

PROJECT MANUAL
FOR THE
LAWRENCEVILLE PUBLIC WORKS DEPARTMENT –
EQUIPMENT SHED EXPANSION

LAWRENCEVILLE, GA
GWINNETT COUNTY, GA

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OWNER
City of Lawrenceville
70 S. Clayton Street
Lawrenceville, GA 30046

Prepared by:
Precision Planning
400 Pike Boulevard
Lawrenceville, GA 30046
770-338-8000

APRIL 2023

**LAWRENCEVILLE PUBLIC WORKS DEPARTMENT – EQUIPMENT SHED EXPANSION
PPI PROJECT NO. A22-106**

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LAWRENCEVILLE

GEORGIA

April 27, 2023

**NOTICE OF BID
FOR
Lawrenceville Public Works Equipment Shed Expansion Project
SB019-23**

The City of Lawrenceville is soliciting competitive sealed bids from qualified contractors for the **Lawrenceville Public Works Equipment Shed Expansion Project**. Sealed bids will be received by the Lawrenceville Purchasing Office, 70 S. Clayton Street, 4th floor, Lawrenceville, Georgia 30046 until **3:00 P.M. local time on Thursday, June 1, 2023** and then publicly opened and read aloud. Any bid received after 3:00 P.M. will not be accepted. Bid envelope should be marked on the outside with Bid Number, name of Bidder, date and time of opening. One unbound original and one (1) copy should be submitted.

The work to be performed by the Contractor consists of but is not limited to the following:

The project consists of a 17,080-sf addition to the existing structure. The new addition will be a stand-alone one-story pre-engineered shed structure on a poured-in-place concrete floor slab. The new structure is designed to match the existing building and will have electric power and lighting. A portion of the interior will be fenced to subdivide the space. There will be a new trench drain and stormwater piping installed on the north side of the building and new grate inlets and storm piping installed on the east side of the building, along with asphalt removal and replacement.

Copies of the Plans, Specifications and Contract Documents may be obtained from the Lawrenceville City website www.lawrencevillega.org.

A **pre-bid conference** is scheduled for 10:00 A.M. on **Monday, May 15, 2023** at Lawrenceville Public Works located at 435 W. Pike Street, Lawrenceville, GA. 30046. **All bidders are urged to attend.**

Questions regarding bids should be directed to Steve Murray, Purchasing Director, at steve.murray@lawrencevillega.org or by calling 678-407-6420, no later than **3:00 P.M. on Friday, May 19, 2023.**

Bids are legal and binding upon the bidder when submitted. All bids should be submitted in **duplicate.**

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.

Bidder agrees to complete the Contract awarded within the "allowable calendar days for completion" from the date of the "Notice to Proceed".

Notice of Bid -Page 2

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BID DATE: June 1, 2023

Bid Number: SB019-23

A five percent (5%) bid bond must be submitted with the bid. Successful contractor will be required to provide a one hundred percent (100%) payment and one hundred percent (100%) performance bond as well as an insurance certificate fulfilling requirements as stated in the bid documents. Surety and insurance companies must have an AM Best rating of A-5 or greater, be listed in the Federal Registry of Companies holding Certificate of Authority and acceptable sureties on Federal Bonds, be licensed by the Georgia Insurance Department and the Georgia Secretary of State to do business in the State of Georgia.

All bonds must be submitted on forms provided by the City of Lawrenceville and agencies providing bonds and insurance should provide proof that they meet the criteria outlined in the bid and contract documents.

The City of Lawrenceville does not discriminate on the basis of disability in the admission or access to its programs or activities. The written Bid Documents supersede any prior verbal or written communications between the parties.

Award will be made to the contractor submitting the lowest responsive and responsible bid. The City of Lawrenceville reserves the right to reject any or all bids to waive technicalities and to make an award deemed in its best interest. Bids may be split or awarded in entirety.

Award notification will be sent to companies submitting a bid via email.

We look forward to your bid and appreciate your interest in the City of Lawrenceville.

END OF SECTION 00100

**SECTION I
INSTRUCTIONS TO BIDDERS**

1. Each bidder must examine the Notice to Bid, Instructions to Bidders, Contract, Contract General Conditions, Specifications, Bid Schedule, Drawings, and Addenda. Failure to do so will be at the bidder's risk.
2. Each bidder shall furnish all information required by the bidding requirements. The authorized representative must sign the bid as well as print or type his/her name on the bid schedule. Erasures or other changes must be initialed by the authorized representative signing the bid. Bids can only be signed by a person authorized to commit company resources.
3. Bids are legal and binding upon the bidder when submitted. Receipt of addenda should be acknowledged on the bid schedule. No oral interpretations or information can be considered as binding.
4. Bid envelope should be marked on the outside with Bid Number, name of Bidder, date and time of opening. One unbound marked original and one (1) copy should be submitted. Faxed bids cannot be considered.
5. Bidding Requirements will consist of the following:
 - a) Bid Schedule
 - b) Bid Bond
 - c) Non-Collusion Affidavit
 - d) Statement of Bidder's Qualifications
6. Award will be made to the bidder submitting the lowest responsive and responsible bid. The City reserves the right to make such investigations as it deems necessary to determine the ability of the bidder to perform, and the bidder shall furnish to the City, all such information for this purpose as the City may request. The City reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the City that such bidder is properly qualified to carry out the obligations of the contract.
7. Bids may be withdrawn only the case of mathematical error. The bidder shall give notice in writing of his claim of right to withdraw his bid without penalty due to an error within two (2) business days after the conclusion of the bid opening procedure. Bids may be withdrawn from consideration if the price was substantially lower than the other bids due solely to a mistake therein, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of the bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and material used in the preparation of the bid sought to be withdrawn. The bidder's original work papers shall be the sole acceptable evidence of error and mistake if he elects to withdraw his bid. If a bid is withdrawn under the authority of this provision, the lowest remaining responsive bid shall be deemed to be low bid.

No bidder who is permitted to withdraw a bid shall, for compensation, supply any material or labor or perform any subcontract or other work agreement for the person or firm to whom the contract is awarded or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn bid was submitted.

Lawrenceville Public Works Equipment Shed Expansion Project

Bidder has up to forty-eight (48) hours to notify the City of Lawrenceville Purchasing Office of an obvious clerical error made in calculation of bid in order to withdraw a bid after bid opening. Withdrawal of bid for this reason must be done in writing within the forty-eight (48) hour period. Suppliers who fail to request withdrawal of bid by the required forty-eight (48) hours shall automatically forfeit bid bond. Bid may not be withdrawn otherwise.

Bid withdrawal is not automatically granted and will be allowed solely at the City of Lawrenceville's discretion.

8. The City of Lawrenceville reserves the right to reject any or all bids, to waive technicalities, and to make an award as deemed in its best interest.
9. The City is exempt from federal excise tax and Georgia sales tax with regard to goods purchased directly by the City. Nevertheless, contractors are responsible for federal excise tax and Georgia sales taxes, including taxes for materials incorporated in City demolition contracts.
10. The attention of all bidders is directed to the fact that all applicable federal state laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though therein written.
11. Information submitted by a bidder in the bidding process shall be subject to disclosure after bid award in accordance with the Georgia Open Records Act of Compulsory Process.
12. Failure to observe any of the Instructions to Bidders or conditions in the Invitation to Bid may constitute grounds for rejection of the bid. Failure to use City Bidding Form and to acknowledge applicable addenda may result in a bid being deemed non-responsive an automatic rejection.
13. The Work shall be completed within **150** consecutive calendar days.
14. Add or deduct amounts indicated on the outside of the envelope are allowed and will be applied to the lump sum amount. Amount shall be clearly stated and should be initialed by an authorized company representative.
15. "Liquidated Damages" shall mean the negotiated sum of which the Bidder agrees to pay for each consecutive working day beyond the Contract Time required to complete the work.
16. The Bidder is advised to examine all the locations of the work and to inform himself fully as to its conditions, the conformation of the ground, the character, quality and quantity of the products needed preliminary to and during the execution of the work; the general and local conditions and all other matters which can in any way affect the work to be done under the Contract. The Plans are based on field run survey provided by the City of Lawrenceville, accuracy of this information shall be verified by the Bidder.

Failure to examine the site will not relieve the successful bidder of his obligation to furnish all products and labor necessary to carry out the provisions of his contract.

The Bidder shall notify the Owner of the date and time he proposes to examine the location of the work. The Bidder shall confine his examination to the specific areas designated for the proposed demolition, including easements and public right-of-ways. If, due to some unforeseen reason, the Owner's

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proceedings for obtaining the proposed construction site (including easements), have not been completed, the Bidder may enter the site only with the express consent of the property owner. The Bidder is solely responsible for any damages caused by his examination of the site.

17. REQUIREMENTS:

The minimum requirements; the bidder must have:

- 1 Maintain a permanent place of business.
- 2 Have the appropriate technical experience and working knowledge, to perform the work.
- 3 Have the right equipment to perform the work.
- 4 Have done and to show proof of no less than THREE Contracts of similar character to the work being bid with an original contract price of no less than \$300,000.00 within the past five years.
- 5 Have visited and examine the location of the work.
- 6 Be required to enter into a binding contract with the City to perform the work.

