

PROVIDED, FURTHER, that any suit under this bond must be instituted before the expiration of one (1) year after the acceptance of the public works covered by the Contract by the proper authorities.

PROVIDED, FURTHER, that Principal and Surety agree and represent that this bond is executed pursuant to and in accordance with the applicable provisions of the Official Code of Georgia Annotated, as Amended, including, but not limited to, O.C.G.A. 13-10-1, et. seg. and 36-86-101, et. seg., and is intended to be and shall be construed as a bond in compliance with the requirements thereof.

(SIGNATURES NEXT PAGE)

PAYMENT BOND
BID NUMBER: CIP 2022-001
Page 4

Signed, sealed, and dated this _____ day of _____ A. D., 20__

ATTEST:

(Principal Secretary)

(Principal)

(SEAL)

By: _____

(Address)

(Witness as to Principal)

(Address)

(Surety)

(Surety)

By: _____

ATTEST:

(Attorney in Fact)

By: _____

And Resident Agent

(Attorney-in-Fact)

(Address)

(SEAL)

(Witness as to Surety)

(Address)

NOTE: Date of Bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

ACKNOWLEDGEMENT OF CONTRACTOR, IF A CORPORATION

STATE OF)
) SS
COUNTY OF)

On this _____ day of _____, 20____ before me personally came and appeared _____
to me known, who, being by me duly sworn, did depose and say that he resides at _____

that he is the _____ of _____
the corporation described in and which executed the foregoing instrument; that he knows the seal
of said corporation; that one of the seals affixed to said instrument is such seal; that it was so
affixed by order of the directors of said corporation, and that he signed his name thereto by like
order.

(Notary Public)

(SEAL)
=====

ACKNOWLEDGEMENT OF CONTRACTOR, IF A PARTNERSHIP

STATE OF)
) SS
COUNTY OF)

On this _____ day of _____, 20____ before me personally came and appeared _____
to me known, and known to me to be one of the members of the firm of _____
described in and who executed the foregoing instrument, and he acknowledged to me that he executed the same as and for the act and deed of said firm.

(Notary Public)

(SEAL)

=====

ACKNOWLEDGEMENT OF CONTRACTOR, IF AN INDIVIDUAL

STATE OF)
) SS
COUNTY OF)

On this _____ day of _____, 20____ before me personally came and appeared _____
to me known, and known to me to be the person described in and who executed the foregoing
instrument and acknowledged to me that he executed the same as and for the act and deed of said
firm.

(Notary Public)

(SEAL)

=====

ACKNOWLEDGEMENT OF CONTRACTOR, IF A CORPORATION

STATE OF _____)
) SS
COUNTY OF _____)

On this _____ day of _____, 20____ before me personally came and appeared _____
to me known, who, being by me duly sworn, did depose and say that he resides at _____

that he is the _____ of _____
the corporation described in and which executed the foregoing instrument; that he knows the seal
of said corporation; that one of the impressions affixed to said instrument is an impression of
such seal; that it was so affixed by order of the directors of said corporation, and that he signed
his name thereto by like order.

(Notary Public)

(SEAL)

=====

ACKNOWLEDGEMENT OF PRINCIPAL, IF A FIRM OR PARTNERSHIP

STATE OF)
) SS
COUNTY OF)

On this _____ day of _____, 20____ before me personally came and appeared _____
to me known, and known to me to be one of the members of the firm of _____
_____ described in and who executed the foregoing instrument and he
acknowledged to me that he executed the same as and for the act and deed of said firm.

(Notary Public)

(SEAL)

=====

ACKNOWLEDGEMENT OF PRINCIPAL, IF AN INDIVIDUAL

STATE OF)
) SS
COUNTY OF)

On this _____ day of _____, 20____ before me personally came and
appeared _____
to me known to be the person described in and who executed the foregoing instrument and
acknowledged that he executed the same.

(Notary Public)

(SEAL)

=====

ACKNOWLEDGEMENT BY SURETY COMPANY

STATE OF)
) SS
COUNTY OF)

On this _____ day of _____, 20____ before me personally came and appeared _____ the to me personally known of _____ corporation described in and which executed within the instrument, who being by me duly sworn, did depose and say that he resides at _____ that he is the _____ of the said corporation; that he knows the seal of said corporation; that the seal affixed to the said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation, and that he signed his name thereto by like order.

(Notary Public)

(SEAL)

**GENERAL CONDITIONS
FOR CITY OF AVONDALE ESTATES CONSTRUCTION CONTRACTS**

GC-1 FAMILIARITY WITH SITE

Execution of this agreement by the Contractor is a representation that the Contractor has visited the site, has become familiar with the local conditions under which the Work is to be performed, and has correlated personal observations with the requirements of this agreement.

GC-2 CONTRACT DOCUMENTS

This agreement consists of the City of Avondale Estates' invitation to bid, instructions to bidders, Contractor's bid form, construction form of agreement, Performance Bond, Payment Bond, general conditions, special provisions, specifications, plans, drawings, addenda, and written change orders.

GC-3 DEFINITIONS

The following terms as used in this agreement are defined as follows:

Change Order - a written order to the Contractor, prepared by the Engineer and issued by the City for changes in the Work within the general scope of the contract documents, adjustment of the contract price, extension of the contract time, or reservation of determination of a time extension.

City - City of Avondale Estates, Georgia, a political subdivision of the State of Georgia, acting by and through the City Council.

Day - a calendar day of twenty-four hours lasting from midnight of one day to midnight the next day.

Notice to Proceed - written communication issued by the City, or their designated representative, to the Contractor authorizing him to proceed with the Work and establishing the date of commencement and completion of the Work.

Substantial Completion - the date certified by the Engineer when all or a part of the Work, identified in the Engineer's certification, is sufficiently completed in accordance with the requirements of the contract documents so that the identified portion of the Work can be utilized for the purposes for which it is intended.

Work - all of the services specified, indicated, shown or contemplated by the contract documents, and furnishing by the Contractor of all materials, equipment, labor, methods, processes, construction and manufacturing materials and equipment, tools, plans, supplies, power, water, transportation and other things necessary to complete such services in accordance with the contract documents to insure a functional and complete facility.

GQ-4 CODES

All codes, specifications, and standards referenced in the contract documents shall be the latest additions, amendments and revisions of such referenced standards in effect as of the date of the request for proposals for this contract.

GC-5 REVIEW OF CONTRACT DOCUMENTS

Before making its proposal to the City, and continuously after the execution of the agreement, the Contractor shall carefully study and compare the contract documents and shall at once report to the Engineer any error, ambiguity, inconsistency or omission that may be discovered, including any requirement which may be contrary to any law, ordinance, rule, or regulation of any public authority bearing on the performance of the Work. By submitting its proposal, the Contractor agrees that the contract documents, along with any supplementary written instructions issued by or through the Engineer that have become a part of the contract documents appear accurate, consistent and complete insofar as can be reasonably determined. If the Contractor has reported in writing any error, inconsistency, or omission to the City, has properly stopped the effected Work until instructed to proceed, and has otherwise followed the instructions of the Engineer, the Contractor shall not be liable to the City for any damage resulting from any such error, inconsistency, or omission in the contract documents. The Contractor shall not perform any portion of the Work without the contract documents, approved plans, specifications, products and data, or samples for such portion of the Work.

GC-6 STRICT COMPLIANCE

No observation, inspection, test or approval of the City or Engineer shall relieve the Contractor from its obligation to perform the Work in strict conformity with the contract documents.

GC-7 APPLICABLE LAW

All applicable State laws, City ordinances, and rules and regulations of all authorities having jurisdiction over the construction of the project shall apply to this agreement. All Work performed within the right of way of the Georgia Department of Transportation shall be in accordance with DOT regulations, policies and procedures. The Contractor shall comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as specified and the Contractor agrees to indemnify and hold harmless the City, its officers, agents and employees, as well as the Engineer, against any claim or liability arising from or based on the violation of any law, ordinance, regulation, order or decree affecting the conduct of the Work, whether occasioned by the Contractor, his agents or employees.

GC-8 PERMITS & LICENSES

All permits and licenses necessary for the Work shall be secured and paid for by the Contractor. If any permit, license or certificate expires or is revoked, terminated, or suspended as a result of any action on the part of the Contractor, the Contractor shall not be entitled to additional compensation or time.

GC-9 TAXES

The Contractor shall pay all sales, retail, occupational, service, excise, old age benefit and unemployment compensation taxes, consumer, use and other similar taxes, as well as any other taxes or duties on the materials, equipment, and labor for the Work provided by the Contractor which are legally enacted by any municipal, City, state or federal authority, department or agency at the time bids are received, whether or not yet effective. The Contractor shall maintain records pertaining to such taxes and levies as well as payment thereof and shall make the same available to the City at all reasonable times for inspection and copying.

GC-10 DELINQUENT CONTRACTORS

The City shall not pay any claim, debt, demand or account whatsoever to any person, firm or corporation who is in arrears to the County or City for taxes. The City shall be entitled to a counterclaim and offset for any such debt in the amount of taxes in arrears, and no assignment or transfer of such debt after the taxes become due shall affect the right of the City to offset any taxes owed against said debt.

GC-11 LIEN WAIVERS

The Contractor shall furnish the City with evidence that all persons who have performed Work or furnished materials pursuant to this agreement have been paid in full prior to submitting its demand for final payment pursuant to this agreement. In the event that such evidence is not furnished, the City may retain sufficient sums necessary to meet all lawful claims of such laborers and materialmen. The City assumes no obligation nor in any way undertakes to pay such lawful claims from any funds due or that may become due to the Contractor.

GC-12 MEASUREMENT

All items of Work to be paid for per unit of measurement shall be measured and certified by the Engineer.

GC-13 ASSIGNMENT

The Contractor shall not assign any portion of this agreement or moneys due therefrom without the prior written consent of the City. The Contractor shall retain personal control and shall provide personal attention to the fulfillment of its obligations pursuant to this agreement.

GC-14 FOREIGN CONTRACTORS

In the event that the Contractor is a foreign corporation, partnership, or sole proprietorship, the Contractor hereby irrevocably appoints the Secretary of State of Georgia as its agent for service of all legal process for the purpose of this contract only.

GC-15 INDEMNIFICATION

To the fullest extent permitted by law, the Contractor shall, at his sole cost and expense, indemnify, defend, satisfy all judgments, and hold harmless the City, the Engineer, and their agents and employees from and against all claims, damages, actions, judgments, costs, penalties, liabilities, losses and expenses, including, but not limited to, attorney's fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, action, judgment, cost, penalty, liability, loss or expense (1) is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and (2) is caused in whole or in part by any act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless whether such claim is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or otherwise reduce any of the rights or obligations of indemnity which would otherwise exist as to any party or person described in this agreement. In any and all claims against the City, the Engineer, or any of their agents or employees by any employee of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation contained herein shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the

Contractor or any subcontractor under Worker's Compensation Acts, disability benefit acts, or other employee benefit acts.

GC-16 SUPERVISION OF WORK

The Contractor shall supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for all construction methods and procedures and shall coordinate all portions of the Work pursuant to the contract subject to the overall coordination of the Engineer. All Work pursuant to this agreement shall be performed in a skillful and workmanlike manner.

GC-17 RESPONSIBILITY FOR WORK

The Contractor shall not be relieved from the Contractor's obligations to perform the Work in accordance with the contract documents by the activities or duties of the Engineer, including inspections, tests or approvals required or performed pursuant to this agreement.

GC-18 RESPONSIBILITY FOR ACTS OF EMPLOYEES

The Contractor shall be responsible to the City for the acts and omissions of its employees, subcontractors, and agents as well as any other persons performing Work pursuant to this agreement.

GC-19 PAYMENT FOR LABOR AND MATERIALS

Unless otherwise provided in this agreement, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the execution and completion of the Work.

GC-20 DISCIPLINE ON WORK SITE

The Contractor shall enforce strict discipline and good order among its employees and subcontractors at all times during the performance of the Work. The Contractor shall not employ any subcontractor who is not skilled in the task assigned to it. The Engineer may, by written notice, require the Contractor to remove from the Work any subcontractor or employee deemed by the Engineer to be incompetent.

GC-21 HOURS OF OPERATION

All Work at the construction site shall be performed during regular business hours, except upon the Engineer's prior written consent to other Work hours.

GC-22 FAMILIARITY WITH WORK CONDITIONS

The Contractor shall take all steps necessary to ascertain the nature and location of the Work and the general and local conditions which may affect the Work or the cost thereof. The Contractor's failure to fully acquaint itself with the conditions which may affect the Work, including, but not limited to conditions relating to transportation, handling, storage of materials, availability of labor, water, roads, weather, topographic and subsurface conditions, other separate contracts to be entered into by the City relating to the project which may affect the Work of the Contractor, applicable provisions of law, and the character and availability of equipment and facilities necessary prior to and during the performance of the Work shall not relieve the Contractor of its responsibilities pursuant to this agreement and shall not constitute a basis for an equitable adjustment of the contract terms. The City assumes no responsibility for

any understandings or representations concerning conditions of the Work made by any of its officers, agents, or employees prior to the execution of this agreement.

GC-23 RIGHT OF ENTRY

The City reserves the right to enter the site of the Work by such agent as it may elect for the purpose of inspecting the Work or installing such collateral Work as the City may desire.

GC-24 NOTICES

Any notice, order, instruction, claim or other written communication required pursuant to this agreement shall be deemed to have been delivered or received as follows:

- (1) Upon personal delivery to the Contractor, its authorized representative, or the Engineer on behalf of the City. Personal delivery may be accomplished by in-person hand delivery or bona fide overnight express service.
- (2) Three days after depositing in the United States mail a certified letter addressed to the Contractor, the City, or the Engineer. For purposes of mailed notices, the City's mailing address shall be 4040 South Avondale Estates Road, NW, Avondale Estates, Georgia 30096-3016. The Contractor's mailing address shall be the address stated in its proposal, and the Engineer's mailing address shall be its address listed in the Notice to Begin Work.

GC-25 SAFETY

The Contractor shall take all reasonable precautions for the safety of all persons and property associated with the Work, and the Contractor shall erect and maintain, as required by existing conditions and the progress of the Work, all reasonable safeguards for the safety and protection of persons in the vicinity of the project.

GC-26 BLASTING AND EXCAVATION

The Contractor acknowledges that it is fully aware of the contents and requirements of O.C.G.A. §§ 25-9-1 through 25-9-12 concerning blasting and excavation near underground gas pipes and facilities and shall fully comply therewith.

GC-27 HIGH VOLTAGE LINES

The Contractor acknowledges that it is fully aware of the contents and requirements O.C.G.A. §§ 46-3-30 through 46-3-39 concerning safeguards against contact with high voltage lines, and the Contractor shall fully comply with said provisions.

GC-28 SCAFFOLDING AND STAGING

The Contractor acknowledges that it is the person responsible for employing and directing others to perform labor within the meaning of O.C.G.A. § 34-1-1 and agrees to comply with said provisions.

GC-29 CLEAN-UP

The Contractor shall clean up all refuse, rubbish, scrap materials, and debris caused by its operations to the end that the site of the Work shall present a neat, orderly and workmanlike appearance at all times.

GC-30 PROTECTION OF WORK

The Contractor shall be responsible for maintenance and protection of the Work until final completion of this agreement and acceptance of the Work as defined herein. Any portion of the Work suffering injury, damage or loss shall be considered defective and shall be corrected or replaced by the Contractor without additional cost to the City.

GC-31 REJECTED WORK

The Contractor shall promptly remove from the project all Work rejected by the Engineer for failure to comply with the contract documents and the Contractor shall promptly replace and re-execute the Work in accordance with the contract documents and without expense to the City. The Contractor shall also bear the expense of making good all Work of other Contractors destroyed or damaged by such removal or replacement.

GC-32 DEFECTIVE WORK

If the Contractor defaults or neglects to carry out any portion of the Work in accordance with the contract documents, and fails within three days after receipt of written notice from the City or the Engineer to commence and continue correction of such default or neglect with diligence and promptness, the City or the Engineer may, after three days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy the City may have, make good such deficiencies and complete all or any portion of any Work through such means as the City may select, including the use of a new Contractor. In such case, an appropriate change order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies. In the event the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the City on demand.

GC-33 NEW MATERIALS

The Contractor warrants to the City that all materials and equipment furnished under this contract will be new unless otherwise specified, and the Contractor further warrants that all Work will be of good quality, free from faults and defects, and in conformance with the contract documents. The warranty set forth in this paragraph shall survive final acceptance of the Work.

GC-34 CONTRACTOR'S WARRANTY

If within one year after the date of substantial completion and final acceptance of the Work by the City, or within such longer period of time as may be prescribed by law or by the term of any applicable special warranty required by the contract documents, any of the Work is found to be defective or not in accordance with the contract documents, the Contractor shall correct such Work promptly after receipt of written notice from the City to do so. This obligation shall survive both final payment for the Work and termination of the contract.

GC-35 ASSIGNMENT OF MANUFACTURERS' WARRANTIES

Without limiting the responsibility or liability of the Contractor pursuant to this agreement, all warranties given by manufacturers on materials or equipment incorporated in the Work are hereby assigned by the Contractor to the City. If requested, the Contractor shall execute formal assignments of said manufacturer's warranties to the City. All such warranties shall be directly enforceable by the City.

GC-36 WARRANTIES IMPLIED BY LAW

The warranties contained in this agreement, as well as those warranties implied by law, shall be deemed cumulative and shall not be deemed alternative or exclusive. No one or more of the warranties contained herein shall be deemed to alter or limit any other.

GC-37 STOP WORK ORDERS

In the event that the Contractor fails to correct defective Work as required by the contract documents or fails to carry out the Work in accordance with contract documents, the City, or the Engineer, in writing, may order the Contractor to stop Work until the cause for such order has been eliminated. This right of the City or Engineer to stop Work shall not give rise to any duty on the part of the City or the Engineer to execute this right for the benefit of the Contractor or for any other person or entity.