PART II – BONDS AND INSURANCE

- A) A Certified or Cashier's Check payable to the City of Lawrenceville or a Bid Bond in the amount of five percent (5%) of the total bid must be submitted with the bid. Successful bidder will be required to furnish a payment and performance bond each in the amount of one hundred percent (100%) of the bid amount.
- B) Bonding Company must be listed in the Federal Registry of Companies Holding certificates of authority as acceptable sureties on Federal bonds, and must be listed in the AM Best catalog with a listing of A-5 or higher. Bonding company must also be licensed to do business by the Georgia Insurance Department.

The successful bidder, shall obtain, maintain and furnish to the City certificates or insurance for the entire duration of the contract period. Insurance requirements starting on the next page.

STANDARD INSURANCE REQUIREMENTS

(For projects less than \$1,000,000)

1. Statutory Workers' Compensation Insurance
 - (a) Employers Liability:
 - ✓ Bodily Injury by Accident - \$100,000 each accident
 - ✓ Bodily Injury by Disease - \$500,000 policy limit
 - ✓ Bodily Injury by Disease - \$100,000 each employee

2. Commercial General Liability Insurance
 - (a) \$500,000 limit of liability per occurrence for bodily injury and property damage
 - (b) The following additional coverage must apply:
 - ✓ 1986 (or later) ISO Commercial General Liability Form
 - ✓ Dedicated Limits per Project Site or Location (CG 25 03 or CG 25 04)
 - ✓ Additional Insured Endorsement (Form B CG 20 10 with a modification for completed operations or a separate endorsement covering Completed Operations)
 - ✓ Blanket Contractual Liability
 - ✓ Broad Form Property Damage
 - ✓ Severability of Interest
 - ✓ Underground, explosion, and collapse coverage
 - ✓ Personal Injury (deleting both contractual and employee exclusions)
 - ✓ Incidental Medical Malpractice
 - ✓ Hostile Fire Pollution Wording

3. Auto Liability Insurance
 - (a) \$500,000 limit of liability per occurrence for bodily injury and property damage
 - (b) Comprehensive form covering all owned, non-owned, leased, hired, and borrowed vehicles
 - (c) Additional Insured Endorsement
 - (d) Contractual Liability

4. Umbrella Liability Insurance - \$1,000,000 limit of liability
 - (a) The following additional coverage must apply
 - ✓ Additional Insured Endorsement
 - ✓ Concurrence of Effective Dates with Primary
 - ✓ Blanket Contractual Liability
 - ✓ Drop Down Feature
 - ✓ Care, Custody, and Control - Follow Form Primary
 - ✓ Aggregates: Apply Where Applicable in Primary
 - ✓ Umbrella Policy must be as broad as the primary policy

5. The City of Lawrenceville should be shown as an additional insured on General Liability, Auto Liability and Umbrella Liability policies.

6. The cancellation should provide 10 days notice for nonpayment and 30 days notice of cancellation.

7. Certificate Holder should read:

City of Lawrenceville
70 S. Clayton St.
P.O. Box 2200
Lawrenceville, Georgia 30046

8. Insurance Company, except Worker' Compensation carrier, must have an A.M. Best Rating of A-5 or higher. Certain Workers' Comp funds may be acceptable by the approval of the Insurance Unit. European markets including those based in London and domestic surplus lines markets that operate on a non-admitted basis are exempt from this requirement provided that the contractor's broker/agent can provide financial data to establish that a market is

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equal to or exceeds the financial strengths associated with the A.M. Best's rating of A-5 or better.

9. Insurance Company should be licensed to do business by the Georgia Department of Insurance.
10. Certificates of Insurance, and any subsequent renewals, must reference specific bid/contract by project name and project/bid number.
11. The Contractor shall agree to provide complete certified copies of current insurance policy (ies) or a certified letter from the insurance company (ies) if requested by the City to verify the compliance with these insurance requirements.
12. All insurance coverages required to be provided by the Contractor will be primary over any insurance program carried by the City.
13. Contractor shall incorporate a copy of the insurance requirements as herein provided in each and every subcontract with each and every Subcontractor in any tier, and shall require each and every Subcontractor of any tier to comply with all such requirements. Contractor agrees that if for any reason Subcontractor fails to procure and maintain insurance as required, all such required Insurance shall be procured and maintained by Contractor at Contractor's expense.
14. No Contractor or Subcontractor shall commence any work of any kind under this Contract until all insurance requirements contained in this Contract have been complied with and until evidence of such compliance satisfactory to the City of Lawrenceville as to form and content has been filed with the City. **The Acord Certificate of Insurance or a preapproved substitute is the required form in all cases where reference is made to a Certificate of Insurance or an approved substitute.**
15. The Contractor shall agree to waive all rights of subrogation against the City of Lawrenceville, the Mayor, City Council members, its officers, officials, employees, and volunteers from losses arising from work performed by the contractor for the City.
16. Special Form Contractors' Equipment and Contents Insurance covering owned, used, and leased equipment, tools, supplies, and contents required to perform the services called for in the Contract. The coverage must be on a replacement cost basis. The City will be included as a Loss Payee in this coverage for City owned equipment, tools, supplies, and contents.
17. The Contractor shall make available to the City, through its records or records of their insurer, information regarding a specific claim related to any City project. Any loss run information available from the contractor or their insurer relating to a City project will be made available to the City upon their request.
18. Compliance by the Contractor and all subcontractors with the foregoing requirements as to carrying insurance shall not relieve the Contractor and all Subcontractors of their liability provisions of the Contract.
19. The Contractor and all Subcontractors are to comply with the Occupational Safety and Health Act of 1970, Public Law 91-956, and any other laws that may apply to this Contract.
20. The Contractor shall at a minimum apply risk management practices accepted by the contractors' industry.

Surety Bonds

All of the surety requirements will stay the same except the Surety Company must have the same rating as item 8 above.

Rev. 05/15

PART III – CONTRACT AWARD AND EXECUTION

- A. Within ten days from receipt of the Notice of Award from the City, the successful bidder is required to:
1. Return to the City’s Purchasing Office contract documents executed by the authorized representative and attested by the corporate secretary of the bidder.
 2. Provide insurance certificates as specified in the bidding documents; and
 3. Provide a performance bond and a payment bond as specified in the bidding documents.

The City may extend this ten-day period at its discretion.

- B. The successful bidder’s failure to execute the contract, provide a performance bond and a payment bond and furnish satisfactory proof of coverage of the insurance required within a ten-day period or any extension thereof may be just cause for annulment of the award and forfeiture of the bid guaranty to the City of Lawrenceville, not as a penalty but as liquidation of damages sustained. At the discretion of the City the award then may be made to the next lowest, responsible bidder, or the work may be re-advertised.
- C. Samples of the payment bond and performance bond are included.
- D. The contract documents, including the payment bond, performance bond, and insurance certificate, shall be executed and furnished to the City in duplicate.

END OF SECTION 00200

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Failure to return this page as part of bid document may result in rejection of bid.

Bidder submits the following lump-sum price for the **Lawrenceville Public Works Equipment Shed Expansion Project** Identified in Bid Form as part of this Bid. Failure to utilize and return this form as a part of the bidding documents may result in rejection of bid.

BIDDING FORM

LUMP SUM BASE BID

_____ Dollars and _____ Cents
(\$ _____)

SCHEDULE OF UNIT PRICES

ITEM

UNIT COST

1. UNSUITABLE MATERIAL

- a. Removal and disposal of unsuitable materials off-site

\$ _____

2. SUITABLE SOIL

- a. Import suitable soil from off-site and compact in-place to replace excavated unsuitable materials. This quantity includes imported soils above subgrade required to reach final grade.

\$ _____

NOTES

*Individuals, firms and businesses seeking an award of a City of Lawrenceville contract may not initiate or continue any verbal or written communications regarding a solicitation with any City officer, elected official, employee or other City representative without permission of the Purchasing Director named in the solicitation between the date of the issuance of the solicitation and the date of the final contract award by the City Council. Violations will be reviewed by the Purchasing Director. If determined that such communication has compromised the competitive process, the offer submitted by the individual, firm or business may be disqualified from consideration for award.

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Failure to return this page as part of bid document may result in rejection of bid.

BIDDING FORM CONTINUED
(This Bid Form is part of the Bid Documents)

BID NUMBER: SB019-23

BID DATE: June 1, 2023

SUBMITTAL DATE: _____

BY: _____
(Bidder)

PROJECT DESCRIPTION: Lawrenceville Public Works Equipment Shed Expansion Project

THIS BID IS SUBMITTED TO: City of Lawrenceville, Georgia (hereinafter called Owner)

This bid is submitted to the City of Lawrenceville in accordance with the instructions, requirements, and forms included in the bidding documents, and the bidder agrees to complete all work for the bid price and substantially complete the work within **150** calendar days from the written notice to proceed.

The bidder agrees if the bid is accepted by the City of Lawrenceville within ninety (90) days of the date of bid opening, the bidder shall within ten days after receipt of notification of this acceptance execute a contract upon the terms, conditions, and prices set forth herein and in the form and manner required by the City of Lawrenceville. The bidder further accepts the terms and conditions contained in the bidding requirements for disposition of bid security.

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

- a. Bidder has examined Bid Document Package, including Advertisement 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	_____

- b. 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.
- c. Bidder has carefully studied reports and drawings indicating subsurface conditions and drawings 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.

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- d. 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.
- e. **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.
- f. Bidder has correlated results from observations, examinations, investigations, explorations, tests, reports, and studies with terms and conditions contained in bid document package.
- g. 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.
- h. 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.
- i. The City requires that all who enter into a contract for the physical performance of services with the City must satisfy O.C.G.A. 13-10-91 and Rule 300-10-1-.02, in all manner, and such are conditions of the contract.
- j. By submitting a bid to the City, contractor agrees that they are in compliance with O.C.G.A. 13-10-91 and Rule 300-10-1-.02. Such attestation(s) shall be maintained and may be inspected by the City at any time. Any such attestation shall become a part of the contractor/subcontractor agreement.
- k. An affidavit of such compliance with O.C.G.A. 13-10-91 and Rule 300-10-1-.02 will be initiated by the City, signed by the contractor, and will become part of the contract.
- l. It is the policy of the City of Lawrenceville that unauthorized aliens shall not be employed to perform work on City contracts involving the physical performance of services. Therefore, the City shall not enter into a contract for the physical performance of services within the State of Georgia unless the contractor shall provide evidence on City-provided forms that it and its subcontractors have

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registered for and are participating in the federal work authorization program as defined by O.C.G.A. 13-10-90(2) to verify information of all new employees.

- m. The Purchasing Manager shall be authorized to conduct random audits of a contractor's or subcontractors' compliance with O.C.G.A. 13-10-91 and the rules and regulations of the Georgia Department of Labor. The contractor and subcontractors shall retain all documents and records of its compliance for a period of three (3) years following completion of the contract. Whenever it appears that a contractor's or subcontractor's records are not sufficient to verify the work eligibility of any individual in the employ of such contractor or subcontractor, the Purchasing Manager shall report same to the Department of Homeland Security.
- n. A contractor's failure to participate in the federal work authorization program as defined by O.C.G.A. 13-10-90(2) may be sanctioned by termination of the contract. If it is determined that a subcontractor is not participating in the federal work authorization program as defined by O.C.G.A. 13-10-90(2), the City of Lawrenceville may direct the contractor to terminate that subcontractor. A contractor's failure to follow the City's instruction to terminate a subcontractor that is not participating in the federal work authorization program as defined by O.C.G.A. 13-10-90(2) may be sanctioned by termination of the contract.
- p. The above requirements shall be in addition to the requirements of state and federal law, and shall be construed to be in conformity with those laws.

In compliance with the attached specifications, the undersigned offers and agrees, if this bid is accepted by the City Council within ninety (90) days of the date of bid opening, to furnish any or all of the items upon which prices are quoted within the time specified in the bid schedule.

Legal Business Name _____

Federal Tax ID _____

Address _____

Representative Signature _____

Print Authorized Representative's Name _____

Telephone Number _____

E-Mail Address _____

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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.: _____

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Lawrenceville Public Works Equipment Shed Expansion Project**

Lawrenceville, Georgia

BID BOND

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 Lawrenceville
(Name of Obligee)

70 S. Clayton Street, Lawrenceville, Georgia 30046
(Address of Obligee)

Thereinafter referred to as Obligee: in the penal sum of _____ Dollars (\$_____) in lawful money of the United States, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

WHEREAS, the Principal is about to submit, or has submitted, to Lawrenceville, 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 Lawrenceville, Georgia, and execute a sufficient and satisfactory Performance Bond and Payment Bond payable to Lawrenceville, Georgia, each in the amount of 100% of the total Contract Price, in form and with security satisfactory to said Lawrenceville, 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 Lawrenceville, 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.

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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. 36-91-1 et seq., and is intended to be and shall be constructed as a bond in compliance with the requirements thereof.

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

ATTEST:

(Principal Secretary)
(SEAL)

(Principal)

By: _____

(Address)

(Witness as to Principal)

(Address)

ATTEST:

Resident or Nonresident Agent
(SEAL)

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

(Address)

(Witness as to Surety)

(Address)

NOTE: If Contractor is Partnership, all partners should execute Bond. 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.

STATEMENT OF BIDDER'S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information desired. Attach all additional sheets to this statement.

1. Name of Bidder:

2. Permanent main office address:

3. When organized:

4. If a Corporation, where incorporated:

5. How many years have you been engaged in the contracting business under your present firm or trade name?

6. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion.

7. General description of work performed by your company. Attach copy.

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

9. Have you ever defaulted on a contract? _____ If so, where and why? _____.

10. List the most important projects recently completed by your company, stating the approximate cost for each, and the month and year completed. Attach copy.

11. Experience in work similar in importance to this project. Attach copy.

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12. Background and experience of the principal members of your organization, including officers:
Attach copy.

The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the local public agency in verification of the recitals comprising this Statement of Bidder's Qualifications.

Dated this _____ day of _____, 20____.

(Name of Bidder)

By: _____

Title: _____

State of _____

County of _____

_____ being duly sworn deposes and says that he or she
is _____ of _____ and that the answers to the foregoing
questions and all statements therein contained are true and correct. Subscribed and sworn to before me
this _____ day of _____, 20____.

(Notary Public)

My Commission Expires:

_____ (SEAL)

(Date)

END OF SECTION

CONTRACT

This **CONTRACT** made and entered into this _____ day of _____, 20____ by and between the City of Lawrenceville, Georgia, a Georgia Municipal Corporation, duly organized and existing under the laws of the State of Georgia (Party of the First Part, hereinafter called the City), and _____, (Party of the Second Part, hereinafter called the Contractor).

WITNESSETH: That the Contractor has agreed, and by these presents does agree, with the City for the consideration herein mentioned to furnish all equipment, tools, material, skill, knowledge and labor of every description necessary to carry out and complete in a good, firm, substantial and workmanlike manner the work required under the Contract Documents and under the provisions of the Performance Bond and Payment Bond. The term Contract Documents shall include: the Drawings and Specifications of the project, the Proposal made by the Contractor, the Advertisement, the Instructions to Bidder, the Bid Form, the General Conditions and this Contract. The work shall be performed in strict conformity with the Contract Documents and said Contract Documents shall all form essential parts of the Contract. The work covered by this Contract includes all work shown on the plans and specifications and listed in the conditions and specifications to wit:

Lawrenceville Public Works Equipment Shed Expansion Project

The Contractor awarded work under this contract shall commence work within ten (10) days after the issuance of the Notice to Proceed and shall fully complete all work hereunder within 150 consecutive calendar days from and after said date.

CITY and CONTRACTOR recognize that time is the essence of this Agreement. If the WORK is not substantially complete within the time specified (plus any extension of time allowed in the General Conditions), the CITY will suffer damage and loss that is difficult to calculate. The CITY and CONTRACTOR recognize and agree that the damage and loss that CITY will suffer if the WORK is not completed in a timely manner in accordance with the contract terms is difficult or impossible to accurately calculate. Therefore, CITY and CONTRACTOR agree that a reasonable amount to fully compensate CITY for damage and loss it would incur as a result of the failure of CONTRACTOR to complete the WORK in the time allowed by this Agreement shall be the sum of \$200.00 per day. The amount in this provision is an amount CITY and CONTRACTOR agree upon as a reasonable amount of damages to fully compensate the CITY for any damage or loss it would suffer from a delay in the timely completion of the WORK, and is intended to provide CITY with reasonable liquidated damages and is not intended as a penalty.

The City shall pay and the Contractor shall receive the prices stipulated in the proposal hereto attached as full compensation for everything furnished and done by the Contractor under this contract, which shall in no event exceed _____ (\$) based on the proposal which sum shall be paid in the manner and terms specified in the Contract Documents, but before issuance of certificate of payment, if the Contractor shall not have submitted evidence satisfactory to the City that all payrolls, materials bills, and other indebtedness connected with the work have been paid, the City may withhold, in addition to the retained percentages, such amount or amounts as may be necessary to pay just claims for labor and services rendered and materials

in and about the work, and such amount or amounts withheld or retained may be applied by the City to the payment of such just claims.

When the Contractor has performed in accordance with the provisions of this Contract, the City of Lawrenceville shall pay to the Contractor, within thirty (30) days of receipt 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 Contract, if any. In the event that the City of Lawrenceville fails to pay the Contractor within sixty (60) days of 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% per month or pro rata fraction thereof, beginning the sixty-first (61st) day following receipt of the pay request. The Contractor's acceptance of progress payments or final payment shall release all claims for interest on said payments.

It is further mutually agreed between the Parties hereto that if, at any time after the execution of the Contract and the Performance Bond for its faithful performance and the Payment Bond, the first party shall deem the surety or sureties upon such bond to be inadequate to cover the performance of the work, the second party shall, at its expense, within five (5) days after the receipt of notice from the first party to do so, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to the first party. In such event, no further payment to the second party shall be deemed to be due under this Contract until such new or additional security for the faithful performance of the work shall be furnished in a manner and form satisfactory to the first party.