GC-38 TERMINATION FOR CAUSE

If the Contractor is adjudged bankrupt, makes a general assignment for the benefit of creditors, suffers the appointment of a receiver on account of its insolvency, or fails to supply sufficient properly skilled Workers, materials, fails to make prompt payment to subcontractors or materialmen, disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, or is otherwise guilty of a material violation of this agreement and fails within seven days after receipt of written notice to commence and continue correction of such default, neglect, or violation with diligence and promptness, the City may, after seven days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy the City may have, terminate the employment of the Contractor and take possession of the site as well as all materials, equipment, tools, construction equipment and machinery thereon. The City may finish the Work by whatever methods the City deems expedient. In such case, the Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the contract price exceeds the cost of completing the Work, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the City on demand. This obligation for payment shall survive the termination of the contract. Termination of this agreement pursuant to this paragraph may result in disqualification of the Contractor from bidding on future City contracts.

GC-39 TERMINATION FOR CONVENIENCE

The City may, at any time upon 30 days written notice to the Contractor, terminate the whole or any portion of the Work for the convenience of the City. Said termination shall be without prejudice to any right or remedy of the City provided herein. In addition, in the event this agreement has been terminated due to the default of the Contractor, and if it is later determined that the Contractor was not in default pursuant to the provisions of this agreement at the time of termination, then such termination shall be considered a termination for convenience pursuant to this paragraph.

GC-40 TERMINATION FOR CONVENIENCE - PAYMENT

In the event that the City terminates this agreement for the convenience of the City, the City shall only be liable to the Contractor for those costs reimbursable to the Contractor plus a mark-up of ten percent on the actual fully accounted cost recovered pursuant to this paragraph. In the event that it appears that the Contractor would have sustained a loss on the entire contract had it been completed, no profit shall be included or allowed hereunder and an appropriate adjustment shall be made reducing the amount of settlement to reflect the indicated rate of loss. In the event of termination for the convenience of the City, the City shall pay the Contractor the following amounts determined by the Engineer:

- A. An amount for supplies, services, or property accepted by the City for which payment has not previously been made. The price to be paid for these items shall be equivalent to the aggregate price for such-supplies or services computed in accordance with the price specified in this agreement appropriately adjusted for any saving of freight or other charges; and
- B. The total of:
 - (1) The costs incurred in the performance of the Work terminated, including initial costs and preparatory expenses allocable thereto, but exclusive of any costs attributable to supplies or services previously paid;
 - (2) The costs of settling and paying claims arising pursuant to the termination of the Work under said contracts or orders which are properly chargeable to the terminated portion of the contract (exclusive of the amounts paid or payable on account of completed items or equipment delivered or services furnished by a subcontractor or vendor prior to the effective date of the notice of termination, which amounts shall be included in the costs payable pursuant to (A)); and
 - (3) The reasonable costs of settlement, including accounting, legal, clerical, and other expenses reasonable and necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the contract and for the termination and settlement of subcontracts thereunder, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of property allocable to this agreement.

GC-41 TERMINATION FOR CONVENIENCE - PAYMENT LIMITATIONS

In the event of termination for the convenience of the City, the total sum to be paid to the Contractor shall not exceed the contract price as reduced by the amount of payments otherwise made, by the contract price for Work not terminated, and as otherwise permitted by the contract. Except for normal spoilage, and except to the extent that the City shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor the fair value, as determined by the Engineer, of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the City or to another buyer.

GC-42 COST TO CURE

If the City terminates the whole or any part of the Work pursuant to this agreement, then the City may procure upon such terms and in such manner as the Engineer may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the City for any excess costs

for such similar supplies or services. The Contractor shall continue the performance of this agreement to the extent not terminated hereunder.

GC-43 ATTORNEY'S FEES

Should the Contractor default pursuant to any of the provisions of this agreement, the Contractor and its surety shall pay to the City such reasonable attorney's fees as the City may expend as a result thereof and all costs, expenses, and filing fees incidental thereto.

GC-44 CONTRACTOR'S RESPONSIBILITIES UPON TERMINATION

After receipt of a notice of termination from the City, and except as otherwise directed by the Engineer, the Contractor shall:

1. Stop Work under the contract on the date and to the extent specified in the notice of termination;
2. Place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the Work under the agreement as is not terminated;
3. Terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated by the notice of termination;
4. Assign to the City in the manner, at the times, and to the extent directed by the Engineer, all of the rights, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the City shall have the right, at its discretion, to settle or pay any and all claims arising out of the termination of such orders or subcontracts;
5. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Engineer, to the extent the Engineer may require, which approval or ratification shall be final for all purposes;
6. Transfer title and deliver to the entity or entities designated by the City, in the manner, at the times, and to the extent, if any, directed by the Engineer, and to the extent specifically produced or specifically acquired by the Contractor for the performance of such portion of the Work as has been terminated:
 - (a) The fabricated or unfabricated parts, Work, and progress, partially completed supplies, and equipment, materials, parts, tools, dyes, jigs, and other fixtures, completed Work, supplies, and other material produced as a part of or acquired in connection with the performance of the Work terminated by the notice of termination; and
 - (b) The completed or partially completed plans, drawings, information, and other property to the Work.
7. Use its best efforts to sell in the manner, at the times, to the extent, and at the prices directed or authorized by the Engineer, any property described in Section 6 of this paragraph, provided, however, that the Contractor shall not be, required to extend credit to any buyer and further provided that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the City to the Contractor pursuant to this agreement.

8. Complete performance of such part of the Work as shall not have been terminated by the notice of termination; and
9. Take such action as may be necessary, or as the Engineer may direct, for the protection and preservation of the property related to the agreement which is in the possession of the Contractor and in which the City has or may acquire an interest.

GC-45 RECORDS

The Contractor shall preserve and make available to the City all of its records, books, documents and other evidence bearing on the costs and expenses of the Contractor and any subcontractor pursuant to this agreement upon three days advance notice to the Contractor.

GC-46 DEDUCTIONS

In arriving at any amount due the Contractor pursuant to the terms of this agreement, there shall be deducted all liquidated damages, advance payments made to the Contractor applicable to the termination portion of the contract, the amount of any claim which the City may have against the Contractor, the amount determined by the Engineer to be necessary to protect the City against loss due to outstanding potential liens or claims, and the agreed price of any materials acquired or sold by the Contractor and not otherwise recovered by or credited to the City.

GC-47 REIMBURSEMENT OF THE CITY

In the event of termination, the Contractor shall refund to the City any amount paid by the City to the Contractor in excess of the costs reimbursable to the Contractor.

GC-48 TERMINATION FOR CONVENIENCE – DELAY

The Contractor shall be entitled to only those damages and that relief from termination by the City as specifically set forth in this agreement. The City or the Engineer may issue a written order requiring the Contractor to suspend, delay or interrupt all or any part of the Work for such period of time as the City may determine to be appropriate for the convenience of the City. If the performance of the Work is interrupted for an unreasonable period of time by an act of the City or Engineer in the administration of this agreement, an equitable adjustment shall be made for any increase in the Contractor's costs of performance and any increase in the time required for performance of the Work necessarily caused by the unreasonable suspension, delay, or interruption. Any equitable adjustment shall be reduced to writing and shall constitute a modification to this agreement. In no event, however, shall an equitable adjustment be made to the extent that performance of this agreement would have been suspended, delayed or interrupted by any other cause, including the fault or negligence of the Contractor. No claim for an equitable adjustment pursuant to this paragraph shall be permitted before the Contractor shall have notified the Engineer in writing of the act or failure to act involved, and no claim shall be allowed unless asserted in writing to the Engineer within ten days after the termination of such suspension, delay or interruption.

GC-49 COMMENCEMENT AND DURATION OF WORK

The Contractor shall commence Work pursuant to this agreement within ten days of mailing or delivery of written notice to proceed by the City. The Contractor shall diligently prosecute the Work to completion within the time specified therefore. The capacity of the Contractor's construction and manufacturing equipment and plan, sequence and method of operation and forces employed, including management and supervisory personnel, shall be such as to insure completion of the Work within the

specified time. The Contractor and City hereby agree that the contract time for completion of the Work is reasonable taking into consideration the average climatic conditions prevailing in the locality of the Work.

GC-50 TIME OF THE ESSENCE

All time limits stated in this agreement are of the essence of this contract.

OC-51 IMPACT DAMAGES

Except as specifically provided pursuant to a stop Work order or change order, the Contractor shall not be entitled to payment or compensation of any kind from the City for direct or indirect or impact damages including, but not limited to, costs of acceleration arising because of delay, disruption, interference or hindrance from any cause whatsoever whether such delay, disruption, interference or hindrance is reasonable or unreasonable, foreseeable or unforeseeable, or avoidable, provided, however, that this provision shall not preclude the recovery of damages by the Contractor for hindrances or delays due solely to fraud or bad faith on the part of the City, its agents or employees. The Contractor shall be entitled only to extensions in the time required for performance of the Work as specifically provided in the contract.

GC-52 DELAY

The Contractor may be entitled to an extension of the contract time, but not an increase in the contract price, for delays arising from unforeseeable causes beyond the control and without the fault or negligence of the Contractor or its subcontractors for labor strikes, acts of God, acts of the public enemy, acts of the state, federal or local government in its sovereign capacity, by acts of another separate contractor, or by an act of neglect of the City with the Engineer.

GC-53 INCLEMENT WEATHER

The Contractor shall not be entitled to an extension of the contract time due to normal inclement weather. Unless the Contractor can substantiate to the satisfaction of the Engineer that there was greater than normal inclement weather considering the full term of the contract using a ten year average of accumulated mean values for climatological data compiled by the U.S. Department of Commerce for Atlanta, Georgia and that such greater than normal inclement weather actually delayed the Work, the Contractor shall not be entitled to an extension of time therefore.

GC-54 NOTICE OF DELAY

The Contractor shall not receive an extension of time unless a notice of a claim is filed with the City and the Engineer within ten days of the first instance of such delay, disruption, interference or hindrance and a written statement of the claim is filed with the Engineer and the City within 20 days of the first such instance. In the event that the Contractor fails to comply with this provision, it waives any claim which it may have for an extension of time pursuant to this agreement.

GC-55 NOTICE OF DELAY - CONTENTS

The notice of delay referenced in the preceding paragraph shall include specific information concerning the nature of the delay, the date of commencement of the delay, the construction activities

affected by the delay, the person or organization responsible for the delay, the anticipated extent of the delay, and any recommended action to avoid or minimize the delay.

GC-56 PROGRESS OF WORK

To the extent that the Contractor is entitled to additional compensation for delay, an absolute condition precedent to such entitlement shall be in strict compliance with all requirements and procedures for entitlement to an extension of time herein. If the Work actually in place falls behind the currently updated and approved project network schedule, and it becomes apparent from the current schedule that Work will not be completed within the contract time, the Contractor agrees that it will, as necessary, or as directed by the Engineer, take action at no additional cost to the City to improve the progress of the Work, including increasing manpower, increasing the number of Working hours per shift or shifts per Working day, increasing the amount of equipment at the site, and any other measure reasonably required to complete the Work in a timely fashion.

GC-57 DILIGENCE

The Contractor's failure to substantially comply with the requirements of the preceding paragraph may be grounds for determination by the City or Engineer that the Contractor is failing to prosecute the Work with such diligence as will insure its completion within the time specified. In such event, the City shall have the right to furnish such additional labor and materials as may be required to comply with the schedule after 48 hours written notice to the Contractor, and the Contractor shall be liable for such costs incurred by the City.

GC-58 SET-OFFS

Any monies due to the City pursuant to the acceleration provisions of this agreement may be deducted by the City against monies due from the City to the Contractor.

GC-59 ACCELERATION - REMEDIES

The remedies of the City concerning acceleration are in addition to and without prejudice to all of the rights and remedies of the City at law, in equity, or contained in this agreement.

GC-60 TITLE TO MATERIALS

No materials or supplies shall be purchased by the Contractor or by any Subcontractor subject to any chattel mortgage or under a conditional sales contract or other agreement by which any interest is retained by the seller. The Contractor hereby warrants that it has good and marketable title to all materials and supplies used by it in the Work, and the Contractor further warrants that all materials and supplies shall be free from all liens, claims, or encumbrances at the time of incorporation in the Work.

GC-61 INSPECTION OF MATERIALS

All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards and in accordance with the requirements of the contract documents. Additional tests performed after the rejection of materials or equipment shall be at the Contractor's expense.

GC-62 ENGINEER'S PRESENCE DURING TESTING

All tests performed by the Contractor shall be witnessed by the Engineer unless the requirement therefore is waived in writing. The Engineer may perform additional tests on materials previously tested by the Contractor, and the Contractor shall furnish samples for this purpose as requested.

GC-63 MATERIALS INCORPORATED IN WORK

The Contractor shall furnish all materials and equipment to be incorporated in the Work. All such materials or equipment shall be new and of the highest quality available. Manufactured materials and equipment shall be obtained from sources which are currently manufacturing such materials, except as otherwise specifically approved by the Engineer.

GC-64 STORAGE OF MATERIALS

Materials and equipment to be incorporated in the Work shall be stored in such a manner as to preserve their quality and fitness for the Work and to facilitate inspection.

GC-65 PAYROLL REPORTS

The Contractor shall not be required to furnish weekly payroll reports to the Engineer on this project.

GC-66 CONTRACTORS' REPRESENTATIVE

Before beginning Work, the Contractor shall notify the Engineer in writing of one person within its organization who shall have complete authority to supervise the Work, receive orders from the Engineer, and represent the Contractor in all matters arising pursuant to this agreement. The Contractor shall not remove its representative without first designating in writing a new representative. The Contractor's representative shall normally be present at or about the site of Work while the Work is in progress. When neither the Contractor nor its representative is present at the Worksite, the superintendent, foreman, or other employee in charge of the Work shall be an authorized representative of the Contractor.

GC-67 SPECIALTY SUB-CONTRACTORS

The Contractor may utilize the services of specialty subcontractors on those parts of the project which, under normal contracting practices, are performed by specialty subcontractors. Neither the Contractor nor any subcontractor shall award Work to any subcontractor without the prior written consent of the City. The Contractor shall not award more than seventy-five percent of the Work to subcontractors.

GC-68 INSPECTION BY ENGINEERS

All Work pursuant to this agreement shall be subject to inspection by the Engineer for conformity with contract drawings and specifications. The Contractor shall give the Engineer reasonable advance notice of operations requiring, special inspection of a portion of the Work.

GC-69 WORK COVERED PRIOR TO ENGINEER'S INSPECTION

In the event that Work is covered or completed without the approval of the Engineer, and such approval is required by the specifications or required in advance by the Engineer, the Contractor shall

bear all costs involved in inspection notwithstanding conformance of such portion of the Work to the contract drawings and specifications.

GC-70 ENGINEER'S AUTHORITY

The Engineer shall have the authority to decide all questions concerning interpretation and fulfillment of contract requirements, including, without limitation, all questions concerning the prosecution, progress, quality and acceptability of the Work. Any oral decision or instruction of the Engineer shall be confirmed in writing. All communications between the City and the Contractor shall be made through the Engineer. The Contractor shall submit to the Engineer a complete schedule of values of various portions of the Work, including quantities and unit prices, aggregating the contract price. The schedule shall subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Each item in the schedule of values shall include its proper share of overhead and profit. The schedule of values, when approved by the Engineer, shall be used only as a basis for the Contractor's monthly request for payment and shall not be used for additions to or deductions from the contract amount.

GC-71 PROGRESS ESTIMATES

The Contractor shall also prepare a written report for the Engineer's approval, on City forms of the total amount of value of Work performed to the date of submission. No progress estimate or payment shall be considered an approval or acceptance of any Work performed, and all estimates and payments shall be subject to correction in subsequent estimates. Progress payments shall be made for all completed activities and for suitably stored materials.

GC-72 PROGRESS PAYMENTS

Upon completion of each monthly estimate of Work performed and materials furnished, the Engineer shall recommend payment to the Contractor for the estimated value of such Work, materials, and equipment, less the amount of all prior payments and all liquidated damages. The Contractor will be paid 100 percent, less retainage, of the cost of materials received and properly stored but not incorporated into the Work. Payments for materials or equipment stored on the site shall be conditioned upon submission by the Contractor of bills of sale to establish the City's title to such materials or equipment. No progress estimate or payment need be made when, in the Engineer's judgment, the increment in the estimated value of Work performed and materials furnished since the preceding estimate is less than \$10,000.

GC-73 TIME OF PAYMENT

The Contractor will be paid on or before the 25th day following receipt of an approved estimate. When the contractor has performed in accordance with the provisions of this Agreement, the City shall pay to the contractor, within 30 days of receipt by the City of any payment request based upon Work completed or service provided pursuant to the contract, the sum so requested, less the retainage stated in this Agreement, if any. In the event that the City fails to pay the contractor within 60 days of the City's receipt of a pay request based upon Work completed or service provided pursuant to the contract, the City shall pay the Contractor interest at the rate of 1/2 percent per month or pro rata fraction thereof beginning the 61st day following the City's receipt of the pay request. The contractor's acceptance of progress payments or final payment shall release all claims for interest on said payments. The provisions of this agreement are intended to supersede all provisions of the Georgia Prompt Pay Act as provided by law.

GC-74 RETAINAGE

The City shall retain from each progress payment ten percent of the estimated value of the Work performed until the progress payments, including retainage, total 50 percent of the contract price. Thereafter, no further retainage shall be withheld so long as the Contractor is making satisfactory progress to insure completion of the Work within the time specified therefore. The City may reinstate the ten percent retainage, in the event the Engineer determines that the Contractor is not making satisfactory progress to complete the Work within the time specified in this agreement or in the event that the Engineer provides a specific cause for such withholding.

GC-75 PAYMENT OF SUBCONTRACTORS

The Contractor shall promptly pay each subcontractor upon the receipt of payment from the City. Such payment shall be made from the amount paid to the Contractor pursuant to the subcontractor's Work. The Contractor shall also maintain the records of the percentage retained from payments to the Contractor pursuant to such subcontractor's Work. The Contractor shall procure agreements from each subcontractor requiring each subcontractor to pay their subcontractors, agents and employees in a similar manner.

GC-76 CITY'S RESPONSIBILITIES TO SUBCONTRACTORS

Neither the City nor the Engineer shall have any obligation to pay any subcontractor except as otherwise required by law.

GC-77 PROGRESS PAYMENTS - ACCEPTANCE OF WORK

Certification of progress payments, as well as the actual payment thereof, shall not constitute the City's acceptance of Work performed pursuant to this agreement.

GC-78 PAYMENTS IN TRUST

All sums paid to the Contractor pursuant to this agreement are hereby declared to constitute trust funds in the hands of the contractor to be applied first to the payment of claims of subcontractors, laborers, and suppliers arising out of the Work, to claims for utilities furnished and taxes imposed, and to the payment of premiums on surety and other bonds and on insurance for any other application.

GC-79 JOINT PAYMENTS

The City reserves the right to issue any progress payment or final payment by check jointly to the Contractor and any subcontractor or supplier.

GC-80 RIGHT TO WITHHOLD PAYMENT

The Engineer may decline to approve payment and may withhold payment in whole or in part to the extent reasonable and necessary to protect the City against loss due to defective Work, probable or actual third party claims, the Contractor's failure to pay subcontractors or material men, reasonable evidence that the Work will not be completed within the contract time or contract price or damage to the City or any other contractor on the project.

GC-81 CERTIFICATE OF-SUBSTANTIAL COMPLETION

Upon the Contractor's submission of a request for a certificate of substantial completion, the Engineer shall inspect the Work and determine whether the Work is substantially complete. If the Work is substantially complete, the Engineer shall issue a certificate of substantial completion of the Work which shall establish the date of substantial completion, shall state the responsibilities of the City and the Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall complete the items submitted by the Contractor as requiring correction or further Work. The certificate of substantial completion of the Work shall be submitted to the City and the Contractor for their written acceptance of the responsibilities assigned to them pursuant to such certificate.

GC-82 FINAL PAYMENT

Upon substantial completion of the Work and upon application by the Contractor and approval by the Engineer, the City shall make payment reflecting adjustments and retainage for the Work as provided in this agreement.

GC-83 COMMENCEMENT OF WARRANTIES

Warranties required by this agreement shall commence on the date of final completion of the project unless otherwise provided in the certificate of substantial completion.

GC-84 FINAL PAYMENT - WAIVER OF CLAIMS

The acceptance of the substantial completion 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 application for payment at substantial, completion and except for the retainage sums due at final acceptance. Following the Engineer's issuance of the certificate of substantial completion and the Contractor's completion of the Work pursuant to this agreement, the Contractor shall forward to the Engineer a written notice that the Work is ready for final inspection and acceptance and shall also forward to the Engineer a final application for payment. When the Engineer finds the Work acceptable and determines that the contract has been fully performed, the Engineer shall issue a certificate for payment which shall approve final payment to the Contractor.

GC-85 DOCUMENTATION OF COMPLETION OF WORK

Neither the final payment nor the remaining retainage shall become due until the Contractor submits the following documents to the Engineer:

- A. An affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work have been paid other otherwise satisfied;
- B. The surety's consent to final payment; and
- C. Any other data reasonably required by the City or Engineer establishing payment or satisfaction of all such obligations, including releases, waivers of liens, and documents of satisfaction of debts.

In the event that a subcontractor refuses to furnish a release or waiver as required by the City or Engineer, the Contractor may furnish a bond satisfactory to the City to indemnify the City against such loss. In the event that any lien or indebtedness remains unsatisfied after all payments are made, the contractor shall refund to the City all moneys that the City may become compelled to pay in discharging such lien or other indebtedness, including all costs and reasonable attorney's fees.

GC-86 GOVERNING LAW

Each and every provision of this agreement shall be construed in accordance with and governed by Georgia law. The parties acknowledge that this contract is executed in Gwinnett County, Georgia and that the contract is to be performed in Gwinnett County, Georgia. Each party hereby consents to the Gwinnett Superior Court's sole jurisdiction over any dispute which arises as a result of the execution or performance of this agreement, and each party hereby waives any and all objections to venue in the Gwinnett Superior Court.

GC-87 CHANGES AND EXTRA WORK

GC-87.1 AUTHORITY FOR CHANGES

The City may make changes in the Drawings or Specifications and in the quantities of Work to be done under the Contract.

GC-87.2 CHANGE ORDERS

Without invalidating the Contract, the City may at any time or from time to time, by written order, order additions, deletions, or revisions in the Work. These will be authorized by Change Orders. Upon receipt of the Change Order, Contractor shall promptly proceed with the Work involved. If any price or scope of the Work or an extension or shortening of the Contract Time is involved, an equitable adjustment will be made within the Change Order. In the event the contract price is increased by Change Order, the penal amount of the Payment and Performance Bonds shall be increased as provided for in Section GC-15. All changes in the Work authorized by Change Order shall be performed under the applicable Conditions of the Contract Documents.

GC-87.3 WRITTEN NOTICE

The City may, at the request of the Contractor, issue interpretations, clarifications and other instructions as to the intent of the Contract Documents, in the form of Written Notices. The City may also, at any time, make changes in the details of the Work by issuance of a Written Notice. Upon receipt of such a Written Notice containing interpretations, clarifications and other instructions, Contractor shall proceed with the Work and comply with the Written Notice unless Contractor believes that such Written Notice entitles him to a Change in Contract Price or Time or both.

Should Contractor believe that such Written Notice entitles him to change in Contract Price or Time, or both, he shall give the City notice in writing thereof within seven (7) days after receipt of the Written Notice. Thereafter within thirty (30) days, Contractor shall document the basis for the change in Contract Price or Time. The City shall render a timely, written decision on the Contractor's request for a change in Contract Price or Time. Should the City determine that the Contractor is not entitled to a change in Contract Time or Price, the Contractor shall proceed as directed upon receipt of the City's

decision. Failure to proceed shall constitute a breach of Contract and shall be a cause for the termination of the Contract.

Request for a Change Order arising out of a Written Notice will not be considered without the attachment thereto of a copy of the referenced Written Notice. No claim by Contractor will be allowed if asserted after Final Payment under this Contract.

GC-87.4 EXTRA WORK

Extra Work consists of new and unforeseen Work determined by the City not to be covered by any of the various items for which there is a bid price or by combination of such items.

GC-87.5 VARIATION IN QUANTITIES

Wherever the estimated quantities of Work to be done and materials to be furnished under this Contract are shown in any of the documents including the Proposal, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the City to complete the Work contemplated by the Contract, and such increase or diminution shall in no way vitiate this Contract, nor shall any such increase or diminution give cause for claims or liability for damages.

GC-88 CHANGE ORDERS

QC-88.1 GENERAL

The Contract Price may only be changed by a Written Change Order. Each change will be set forth in a Change Order prepared by the City and approved by City. Change Orders will specify (a) all additional Work to be done and Work to be omitted, if any, in connection with the change; (b) the basis of compensation to the Contractor for additional or omitted Work; and (c) any adjustment of the time of completion of the Work. If the City determines that a change requiring additional Work will cause, delay in completion of Work, he will grant an equitable time extension for the changed Work, or a subsequent Change Order may be issued at such time as the extent of such delay can be determined.

Upon receipt of a Change Order, Contractor shall comply therewith and perform each item of Work set forth therein, furnishing all labor, material, and equipment necessary therefore, in the same manner as if such Work were originally included in the Contract. In the absence of a Change Order, Contractor shall not be entitled to payment or an extension of the time of completion on account of any changes made.

GC-88.2 METHODS OF PAYMENT

The value of any Work covered by a Change Order or any claim for an increase or decrease in the Contract Price shall be determined by the following method which is most advantageous to City, as determined by the City.

- A. Where the Work involved is covered by unit prices contained in Contract Documents, by application of unit prices to the quantities of the items involved.
- B. By mutual acceptance of a lump sum, based on a detailed breakdown of anticipated costs plus Contractor's fee for overhead, small tools, and profit.

- C. On the basis of the actual cost of the Work plus a Contractor's fee for overhead, small tools and profit. This method of payment is herein referred to as force account Work. Contractor's fee for force account Work performed by his own forces shall be twenty percent (20%) for direct labor and payroll burdens; five percent (5%) for all purchased material; and Contractor's fee for subcontracted Work shall be as defined hereinafter.

GC-88.3 LUMP SUM CHANGE ORDER WORK

Contractor shall prepare an estimate of all extra and deleted Work as described by Written Notice, using established unit prices where they are stated in the Bidding Documents. Estimates for labor, bonds, insurance, materials, and equipment required shall otherwise be based on the provisions set forth hereinafter.

GC-88.4 FORCE ACCOUNT WORK

When authorized by a Change Order, Contractor may perform Work on a force account basis and will be paid actual costs and a fee for properly allocated charges which may include labor, bond premium, supplies and materials, equipment and subcontract billings, incurred in the performance of such force account Work. as more particularly described below:

- A. Labor: For all labor and for foremen in direct charge of the specific operations, Contractor shall receive the actual rate of wage in effect at the time the force account Work is performed for each and every hour that said laborer, and foreman, are actually engaged in such Work. Said agreed rate shall be no higher than that regularly paid the employee. A foreman shall not be used where there are fewer than two (2) laborers employed, except with the written consent of the City. Contractor shall receive the actual costs paid to or in behalf of Workmen, by reason of fringe benefits, including but not limited to Social Security contribution, unemployment, excise and payroll taxes, Workmen's compensation, health and retirement benefits, sick leave, vacation and holiday pay. Expenses of Working after hours, on holidays, or on Saturdays and Sundays shall be included to the extent authorized by the City. Subsistence and travel allowance where required by collective bargaining agreements shall be included.

The charges for labor shall include all classifications through foremen when engaged in the actual and direct performance of the Work. They shall not include charges for such overhead personnel as assistant superintendents, superintendents, office personnel, timekeepers, and maintenance mechanics.

- B. Bonds and Insurance: For bonds and insurance premiums or increases thereto necessitated by the force account Work, Contractor shall receive the actual cost to which no percent shall be added. Contractor shall furnish satisfactory evidence of the rate or rates paid for such bond and insurance.
- C. Materials: For materials accepted by the City and used as an integral part of the finished Work, Contractor shall receive the actual cost of such materials delivered on the Work, including transportation charges paid by him, exclusive of machinery rentals as hereinafter set forth.

If materials are procured by Contractor by a method which is not a direct purchase from and a direct billing by the actual supplier, the cost of such materials shall be deemed to be the lowest current wholesale price at which such materials are available in the quantities concerned and delivered to the site of the Work.

For other materials used in the construction which are not an integral part of the finished Work, such as, but not limited to, sheeting, false Work and form lumber, Contractor shall be reimbursed in the amount agreed upon by the City before such Work is begun. The salvage value of such material will be taken into consideration in determining, the amount of reimbursement.

- D. Equipment: Contractor will be paid for the use of Contractor owned or rented equipment at seventy percent (70%).of the suggested monthly rental rates listed for such equipment in the Blue Book Rental Rates for Construction Equipment (published by Equipment Guide-Book Company of Palo Alto), except as modified below, which edition shall be the latest edition in effect at the time of commencement of the force account Work. Hourly rental rates shall be calculated by dividing the listed monthly rates as modified above by 176 hours. The rental rate for equipment used in excess of eight (8) hours per day, shall be at the rate of fifty percent (50%) of the hourly rates as calculated above. The rental rates for standby equipment, when authorized by the City, shall be at the rate of fifty percent (50%) of the hourly rate for equipment in use eight (8) hours per day. No payment of rentals for standby equipment will be made for more than eight (8) hours per Working day and no payment will be made for weekend days or holidays. If it is deemed necessary by Contractor to use equipment not listed in the applicable edition of the Blue Book Rental Rates, Contractor shall furnish the necessary cost data and paid invoices to the City for its use in establishment of such rental rate(s). Equipment must be in good operating condition. The rental rates paid as above provided shall include the cost of fuel, oil, lubricants, supplies, small tools, necessary attachments, repairs and maintenance of all kinds, depreciation, storage and insurance. Equipment operators will be paid for as stipulated herein.

The rental time to be paid for equipment on the Work site shall be the time the equipment is required for the force account Work being performed. The time shall include the time required to move the equipment to the location of the force account Work and return it to the original location or to another location requiring no more time than that required to return it to its original location. Moving time will not be paid if the equipment is used at the site of the force account Work on other than such force account Work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power. No payment for loading and transporting will be made if the equipment is used at the site of the force account Work on other than such force account Work. Compensation will not be allowed while equipment is inoperative due to breakdown.

For the use of equipment moved in on the Work and used exclusively for Work paid for on a force account basis, providing the City has agreed to said move, Contractor will be paid the equipment use rates provided for in this clause, for the cost of transporting the equipment to the location of the Work and its return to its original location, and for the cost of loading and unloading the equipment, all in accordance with the following provisions:

1. The cost of transporting equipment shall not exceed the applicable minimum established rates by the State of Georgia Public Service commission.
2. The equipment use period shall begin at the time the equipment is unloaded at the site of the force account Work, shall include each day that the equipment is at the site of the force account Work, excluding Saturdays and Sundays and other legal holidays unless the force account Work is performed on such days, and shall terminate at the end of the day on which the City instructs Contractor to discontinue the use of such equipment. The maximum time to be paid per day will not exceed eight (8) hours unless the equipment is in operation for a longer time.

- E. Subcontract Work: Where the Change Order applies to Work being performed under a subcontract, reimbursement, including the fee for small tools, overhead and profit for the subcontractor's Work performed on a force account basis shall be computed in precisely the same manner as if performed by Contractor as indicated herein. One additional allowance of five percent (5%) of the subcontractor's total costs will be granted to Contractor for overhead and profit regardless of the tier of the subcontractor. If the subcontractor elects to contract out change order Work to a third (or lower) level contractor or supplier of purchased equipment, he shall not be entitled to fees, overhead or profit for such third (or lower) level Work or materials. The City reserves the right to direct the Contractor to contract directly with third (or lower) level subcontractors and suppliers of purchased equipment in order to avoid paying multiple fees, overhead and profit for such third (and lower level) subcontractors and suppliers of purchased equipment. If similar Work is not being performed at the Work site, and if required by City, Contractor shall obtain three (3) competitive bids for the requirements of the Change Order and the Contract Documents from Subcontractors acceptable to the City. Selection of the Subcontractor shall be subject to the approval of the City.
- F. Compensation: The compensation as set forth above shall be received by Contractor as payment in full for Work done on a force account basis. At the end of each day, Contractor's Representative and Inspector shall compare records of the Work performed including classification of all laborers, ordered on a force account basis.
- G. Statements: No payment will be made for Work performed on a force account basis until Contractor furnishes the County itemized statements of the cost of such force account Work detailed as to the following:
1. Labor - name, classification, date, daily hours, total hours, rate, and extension of each laborer and foreman.
 2. Equipment - size, type, identification number, dates, daily hours, total hours, rental rate, and extension of each unit of machinery and equipment.
 3. Materials - quantities of supplies and materials, prices, including transportation cost and extensions.
 4. Bonds and insurance premiums.
 5. Subcontract Work - force account detail as above or progress quantities and prices of unit price or lump sum subcontracts.
 6. Payments for items under paragraphs (a) to (f) inclusive, shall be conditioned upon Contractor's presentation of original receipted invoices for materials used and transportation charges. If, however, the materials used in the force account Work are not specially purchased for such Work but are taken from Contractor's stock, then in lieu of the original invoices) the statements shall contain or be accompanied by an affidavit of Contractor which shall certify that such materials were taken from his stock, that the price and transportation of the material as claimed represent actual cost.
- H. If, in the City's opinion, Contractor or any of his subcontractors, in performing force account Work, are not making efficient use of labor, material, or equipment and/or are proceeding in a manner which is expensive to the City, the City may request the Contractor to make more

efficient use of labor, material and equipment. Contractor shall in good faith comply with such requests as are reasonable. If the Contractor fails to comply with such requests, the City may independently determine the reasonable cost of the Work and the Contractor will be entitled only to the reasonable cost so estimated by the City.

GC-88.5 CHANGE ORDERS LIMITED

Except as provided herein, no order, statement or conduct of the City or the Construction Program Manager shall be treated as a "Change Order" or entitle the Contractor to any adjustment hereunder of the Contract Price or Contract Time.

GC-88.6 NO WORK STOPPAGE

Nothing in this Article shall excuse the Contractor from proceeding with the Contract as changed.

GC-88.7 CONTRACT AMENDMENT

The amount payable to the Contractor under the Contract, the Contract Time, and the date required for performance of any part of the Work may be changed only by a Change Order to the Contract.

GC-89 DISAGREEMENT WITH ORDERS FOR CHANGE

Contractor's written acceptance of a Change Order or other order for changes shall constitute his final and binding agreement to the provisions thereof and a waiver of all claims in connection therewith, whether direct or consequential in nature. Should Contractor disagree with any order for changes, he may submit a notice of potential claim to the City, at such time as the order is set forth in the form of a Change Order. Disagreement with the provisions of an order for changes shall not relieve Contractor of his obligation under Clause GC-88, Change Orders.

GC-90 CHANGED CONDITIONS

Contractor shall notify the City in writing of the following conditions, hereinafter called "changed conditions," promptly upon their discovery and before they are disturbed:

- A. Subsurface or latent physical conditions at the site of Work differing materially from those represented in this Contract; or
- B. Unknown physical conditions at the Site of the Work of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in this Contract.

The City will promptly investigate conditions of which it is so notified or conditions discovered by it which appear to be changed conditions, and will, as soon as practicable, issue appropriate orders or instructions. If the City determines that the conditions materially differ and that they will materially increase or decrease the costs of any portion of Work, it will issue a Change Order adjusting the compensation for such portion of Work.

GC-91 OPTIONAL CHANGE ORDER PROCEDURE

In the event that a change order is deemed necessary and is requested by the City, the Contractor, at his option, may elect to perform the necessary Work prior to the approval of the change order by the City Council. In such event, the Contractor shall proceed at his own risk that the City Council may not approve the change order.

Within thirty days following the Contractor's submission of a request for payment for the Change Order Work pursuant to this paragraph, the City shall initiate an agenda item requesting that the City Council approve and execute a written change order for the Work in question. During the pendency of the agenda item, the Contractor shall not be entitled to compensation for the change order Work performed.

If the City Council subsequently approves and executes the change order, the Contractor shall be paid the sum approved in the change order from funds reserved by the City for payment of anticipated and approved written change orders in conjunction with this contract pursuant to Part III of the bid with regard to this project. If the City Council rejects or fails to approve the change order, the Contractor shall not be entitled to compensation for the Work performed pursuant to the change order request.

Nothing contained in this contract shall prevent or discourage the Contractor from electing to obtain prior written approval of a change order by the City Council prior to initiation of Work pursuant to such change order.