The parties agree that each of the provisions included in this Contract is separate, distinct and severable from the other and remaining provisions of this Contract, and that the invalidity of any Contract provision shall not affect the validity of any other provision or provisions of this Contract.

(Signatures Next Page)

IN WITNESS WHEREOF, the parties hereto, acting through their duly authorized agents, have caused this **CONTRACT** to be signed, sealed and delivered.

LAWRENCEVILLE, GEORGIA

By: _____
David R. Still, Mayor
City of Lawrenceville, Georgia

ATTEST:

Signature

Karen Pierce, City Clerk
City of Lawrenceville, Georgia

APPROVED AS TO FORM:

Signature
City of Lawrenceville Attorney
Pereira, Kirby, Kinsinger & Nguyen, LLP

CONTRACTOR: _____

BY: _____
Signature

Print Name

Title

ATTEST:

Signature

Print Name
Corporate Secretary

(Seal)

PERFORMANCE BOND

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 Lawrenceville
(Name of Obligee)

70 S. Clayton Street, Lawrenceville, Georgia 30046
(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 referred to, in the penal sum of _____ Dollars(\$ _____)in lawful money of the United States, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

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Lawrenceville Public Works Equipment Shed Expansion Project

Performance Bond Page 2

The condition of this obligation is such, as whereas the Principal entered into a certain contract, hereto attached, with the Obligee.

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. 36-91-1 et seq., and is intended to be and shall be construed as a bond in compliance with the requirements thereof.

(Signatures Next Page)

PERFORMANCE BOND

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**SB019-23
Lawrenceville Public Works Equipment Shed Expansion Project
Performance Bond Page 3**

ATTEST:

(Principal)

(Principal Secretary)

(SEAL)

By: _____

(Address)

(Witness to Principal)

(Address)

(Surety)

ATTEST:

By: _____

(Attorney-in-Fact)

(Resident Agent)

(Address)

(SEAL)

(Witness as to Surety)

(Address)

NOTE: If Contractor is Partnership, all partners should execute Bond. 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.

BONDING AGENT CONTACT INFO

Print Name _____

Company Name _____

E-Mail _____

Phone _____

PAYMENT BOND

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 Lawrenceville
(Name of Obligee)

70 S. Clayton Street, Lawrenceville, Georgia 30046
(Address of Obligee)

hereinafter called the 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 full and just sum of _____ Dollars(\$ _____)

in lawful money of the United States, for the payment of which sum, will and truly to be made, the Principal and Surety bind themselves, their, and each of their heirs, executors, administrators, successors and assigns, 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.

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Lawrenceville Public Works Equipment Shed Expansion Project

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.

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. 36-91-1 et seq., and is intended to be and shall be construed as a bond in compliance with the requirements thereof.

**SB019-23
Lawrenceville Public Works Equipment Shed Expansion Project
Payment Bond Page 3**

ATTEST:

(Principal)

(Principal Secretary)

(SEAL)

By: _____

(Address)

(Witness to Principal)

(Address)

(Surety)

ATTEST:

By: _____

(Attorney-in-Fact)

(Resident Agent)

(Address)

(SEAL)

(Witness as to Surety)

(Address)

NOTE: If Contractor is Partnership, all partners should execute Bond. 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.

BONDING AGENT CONTACT INFO

Print Name _____

Company Name _____

E-Mail _____

Phone _____



LAWRENCEVILLE

GEORGIA

Solicitation Name & No. Lawrenceville Public Works Equipment Shed Expansion Project; SB019-23
Contractor Affidavit under O.C.G.A. § 13-10-91(b)(l)

The undersigned contractor ("Contractor") executes this Affidavit to comply with O.C.G.A § 13-10-91 related to any contract to which Contractor is a party that is subject to O.C.G.A. § 13-10-91 and hereby verifies its compliance with O.C.G.A. § 13-10-91, attesting as follows:

- a) The Contractor has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program;
- b) The Contractor will continue to use the federal work authorization program throughout the contract period, including any renewal or extension thereof;
- c) The Contractor will notify the public employer in the event the Contractor ceases to utilize the federal work authorization program during the contract period, including renewals or extensions thereof;
- d) The Contractor understands that ceasing to utilize the federal work authorization program constitutes a material breach of Contract;
- e) The Contractor will contract for the performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the Contractor with the information required by O.C.G.A. § 13-10-91(a), (b), and (c);
- f) The Contractor acknowledges and agrees that this Affidavit shall be incorporated into any contract(s) subject to the provisions of O.C.G.A. § 13-10-91 for the project listed below to which Contractor is a party after the date hereof without further action or consent by Contractor; and
- g) Contractor acknowledges its responsibility to submit copies of any affidavits, drivers' licenses, and identification cards required pursuant to O.C.G.A. § 13-10-91 to the public employer within five business days of receipt.

Federal Work Authorization User Identification Number

Date of Authorization

Name of Contractor

Name of Public Employer

Street Address

City/State/Zip Code

Executed on _____, _____, 20____ in _____ (city), _____ (state).

Signature of Authorized Officer or Agent

Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____, 20_____.

NOTARY PUBLIC
My Commission Expires: _____

**GENERAL CONDITIONS
FOR CITY OF LAWRENCEVILLE 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 City of Lawrenceville's request for proposals, instructions to bidders, Contractor's proposal, construction contract, 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 - Lawrenceville, Georgia, a Georgia Municipal Corporation, duly organized and existing under the laws of the State of Georgia.

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 to the Contractor authorizing it 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.

GC-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 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. All areas within the limits of the Project which are determined by the Engineer to be unnecessarily damaged, due either directly or indirectly to the process of construction, shall be responsibility of the Contractor to correct and repair. This is not a payment item and shall be done without additional compensation.

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 70 S. Clayton St., P.O. Box 2200, Lawrenceville, Georgia 30046-2200. 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 46-3-40 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 ten 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.

GC-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 therefor.

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 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 therefor 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 be required to furnish weekly payroll reports to the engineer certifying conformance with the wage rates listed in the specifications.

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 work site, 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 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 \$10,000.00.

GC-73 TIME OF PAYMENT

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 and the sum so requested in this Agreement. 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 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-75 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-76 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-77 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-78 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-79 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 materialmen, 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-80 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-81 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 for the work as provided in this agreement.

GC-82 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-83 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. 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-84 DOCUMENTATION OF COMPLETION OF WORK

The final payment 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-85 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 Lawrenceville, Georgia and that the contract is to be performed in Lawrenceville, 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-86 CHANGES AND EXTRA WORK

GC-86.1 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

C-86.2 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 related to the original scope of the Work. Change Orders will authorize these. 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 Change Order increases the contract price, 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-86.3 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-86.4 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-86.5 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 City to complete the Work contemplated by this 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-87 CHANGE ORDERS

GC-87.1 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-87.2 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-87.3 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-87.4 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-87.5 NO WORK STOPPAGE

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

GC-87.6 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-88 FORCE ACCOUNT WORK

Force account work is an Owner-defined emergency, a sudden or unforeseen failure or malfunction of an existing system, which results in the Contractor being obligated to respond to the site of the emergency as Owner-directed. Contractor may perform work on a force account basis and will be paid 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: All labor shall be billed at the hourly rates specified in the bid. Regular rates will apply during normal business hours, defined as Monday through Friday, 7a.m.–5p.m. Overtime rates will apply during non-normal business hours. If premium rates apply, then overtime rates shall be defined as Monday through Friday, 5p.m.–8p.m. Accordingly, premium rates, if applicable, shall be defined as Monday through Saturday, 8p.m.–7a.m., all hours on Sundays and all City recognized holidays. A foreman shall not be used where there are fewer than two (2) laborers employed, except with the written consent of 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 to 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 Worksite, 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 City 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-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.

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SECTION 00800

SUPPLEMENTAL GENERAL CONDITIONS

The provisions of the City of Lawrenceville Supplemental General Conditions as described herein change, amend, or supplement the General Conditions and shall supersede any conflicting provisions of this CONTRACT. All provisions of the General conditions that are not changed, amended, or supplemented, remain in full force.

- Certificate for Payment Forms
- Conflict of Interest
- Protection of Lives and Property
- Remedies
- Gratuities
- Audit and Access to Records
- Small, Minority and Women's Businesses
- Anti-Kickback
- Violating Facilities
- State Energy Policy
- Equal Opportunity Requirements

1.01 CERTIFICATE FOR PAYMENT FORMS

- A. Section 00900, "Certificate for Payment", or similar form approved by the City of Lawrenceville shall be used when estimating monthly payments due to the CONTRACTOR.
- B. The CITY may after consultation with the ENGINEER withhold or, on account of subsequently discovered evidence, nullify the whole or part of any approved partial payment estimate to such extent as may be necessary to protect the CITY from loss on account of:
 - A. Defective work not remedied.
 - B. Claims filed.
 - C. Failure of CONTRACTOR to make payments properly to subcontractors or suppliers.
 - D. A reasonable doubt that the WORK can be completed for the balance then unpaid.
 - E. Damage to another CONTRACTOR.
 - F. Performance of WORK in violation of the terms of the CONTRACT DOCUMENTS.
- C. Where WORK on unit price items is substantially complete but lacks testing, clean up and/or corrections, amounts shall be deducted from unit prices in partial payment estimates to amply cover such testing, clean-up and/or corrections.