The parties to this agreement recognize that the Contractor's election to proceed with a change order prior to Council approval of such change order will evidence the Contractor's desire to continue the project without interruption. In the event that the Contractor determines to await Council approval of a written change order, however, neither party to this agreement shall be entitled to damages, including delay damages and impact damages, as a result of the change order approval process.

The Contractor hereby acknowledges that thirty to sixty days are normally required in order to obtain the City Council's approval of a written change order. The Contractor further acknowledges that no agent or employee of the City has authority to bind the City to a contract or change order, and approval by the City Council is necessary prior to the City's entry into a valid and binding contract or change order.

The Contractor further acknowledges that the funds reserved by the City pursuant to Part III of the bid concerning this project do not form a portion of the contract price for this project. Said funds merely represent the City's effort to set aside funds from its general operating budget to pay approved written change orders arising from this project. The Contractor acknowledges that the City is not obligated to expend any or all of the amount designated in Part III of the bid for this project, and the Contractor agrees to make no claim to any such funds which remain unexpended and unauthorized after completion of this agreement.

Each party to this agreement hereby warrants that it has read and fully understands each and every provision of these general conditions to the parties' construction contract. Each party further agrees that these general conditions form a portion of the construction contract and are hereby incorporated therein by reference.

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PART 1 - GENERAL

1.01 GENERAL AND SUPPLEMENTARY CONDITIONS

- A. The requirements of the Agreement between Owner and Contractor and the General the Supplementary Conditions indicated in Division 0 are a part of and apply to all work hereunder.

1.02 PRE-CONSTRUCTION CONFERENCE

- A. Within 7 calendar days following issuance of the Written "Notice to Proceed" the Engineer shall schedule a conference for the purpose of reviewing the construction program with the contractor. The general contractor is encouraged to have all subcontractors present at the conference. The following issues will be addressed:
1. Introduction of all attending parties
 2. Channels and procedures for communications
 3. Requests for substitutions in accordance with the requirements of specification Section 01 100, Part 1.02 F.
 4. Issuance of RFP's (Request for Proposals) by the Engineer shall be addressed by the General Contractor within 7 calendar days of receipt thereof in accordance with Supplementary Conditions indicated in Paragraph 7.1.5.
 5. Change order compensation based on figures indicated in Supplementary Conditions Paragraph 7.1.7.
 6. Pre-construction submittals indicated in Supplementary Conditions Paragraph 3.19.
 7. Shop drawings, samples and other project submittals issued in accordance with the requirements of Specification Section 01 100.
 8. Job progress meeting frequency. In addition to periodic progress meetings, the City would like to schedule a public "hard hat" tour of the project site, on a Saturday, near the contract completion date.
 9. Applications for payment issued in accordance with the requirements of the General Conditions of the contract for construction and all applicable supplementary conditions in Paragraphs 9.3.4.
 10. Safety precautions and programs as directed by the General Contractor in accordance with AIA General Conditions Article 10 and part 1.07 in Section 01010.
 11. Any mock-ups required.

12. Requests for time extensions shall be issued in accordance with the requirements of Supplementary Conditions Paragraph 8.3.4.
13. Discrepancies and conflicts in the Contract Documents shall be resolved using the order of precedence indicated in the Supplementary Conditions, paragraph 1.2.7. In the event of a possible discrepancy between portions of the contract documents, the Engineer shall be notified in writing by the Contractor and a clarification will be issued. The Contractor assumes an obligation to bring all possible discrepancies within the Contract Documents to the Engineers attention in writing for possible resolution prior to performing any construction related thereto. If the Contractor neglects to do so, all expenses related reparations required by the Owner due to such negligence shall be borne by the Contractor. In all instances, the Engineer shall be the sole interpreter of the Contract Documents.
14. The date of substantial completion shall not be achieved and the substantial completion certificate shall not be issued prior to receipt of the final official certificate of occupancy by the General Contractor.
15. Contract closeout/final payment requirements shall be clearly understood by the General Contractor. Piecemeal delivery of final closeout documents and materials is not acceptable.
16. Materials testing shall be conducted by a certified testing agency in accordance with the requirements of Section 01 400.
17. Immediately prior to substantial completion, the General Contractor shall prepare a comprehensive list of items to be corrected or completed (a punchlist) for the Engineers review in accordance with Paragraph 9.8.2 of the AIA General Conditions. The Engineer shall then add to or delete items from the list during a substantial completion inspection.
18. Permits, fees, licenses, etc..., shall be addressed in accordance with the requirements of General Conditions Section 3.7, all applicable supplementary conditions and Part 1.09 A of Section 01 010.
19. Compensation for stored material shall be as defined in Parts 6.2.1, 9.3.2, 10.2.1.2, 11.3.1.4 & 12.2.4 of the General Conditions as well as Part 9.3.2.1 of the Supplementary Conditions, Paragraph 1.03A of Section 01 010, Paragraph 1.03 A of Section 01 100 and Paragraph 2.04G of Section 01 500. Invoices for stored materials must be delivered with the applications for payment on which compensation for the stored materials has been requested. Invoices for stored materials delivered separately from the applications for payment will not be recognized until the following application for payment is received.
20. A lien waiver issued by the General Contractor shall be submitted with each application for payment. An individual lien waiver from each subcontractor will be required prior to final payment.

1.03 CONTRACTOR'S WORK AND MATERIALS STORAGE

- A. Contractor's materials storage area shall be determined at the pre-construction conference. The Contractor shall confine his storage therein and take necessary precautions to protect materials at his own expense against all weather conditions, theft and damage.
- B. All debris generated during the construction process shall be removed from the project site and adjacent property.

1.04 OVERLOADING

- A. Contractor shall be responsible for overloading any part or parts of the site beyond safe load carrying capacities.

1.05 MANUFACTURER'S DIRECTIONS

- A. Where it is required in the specifications that materials, products, processes, or equipment be installed or applied in accordance with manufacturer's instructions, directions, or specifications, it shall be construed to mean that said application or installation shall be in strict accordance with printed instructions furnished by the manufacturer of the material or system proposed for use under conditions similar to those experienced at the project.
- B. The Contractor shall notify the Utility Protection Center at 1-800-282-7411 prior to commencing with any subsurface excavations.

1.06 LAYING OUT WORK

- A. Prior to commencing work, the Contractor shall be responsible for careful comparison and review of all Engineering, Structural, Mechanical, Plumbing, Fire Protection, Electrical, Civil, Landscape and other working drawings. All drawings shall be compared with one another which in any way affect the work to be executed. Should any discrepancy be found, it shall immediately be reported to the Engineer in writing for verification and adjustment.
- B. Contractor shall exercise proper precautions to verify figures and dimensions shown on the Drawings before laying out work and shall be held responsible for any error resulting from his failure to exercise such precaution. Drawings shall not be scaled for any purpose.

1.07 ACCIDENT PREVENTION

- A. Precaution shall be exercised at all times for the protection of all persons, including employees of the Contractor. Machinery equipment, openings, power lines and all other hazards shall be guarded or eliminated in accordance with the safety provisions of "The Manual of Accident Prevention in Construction" published by the Associated General Contractors of America.

1.08 PERIODIC CLEANING

- A. Throughout the construction period, maintain the site in a standard of cleanliness as described in this Section.
- B. Site and Structure
 - 1. Maintain the site and adjacent areas in a neat and orderly condition at all times.
 - 2. At least weekly inspect the site and pick up all scrap, debris and waste material and remove them to the place designated for their storage.
 - 3. At least weekly and prior to any and all inspections, sweep interior spaces clean. “Clean” for the purpose of this paragraph shall be interpreted as meaning free from material capable of being removed by reasonable effort and a hand-held broom.

1.09 FINAL CLEANING

- A. “Clean” for the purpose of this Article shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality equipment and materials.
- B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste.
 - a. Visually inspect finished surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
 - b. Remove all paint droppings, spots, stains and dirt from finished surfaces.
- C. Unless otherwise directed by the Engineer, broom clean paved areas on the site and public paved areas adjacent to the site. Completely remove resultant debris.

1.10 PERMITS AND REGULATIONS

- A. All work and material shall be in accordance with Safety Orders of the Division of Industrial Safety, and other applicable Federal, State, County and City Municipal laws, ordinances, rules and regulations pertaining to construction. Nothing in the contract documents shall be construed to permit work not conforming thereto. The Contractor shall consult the Engineer on all issues regarding possible non-conformance. Contractor shall provide all labor, materials and equipment to complete the work as required by all applicable laws, ordinances, rules and regulations. The Contractor shall consult the Engineer before making any determinations as to changes in quality, scope and/or increases or decreases in cost.
- B. The Contractor shall notify all local utility companies prior to beginning any subsurface investigations.

1.11 PROJECT COMPLETION

- A. The City Engineer shall review the project for Substantial completion. If the project is Substantially complete, as defined in the General Conditions of the Contract for Construction, the City Engineer shall issue a Certificate of Substantial Completion.

- B. When the project is substantially complete (as defined in the Agreement Between the Owner and the Contractor) and all mechanical and electrical systems are operating after having been checked by the Contractor and/or manufacturer, the Contractor shall notify the Engineer in writing at least seven days before the date of request for substantial completion inspection. The Contractor shall arrange for the presence of all subcontractors whose work is involved.
 1. No sooner than 2 calendar days prior to the proposed date of substantial completion inspection, the Contractor shall prepare a "Punch List" for items not completed and work not complying with the requirements of the Contract Documents. The City Engineer shall add to and/or delete items from the punch list during the Substantial Completion inspection. The "Punch List" shall not be construed as a contract requirement but is intended only to assist in the completion of the project. The Contractor shall make a diligent effort to complete all work in conformance with the requirements of the Contract Documents before requesting a "Punch List".
 2. Correction of items noted on the "Punch List" does not relieve the Contractor from conforming with all requirements of the Contract Documents.

- C. Before final payment is made, the following items shall be delivered in satisfactory form to the Owner:
 1. All maintenance/operating manuals and instructions.
 2. All guarantees required by the individual technical specification sections.
 3. All other required items noted in the Contract Documents.
 4. All items on the Punch List shall have been completed in satisfactory order and such notice forwarded in writing to the Engineer.
 5. All as-built drawings shall be provided by the Contractor as described in the Specifications.
 6. All maintenance and replacement stock material required.
 7. Certificate which warrants that all materials, products and assemblies incorporated in this project are totally free of asbestos, PCB, or other such hazardous material.
 8. Owner, after completion of project, may elect and pay to use services of an independent testing agency to test for asbestos content.

- D. Final Inspection

1. When the work is completed in accordance with the Contract Documents and the requirements of Paragraphs A and B above and General and Supplementary Conditions of the contract for construction have been satisfied, the Contractor shall notify the City in writing that the work shall be ready for final inspection on a definite date, which shall be stated in such notice. The City shall receive such notification no sooner than seven calendar days prior to the date stated in such notice. The notice shall be forwarded to the City Engineer, who shall attach his endorsement as to whether or not he agrees with the Contractor's statement that the work will be ready for final inspection on the established date, but such endorsement shall not relieve the Contractor of any contractual responsibilities.
2. Final inspection shall be made by the Owner, City Engineer, and/or Consultants when the Contractor states that the project has been completed in accordance with the Contract Documents, all punch list items have been completed and a formal written request for final inspection is made as outlined above.

1.12 LIMITS OF WORK

- A. Work shall be performed as indicated on the working drawings.

1.13 OFFENSIVE BEHAVIOR

- A. A penalty of \$100.00 per event shall be levied against the General Contractor and, subsequently, deducted from the next application for payment for objectionable behavior by any of the General Contractor's forces while on the Owner's property, as determined by the Engineer. This objectionable behavior shall include, but not necessarily be limited to, profanity, alcohol and/or illegal drug consumption or possession and sexual misconduct.
- B. All workmen shall be fully clothed and shall be expected to exhibit acceptable behavior. Association with the public shall be prohibited. Refer all non-project related visitors to the City Hall for assistance. Failure to comply with this requirement can subject personnel to being banned from the project site.

END OF SECTION 01 010

PART 1 - GENERAL

1.01 PRODUCTS

- A. Products are specified by ASTM and/or other reference standard, and/or by manufacturer's name and model number or trade name. When specified only by reference standard, Contractor may select any product meeting this standard by any manufacturer. When several products or manufacturers are specified as being equally acceptable, Contractor shall have the option of choosing among those names. When one manufacturer's specific product is specified, and other manufacturers are listed as being acceptable suppliers, the other manufacturers products must have the same basic properties as the specific product mentioned. Otherwise, the following substitution provisions must be observed.

1.02 SUBSTITUTIONS

- A. During bidding, the Architect shall consider written requests for substitutions received at least ten calendar days prior to the bid date. Requests received after that time shall not be considered.
1. Contractor shall submit requests for substitution on form attached to this section, which may be copied. Form shall be complete, accurate and legible.
 2. Blank substitution forms are also available at most local plan centers and at the Architect's office.
 3. If proposed substitution is accepted by Architect, such acceptance shall be set forth in an addendum or modification. Bidders shall not rely upon accepted substitutions made in any other manner.
- B. The Contractor shall be required to provide a substitution form for any change to the original documents before the decision is made whether it will be incorporated into the contract documents.
- C. Prior to award of the Contract, the Architect may consider formal requests from the Contractor for substitution of products in lieu of those specified. Requests shall be submitted in accordance with the preceding requirements. One or more of the following conditions must also be documented:
1. Substitution is required for compliance with interpretation of code requirements or insurance regulations that exist.
 2. Substitution is required due to unavailability of specified products through no fault of the Contractor.
 3. Substitution is required because subsequent information disclosed an inability of specified products to perform properly or to fit in designated space.

4. Substitution is required because manufacturer/fabricator refuses to certify or guarantee performance of specified product as required.
 5. When in the judgment of the Owner the proposed substitution is substantially in the Owner's best interest in terms of costs, time or other consideration.
- D. Should the Contractor wish to substitute another product or method for products or methods specified or shown in Contract Documents, whether or not such phrases as "or equal", "equivalent to", or "based on" are used, he shall apply in writing for review. He shall enclose such data as Architect requires to evaluate the proposed products. The Architect's decision shall be final. Contractor is responsible for special requirements of substitutions. He shall execute necessary changes in adjacent work and relocate Work as necessary due to such substitutions, and he shall be responsible for delays required for evaluation of proposed substitutions
1. Full explanation of the proposed substitution and submittal of all supporting data including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures and other similar information necessary for a complete evaluation of the proposed substitution.
 2. Reasons substitution is advantageous and necessary including the benefits to the Owner of the Work in the event substitution is acceptable.
 3. The adjustment, if any, in the Contract Sum in the event the substitution is acceptable.
 4. The adjustment, if any, of time of completion of the Contract and Construction Schedule in the event the substitution is acceptable.
 5. An affidavit stating that (1) the proposed substitution conforms to and meets all the requirements of the pertinent specifications and the requirements shown on the working drawings, and (2) the Contractor accepts the warranty and correction obligations in connection with the proposed substitutions as if originally specified by the Architect. Proposals for substitution shall be submitted in triplicate to the Architect with sufficient time to allow the Architect no less than ten working days to review. No substitutions will be considered or allowed without the Contractor's submittal of complete substantiating data and information as stated herein.
- E. In submitting requests for substitution, the Contractor shall make the following representations:
1. Contractor has investigated proposed product and has determined that it is equal or superior in all respects to the specified product.
 2. Contractor will provide an equal or better guarantee for proposed substitution as compared to the product specified.

3. Contractor will coordinate installation of accepted proposed substitution into the project, making any such changes as may be required for the project to be completed in accordance with the Contract Documents.
 4. Contractor waives all claims for additional costs related to proposed substitution which become apparent during or following substitution submittal process.
 5. Cost comparison data is complete and includes all related costs under the contract:
 6. The proposed substitution satisfies Code Official's interpretations of all applicable codes.
- F. Substitutions shall not be considered if:
1. They are indicated or implied on shop drawings or product data submittals without a formal request submitted in accordance with this Article.
 2. Acceptance will require substantial revision of contract documents.

REQUEST FOR SUBSTITUTION

PROJECT: CITY OF AVONDALE ESTATES- DRAINAGE REPAIRS – MAJESTIC CIRCLE

DATE: _____

CONTRACTOR: _____

SUBCONTRACTOR: _____

SUPPLIER: _____

1. The following required information is attached:
 - A. Product identification, manufacturer's name, address, telephone number
 - B. Manufacturer's literature, performance/test data, reference standard
 - C. Name/address of similar projects where product has been used and Date of Application

2. Comparison of proposed substitute product with specified product:

3. If submitted after the date the contract agreement between the owner and contractor is signed:

- A. Data related to changes in construction schedule:

- B. Accurate cost data on proposed substitution in comparison with product specified:

- C. Reason for request for substitution: (Check One)

- 1) Substitution is required for compliance with interpretation of code requirements or insurance regulations that exist.
- 2) Substitution is required due to unavailability of specified products through no fault of the Contractor.

- 3) Substitution is required because subsequent information disclosed an inability of specified products to perform properly or to fit in designated space.
- 4) Substitution is required because manufacturer/fabricator refuses to certify or guarantee performance of specified product as required.
- 5) When in the judgment of the Owner the proposed substitution is substantially in the Owner's best interest in terms of costs, time or other consideration.

END OF SECTION 01 630

CONTRACTOR WARRANTY FORM

PROJECT: AVONDALE ESTATES DRAINAGE REPAIR – MAJESTIC CIRCLE

LOCATION: AVONDALE ESTATES, GEORGIA

OWNER: CITY OF AVONDALE ESTATES

GENERAL CONTRACTOR:

We _____, contractor
(Company Name)

for _____, as described in Specification Section (s)
(list trade)

_____ do hereby warrant
(list appropriate sections of specifications)

that all labor and materials furnished and work performed in conjunction with the above referenced project are in accordance with the Contract Documents and authorized modifications thereto, and will be free from defects due to defective materials or workmanship for a period of one year from Date of Substantial Completion and that all street signs will be free from defects due to defective materials or workmanship for a period of seven years from Date of Substantial Completion.

This warranty commences at 12:00 noon on _____
and expires at 12:00 noon on _____.

Should by any defect develop during the warranty period due to improper materials, workmanship or arrangement, the defect shall, upon written notice by the Owner, be repaired or replaced by the undersigned at no expense to the Owner.

Nothing in the above shall be deemed to apply to work which has been abused or neglected by the Owner

DATE: _____ FOR: _____
(COMPANY NAME)

BY: _____

TITLE: _____

END OF SECTION 01740

SUBCONTRACTOR WARRANTY FORM

PROJECT: AVONDALE ESTATES— DRAINAGE REPAIRS – MAJESTIC CIRCLE

LOCATION: AVONDALE ESTATES, GEORGIA

OWNER: CITY OF AVONDALE ESTATES

GENERAL CONTRACTOR:

We _____, subcontractor

(Company Name)

for _____, as described in Specification Section (s)

(list trade)

_____ do hereby warrant

(list appropriate sections of specifications)

that all labor and materials furnished and work performed in conjunction with the above referenced project are in accordance with the Contract Documents and authorized modifications thereto, and will be free from defects due to defective materials or workmanship for a period of one year from Date of Substantial Completion and that all street signs will be free from defects due to defective materials or workmanship for a period of seven years from Date of Substantial Completion..

This warranty commences at 12:00 noon on _____

_____ and expires at 12:00 noon on _____.

Should by any defect develop during the warranty period due to improper materials, workmanship or arrangement, the defect shall, upon written notice by the Owner, be repaired or replaced by the undersigned at no expense to the Owner.

Nothing in the above shall be deemed to apply to work which has been abused or neglected by the Owner.

DATE: _____ FOR: _____

(COMPANY NAME)

BY: _____

TITLE: _____

END OF SECTION 01 741

SECTION 03300 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provision of Contract, including General and supplementary conditions and Division 1 Specification Sections, apply to this section.

1.02 SUMMARY OF WORK

- A. This section specifies cast-in-place concrete, mix design, placement procedures and curing procedures.
- B. Related Sections The following Sections contain requirements that relate to this Section:
 - 1. Division 3: Section "Concrete Formwork".
 - 2. Division 3: Section "Steel Reinforcement for Concrete"
 - 3. Division 3: Section "Brushed Concrete Finish"

1.03 SUBMITTALS

- A. Mix Designs: Submit to City Engineer for each type of concrete used on project, in advance of proposed use. Verify the design mix in accordance with Method 1 or Method 2 of ACI 301, Section 3.8, as follows:
 - 1. Method 1 : Submit samples of materials to be used and proposed mix design to testing Agency for verification as outlined in Method 1.
 - 2. Method 2: Submit to City Engineer, with copy to Testing Agency, necessary data to verify mix in accordance with ACI 301, Section 3.8.2.2.
- B. Pre-qualify ready-mixed concrete suppliers according to the requirements of ASTM Specification C94, entitled "Ready-Mixed Concrete". Mix and transport concrete as required by ASTM C94, Paragraphs 15.1 and 15.2.
- C. Product Data for proprietary materials and items, including mixtures, patching compounds, waterstops, joint systems, curing compounds, dry shake finish materials, and others as requested by City Engineer.
- D. Samples of materials as requested by City Engineer, including names, sources, and descriptions, as follows:
 - 1. Design Test

1.03 JOB CONDITIONS

- A. Weather
 - 1. Precaution shall be taken to prevent high temperatures in fresh concrete during hot weather, in accordance with ACI 305. Water reducing set retarding admixtures shall be used in such quantities as recommended by concrete supplier to assure that concrete remains workable and lift lines will not be visible.
 - 2. Cold weather placement shall be in accordance with ACI 306.

1.05 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specification and standards, except where more stringent requirements are shown or specified.
 - 1. American Concrete Institute (ACT) Standards:
 - a. ACI 3 01, "Specification for Structural Concrete for Buildings".
 - b. ACI 3 18, "Building Code Requirements for Reinforced Concrete".
 - 2. Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice".
 - 3. American Society for Testing and Materials (ASTM) "Specification for Ready-Mixed concrete" ASTM C94.
- B. Allowable Tolerances in finished, exposed work.
 - 1. Maximum + 3/16" in length of 20'-9" maximum, + 3/16" in length of 40'-0" or more.
 - 2. In cross sectional dimension +3/16".
 - 3. In surface plane, plumb and level + 1/8" in 10'-0" in any direction when measured with a 10'0" straight edge.
 - 4. Tolerances shall conform to ACI 301.

PART 2 PRODUCTS

2.01 CONCRETE MATERIALS

- A. Portland Cement: Meeting ASTM C150, Type I of 111, natural color, domestic Manufacture. Only one brand of cement shall be used.
- B. Normal Weight Aggregate: Fine and coarse aggregate meeting ASTM C33 from a single source for exposed concrete.
- C. Air-Entraining Admixture: Meeting ASTM C260. Add to produce air entrainment in accordance with ACI 3 18.
- D. Water-Reducing Admixture: Meeting ASTM C494, Type A only.

- E. Water-Reducing Retarding and Accelerating Admixtures: Meeting ASTM C494, Type D and E. Add as required for weather conditions encountered.
- F. Water shall be clean, potable and free of deleterious amounts of acid.
- G. Expansion Joints Filler Strips: Non-extruding, pre-molded asphaltic fiber board, of thickness shown on drawings.
- H. Calcium chloride or mixtures containing calcium chloride or fly ash shall not be used in concrete without City Engineer's approval.

2.02 RELATED MATERIALS

- A. Waterstops: Water stops for below grade shall be polyvinyl chloride plastic compound, ribbed, with center bulb designed to resist 125 head feet of water.
- B. Embedded items such as sleeves, straps, washers, angles and plates, shall be of structural steel conforming to ASTM A36. Anchor bolts shall conform to ASTM A36 and shall be the regular hexagon type. All embedded items shall be hot-dipped galvanized in accordance with ASTM A123.

2.03 CURING AND SEALING COMPOUND

- A. The compound shall be a clear styrene acrylate liquid type complying with ASTM C309, Type I, Class A.
 - 1. Curing and sealing compounds must not change the color of the concrete (i.e. yellowing) and breakdown in a two to four week period.

2.04 CONCRETE TYPES

- A. Class of Concrete : Class A - 3000 psi normal weight.
- B. Concrete Mixtures: The concrete shall be positioned by the water-cement ration method. The proportioning shall be based on the requirements of a plastic and workable mix within the slump range (ASTMC-145) and strengths required. The following class of concrete is required:
 - Class: A
 - Minimum Compressive Strength @ 28 Days: 3000 psi
 - Maximum Slump: 3-4 inches
 - Water Cement ratio: .46 maximum
- C. All concrete exposed to freezing and thawing shall be air-entrained at manufacturer's prescribed rate to result in concrete with a total air content of 4.5% to 6.0%.

PART 3 EXECUTION

3.01 INSPECTION

- A. Examine surfaces designated to receive work described in this section for conditions adversely affecting the finished work. Repair or replace surfaces not meeting tolerances or quality requirements imposed within specifications governing substrate construction prior to initiating this work.

3.02 MIXING AND BATCHING

- A. Method of Mixing: Mix concrete in accordance with ASTM C94, except where more stringent requirements are specified.
 - 1. All trucks used for truck mixing shall be equipped with accurate water measuring devices and revolution counters.
- B. Batching Hot and cold weather batching shall comply with ACU306 and ACI 305 and conform to the following:
 - 1. Cold weather batching when the temperature is below 40 degrees or likely to fall below 40 degrees in the 24 hour period before placing, adequate equipment shall be provided for heating the concrete materials. When placed in forms, the concrete shall have a temperature between 55 degrees F. and 90 degrees F. Only specified non-chloride acceleration shall be used.
 - 2. Hot weather batching During hot weather the temperature of the concrete shall be less than 100 degrees F.

3.03 DISCHARGE CONCRETE

- A. Discharge of concrete shall be completed within 1- ½ hrs.
- B. Adding water to restore slump loss during excessive mixing or due to too long an elapsed time since initial mixing (1- ½ hrs.) will not be permitted.

3.04 PLACING

- A. Before placing concrete, preliminary work such as forms and reinforcing steel sleeves and embedded items shall be checked carefully, inspected and approved.
- B. Concrete shall be handled from mixer to place of final deposit as rapidly as practical by methods which shall prevent separation or loss of ingredients. Concrete shall be distributed by means equal to a steep-sided bottom drop concrete bucket and shall not be allowed a free fall of over four feet, except as specifically allowed for caissons. Bucket shall have a capacity of not less than ½ cubic yard. Transporting and handling equipment shall be cleaned at frequent intervals and flushed thoroughly with water before and after each day's m. Water shall not be discharged into concrete forms.
- C. No concrete shall be placed in forms after initial set has taken. Re-tempering of concrete which has partially set is prohibited. Place concrete in the forms within 1- ½ hours after initial batching. No placing will be permitted when the sun, temperature, wind or limiting of facilities prevent proper finishing and curing.
- D. Deposit concrete as near final position as possible to avoid re-handling. Place in uniform, horizontal layers 18 to 24 inches in depth; care being taken to avoid vertical joints or inclined planes. Piling up of concrete in forms in such a manner as to permit escape of mortar, or flow of the concrete itself, will not be permitted. Deposit concrete continuously and as rapidly as practical until entire unit of pour is completed, with thorough consolidation by vibrating to insure a dense, homogeneous mass without voids or pockets.

- E. Transport and place pumped concrete in accordance with ACI requirements. Make provisions in formwork design and construction to handle effects of pump hammer. Employ aggregates of controlled water contents for pumped concrete. Equipment used to transport concrete shall be compatible with concrete reinforcing and desired finishes.

3.05 CONSOLIDATION

- A. Use mechanical vibrating equipment for concrete consolidation. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
- B. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer.

3.06 COLD WEATHER PLACING

- A. Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- B. When air temperature has fallen to or is expected to fall below 40 degrees, uniform heat water and aggregates before mixing to obtain a concrete mixture temperature of no less than 55 degrees and not more than 90 degrees at placement.

3.07 HOT WEATHER PLACING

- A. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
- B. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees; mixing water may be chilled.
- C. Use water reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, when acceptable to Landscape Architect.

3.08 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with a.11 evaporation-control material. Apply in accordance with manufacturer's instructions after screening and bull floating, but before trowling.
 - 1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting keep continuously moist for not less than 7 days.
- B. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing and by combinations thereof as herein specified.
 - 1. Provide moisture curing by keeping concrete surfaces continuously wet by

covering with water of continuous water-fog spray.

2. Provide moisture-cover curing as follows Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape.
 3. Provide curing and sealing compound to exposed exterior slabs, walks, and curbs as follows Apply specified curing and sealing compound to concrete surfaces as soon as final finishing operations are complete. Apply uniformly in continuous operation in accordance with manufacturer's direction.
- C. Curing Formed Surfaces: Cure formed concrete surfaces, including walls, by moist curing with forms in place for the full 7 day curing period. If forms are removed, continue curing by methods specified above, as applicable.
- D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, walks and curbs by application of appropriate curing method.
- E. Protection: During curing period, the concrete shall be protected from damaging mechanical disturbances and excessive vibration. All finished surfaces shall be protected from damage by construction equipment, materials or methods, and by rain or running water.

3.09 CONCRETE FINISHES

- A. Scratch Finish: Apply scratch finish to sub slab surfaces to receive mortar setting beds for brick pavers, tile and dimensional stone pavement. After placing slab, slope surface to drains as required, roughen surface with stiff brushes, brooms, or rakes.
- B. Float Finish: Apply float finish to slab surfaces to receive trowel finish and other finishes specified in Division 3 "Brushed Concrete Finish".
1. After screening, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades, when surface water has disappeared. Consolidate surface by hand floating. Check and level surface plane and slope surface to drains as required. Immediately after leveling, refloat surfaces to a uniform, smooth, granular texture.
- C. Trowel Finish: Apply trowel finish to concrete surfaces to be exposed to view as required on the drawings.
1. After floating, consolidate concrete surface by hand-troweling operation, free of trowel marks, uniform in texture and appearance.

3.10 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to City Engineer.
1. Cut out honeycombs, rock pockets, voids over ¼ inch in any dimension, and holes left by the rods and bolts, down to solid concrete but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush out the area to be

patched with specified bonding agent. Place patching mortar before bonding compound has dried.

2. Patching mortar for exposed-to-view surfaces shall, when dry, match color surrounding. Compact mortar in place and strike off slightly higher than surrounding surface. Finish patch after shrinkage in such a manner as to match the adjoining surfaces.

END OF SECTION 03300

GENERAL

1.01 SCOPE

- A. This Section describes materials and equipment to be utilized and requirements for their use in preparing the work site for construction. The Contractor shall furnish all materials, equipment and labor necessary to complete the work.
- B. Comply with applicable codes, ordinances, rules, regulations and laws of local, municipal, state or federal authorities having jurisdiction.

1.02 CLEARING AND GRUBBING

- A. Within the limits shown on the Drawings, the site will be cleared and grubbed to prepare for construction.
- B. Clearing
 - 1 All vegetable growth such as trees, shrubs, brush, logs, upturned stumps and roots of down trees, and other similar items shall be removed and disposed of properly by the Contractor as specified below. Cultivated growth shall be removed and trees felled as necessary within the construction work site and as indicated.
 - 2 Where the tree limb structure interferes with utility wires, or where the trees to be felled are in close proximity to utility wires, the tree shall be taken down in sections to eliminate the possibility of damage to the appropriate utility.
 - 3 Only items shown to be demolished or abandoned on the on the demolition plans shall be removed. All other items within the limits of the work shall remain in service.
 - 4 All fences adjoining any excavation or embankment that may be damaged or buried shall be carefully removed, stored and replaced.
- C. All Stumps, roots, foundations and planking embedded in the ground shall be removed and disposed of properly by the Contractor as specified below.

1.03 PRELIMINARY GRADING

Any preliminary grading conducted by the Contractor shall consider the existing functions of the facility; and shall in no way impede or prevent the daily, uninterrupted operation of the facility.

1.04 TESTING AND INSPECTION SERVICES

- A. An independent testing laboratory will perform soil testing. Payment for soil testing shall be made by the Contractor.
- B. The soils testing laboratory is responsible for the following:
 - 1 Compaction tests in accordance with ASTM D 698.
 - 2 Field density tests for each two feet of lift; one test for each 5,000 square feet of fill
Inspecting and testing stripped site, subgrade and proposed fill materials.

C. The Contractor's duties relative to testing include:

- 1 Notifying the laboratory of conditions requiring testing.
- 2 Coordinating with the laboratory for field testing.
- 3 Providing representative fill soil samples to laboratory for test purposes.
- 4 Provide 50-pound samples of each fill soil.
- 5 Paying costs for additional testing performed beyond the scope of that required and for re-testing where initial tests reveals non-conformance with specified requirements.

D. Inspection:

- 1 Earthwork operations, suitability of excavated materials for fill and backfill, and placing the compaction of fill and backfill is subject to inspection. The Engineer will observe earthwork operations.
- 2 Foundations and shallow spread footing foundations are required to be inspected by a geotechnical engineer to verify suitable bearing and construction.

PART 2 PRODUCTS (NOT USED) PART

3 EXECUTION

3.01 PREPARATION

Maintain bench marks, monuments and other reference points. Re-establish, at no cost to the Owner, any such reference points if disturbed or destroyed.

3.02 CLEARING

- A. Clear areas required for access to site and execution of work.
- B. Remove trees and shrubs within the area to be cleared.
- C. Clear undergrowth and deadwood, without disturbing subsoil.

3.03 DISPOSAL OF REFUSE

The refuse resulting from the clearing and grubbing operation may be disposed of onsite at the location shown on the construction documents and with the approval of the City of Avondale Estates Public Works Department. No debris of any kind shall be deposited in any stream or body of water, or in any street or alley. No debris shall be deposited upon any private property except by written consent of the property owner. In no case shall any material be buried in embankments or trenches on the Project.

END OF SECTION

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses and plants.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete walks and pavements.
5. Subbase course and base course for asphalt paving.
6. Subsurface drainage backfill for walls and trenches.
7. Excavating and backfilling trenches for utilities and pits for buried utility structures.
8. Excavating well hole to accommodate elevator-cylinder assembly.

B. Related Sections:

1. Section 015000 "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities; also for temporary site fencing if not in another Section.
2. Section 033000 "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
3. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.
4. Section 312319 "Dewatering" for lowering and disposing of ground water during construction.
5. Section 329200 "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
6. Section 329300 "Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.3 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Design Professional. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
 - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Design Professional. Unauthorized excavation, as well as remedial work directed by Design Professional, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. Yd. for footing, trench, and pit excavation that cannot be removed by rock-excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 - 1. Equipment for Footing, Trench, and Pit Excavation: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch-maximum-width, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom.
 - 2. Equipment for Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket.
- I. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.
- J. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- K. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- L. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

- M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
 - 1. Warning tapes.
- B. Samples for Verification: For the following products, in sizes indicated below:
 - 1. Warning Tape: 12 inches long; of each color.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D 2487.
 - 2. Laboratory compaction curve according to ASTM D 698.
- C. Seismic survey report from seismic survey agency.
- D. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.6 QUALITY ASSURANCE

- A. Seismic Survey Agency: An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures to perform the following services:
 - 1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
 - 2. Seismographic monitoring during blasting operations.
- B. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.
- C. Preexcavation Conference: Conduct conference at Project site.

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
1. Do not proceed with work on adjoining property until directed by Design Professional.
- C. Utility Locator Service: Notify "Call Before You Dig" for area where Project is located before beginning earth moving operations.
- D. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in on the drawings are in place.
- E. Do not commence earth moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.
- F. The following practices are prohibited within protection zones:
1. Storage of construction materials, debris, or excavated material.
 2. Parking vehicles or equipment.
 3. Foot traffic.
 4. Erection of sheds or structures.
 5. Impoundment of water.
 6. Excavation or other digging unless otherwise indicated.
 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- G. Do not direct vehicle or equipment exhaust towards protection zones.
- H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
1. Liquid Limit: per geotechnical engineer's recommendation.
 2. Plasticity Index: per geotechnical engineer's recommendation.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- E. Base Course: Graded aggregate course material of uniform quality meeting the requirements of Georgia Department of Transportation Specification Section 815.
- F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 sieve.
- I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- J. Sand: ASTM C 33; fine aggregate.
- K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 ACCESSORIES

- A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
 1. Red: Electric.
 2. Yellow: Gas, oil, steam, and dangerous materials.
 3. Orange: Telephone and other communications.
 4. Blue: Water systems.
 5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXCAVATION, GENERAL

- A. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth and rock. Do not excavate rock until it has been classified and cross sectioned by Design Professional and Geotechnical Testing Agency. Do not sub excavate unsuitable material unless directed or approved by the Design Professional and Geotechnical Testing Agency. The Contract Sum will be adjusted for rock excavation, sub excavation and import fill according to unit prices included in the Contract Documents. Changes in the Contract Time may be authorized for rock excavation.
 - 1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
 - 2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs-on-grade.
 - f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.
 - 3. Sub Excavation: Unit prices for sub excavation shall include replacement of unsuitable material with geotextile for separation and approved backfill material. Volumetric measurement of sub excavation is based on neat line quantities as directed or approved by the Design Professional and Geotechnical testing agency.
 - 4. Imported Fill Material: Unit prices for import fill (structural fill, general fill when shown and not including any fill material for rock excavation or sub excavation) shall include disposing of any unsuitable material, procuring fill materials and transporting them to the site.