- D. When the items in B and C are cured, payment shall be made for amounts withheld because of them.
- E. Payments will not be made that would deplete the retainage nor place in escrow any funds that are required for retainage nor invest the retainage for the benefit of the CONTRACTOR.

1.02 CONFLICT OF INTEREST

- A. Unacceptable bidders. An ENGINEER or CITY ENGINEER (individual or firm including persons they employ) who has prepared plans and specifications will not be considered an acceptable bidder. Any firm or corporation in which such ENGINEER or CITY ENGINEER (including persons they employ) is an officer, employee, or holds or controls a substantial interest will not be considered an acceptable bidder. Contracts or purchases by the CONTRACTOR shall not be awarded or made to a supplier or manufacturer. Bids will not be awarded to firms or corporations who are owned or controlled wholly or in part by a member of the governing body of the CITY or to an individual who is such a member.
- B. The CITY'S officers, employees, or agents shall not engage in the award or administration of this CONTRACT if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (a) the employee, officer or agent; (b) any member of their immediate family; (c) their partner or (d) an organization which employs, or is about to employ, any of the above has financial or interest in the CONTRACTOR. The CITY'S officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from the CONTRACTOR or subcontractor.

1.03 PROTECTION OF LIVES AND PROPERTY

- F. In order to protect the lives and health of its employees under the CONTRACT, the CONTRACTOR shall comply with all pertinent provisions of the Occupational Safety and Health Administration (OSHA) and any State Safety and Health agency requirements.
- G. The CONTRACTOR alone shall be responsible for the safety, efficiency, and adequacy of its plant, appliances, and methods, and for any damage that may result from their failure or their improper construction, maintenance or operation.

1.04 REMEDIES

Unless otherwise provided in this CONTRACT, all claims, counterclaims, disputes, and other matters in question between the CITY and the CONTRACTOR arising out of or relating to this CONTRACT or the breach thereof will be heard in the Superior Court of Gwinnett County, Georgia. All parties hereby waive any defenses of lack of personal or subject matter jurisdiction or lack of venue in the Superior Court of Gwinnett County and agree to have all disputes heard in the Superior Court of Gwinnett County.

1.05 GRATUITIES

- A. If the CITY finds after a notice and hearing that the CONTRACTOR, or any of the CONTRACTOR'S agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, agent of the CITY, the State, or City of Lawrenceville officials in an attempt to secure this CONTRACT or favorable treatment in awarding, amending, or making any determinations related to the performance of this CONTRACT, the CITY may, by written notice to the CONTRACTOR, terminate this

CONTRACT. The CITY may also pursue other rights and remedies that the law or this CONTRACT provides. However, the existence of the facts on which the CITY bases such findings shall be an issue and may be reviewed in proceedings under the Remedies clause of this CONTRACT.

- B. In the event this CONTRACT is terminated as provided in paragraph A the CITY may pursue same remedies against the CONTRACTOR as it could pursue in the event of a breach of the CONTRACT by the CONTRACTOR. As a penalty, in addition to any other damages to which it may be entitled by law, the CITY may pursue exemplary damages in an amount (as determined by the CITY) which shall be not less than three nor more than ten times the costs the CONTRACTOR incurs in providing any such gratuities to any such officer or employee.

1.06 AUDIT AND ACCESS TO RECORDS

For all negotiated contracts (except those of \$10,000 or less), the City of Lawrenceville, the Comptroller General, the CITY or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the CONTRACTOR, which are pertinent to the CONTRACT, for the purpose of making audits, examinations, excerpts and transcriptions. The CONTRACTOR shall maintain all required records for three years after final payment is made and all other pending matters are closed.

1.07 SMALL, MINORITY AND WOMEN'S BUSINESSES

If the CONTRACTOR intends to let any subcontracts for a portion of the work, the CONTRACTOR shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of (1) including qualified small minority, and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) CONTRACTORS are encouraged to procure goods and services from labor surplus area firms.

1.08 ANTI-KICKBACK

The CONTRACTOR shall comply with the Copeland Anti-kickback Act (18 USC 874) as supplemented in Department of Labor regulations (29 CFR, Part 3). This act provides that each CONTRACTOR shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. The CITY shall report all suspected or reported violations to FmHA.

1.09 VIOLATING FACILITIES.

CONTRACTOR shall comply with all applicable standards, orders or requirements issued under section 306 of the Clean Water Air Act (42 U.S.C. 1857 (h)), section 508 of the Clean

Water Act (33 U.S.C. 1368), Executive Order 11738, and Environmental Protection Agency regulations 40 CFR Part 15 which prohibit the awarding of non-exempt federal contracts, grants, or loans to facilities included on EPA's list of violating facilities, The CONTRACTOR will report violations to the EPA.

1.10 STATE ENERGY POLICY

The CONTRACTOR shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in the State Energy Conservation Plan, shall be utilized.

1.11 EQUAL OPPORTUNITY REQUIREMENTS

For all contracts, the CONTRACTOR shall comply with Executive Order 11246, entitled "Equal Employment Opportunity," as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR Part 60).

END OF SECTION

PARTIAL PAYMENT ESTIMATE		Contract No. _____
		Partial Payment Estimate No. _____
		Page 1
OWNER: CITY OF LAWRENCEVILLE, GA	CONTRACTOR: _____	PERIOD OF ESTIMATE FROM _____ TO _____

CONTRACT CHANGE ORDER SUMMARY				ESTIMATE
No.	CITY Approval Date	Additions	Deductions	
<input type="checkbox"/> 1				1. Original Contract 2. Change Orders 3. Revised Contract (1+2) 4. Work Completed* 5. Stored Materials * 6. Subtotal (4+5) 7. Retainage 8. Previous Payments
Totals	_____	_____	_____	9. Amount Due (6-7-8) _____
Net Charge	_____	_____	_____	* Detailed breakdown attached

CONTRACT TIME			
Original (days) _____	On Schedule	___ yes	Starting Date _____
Revised _____		___ no	Projected Completion _____
Remaining _____			

CONTRACTOR'S CERTIFICATION:

The undersigned Contractor certifies that to the best of their knowledge, information and belief that work covered by this payment estimate has been completed in accordance with the contract documents, that all amounts have been paid by the Contractor for work for which previous payment estimates were issued and payments received from the Owner, and the current payment shown herein is now due.

Contractor _____
 Name _____
 By _____
 Date _____

CERTIFIED AND APPROVED BY CITY OF LAWRENCEVILLE:

Name _____
 By _____
 Date _____

END OF SECTION

TYPICAL UNIT PRICE BREAKDOWN

ITEM	DESCRIPTION	CONTRACT (REVISED)			THIS PERIOD		TOTAL TO DATE		
		QUANTITY	UNIT PRICE	AMOUNT	QUANTITY	AMOUNT	QUANTITY	AMOUNT	% COMPLETE
	TOTALS								

TYPICAL LUMP SUM PRICE BREAKDOWN

TYPICAL STORED MATERIAL AND RETAINAGE BREAKDOWN

PAYMENT PERIOD		WORK COMPLETED				MATERIALS STORED AT END OF THIS			
ITEM	DESCRIPTION	SCHEDULED VALUE	THIS PERIOD	TO DATE	% COMPLETE	DESCRIPTION	QUANTITY	UNIT VALUE	AMOUNT
								\$	\$
							THIS ESTIMATE \$	PERCENT %	RETAINED
						WORK COMPLETED:			
						STORED MATERIALS:			
						OTHER (explain)			
	TOTALS					TOTAL			

END OF SECTION

SECTION 01 01 00
SUMMARY OF WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specifications Sections apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Project description
 - 2. Summary by reference
 - 3. Other contracts

1.03 PROJECT DESCRIPTION

- A. Briefly and without force and effect on other requirements of the Contract Documents, the Project of the Contract can be described in summary as follows:

The project is located at 435 West Pike Street, Lawrenceville, Georgia. The site is developed, owned, and occupied by the City of Lawrenceville and the Public Works Department. There is currently a 30,800 square foot pre-engineered shed building used for storage of vehicles and other outdoor storage needs. The scope of work consists of a 17,080 sf addition to the existing structure. The new addition will be a stand-alone one-story pre-engineered shed structure on a poured in place concrete floor slab. The new structure is designed to match the existing building and will have electric power and lighting. A portion of the interior will be fenced to subdivide the space. There will be a new trench drain and storm water piping installed on the north side of the building and new grate inlets and storm piping installed on the east side of the building, along with asphalt removal and replacement.

- B. Work Included: The intent and meaning of the Contract Documents is that the Contractor, under the General Conditions and other terms of the Contract, shall take all actions necessary and required to provide all labor, plant, materials, supplies, equipment, transportation, facilities, and appurtenances which are indicated or implied by each drawing within the Drawings and each section of the Specifications, all of which are collectively necessary and required for the construction of the described Project.