- a. Unless otherwise specified in the General conditions, when mass measurements are shown on the bid form, measurement of additional import material are based on weight tickets for material delivered to the site and incorporated into the work.
- b. Unless otherwise specified in the General Conditions, when volume measurements are shown on the bid form, measurement shall be based on volumes measured in the truck or transporting vehicle.

3.4 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
 1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY TRENCHES

- A. Excavation for water and sewer shall comply with the more stringent of these requirements or Fairburn Utilities Department' requirements.
- B. Excavate trenches to indicated gradients, lines, depths, and elevations.
 1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- C. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.
- D. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.
 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- E. Trenches in Tree- and Plant-Protection Zones:
 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
 3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.7 SUBGRADE INSPECTION

- A. Notify Design Professional and Geotechnical Testing Agency when excavations have reached required subgrade.
- B. Geotechnical Engineer shall be present for testing of subgrade soils.
- C. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- D. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Geotechnical Engineer, and replace with compacted backfill or fill as directed.
- E. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- F. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Design Professional, without additional compensation.

3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
 2. Consult with Design Professional for exact location of approved material storage locations. Soil storage locations shall have erosion and sedimentation control bmp's installed prior to placement and shall be maintained throughout the duration of the project schedule.

3.10 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 2. Surveying locations of underground utilities for Record Documents.
 3. Testing and inspecting underground utilities.
 4. Removing concrete formwork.
 5. Removing trash and debris.
 6. Removing temporary shoring and bracing, and sheeting.
 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

- A. Backfill for water and sewer shall comply with the more stringent of these requirements or Augusta Utilities Department' requirements.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.
- C. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- D. Backfill voids with satisfactory soil while removing shoring and bracing.
- E. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

- F. Place and compact final backfill of satisfactory soil to final subgrade elevation.

3.12 SOIL FILL

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 24” inches (300 mm) of existing subgrade and each layer of backfill or fill soil material at 98 percent. **This does not apply to parking areas with existing gravel which will remain and be used as part of pavement section, only parking areas that experience earthwork and cut/fill operations.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 98 percent.
 - 3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.

4. For storm drainage utility trenches, compact each layer of initial and final backfill soil material at 95 percent. For water and sewer utility trenches, comply with Columbus Water Works requirements.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 1. Provide a smooth transition between adjacent existing grades and new grades.
 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 1. Turf or Unpaved Areas: Plus or minus 1 inch.
 2. Walks: Plus or minus 1/2 inch.
 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.16 SUBSURFACE DRAINAGE

- A. Subdrainage Pipe: Specified in Section 334600 "Subdrainage."
- B. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.
 1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698 with a minimum of two passes of a plate-type vibratory compactor.
 2. Place and compact impervious fill over drainage backfill in 6-inch- thick compacted layers to final subgrade.

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
 1. Place base course material over subbase course under hot-mix asphalt pavement.
 2. Shape subbase course and base course to required crown elevations and cross-slope grades.
 3. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.

4. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 5. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of maximum dry unit weight according to ASTM D 698.
- C. Pavement Shoulders: Place shoulders along edges of subbase course and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each subbase and base layer to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

3.18 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
 1. Place drainage course 6 inches or less in compacted thickness in a single layer.
 2. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 3. Compact each layer of drainage course to required cross sections and thicknesses to not less than 98 percent of maximum dry unit weight according to ASTM D 698.

3.19 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
 2. Determine that fill material and maximum lift thickness comply with requirements.
 3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Design Professional.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
 2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length, but no fewer than two tests.
 3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by Design Professional; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 2000

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SECTION 31 5000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes temporary excavation support and protection systems.
- B. Related Requirements:
1. Section 013233 "Photographic Documentation" for recording preexisting conditions and excavation support and protection system progress.
 2. Section 312000 "Earth Moving" for excavating and backfilling and for controlling surface-water runoff and ponding.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project Site.
1. Review geotechnical report.
 2. Review existing utilities and subsurface conditions.
 3. Review coordination for interruption, shutoff, capping, and continuation of utility services.
 4. Review proposed excavations.
 5. Review proposed equipment.
 6. Review monitoring of excavation support and protection system.
 7. Review coordination with waterproofing.
 8. Review abandonment or removal of excavation support and protection system.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
1. Include construction details, material descriptions, performance properties, and dimensions of individual components and profiles, and calculations for excavation support and protection system.
- B. Shop Drawings: For excavation support and protection system, prepared by or under the supervision of a qualified professional engineer.
1. Include plans, elevations, sections, and details.
 2. Show arrangement, locations, and details of soldier piles, piling, lagging, tiebacks, bracing, and other components of excavation support and protection system according to engineering design.
 3. Indicate type and location of waterproofing.
 4. Include a written plan for excavation support and protection, including sequence of construction of support and protection coordinated with progress of excavation.

1.5 FIELD CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:
 - 1. Notify Design Professional and Owner no fewer than two days in advance of proposed interruption of utility.
 - 2. Do not proceed with interruption of utility without Design Professional's written permission.
- B. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of a geotechnical design professional and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.
 - 1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection according to the performance requirements.
 - 2. The geotechnical report is included elsewhere in Project Manual.
- C. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Provide design, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting earth and hydrostatic pressures and superimposed and construction loads.
 - 1. Contractor Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer.
 - 2. Prevent surface water from entering excavations by grading, dikes, or other means.
 - 3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.
 - 4. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

2.2 MATERIALS

- A. General: Provide materials that are either new or in serviceable condition.
- B. Structural Steel: ASTM A 36/A 36M, ASTM A 690/A 690M, or ASTM A 992/A 992M.
- C. Steel Sheet Piling: ASTM A 328/A 328M, ASTM A 572/A 572M, or ASTM A 690/A 690M; with continuous interlocks.
 - 1. Corners: Site-fabricated mechanical interlock or Roll-formed corner shape with continuous interlock.
- D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness determined by design professional.
- E. Shotcrete: Comply with Section 033713 "Shotcrete" for shotcrete materials and mixes, reinforcement, and shotcrete application.

- F. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.
- G. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- H. Tiebacks: Steel bars, ASTM A 722/A 722M.
- I. Tiebacks: Steel strand, ASTM A 416/A 416M.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.
 - 1. Shore, support, and protect utilities encountered.
- B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- C. Locate excavation support and protection systems clear of permanent construction so that construction and finishing of other work is not impeded.

3.2 SOLDIER PILES AND LAGGING

- A. Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.
- B. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.
- C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 SHEET PILING

- A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock vertical edges to form a continuous barrier.
- B. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment
- C. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 TIEBACKS

- A. Drill, install, grout, and tension tiebacks.
- B. Test load-carrying capacity of each tieback and replace and retest deficient tiebacks.

1. Have test loading observed by a qualified design professional responsible for design of excavation support and protection system.
- C. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.5 BRACING

- A. Bracing: Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.
1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Design Professional.
 2. Install internal bracing if required to prevent spreading or distortion of braced frames.
 3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 FIELD QUALITY CONTROL

- A. Survey-Work Benchmarks: Resurvey benchmarks daily during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Design Professional if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.
- B. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.
- C. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

3.7 REMOVAL AND REPAIRS

- A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.
1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction and abandon remainder.
 2. Fill voids immediately with approved backfill compacted to density specified in Section 312000 "Earth Moving."
 3. Repair or replace, as approved by Design Professional, adjacent work damaged or displaced by removing excavation support and protection systems.
- B. Leave excavation support and protection systems permanently in place.

END OF SECTION 31 5000

SECTION 32 3113
CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fence framework, fabric, and accessories.
- B. Excavation for post bases; concrete foundation for posts.
- C. Manual gates and related hardware.

1.02 RELATED REQUIREMENTS

- A. General Conditions, Supplementary Conditions and General Requirements shall govern the work of this Section.
- B. Section 03 3000 - Cast-in-Place Concrete: Concrete anchorage for posts.

1.03 REFERENCE STANDARDS

- A. ASTM A121 - Standard Specification for Metallic-Coated Carbon Steel Barbed Wire; 2013.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2015.
- D. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2016a.
- E. ASTM F567 - Standard Practice for Installation of Chain-Link Fence; 2014a.
- F. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric; 2011.
- G. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework; 2016a.
- H. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures; 2013.

1.04 SUBMITTALS

- A. See Section 01300 – Submittals.
- B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.
- C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Posts, Rails, and Frames: ASTM F1083 Schedule 40 hot-dipped galvanized steel pipe, welded construction, minimum yield strength of 30 ksi.
- B. Posts, Rails, and Frames: ASTM A1011/A1011M, Designation SS; hot-rolled steel strip, cold formed to pipe configuration, longitudinally welded construction, minimum yield strength of 50 ksi; zinc coating conforming to ASTM F1043 Type B on pipe exterior and interior.
- C. Wire Fabric: ASTM F668 polymer-coated steel chain link fabric.
- D. Barbed Wire: Zinc-coated steel, complying with ASTM A121 Type Z Coating Class 1; 2 strands of 0.099 inch diameter wire, with 2-pointed barbs at 4 inches on center.

- E. Concrete: Ready-mixed, complying with ASTM C94/C94M; normal Portland cement; 2,500 psi strength at 28 days, 3 inch slump; 1 inch maximum size aggregate.

2.02 COMPONENTS

- A. Line Posts: 2.38 inch diameter.
- B. Corner and Terminal Posts: 2.88 inch.
- C. Gate Post: Per opening size as called for in drawings.
- D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.
- E. Gate Frame: 1.90 inch diameter for welded fabrication.
- F. Fabric: 2 inch diamond mesh interwoven wire, 6 gage, 0.1620 inch thick, top selvage twisted tight, bottom selvage twisted tight.
- G. Tension Wire: 6 gage, 0.1620 inch thick steel, single strand.
- H. Tie Wire: Aluminum alloy steel wire.

2.03 ACCESSORIES

- A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.
- B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.
- C. Hardware for Single Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; fork latch with gravity drop and padlock hasp; keeper to hold gate in fully open position.
- D. Hardware for Double Swinging Gates: 180 degree hinges, 2 for gates up to 60 inches high, 3 for taller gates; drop bolt on inactive leaf engaging socket stop set in concrete, active leaf latched to inactive leaf preventing raising of drop bolt, padlock hasp; keepers to hold gate in fully open position.

2.04 FINISHES

- A. Hardware: Hot-dip galvanized to weight required by ASTM A153/A153M.
- B. All components same finish as fabric.
- C. Accessories: Same finish as fabric.
- D. Color(s): Black.

2.05 OTHER MATERIALS

- A. All other materials and accessories, not specifically described or called for, but which are required for a complete and finished installation for the work of this Section shall be furnished and installed by the Contractor at no additional cost to the Owner. These materials shall be selected by the Contractor, subject to the approval of the Architect.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install framework, fabric, accessories and gates in accordance with manufacturer's instructions.
- B. Place fabric on outside of posts and rails.
- C. Set intermediate, terminal, gate, and corner posts plumb using four (4) expansion achors per post.
- D. Line Post Footing Depth Below Finish Grade: ASTM F567.
- E. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.
- F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.
- G. Provide top rail through line post tops and splice with 6 inch long rail sleeves.
- H. Install center brace rail on corner gate leaves.
- I. Do not stretch fabric until concrete foundation has cured 28 days.

- J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
- K. Position bottom of fabric 1 inches above finished grade.
- L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.
- M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.
- N. Install bottom tension wire stretched taut between terminal posts.
- O. Install support arms sloped outward and attach barbed wire; tension and secure.
- P. Install hardware and gate with fabric to match fence.
- Q. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

3.02 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch.
- B. Maximum Offset From True Position: 1 inch.
- C. Components shall not infringe adjacent property lines.

END OF SECTION 32 3113

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SECTION 32 9113 - SOIL PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes planting soils and layered soil assemblies specified by composition of the mixes.
- B. Related Requirements:
 - 1. Section 311000 "Site Clearing" for topsoil stripping and stockpiling.
 - 2. Section 329200 "Turf and Grasses" for placing planting soil for turf and grasses.
 - 3. Section 329300 "Plants" for placing planting soil for plantings.

1.3 DEFINITIONS

- A. AAPFCO: Association of American Plant Food Control Officials.
- B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.
- C. CEC: Cation exchange capacity.
- D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.
- E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
- F. Imported Soil: Soil that is transported to Project site for use.
- G. Layered Soil Assembly: A designed series of planting soils, layered on each other, that together produce an environment for plant growth.
- H. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

- I. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.
- J. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."
- K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- L. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
- M. SSSA: Soil Science Society of America.
- N. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- O. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
- P. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- Q. USCC: U.S. Composting Council.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include recommendations for application and use.
 - 2. Include test data substantiating that products comply with requirements.
 - 3. Include sieve analyses for aggregate materials.
 - 4. Material Certificates: For each type of structural fill and topsoil before delivery to the site, according to the following:
 - a. Manufacturer's qualified testing agency's certified analysis of standard products.
 - b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
 - c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

- B. Samples: For each bulk-supplied material, 1-gal. volume of each in sealed containers labeled with content, source, and date obtained. Each Sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For each testing agency.
- B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.
- C. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed.
 - 1. Laboratories: Subject to compliance with requirements,
 - a. registered geotechnical engineer.
 - 2. Multiple Laboratories: At Contractor's option, work may be divided among qualified testing laboratories specializing in physical testing, chemical testing, and fertility testing.

1.8 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Contractor will engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil.
 - 1. Notify Design Professional seven days in advance of the dates and times when laboratory samples will be taken.
- B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.
 - 1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.9 SOIL-SAMPLING REQUIREMENTS

- A. General: Extract soil samples according to requirements in this article.
- B. Sample Collection and Labeling: Have samples taken and labeled by registered geotechnical engineer.

1. Number and Location of Samples: Minimum of three representative soil samples where indicated on Drawings each soil to be used or amended for landscaping purposes.
2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
3. Division of Samples: Split each sample into two, equal parts. Send half to the testing agency and half to Owner for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.10 TESTING REQUIREMENTS

- A. General: Perform tests on soil samples according to requirements in this article.
- B. Physical Testing:
 1. Soil Texture: Soil-particle, size-distribution analysis by one of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods":
 - a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
 - b. Hydrometer Method: Report percentages of sand, silt, and clay.
 2. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 3. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
 4. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods"; at 85% compaction according to ASTM D 698 (Standard Proctor).
- C. Chemical Testing:
 1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
 2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1- Physical and Mineralogical Methods."
 3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
 4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.
- D. Fertility Testing: Soil-fertility analysis according to standard laboratory protocol of SSSA NAPT NCR-13 including the following:

1. Percentage of organic matter.
2. CEC, calcium percent of CEC, and magnesium percent of CEC.
3. Soil reaction (acidity/alkalinity pH value).
4. Buffered acidity or alkalinity.
5. Nitrogen ppm.
6. Phosphorous ppm.
7. Potassium ppm.
8. Manganese ppm.
9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm
14. Soluble-salts ppm.
15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
16. Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.

1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1000 sq. ft. for 6-inch depth of soil.
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1000 sq. ft. for 6-inch depth of soil.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 MATERIALS

2.2 PLANTING SOILS SPECIFIED BY COMPOSITION

- A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.
- B. Planting-Soil Type Imported, naturally formed soil from off-site sources and consisting of sandy loam, loam, silt loam, or loamy sand] soil according to USDA textures; and modified to produce viable planting soil.
1. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 4 inches deep, not from agricultural land, bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass.
 2. Additional Properties of Imported Soil before Amending: Soil reaction of pH 6 to 7 and minimum of 4 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
 3. Unacceptable Properties: Clean soil of the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
 - b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.
 - c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 3 inches in any dimension.
- C. Planting-Soil Type: Manufactured soil consisting of manufacturer's basic topsoil blended in a manufacturing facility with sand, stabilized organic soil amendments, and other materials to produce viable planting soil.
1. Additional Properties of Manufacturer's Basic Soil before Amending: Soil reaction of pH 6 to 7 and minimum of 4 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.
 2. Unacceptable Properties: Manufactured soil shall not contain the following:
 - a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.

- b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 5 percent by dry weight of the manufactured soil.
- c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 2 inches in any dimension.

2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
 - 2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
 - 3. Form: Provide lime in form of ground dolomitic limestone or calcitic limestone.
- B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.
- F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C 33/C 33M

2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
 - 1. Feedstock: Limited to leaves
 - 2. Reaction: pH of 5.5 to 8
 - 3. Soluble-Salt Concentration: Less than 4 dS/m.
 - 4. Moisture Content: 35 to 55 percent by weight.
 - 5. Organic-Matter Content: 30 to 40 percent of dry weight.
 - 6. Particle Size: Minimum of 98 percent passing through a 2-inch sieve.
- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.

- C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 6 to 7.5, a soluble-salt content measured by electrical conductivity of maximum 5 dS/m, having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.
- D. Wood Derivatives: Shredded and composted, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
 - 1. Partially Decomposed Wood Derivatives: In lieu of shredded and composted wood derivatives, mix shredded and partially decomposed wood derivatives with ammonium nitrate at a minimum rate of 0.15 lb/cu. ft. of loose sawdust or ground bark, or with ammonium sulfate at a minimum rate of 0.25 lb/cu. ft. of loose sawdust or ground bark.
- E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.5 FERTILIZERS

- A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.
- D. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

- A. Place planting soil and fertilizers according to requirements in other Specification Sections.