1.04 SUMMARY BY REFERENCE

- A. The Work can be summarized by reference to the requirements of all of the various elements of the Contract Documents, which in turn make references to the requirements of other applicable provisions which control or influence the Work; and these references can be summarized by but are not necessarily limited to the following:
 - 1. Executed Owner & Contractor Agreement
 - 2. General Conditions
 - 3. Drawings as listed on the Index of Drawings located on the first sheet of Drawings prepared by Precision Planning, Inc.
 - 4. Specifications in Project Manual.
 - 5. All Addenda to the Contract Documents issued prior to bid.

6. All Modifications to the Contract Documents made in accordance with the General Conditions and Specifications.
7. Statutory requirements and governing regulations which have a bearing on the performance of the Work.
8. Contractor submittals required by the Contract Documents.

1.05 OTHER CONTRACTS

- A. Separate prime contracts are not anticipated on this project, but may be awarded for other work on the Project or the Owner may undertake such work directly. The Contractor should be prepared to coordinate with the Owner if such work does occur. Work expected to run concurrently with the Owner & Contractor Agreement for general construction.

1.06 QUANTITY OF CONTRACT DOCUMENTS

- A. Upon or about the time of the Notice to Proceed to the Contractor, the Owner shall provide the Contractor five (5) sets of the Drawings and Technical Specifications, if requested.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 01 00

SECTION 01 05 10
SPECIAL INSPECTIONS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. **Attached Statement of Special Inspections.**
- C. **Attached Schedule of Special Inspections.**

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for International Building Code 2018 edition, Chapter 17 Special Inspection Requirements.
- B. Special Inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- C. Special Inspections Services shall be in accordance with Chapter 17 Structural Tests and Special Inspections of the 2018 International Building Code.

1.03 RESPONSIBILITIES

- A. Contractor: Contractor shall not be responsible for engaging, selecting or procuring the Special Inspections Services Agency. Contractor shall be required to coordinate the following items with the Special Inspections Agency:
 - 1. Maintain a certified written report of each test, inspection, and similar quality-control service provided by Special Inspections Agent.
 - 2. Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
- B. Special Inspections Agency: Conducted by a qualified Special Inspections Agent as required by Chapter 17 of the 2018 International Building Code as indicated in attached Statement of Special Inspections, and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor.
 - 4. Submitting a final report of special inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 6. Retesting and re-inspecting corrected work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 TEST AND INSPECTION LOG

- A. Prepare a Record of Tests and Inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain Log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Architect's and Contractor's reference during normal working hours.

3.02 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
- B. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 05 10

STATEMENT OF SPECIAL INSPECTIONS

PROJECT: Lawrenceville Public Works Shed Expansion

LOCATION: 435 West Pike Street, Lawrenceville, Georgia 30046

PERMIT APPLICANT: Precision Planning, Inc.

APPLICANT'S ADDRESS: 400 Pike Boulevard, Lawrenceville, Georgia 30043

ARCHITECT OF RECORD: Elizabeth A. Hudson, RA

STRUCTURAL ENGINEER OF RECORD: Tony D. Fagan, P.E., S.E.

MECHANICAL ENGINEER OF RECORD: NA

ELECTRICAL ENGINEER OF RECORD: Leah Benincasa, P.E.

REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE: Elizabeth A. Hudson, RA

This Statement of Special Inspections is submitted in accordance with Section 1704.3 of the 2018 International Building Code. It includes a *Schedule of Special Inspection Services* applicable to the above-referenced Project as well as the identity of the individuals, agencies, or firms intended to be retained for conducting these inspections. If applicable, it includes *Special Inspections for Seismic Resistance* and/or *Special Inspections for Wind Resistance*.

Are *Special Inspections for Seismic Resistance* included in the *Statement of Special Inspections*? Yes No
 Are *Special Inspections for Wind Resistance* included in the *Statement of Special Inspections*? Yes No

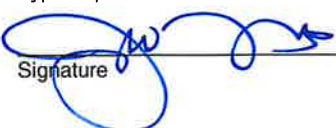
The Special Inspector(s) shall keep records of all inspections and shall furnish interim inspection reports to the Building Official and to the Registered Design Professional in Responsible Charge at a frequency agreed upon by the Design Professional and the Building Official prior to the start of work. Discrepancies shall be brought to the immediate attention of the Contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Registered Design Professional in Responsible Charge prior to completion of that phase of work. A *Final Report of Special Inspections* documenting required special inspections and corrections of any discrepancies noted in the inspections shall be submitted to the Building Official and the Registered Design Professional in Responsible Charge at the conclusion of the project.

Frequency of interim report submittals to the Registered Design Professional in Responsible Charge:

Weekly Bi-Weekly Monthly Other; specify: _____

The Special Inspection program does not relieve the Contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

Statement of Special Inspections Prepared by:

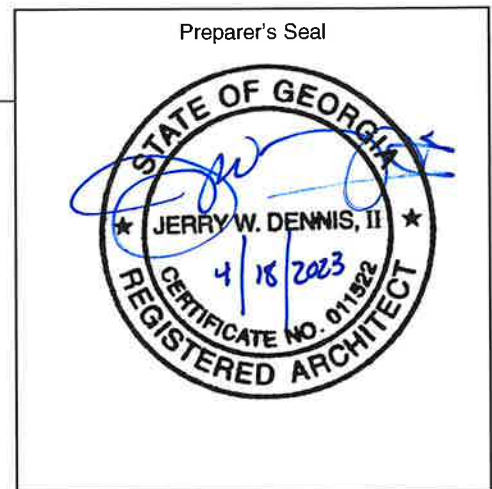
Jerry W. Dennis II, RA
 Type or print name
 Signature 4/18/2023 Date

Building Official's Acceptance:

 Signature Date
 Permit Number:

Frequency of interim report submittals to the Building Official:

Monthly Bi- Monthly Upon Completion Other; specify: _____



Special Inspections for Seismic Resistance

See the Schedule of Special Inspections for inspection and testing requirements

Seismic Design Category: C

Special Inspections for Seismic Resistance Required (Yes/No): NO

Description of seismic force-resisting system subject to special inspection and testing for seismic resistance:

(Where required per IBC Sections 1705.12.1, 1705.12.2, and 1705.12.3) (Special inspections for seismic resistance of structural steel, where required, shall be in accordance with AISC 341)

None

Description of designated seismic systems subject to special inspection and testing for seismic resistance:

(Required for architectural, electrical and mechanical systems and their components that require design in accordance with Chapter 13 of ASCE 7, have a component importance factor, I_p , greater than one and are in Seismic Design Categories C, D, E or F.)

None

Description of additional seismic systems and components requiring special inspections:

(Required for systems noted in IBC Section 1705.12.5, 1705.12.6, 1705.12.7, and 1705.12.8.)

None

Description of additional seismic systems and components requiring testing:

(Where required per IBC Section 1705.13)

None

Statement of Responsibility:

Each contractor responsible for the construction or fabrication of a system or component described above must submit a Statement of Responsibility.

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
1705.1.1 Special Cases (work unusual in nature, including but not limited to alternative materials and systems, unusual design applications, materials and systems with special manufacturer's requirements - add additional rows as needed.)	Submittal review, shop (3) and/or field inspection				
1. Inspection of anchors post-installed in solid grouted masonry: Per research reports including verification of anchor type, anchor dimensions, hole dimensions, hole cleaning procedures, anchor spacing, edge distances, masonry unit, grout, masonry compressive strength, anchor embedment and tightening torque	Field inspection	N	Periodic or as required by the research report issued by an approved source		
2. Aggregate Pier Inspection: The special inspector's responsibilities include, but are not limited to, review of the aggregate pier designer's use of soil parameters as presented in the project soils report, and during construction, verification of aggregate properties, type and number of lifts of aggregate, hole size and depths and top elevations of the pier elements, and applied energy. Additionally, results of qualitative tests on production aggregate pier elements such as modulus load testing, uplift pull-out testing, bottom stabilization tests and dynamic cone penetration tests, shall be reviewed to verify compliance with design specifications.	Field inspection	N	Periodic or as required by the research report issued by an approved source		
Installation of mechanical rebar couplers	Field inspection	Y		1	
1705.2.1 Structural Steel Construction					
1. Fabricator and erector documents (Verify reports and certificates as listed in AISC 360, Section N 3.2 for compliance with construction documents)	Submittal Review	Y	Each submittal	1	
2. Material verification of structural steel	Shop (3) and field inspection	Y	Periodic	1	
3. Structural steel welding:					
a. Inspection tasks Prior to Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-1)	Shop (3) and field inspection	Y	Observe or Perform as noted (4)	1	
b. Inspection tasks During Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-2)	Shop (3) and field inspection	Y	Observe (4)	1	
c. Inspection tasks After Welding (Observe, or perform for each welded joint or member, the QA tasks listed in AISC 360, Table N5.4-3)	Shop (3) and field inspection	Y	Observe or Perform as noted (4)	1	
d. Nondestructive testing (NDT) of welded joints: <i>see Commentary</i>					
1) Complete penetration groove welds 5/16" or greater in risk category III or IV	Shop (3) or field ultrasonic testing - 100%	N	Periodic		