- B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.
- C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

- A. Excavation: Excavate soil from designated area(s) to a depth of 6 inches and stockpile until amended.
- B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
- C. Unsuitable Materials: Clean soil to contain a maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.
- D. Screening: Pass unamended soil through a 3-inch sieve to remove large materials.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 8 inches. Remove stones larger than 3 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
- C. Mixing: Spread unamended soil to total depth of 6 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Amendments: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
 - a. Mix lime with dry soil before mixing fertilizer.
 - b. Mix fertilizer with planting soil no more than seven days before planting.
 - 2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

- D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place except where a different compaction value is indicated on Drawings.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 PLACING MANUFACTURED PLANTING SOIL OVER EXPOSED SUBGRADE

- A. General: Apply manufactured soil on-site in its final, blended condition. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Subgrade Preparation: Till subgrade to a minimum depth of 8 inches. Remove stones larger than 3 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply approximately half the thickness of planting soil over prepared, loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
- C. Application: Spread planting soil to total depth of 6 inches, but not less than required to meet finish grades after natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
 - 1. Lifts: Apply planting soil in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.
- D. Compaction: Compact each lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 except where a different compaction value is indicated on Drawings].
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 BLENDING PLANTING SOIL IN PLACE

- A. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
- B. Preparation: Till unamended, existing soil in planting areas to a minimum depth of of 8 inches. Remove stones larger than 3 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- C. Mixing: Apply soil amendments and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.
 - 1. Mix lime with dry soil before mixing fertilizer.
 - 2. Mix fertilizer with planting soil no more than seven days before planting.

- D. Compaction: Compact blended planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 except where a different compaction value is indicated on Drawings.
- E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Design Professional will engage a qualified testing agency to perform tests and inspections.
- B. Perform the following tests:
 - 1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.
 - 2. PH test. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.
- C. Soil will be considered defective if it does not pass tests.
- D. Prepare test reports.
- E. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.7 PROTECTION

- A. Protection Zone: Identify protection zones according to Section 015639 "Temporary Tree and Plant Protection."
- B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Vehicle traffic.
 - 4. Foot traffic.
 - 5. Erection of sheds or structures.
 - 6. Impoundment of water.
 - 7. Excavation or other digging unless otherwise indicated.
- C. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Design Professional and replace contaminated planting soil with new planting soil.

3.8 CLEANING

- A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.
- B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.
 - 1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 32 9113

SECTION 32 9200 - TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Seeding.
 - 2. Sodding.
- B. Related Sections:
 - 1. Section 329300 "Plants" for landscape material.

1.3 DEFINITIONS

- A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.
- H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

- I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified landscape Installer.
- B. Product Certificates: For soil amendments and fertilizers, from manufacturer.
- C. Material Test Reports: For existing in-place surface soil and imported or manufactured topsoil.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful turf establishment.
- B. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
 1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 2. The soil-testing laboratory shall oversee soil sampling, with depth, location, and number of samples to be taken per instructions from Architect. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 3. Report suitability of tested soil for turf growth.
 - a. Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. (92.9 sq. m) or volume per cu. yd. (0.76 cu. m) for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
 - b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable.
- B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.8 MAINTENANCE SERVICE

- A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until acceptable turf is established but for not less than the following periods:
 - 1. Seeded and Sodded Turf: 60 days from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
 - 1. Full Sun: Bermudagrass (*Cynodon dactylon*).
 - 2. Storm Water Management Ponds:
 - a. Slopes: Pennington Slopemaster or Approved Equal (Must be approved by Owner)

2.2 TURFGRASS SOD

- A. Turfgrass Sod: Certified Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.
- B. Turfgrass Species: Bermudagrass (*Cynodon dactylon*).
- C. Turfgrass Species: Sod of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

2.3 INORGANIC SOIL AMENDMENTS

- A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:

1. Class: T, with a minimum of 99 percent passing through No. 8 (2.36-mm) sieve and a minimum of 75 percent passing through No. 60 (0.25-mm) sieve.
- B. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve.
- C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.
- D. Aluminum Sulfate: Commercial grade, unadulterated.
- E. Perlite: Horticultural perlite, soil amendment grade.
- F. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.
- G. Sand: Clean, washed, natural or manufactured, and free of toxic materials.
- H. Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.
- I. Zeolites: Mineral clinoptilolite with at least 60 percent water absorption by weight.

2.4 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch (12.5-mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 1. Organic Matter Content: 50 to 60 percent of dry weight.
 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture, with a pH range of 3.4 to 4.8.
- C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture, with a pH range of 6 to 7.5, and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.5 FERTILIZERS

- A. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 4 percent nitrogen and 10 percent phosphoric acid.

- B. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- D. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.6 PLANTING SOILS

- A. Planting Soil Mix: Mix topsoil with the following soil amendments and fertilizers in the following quantities:
 - 1. 60% Topsoil as specified.
 - 2. 40% prepared additives (by volume as follows):
 - 2 parts humus and/ or peat
 - 1 part shredded pine bark (bark pieces between ½ and 2 inches in length)
 - 1 part sterilized composted cow manure
 - 3. Commercial fertilizer as recommended in soil report
 - 4. Lime as recommended in soil report.
- C. Pre-manufactured planting soil mixes may be used if similar in content to soil mixes shown above. See submittal requirements for required pre-approval.

2.7 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.

2.8 PESTICIDES

- A. General: Pesticide, registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
 - 2. Protect grade stakes set by others until directed to remove them.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

- A. Limit turf subgrade preparation to areas to be planted.
- B. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 4 inches (100 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply fertilizer directly to subgrade before loosening.

2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil].
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b. Mix lime with dry soil before mixing fertilizer.
3. Spread planting soil to a depth of 4 inches (100 mm) but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Reduce elevation of planting soil to allow for soil thickness of sod.
- C. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 2. Loosen surface soil to a depth of at least 6 inches (150 mm) Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches (150 mm) of soil. Till soil to a homogeneous mixture of fine texture.
 - a. Apply fertilizer directly to surface soil before loosening.
 3. Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, trash, and other extraneous matter.
 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.
- E. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- F. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 1. Do not use wet seed or seed that is moldy or otherwise damaged.
 2. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow seed at a total rate of 3 to 4 lb/1000 sq. ft. (1.4 to 1.8 kg/92.9 sq. m).
- C. Rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray.

- D. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre (42 kg/92.9 sq. m) to form a continuous blanket 1-1/2 inches (38 mm) in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
- E. All seeding on slopes greater than 4:1 and in stormwater management ponds shall be HydroSeeded.

3.5 SODDING

- A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
 - 1. Lay sod across angle of slopes exceeding 1:3.
- C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches (38 mm) below sod.

3.6 TURF MAINTENANCE

- A. Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
 - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
 - 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
 - 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches (100 mm).
 - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - 2. Water turf with fine spray at a minimum rate of 1 inch (25 mm) per week unless rainfall precipitation is adequate.
- C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 1/3 of grass height. Remove no more than 1/3 of grass-leaf

growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

1. Mow bermudagrass to a height of 1/2 to 1 inch (13 to 25 mm).

3.7 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:
 1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches (125 by 125 mm)].
 2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.8 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Remove non-degradable erosion-control measures after grass establishment period.

END OF SECTION 32 9200

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SECTION 32 9300 - PLANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Plants.
2. Planting soils.
3. Tree stabilization.
4. Landscape edgings.
5. Tree grates.

- B. Related Sections:

1. Section 329200 "Turf and Grasses" for turf (lawn).

1.3 UNIT PRICES

- A. Work of this Section is affected by unit prices specified in Division 01 Section "Unit Prices."

1. Unit prices apply to authorized work covered by quantity allowances.
2. Unit prices apply to additions to and deletions from Work as authorized by Change Orders.

1.4 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than sizes indicated; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than sizes indicated.
- D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when

removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.

- F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- H. Finish Grade: Elevation of finished surface of planting soil.
- I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- L. Planting Area: Areas to be planted.
- M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- O. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated, including soils.

1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
 2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
 3. Plant Photographs: Include color photographs in digital of each required species and size of plant material as it will be furnished to the Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.
- B. Qualification Data: For qualified landscape Installer.
- C. Product Certificates: For each type of manufactured product, from manufacturer.
- D. Material Test Reports: For existing in-place surface soil and imported or manufactured topsoil.
- E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before start of required maintenance periods.
- F. Warranty: Sample of special warranty.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape Installer whose work has resulted in successful establishment of plants.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 2. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
 3. Pesticide Applicator: State licensed, commercial.
- B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of the soil.
1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Design Professional. A minimum of three representative samples shall be taken from varied locations for each soil to be used or amended for planting purposes.
 3. Report suitability of tested soil for plant growth.
 - a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1000 sq. ft. (92.9 sq. m) or volume per cu. yd. (0.76 cu. m) for nitrogen, phosphorus, and

- potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
- b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.
- D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
1. Selection of plants purchased under allowances will be made by Owner Representative, who will tag plants at their place of growth before they are prepared for transplanting.
- E. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches (150 mm) above the root flare for trees up to 4-inch (100-mm) caliper size, and 12 inches (300 mm) above the root flare for larger sizes.
2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- F. Plant Material Observation: Owner Representative may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Owner Representative retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
1. Notify Owner Representative of sources of planting materials seven days in advance of delivery to site.
- G. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
- B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

- C. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.
- D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- E. Handle planting stock by root ball.
- F. Store bulbs, corms, and tubers in a dry place at 60 to 65 deg F (16 to 18 deg C) until planting.
- G. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.
 - 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 3. Do not remove container-grown stock from containers before time of planting.
 - 4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- B. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:
 - 1. Notify Owner Representative no fewer than two days in advance of proposed interruption of each service or utility.
 - 2. Do not proceed with interruption of services or utilities without Owner Representative written permission.
- C. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Material Completion.
 - 1. Spring Planting: March 15th – May 15th
 - 2. Fall Planting: September 15th – December 15th
- D. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

- E. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
 - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.9 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.
 - b. Structural failures including plantings falling or blowing over.
 - c. Faulty performance of tree stabilization.
 - d. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Periods from Date of Material Completion.
 - a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
 - b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
 - c. Annuals: 3 months.
 - 3. Include the following remedial actions as a minimum:
 - a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
 - b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
 - c. A limit of one replacement of each plant will be required except for losses or replacements due to failure to comply with requirements.
 - d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.10 MAINTENANCE SERVICE

- A. Initial Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.
 - 1. Maintenance Period: 12 months from date of Material Completion.
- B. Initial Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period: 6 months from date of Material Completion.
- C. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch (19 mm) in diameter; or with stem girdling roots will be rejected.
 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
- B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Design Professional, with a proportionate increase in size of roots or balls.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label at least one plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.
- E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

2.2 FERTILIZERS

- A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

1. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- D. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
1. Size: 10-gram tablets.
 2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.
- E. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

2.3 PLANTING SOILS

- A. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
1. Ratio of Loose Compost to Surface Soil by Volume: 1:3 ratio.
 2. Weight of Lime per 1000 Sq. Ft. (92.9 Sq. m): 50lbs.

2.4 MULCHES

- A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
1. Type: Pine Straw
 2. Color: Natural.

2.5 PESTICIDES

- A. General: Pesticide registered and approved by EPA, acceptable Design Professional, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by Design Professional.

- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.6 TREE STABILIZATION MATERIALS

- A. Stakes and Guys:
 - 1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal (38-by-38-mm actual) by length indicated, pointed at one end.
 - 2. Wood Deadmen: Timbers measuring 8 inches (200 mm) in diameter and 48 inches (1200 mm) long, treated with specified wood pressure-preservative treatment.
 - 3. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or turnbuckles.
 - 4. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch (2.7 mm) in diameter.
 - 5. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
 - 6. Guy Cables: Five-strand, 3/16-inch- (4.8-mm-) diameter, galvanized-steel cable, with zinc-coated turnbuckles a minimum of 3 inches (75 mm) long, with two 3/8-inch (10-mm) galvanized eyebolts.
 - 7. Flags: Standard surveyor's plastic flagging tape, white, 6 inches (150 mm) long.
 - 8. Proprietary Staking-and-Guying Devices: Proprietary stake and adjustable tie systems to secure each new planting by plant stem; sized as indicated and per manufacturer's written recommendations.
- B. Root-Ball Stabilization Materials:
 - 1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new hardwood or softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal (38-by-38-mm actual) by length indicated; stakes pointed at one end.
 - 2. Wood Screws: ASME B18.6.1.
 - 3. Proprietary Root-Ball Stabilization Devices: Proprietary at- or below-grade stabilization systems to secure each new planting by root ball; sized per manufacturer's written recommendations unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.

3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Design Professional and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Design Professional's acceptance of layout before excavating or planting. Make minor adjustments as required.
- D. Lay out plants at locations directed by Design Professional. Stake locations of individual trees and shrubs and outline areas for multiple plantings.
- E. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.
- F. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3 PLANTING AREA ESTABLISHMENT

- A. Loosen subgrade of planting areas to a minimum depth of 6 inches (150 mm). Remove stones larger than 1 inch (25 mm) in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
1. Apply fertilizer directly to subgrade before loosening.
 2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b. Mix lime with dry soil before mixing fertilizer.
 3. Spread planting soil to a depth of 6 inches (150 mm) but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

- a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches (100 mm) of subgrade. Spread remainder of planting soil.
- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- C. Before planting, obtain Design Professional's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR TREES AND SHRUBS

- A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 1. Excavate approximately three times as wide as ball diameter for balled and burlapped stock.
 2. Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 6. Maintain supervision of excavations during working hours.
 7. Keep excavations covered or otherwise protected overnight.
 8. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.
- B. Subsoil and topsoil removed from excavations may be used as planting soil.
- C. Obstructions: Notify Design Professional if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
 1. Hardpan Layer: Drill 6-inch- (150-mm-) diameter holes, 24 inches (600 mm) apart, into free-draining strata or to a depth of 10 feet (3 m), whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Design Professional if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most

root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 2 inches (50 mm) above adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Set container-grown stock plumb and in center of planting pit or trench with root flare 2 inches (50 mm) above adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. Carefully remove root ball from container without damaging root ball or plant.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- E. Set and support bare-root stock in center of planting pit or trench with root flare 2 inches (50 mm) above adjacent finish grade.
 - 1. Use planting soil for backfill.
 - 2. Spread roots without tangling or turning toward surface, and carefully work backfill around roots by hand. Puddle with water until backfill layers are completely saturated. Plumb before backfilling, and maintain plumb while working backfill around roots and placing layers above roots.
 - 3. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside soil-covered roots about 1 inch (25 mm) from root tips; do not place tablets in bottom of the hole or touching the roots.
 - 4. Continue backfilling process. Water again after placing and tamping final layer of soil.

- F. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 MECHANIZED TREE SPADE PLANTING

- A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.
- B. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
- C. Cut exposed roots cleanly during transplanting operations.
- D. Use the same tree spade to excavate the planting hole as was used to extract and transport the tree.
- E. Plant trees as shown on Drawings, following procedures in "Tree, Shrub, and Vine Planting" Article.
- F. Where possible, orient the tree in the same direction as in its original location.

3.7 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Design Professional.
- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Design Professional, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.8 TREE STABILIZATION

- A. Install trunk stabilization as follows unless otherwise indicated:
 - 1. Upright Staking and Tying: Stake trees of 2- through 5-inch (50- through 125-mm) caliper. Stake trees of less than 2-inch (50-mm) caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches (450 mm) below bottom of backfilled excavation and to extend one-third of trunk height above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
 - 2. Use two stakes for trees up to 12 feet (3.6 m) high and 2-1/2 inches (63 mm) or less in caliper; three stakes for trees less than 14 feet (4.2 m) high and up to 4 inches (100 mm) in caliper. Space stakes equally around trees.

3. Support trees with bands of flexible ties at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
 4. Support trees with two strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
- B. Staking and Guying: Stake and guy trees more than 14 feet (4.2 m) in height and more than 3 inches (75 mm) in caliper unless otherwise indicated. Securely attach no fewer than three guys to stakes 30 inches (760 mm) long, driven to grade.
1. Site-Fabricated Staking-and-Guying Method:
 - a. For trees more than 6 inches (150 mm) in caliper, anchor guys to wood deadmen buried at least 36 inches (900 mm) below grade. Provide turnbuckle for each guy wire and tighten securely.
 - b. Support trees with bands of flexible ties at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
 - c. Support trees with strands of cable or multiple strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to turnbuckle. Allow enough slack to avoid rigid restraint of tree.
 - d. Attach flags to each guy wire, 30 inches (760 mm) above finish grade.
 - e. Paint turnbuckles with luminescent white paint.
 2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.
- C. Root-Ball Stabilization: Install at- or below-grade stabilization system to secure each new planting by the root ball unless otherwise indicated.
1. Wood Hold-Down Method: Place vertical stakes against side of root ball and drive them into subsoil; place horizontal wood hold-down stake across top of root ball and screw at each end to one of the vertical stakes.
 - a. Install stakes of length required to penetrate at least 18 inches (450 mm) below bottom of backfilled excavation. Saw stakes off at horizontal stake.
 - b. Install screws through horizontal hold-down and penetrating at least 1 inch (25 mm) into stakes. Pre-drill holes if necessary to prevent splitting wood.
 - c. Install second set of stakes on other side of root trunk for larger trees as indicated.
 2. Proprietary Root-Ball Stabilization Device: Install root-ball stabilization system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.9 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in even rows with triangular spacing.
- B. Use planting soil for backfill.
- C. Dig holes large enough to allow spreading of roots.

- D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.
- E. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- F. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- G. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.10 PLANTING AREA MULCHING

- A. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Trees and Tree-like Shrubs in Turf Areas: Apply pine straw mulch ring of 3-inch (75-mm) average thickness, with 36-inch (900-mm) radius around trunks or stems. Do not place mulch within 3 inches (75 mm) of trunks or stems.

3.11 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.12 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with Design Professional and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Non-Selective): Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.

3.13 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- C. After installation and before Material Completion remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.14 DISPOSAL

- A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 32 9300

SECTION 33 0500 - COMMON WORK RESULTS FOR UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Piping joining materials.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Sleeves.
 - 5. Identification devices.
 - 6. Grout.
 - 7. Flowable fill.
 - 8. Piped utility demolition.
 - 9. Piping system common requirements.
 - 10. Equipment installation common requirements.
 - 11. Painting.
 - 12. Concrete bases.
 - 13. Metal supports and anchorages.

1.3 DEFINITIONS

- A. Exposed Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions.
- B. Concealed Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- C. ABS: Acrylonitrile-butadiene-styrene plastic.
- D. CPVC: Chlorinated polyvinyl chloride plastic.
- E. PE: Polyethylene plastic.
- F. PVC: Polyvinyl chloride plastic.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:

1. Dielectric fittings.
2. Identification devices.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Steel Piping Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.8 COORDINATION

- A. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- B. Coordinate installation of identifying devices after completing covering and painting if devices are applied to surfaces.
- C. Coordinate size and location of concrete bases. Formwork, reinforcement, and concrete requirements are specified in Section 033000 "Cast-in-Place Concrete."

PART 2 - PRODUCTS

2.1 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness, unless otherwise indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAgl, silver alloy for refrigerant piping, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- G. Solvent Cements for Joining Plastic Piping:
1. ABS Piping: ASTM D 2235.
 2. CPVC Piping: ASTM F 493.
 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 4. PVC to ABS Piping Transition: ASTM D 3138.
- H. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.2 TRANSITION FITTINGS

- A. Transition Fittings, General: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
- B. Transition Couplings NPS 1-1/2 and Smaller:
1. Underground Piping: Manufactured piping coupling or specified piping system fitting.
 2. Aboveground Piping: Specified piping system fitting.
- C. AWWA Transition Couplings NPS 2 and Larger:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cascade Waterworks Mfg. Co.

- b. Dresser, Inc.; DMD Div.
 - c. Ford Meter Box Company, Inc. (The); Pipe Products Div.
 - d. JCM Industries.
 - e. Smith-Blair, Inc.
 - f. Viking Johnson.
3. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.
- D. Plastic-to-Metal Transition Fittings:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Spears Manufacturing Co.
 3. Description: [CPVC] [CPVC and PVC] [PVC] one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint[or threaded] end.
- E. Plastic-to-Metal Transition Unions:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Colonial Engineering, Inc.
 - b. NIBCO INC.
 - c. Spears Manufacturing Co.
 3. Description: MSS SP-107, [CPVC] [CPVC and PVC] [PVC] four-part union. Include brass[or stainless-steel] threaded end, solvent-cement-joint[or threaded] plastic end, rubber O-ring, and union nut.
- F. Flexible Transition Couplings for Underground Nonpressure Drainage Piping:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Cascade Waterworks Mfg. Co.
 - b. Fernco, Inc.
 - c. Mission Rubber Company.
 - d. Plastic Oddities.
 3. Description: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

2.3 DIELECTRIC FITTINGS

- A. Dielectric Fittings, General: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.
- B. Dielectric Unions:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epcos Sales, Inc.
 - d. Hart Industries, International, Inc.
 - e. Watts Water Technologies, Inc.
 - f. Zurn Plumbing Products Group; Wilkins Div.
 3. Description: Factory fabricated, union, NPS 2 and smaller.
 - a. Pressure Rating: 250 psig at 180 deg F.
 - b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded ferrous.
- C. Dielectric Flanges:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Capitol Manufacturing Co.
 - b. Central Plastics Company.
 - c. Epcos Sales, Inc.
 - d. Watts Water Technologies, Inc.
 3. Description: Factory-fabricated, bolted, companion-flange assembly, NPS 2-1/2 to NPS 4 and larger.
 - a. Pressure Rating: minimum 300 psig.
 - b. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Kits:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. Calpico, Inc.
 - c. Central Plastics Company.
 - d. Pipeline Seal and Insulator, Inc.

3. Description: Nonconducting materials for field assembly of companion flanges, NPS 2-1/2 and larger.
 - a. Pressure Rating: 150 psig minimum.
 - b. Gasket: Neoprene or phenolic.
 - c. Bolt Sleeves: Phenolic or polyethylene.
 - d. Washers: Phenolic with steel backing washers.

- E. Dielectric Couplings:
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Calpico, Inc.
 - b. Lochinvar Corporation.
 3. Description: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining, NPS 3 and smaller.
 - a. Pressure Rating: 300 psig at 225 deg F.
 - b. End Connections: Threaded.

- F. Dielectric Nipples:
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Perfection Corporation.
 - b. Precision Plumbing Products, Inc.
 - c. Victaulic Company.
 3. Description: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining.
 - a. Pressure Rating: 300 psig at 225 deg F.
 - b. End Connections: Threaded or grooved.

2.4 SLEEVES

- A. Mechanical sleeve seals for pipe penetrations are specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."
- B. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- C. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized, plain ends.
- D. Cast-Iron Sleeves: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- E. Molded PVC Sleeves: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe Sleeves: ASTM D 1785, Schedule 40.
- G. Molded PE Sleeves: Reusable, PE, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

2.5 IDENTIFICATION DEVICES

- A. General: Products specified are for applications referenced in other utilities Sections. If more than single type is specified for listed applications, selection is Installer's option.
- B. Equipment Nameplates: Metal permanently fastened to equipment with data engraved or stamped.
 - 1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and essential data.
 - 2. Location: Accessible and visible.
- C. Stencils: Standard stencils prepared with letter sizes complying with recommendations in ASME A13.1. Minimum letter height is 1-1/4 inches for ducts, and 3/4 inch for access door signs and similar operational instructions.
 - 1. Material: Brass.
 - 2. Stencil Paint: Exterior, oil-based, alkyd-gloss black enamel, unless otherwise indicated. Paint may be in pressurized spray-can form.
 - 3. Identification Paint: Exterior, oil-based, alkyd enamel in colors according to ASME A13.1, unless otherwise indicated.
- D. Snap-on Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid, snap-on type. Include color-coding according to ASME A13.1, unless otherwise indicated.
- E. Pressure-Sensitive Pipe Markers: Manufacturer's standard preprinted, color-coded, pressure-sensitive-vinyl type with permanent adhesive.
- F. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers, extending 360 degrees around pipe at each location.

- G. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers, at least three times letter height and of length required for label.
- H. Lettering: Manufacturer's standard preprinted captions as selected by Design Professional.
- I. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
 - 1. Arrows: Either integrally with piping system service lettering to accommodate both directions of flow, or as separate unit on each pipe marker to indicate direction of flow.
- J. Plastic Tape: Manufacturer's standard color-coded, pressure-sensitive, self-adhesive vinyl tape, at least 3 mils thick.
 - 1. Width: 1-1/2 inches on pipes with OD, including insulation, less than 6 inches; 2-1/2 inches for larger pipes.
 - 2. Color: Comply with ASME A13.1, unless otherwise indicated.
- K. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch sequenced numbers. Include 5/32-inch hole for fastener.
 - 1. Material: 0.032-inch-thick, polished brass.
 - 2. Material: 0.0375-inch-thick stainless steel.
 - 3. Material: 3/32-inch-thick plastic laminate with 2 black surfaces and a white inner layer.
 - 4. Material: Valve manufacturer's standard solid plastic.
 - 5. Size: 1-1/2 inches in diameter, unless otherwise indicated.
 - 6. Shape: As indicated for each piping system.
- L. Valve Tag Fasteners: Brass, wire-link or beaded chain; or brass S-hooks.
- M. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
 - 1. Engraving: Engraver's standard letter style, of sizes and with terms to match equipment identification.
 - 2. Thickness: 1/8 inch, unless otherwise indicated.
 - 3. Thickness: 1/16 inch, for units up to 20 sq. in. or 8 inches in length, and 1/8 inch for larger units.
 - 4. Fasteners: Self-tapping, stainless-steel screws or contact-type permanent adhesive.
- N. Plastic Equipment Markers: Manufacturer's standard laminated plastic, in the following color codes:
 - 1. Green: Cooling equipment and components.
 - 2. Yellow: Heating equipment and components.
 - 3. Brown: Energy reclamation equipment and components.
 - 4. Blue: Equipment and components that do not meet criteria above.
 - 5. Hazardous Equipment: Use colors and designs recommended by ASME A13.1.
 - 6. Terminology: Match schedules as closely as possible. Include the following:
 - a. Name and plan number.

- b. Equipment service.
 - c. Design capacity.
 - d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
7. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment.
- O. Plasticized Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with mat finish suitable for writing.
1. Size: 3-1/4 by 5-5/8 inches.
 2. Fasteners: Brass grommets and wire.
 3. Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.
- P. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in piped utility identification with corresponding designations indicated. Use numbers, letters, and terms indicated for proper identification, operation, and maintenance of piped utility systems and equipment.
1. Multiple Systems: Identify individual system number and service if multiple systems of same name are indicated.

2.6 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
1. Characteristics: Post hardening, volume adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 2. Design Mix: 5000-psi, 28-day compressive strength.
 3. Packaging: Premixed and factory packaged.

2.7 FLOWABLE FILL

- A. Description: Low-strength-concrete, flowable-slurry mix.
1. Cement: ASTM C 150, Type I, portland.
 2. Density: 115- to 145-lb/cu. ft..
 3. Aggregates: ASTM C 33, natural sand, fine and crushed gravel or stone, coarse.
 4. Aggregates: ASTM C 33, natural sand, fine.
 5. Admixture: ASTM C 618, fly-ash mineral.
 6. Water: Comply with ASTM C 94/C 94M.
 7. Strength: 100 to 200 psig at 28 days.

PART 3 - EXECUTION

3.1 PIPED UTILITY DEMOLITION

- A. Refer to Section 024119 "Selective Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping. Fill abandoned piping with flowable fill, and cap or plug piping with same or compatible piping material.
 - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make operational.
 - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 DIELECTRIC FITTING APPLICATIONS

- A. Dry Piping Systems: Connect piping of dissimilar metals with the following:
 - 1. NPS 2 and Smaller: Dielectric unions.
 - 2. NPS 2-1/2 to NPS 12: Dielectric flanges.
- B. Wet Piping Systems: Connect piping of dissimilar metals with the following:
 - 1. NPS 2 and Smaller: Dielectric nipples.
 - 2. NPS 2-1/2 to NPS 4: Dielectric nipples.
 - 3. NPS 2-1/2 to NPS 8 : Dielectric nipples.
 - 4. NPS 10 and NPS 12: Dielectric flange kits.

3.3 PIPING INSTALLATION

- A. Install piping according to the following requirements and utilities Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on the Coordination Drawings.

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- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
 - D. Install piping to permit valve servicing.
 - E. Install piping at indicated slopes.
 - F. Install piping free of sags and bends.
 - G. Install fittings for changes in direction and branch connections.
 - H. Select system components with pressure rating equal to or greater than system operating pressure.
 - I. Sleeves are not required for core-drilled holes.
 - J. Permanent sleeves are not required for holes formed by removable PE sleeves.
 - K. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of equipment areas or other wet areas 2 inches above finished floor level.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - a. [PVC] [Steel] Pipe Sleeves: For pipes smaller than NPS 6.
 - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
 - L. Verify final equipment locations for roughing-in.
 - M. Refer to equipment specifications in other Sections for roughing-in requirements.

3.4 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and utilities Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

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1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- E. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- G. Grooved Joints: Assemble joints with grooved-end pipe coupling with coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- H. Soldered Joints: Apply ASTM B 813 water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B 32.
- I. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- J. Pressure-Sealed Joints: Assemble joints for plain-end copper tube and mechanical pressure seal fitting with proprietary crimping tool to according to fitting manufacturer's written instructions.
- K. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 appendixes.
 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- L. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- M. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- N. Plastic Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
1. Plain-End PE Pipe and Fittings: Use butt fusion.
 2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.
- O. Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.5 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 3. Install dielectric fittings at connections of dissimilar metal pipes.

3.6 EQUIPMENT INSTALLATION

- A. Install equipment level and plumb, unless otherwise indicated.
- B. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference with other installations. Extend grease fittings to an accessible location.
- C. Install equipment to allow right of way to piping systems installed at required slope.

3.7 PAINTING

- A. Painting of piped utility systems, equipment, and components is specified in Section 099113 "Exterior Painting," Section 099123 "Interior Painting," and Section 099600 "High-Performance Coatings."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.8 IDENTIFICATION

- A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.
1. Stenciled Markers: According to ASME A13.1.
 2. Plastic markers, with application systems. Install on insulation segment if required for hot noninsulated piping.
 3. Locate pipe markers on exposed piping according to the following:
 - a. Near each valve and control device.
 - b. Near each branch, excluding short takeoffs for equipment and terminal units. Mark each pipe at branch if flow pattern is not obvious.
 - c. Near locations where pipes pass through walls or floors or enter inaccessible enclosures.
 - d. At manholes and similar access points that permit view of concealed piping.
 - e. Near major equipment items and other points of origination and termination.
- B. Equipment: Install engraved plastic-laminate sign or equipment marker on or near each major item of equipment.

1. Lettering Size: Minimum 1/4 inch high for name of unit if viewing distance is less than 24 inches, 1/2 inch high for distances up to 72 inches, and proportionately larger lettering for greater distances. Provide secondary lettering two-thirds to three-fourths of size of principal lettering.
 2. Text of Signs: Provide name of identified unit. Include text to distinguish among multiple units, inform user of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
- C. Adjusting: Relocate identifying devices that become visually blocked by work of this or other Divisions.

3.9 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of base.
 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 7. Use 4000-psi, 28-day compressive-strength concrete and reinforcement as specified in Section 033000 "Cast-in-Place Concrete."

3.10 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Section 055000 "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor piped utility materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.11 GROUTING

- A. Mix and install grout for equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.

- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 33 0500

SECTION 33 4100 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Georgia DOT Standards and Specifications, Latest Edition.

1.2 SUMMARY

- A. This Section includes gravity-flow, non-pressure storm drainage outside the building, with the following components:
 - 1. Pipe
 - 2. Cleanouts
 - 3. Inline drains and drain basins
 - 4. Catch Basins

1.3 DEFINITIONS

- A. CPP: Corrugated polyethylene plastic.
- B. PVC: Polyvinyl chloride plastic.
- C. SICPP: Smooth Interior corrugated polyethylene plastic
- D. HDPE: High-Density Polyethylene
- E. RCP: Reinforced concrete pipe

1.4 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Non-pressure, Drainage-Piping Pressure Rating: 10-Foot head of water. Pipe joints shall be at least silttight, unless otherwise indicated.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Pipe.
 - 2. Cleanouts
 - 3. Drain inlets.
 - 4. Catch Basin

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic pipe and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.

1.7 PROJECT CONDITIONS

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:
 - 1. Notify Owner's Representative no fewer than two days in advance of proposed interruption of service.
 - 2. Do not proceed with interruption of service without Owner's Representative written permission.

PART 2 - PRODUCTS

All products shall meet the more stringent of the requirement contained herein or the latest edition of the Georgia DOT Standards and Specifications.

2.1 SICPP AND PCPP PIPE AND FITTINGS

- A. Smooth interior corrugated polyethylene drainage pipe (SICPP) or corrugated polyethylene pipe (CPP) and Fittings: AASHTO M 252M or M 294M, Type S, with smooth waterway for coupling joints.
 - 1. Soiltight Couplings: AASHTO M 252M, corrugated, matching tube and fittings.
- B. Perforated corrugated polyethylene drainage pipe (PCPP) and fittings.

2.2 CONCRETE PIPE AND FITTINGS

- A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76.
 - 1. Bell-and-spigot ends and gasketed joints with ASTM C 443, rubber gaskets
 - 2. Class III.

2.3 CLEANOUTS

- A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
 - 1. Top-Loading Classification: Heavy duty.
 - 2. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

2.4 INLINE DRAIN AND DRAIN BASINS

- A. PVC Inline Drains and Drain Basis
 - 1. Size as designated on Contract Drawings
 - 2. Thermo-molded configuration.
 - 3. Watertight connection to pipe system conforming with ASTM D3034.
 - 4. Manufacturer: Nyloplast or approved equal.
- B. Ductile Iron Grate, integral to the surface drain inlet, and furnished by a single manufacturer as a system.
 - 1. Size designated on the Contract Drawings.
 - 2. Bottom grate flange matching the internal pipe diameter.
 - 3. AASHTO H-20 loading

4. Grates shall be painted black.
5. Manufacturer: Nyloplast or approved equal.

2.5 MANHOLES

B. Standard Precast Concrete Manholes:

1. Description: ASTM C 913; designed according to ASTM C 890 for A-16 (AASHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for sealant joints.
2. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
3. Diameter: 48 inches minimum unless otherwise indicated.
4. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
5. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
6. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
7. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
8. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
9. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
10. Steps: **Individual FRP steps; ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP**, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than **[36 inches]**.
11. Adjusting Rings: Interlocking HDPE rings with level or sloped edge in thickness and diameter matching manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
12. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

C. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."
2. Material: In accordance with NCDOT specifications.

2.6 CATCH BASINS

A. Standard Precast Concrete Catch Basins: Precast, reinforced concrete, AASHTO HS20-44, heavy-traffic, structural loading, of depth indicated, with provision for sealant joints.

1. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
2. Catch basins shall be 3-foot by 3-foot (nominal internal dimension) with one foot deep sump below lowest invert.
3. Riser Sections: 4-inch minimum thickness and lengths to provide depth indicated.

4. Top Section: Flat-slab-top type.
 5. Joint Sealant: ASTM 990 bitumen or butyl rubber.
 6. Grade Rings: Include matching reinforced-concrete rings.
 7. Steps: Provide steps wide enough to allow worker to place both feet on 1 step and designed to prevent lateral slippage off of step. Cast or anchor steps into sidewalls at 12 to 16-inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
 8. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings as designated on Contract Drawings.

PART 3 - EXECUTION

All installations shall meet the more stringent of the requirement contained herein or the latest edition of the Georgia DOT Standards and Specifications.

3.1 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Division 2 Section "Earthwork".

3.2 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.

3.3 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
- B. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.4 IN LINE DRAIN AND DRAIN BASINS

- A. Install in line drains and drain basin in line with sewer piping in accordance with the contract documents and the manufacturer's recommendations.
- B. Set rim frames and covers in concrete as recommended by manufacturer, with grates flush with surface.

3.5 CATCH BASIN INSTALLATION

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

3.6 FIELD QUALITY CONTROL

- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
 - 1. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 - 2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 - 3. Reinspect and repeat procedure until results are satisfactory.

3.7 CLEANING

- A. Following installation, all installed storm drainage piping shall be flushed clean with potable water to clean interior of piping of dirt and superfluous materials. Contractor is responsible for appropriate disposal of any materials flushed from the storm piping system.

END OF SECTION 33 4100

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