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
2) Complete penetration groove welds 5/16" or greater in <i>risk category II</i>	Shop (3) or field ultrasonic testing - 10% of welds minimum	Y	Periodic	1	
3) Welded joints subject to fatigue when required by AISC 360, Appendix 3, Table A-3.1	Shop (3) or field radiographic or Ultrasonic testing	N	Periodic		
4) Fabricator's NDT reports when fabricator performs NDT	Verify reports	Y	Each submittal (5)	1	
4. Structural steel bolting:	Shop (3) and field inspection				
a. Inspection tasks Prior to Bolting (Observe, or perform tasks for each bolted connection, in accordance with QA tasks listed in AISC 360, Table N5.6-1)		Y	Observe or Perform as noted (4)	1	
b. Inspection tasks During Bolting (Observe the QA tasks listed in AISC 360, Table N5.6-2)			Observe (4)		
1) Pre-tensioned and slip-critical joints					
a) Turn-of-nut with matching markings		N	Periodic		
b) Direct tension indicator		Y	Periodic		
c) Twist-off type tension control bolt		Y	Periodic		
d) Turn-of-nut without matching markings		N	Continuous		
e) Calibrated wrench		N	Continuous		
2) Snug-tight joints		Y	Periodic	1	
c. Inspection tasks After Bolting (Perform tasks for each bolted connection in accordance with QA tasks listed in AISC 360, Table N5.6-3)		Y	Perform (4)	1	
5. Visual inspection of exposed cut surfaces of galvanized structural steel main members and exposed corners of the rectangular HSS for cracks subsequent to galvanizing	Shop (3) or field inspection	Y	Periodic	1	
6. Embedments (Verify diameter, grade, type, length, embedment. See 1705.3 for anchors)	Field inspection	Y	Periodic	1	
7. Verify member locations, braces, stiffeners, and application of joint details at each connection comply with construction documents	Field inspection	Y	Periodic	1	
1705.2.2 Cold-Formed Steel Deck					
1. Manufacturer documents (Verify reports and certificates as listed in SDI QA/QC, Section 2, Paragraphs 2.1 and 2.2 for compliance with construction documents)	Submittal Review	Y	Each submittal	1	
2. Material verification of steel deck, mechanical fasteners and welding materials	Shop (3) and field inspection	Y	Periodic	1	
3. Cold-formed steel deck placement:	Shop (3) and field inspection				
a. Inspection tasks Prior to Deck Placement (Perform the QA tasks listed in SDI QA/QC, Appendix 1 Table 1.1)		Y	Perform (4)	1	
b. Inspection tasks After Deck Placement (Perform the QA tasks listed in SDI QA/QC, Appendix 1 Table 1.2)		Y	Perform (4)	1	
4. Cold-formed steel deck welding:	Shop (3) and field inspection				
a. Inspection tasks Prior to Welding (Observe the QA tasks listed in SDI QA/QC, Appendix 1 Table 1.3)		N	Observe (4)		
b. Inspection tasks During Welding (Observe the QA tasks listed in SDI QA/QC, Appendix 1 Table 1.4)		N	Observe (4)		

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
c. Inspection tasks After Welding (Perform the QA tasks listed in SDI QA/QC, Appendix 1 Table 1.5)		N	Perform (4)		
5. Cold-formed steel deck mechanical fastening:	Shop (3) and field inspection				
a. Inspection tasks Prior to Mechanical Fastening (Observe the QA tasks listed in SDI QA/QC, Appendix 1 Table 1.6)		Y	Observe (4)	1	
b. Inspection tasks During Mechanical Fastening (Observe the QA tasks listed in SDI QA/QC, Appendix 1 Table 1.7)		Y	Observe (4)	1	
c. Inspection tasks After Mechanical Fastening (Perform the QA tasks listed in SDI QA/QC, Appendix 1 Table 1.8)		Y	Perform (4)	1	
1705.2.3. Open-Web Steel Joists and Joist Girders					
1. Installation of open-web steel joists and joist girders.		N			
a. End connections - welding or bolted.	per SJI CJ or SJI 100	N	Periodic		
b. Bridging - horizontal or diagonal.		N			
1) Standard bridging.	per SJI CJ or SJI 100	N	Periodic		
2) Bridging that differs from the specifications listed in SJI CJ or SJI 100.		N	Periodic		
1705.2.4. Cold-Formed Steel Trusses Spanning 60 feet or Greater					
Verify temporary and permanent restraint/bracing are installed in accordance with the approved truss submittal package	Field inspection	N	Periodic		
1705.3 Concrete Construction					
1. Inspection and placement verification of reinforcing steel and prestressing tendons.	Shop (3) and field inspection	Y	Periodic	1	
2. Reinforcing bar welding:					
a. Verification of weldability of bars other than ASTM A706.		N	Periodic		
b. Inspection of single-pass fillet welds 5/16 or less in size.		N	Periodic		
c. Inspection of all other welds.		N	Continuous		
3. Inspection of anchors cast in concrete.	Shop (3) and field inspection	Y	Periodic	1	
4. Inspection of anchors post-installed in hardened concrete members per research reports, or, if no specific requirements are provided, requirements shall be provided by the registered design professional and approved by the building official, including verification of anchor type, anchor dimensions, hole dimensions, hole cleaning procedures, anchor spacing, edge distances, concrete minimum thickness, anchor embedment and tightening torque	Field inspection	N	Periodic or as required by the research report issued by an approved source		
a. Adhesive anchors installed in horizontal or upward-inclined orientation that resist sustained tension loads.		N	Continuous		
b. Mechanical and adhesive anchors note defined in 4a.		N	Periodic		
5. Verify use of approved design mix	Shop (3) and field inspection	Y	Periodic	1	

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
6. Prior to placement, fresh concrete sampling, perform slump and air content tests and determine temperature of concrete and perform any other tests as specified in construction documents.	Shop (3) and field inspection	Y	Continuous	1	
7. Inspection of concrete and shotcrete placement for proper application techniques	Shop (3) and field inspection	Y	Continuous	1	
8. Verify maintenance of specified curing temperature and techniques	Shop (3) and field inspection	Y	Periodic	1	
9. Inspection of prestressed concrete:	Shop (3) and field inspection	N			
a. Application of prestressing force		N	Continuous		
b. Grouting of bonded prestressing tendons		N	Continuous		
10. Inspect erection of precast concrete members		N	Periodic		
11. Verification of in-situ concrete strength, prior to stressing of tendons in post tensioned concrete and prior to removal of shores and forms from beams and structural slabs	Review field testing and laboratory reports	N	Periodic		
12. Inspection of formwork for shape, lines, location and dimensions	Field inspection	Y	Periodic	1	
13. Concrete strength testing and verification of compliance with construction documents	Field testing and review of laboratory reports	Y	Periodic	1	
1705.4 Masonry Construction					
MINIMUM VERIFICATION REQUIREMENTS					
(A) Level 1, 2 and 3 Quality Assurance:					
1. Prior to construction, verification of compliance of submittals	Submittal Review	N	Prior to Construction		
(B) Level 2 & 3 Quality Assurance:					
1. Prior to construction verification of f'_m and f'_{AAC} except where specifically required by the code	Testing by unit strength method or prism test method	N	Prior to Construction		
2. During construction, verification of Slump Flow and Visual Stability Index (VSI) when self-consolidating grout is delivered to project site.	Testing by unit strength method or prism test method	N	Periodic		
(C) Level 3 Quality Assurance:					
1. During construction, verification of f'_m and f'_{AAC} for every 5,000 SF	Testing by unit strength method or prism test method	N	Periodic		
2. During construction, verification of proportions of materials as delivered to the project site for premixed or preblended mortar, prestressing grout, and grout other than self-consolidating grout.	Field inspection	N	Periodic		
MINIMUM SPECIAL INSPECTION REQUIREMENTS					
(D) Levels 2 and 3 Quality Assurance:					
1. As masonry construction begins, verify that the following are in					
a. Proportions of the site-prepared mortar	Field inspection	N	Periodic		
b. Grade and size of prestressing tendons and anchorages	Field Inspection	N	Periodic		
c. Grade, type, and size of reinforcement, anchor bolts, and prestressing tendons and anchorages	Field Inspection	N	Periodic		

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
d. Prestressing technique	Field Inspection	N	Periodic		
e. Properties of thin-bed mortar for AAC masonry	Field Inspection	N	Level 2 - Continuous ^(b) Level 2 - Periodic ^(c)		
(b) Required for the first 5,000 square feet (c) Required after the first 5,000 square feet		N	Level 3 - Continuous		
f. Sample panel construction		Field Inspection	N	Level 2 - Periodic	
		N	Level 3 - Continuous		
2. Prior to grouting, verify that the following are in compliance:					
a. Grout space	Field Inspection	N	Level 2 - Periodic		
		N	Level 3 - Continuous		
b. Placement of prestressing tendons and anchorages	Field Inspection	N	Periodic		
c. Placement of reinforcement, connectors, and anchor bolts	Field inspection	N	Level 2 - Periodic		
		N	Level 3 - Continuous		
d. Proportions of site-prepared grout and prestressing grout for bonded tendons	Field Inspection	N	Periodic		
3. Verify compliance of the following during construction:					
a. Materials and procedures with the approved submittals	Field inspection	N	Periodic		
b. Placement of masonry units and mortar joint construction	Field Inspection	N	Periodic		
c. Size and location of structural members	Field inspection	N	Periodic		
d. Type, size, location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction	Field inspection	N	Level 2 - Periodic		
		N	Level 3 - Continuous		
e. Welding of reinforcement	Field inspection	N	Continuous		
f. Preparation, construction, and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F)	Field inspection	N	Periodic		
g. Application and measurement of prestressing force	Field testing	N	Continuous		
h. Placement of grout and prestressing grout for bonded tendons is in compliance	Field inspection	N	Continuous		
i. Placement of AAC masonry units and construction of thin-bed mortar joints	Field inspection	N	Level 2 - Continuous ^(b) Level 2 - Periodic ^(c)		
(b) Required for the first 5,000 square feet (c) Required after the first 5,000 square feet		N	Level 3 - Continuous		
4. Observe preparation of grout specimens, mortar specimens, and/or prisms	Field inspection	Y	Level 2 - Periodic		
		N	Level 3 - Continuous		
1705.5 Wood Construction					
1. For prefabricated wood structural elements, inspection of the fabrication process and assemblies in accordance with Section 1704.2.5.	In-plant review (3)	N	Periodic		
2. For high-load diaphragms, verify grade and thickness of structural panel sheathing agree with approved building plans.	Field inspection	N	Periodic		
3. For high-load diaphragms, verify nominal size of framing members at adjoining panel edges, nail or staple diameter and length, number of fastener lines, and that spacing between fasteners in each line and at edge margins agree with approved building plans	Field inspection	N	Periodic		

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
4. Metal-plate-connected wood trusses:		N			
a. Verification that permanent individual truss member restraint/bracing has been installed in accordance with the approved truss submittal package when the truss height is greater than or equal to 60".	Field inspection	N	Periodic		
b. For trusses spanning 60 feet or greater: verify temporary and permanent restraint/bracing are installed in accordance with the approved truss submittal package	Field inspection	N	Periodic		
1705.6 Soils					
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	Field inspection	Y	Periodic	1	
2. Verify excavations are extended to proper depth and have reached proper material.	Field inspection	Y	Periodic	1	
3. Perform classification and testing of compacted fill materials.	Field inspection	Y	Periodic	1	
4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of controlled fill	Field inspection	Y	Continuous	1	
5. Prior to placement of controlled fill, inspect subgrade and verify that site has been prepared properly	Field inspection	Y	Periodic	1	
1705.7 Driven Deep Foundations					
1. Verify element materials, sizes and lengths comply with requirements	Field inspection	N	Continuous		
2. Determine capacities of test elements and conduct additional load tests, as required	Field inspection	N	Continuous		
3. Inspect driving operations and maintain complete and accurate records for each element	Field inspection	N	Continuous		
4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element	Field inspection	N	Continuous		
5. For steel elements, perform additional inspections per Section 1705.2	See Section 1705.2	N	See Section 1705.2		
6. For concrete elements and concrete-filled elements, perform tests and additional inspections per Section 1705.3	See Section 1705.3	N	See Section 1705.3		
7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge	Field inspection	N	In accordance with construction documents		

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
1705.8 Cast-in-Place Deep Foundations					
1. Inspect drilling operations and maintain complete and accurate records for each element	Field inspection	N	Continuous		
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes	Field inspection	N	Continuous		
3. For concrete elements, perform tests and additional inspections in accordance with Section 1705.3	See Section 1705.3	N	See Section 1705.3		
1705.9 Helical Pile Foundations					
Verify installation equipment, pile dimensions, tip elevations, final depth, final installation torque and other installation data as required by construction documents.	Field inspection	N	Continuous		
1705.10 Fabricated items					
1. List of fabricated items requiring special inspection during fabrication:	Shop inspection	N	As noted in each applicable shop activity		
2. List of fabricated items to be fabricated on the premises of a fabricator approved to perform such work without special inspection (including name of approved agency providing periodic auditing):		N			
1705.11.1 Structural Wood Special Inspections For Wind Resistance					
1. Inspection of field gluing operations of elements of the main windforce-resisting system	Field inspection	N	Continuous		
2. Inspection of nailing, bolting, anchoring and other fastening of components within the main windforce-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.	Shop (3) and field inspection	N	Periodic		
1705.11.2 Cold-formed Steel Special Inspections For Wind Resistance					
1. Inspection during welding operations of elements of the main windforce-resisting system	Shop (3) and field inspection	N	Periodic		
2. Inspection of screw attachment, bolting, anchoring and other fastening of components within the main windforce-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.	Shop (3) and field inspection	N	Periodic		
1705.11.3 Wind-resisting Components					
1. Roof covering, roof deck and roof framing connections.	Shop (3) and field inspection	N	Periodic		
2. Exterior wall covering and wall connections to roof and floor diaphragms.	Shop (3) and field inspection	N	Periodic		
1705.12.1 Structural Steel Special Inspections for Seismic Resistance					
1. Seismic force-resisting systems in SDC B, C, D, E, or F.	Shop (3) and field inspection	N	In accordance with AISC 341		
2. Structural steel elements in SDC B, C, D, E, or F other than those in Item 1. including struts, collectors, chords and foundation elements.	Shop (3) and field inspection	N	In accordance with AISC 341		

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
1705.12.2 Structural Wood Special Inspections for Seismic Resistance					
1. Field gluing operations of elements of the seismic-force resisting system for SDC C, D, E or F.	Field inspection	N	Continuous		
2. Nailing, bolting, anchoring and other fastening of components within the seismic-force-resisting system including wood shear walls, wood diaphragms, drag struts, shear panels and hold-downs for SDC C, D, E or F.	Shop (3) and field inspection	N	Periodic		
1705.12.3 Cold-formed Steel Light-Frame Construction Special Inspections for Seismic Resistance					
1. During welding operations of elements of the seismic-force-resisting system for SDC C, D, E or F.	Shop (3) and field inspection	N	Periodic		
2. Screw attachment, bolting, anchoring and other fastening of components within the seismic-force-resisting system including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs for SDC C, D, E or F.	Shop (3) and field inspection	N	Periodic		
1705.12.4 Designated Seismic Systems Verification Special Inspections for Seismic Resistance					
For SDC C, D, E or F, inspect and verify that the component label, anchorage or mounting conforms to the certificate of compliance in accordance with ASCE 7 Section 13.2.2.	Field inspection	N	Periodic		
1705.12.5 Architectural Components Special Inspections for Seismic Resistance					
1. For SDC D, E or F, inspection during the erection and fastening of exterior cladding and interior or exterior veneer more than 30 feet above grade or walking surface and weighing more than 5 psf.	Field inspection	N	Periodic		
2. For SDC D, E or F, inspection during the erection and fastening of interior nonbearing walls more than 30 feet above grade or walking surface and weighing more than 15 psf.	Field inspection	N	Periodic		
3. For SDC D, E or F, inspection during the erection and fastening of exterior nonbearing walls more than 30 feet above grade or walking surface.		N			
4. For SDC D, E or F, inspection during anchorage of access floors	Field inspection	N	Periodic		
1705.12.6 Plumbing, Mechanical and Electrical Components Special Inspections for Seismic Resistance					
1. Inspection during the anchorage of electrical equipment for emergency or standby power systems in SDC C, D, E or F	Field inspection	N	Periodic		
2. Inspection during the anchorage of other electrical equipment in SDC E or F	Field inspection	N	Periodic		
3. Inspection during installation and anchorage of piping systems designed to carry hazardous materials, and their associated mechanical units in SDC C, D, E or F	Field inspection	N	Periodic		

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
4. Inspection during the installation and anchorage of HVAC ductwork designed to contain hazardous materials in SDC C, D, E or F	Field inspection	N	Periodic		
5. Inspection during the installation and anchorage of vibration isolation systems in SDC C, D, E or F where nominal clearance of 1/4 inch or less is required by the approved construction documents	Field inspection	N	Periodic		
6. Inspection during installation of mechanical and electrical equipment, including duct work, piping systems and their structural supports, where automatic fire sprinkler systems are installed in structures assigned to SDC C, D, E, or F to verify one of the following unless flexible sprinkler hose fittings are used:		N			
a. ASCE/SEI 7, Section 13.2.3 minimum required clearances have been provided.	Field inspection	N	Periodic		
b. A three inch or greater nominal clearance has been provided between fire protection sprinkler system drops and sprigs and: structural members not used collectively or independently to support the sprinklers; equipment attached to the building structure; and other systems' piping.	Field inspection	N	Periodic		
1705.12.7 Storage Racks Special Inspections for Seismic Resistance					
Inspection during the anchorage of storage racks 8 feet or greater in height in structures assigned to SDC D, E or F.	Field inspection	N	Periodic		
1705.12.8 Seismic Isolation Systems					
Inspection during the fabrication and installation of isolator units and energy dissipation devices used as part of the seismic isolation system in structures assigned to SDC B, C, D, E or F.	Shop and field inspection	N	Periodic		
1705.12.9 Cold-formed Steel Special Bolted Moment Frames					
Inspection of installation of cold-formed steel special bolted moment frames in the seismic force-resisting systems in structures assigned to SDC D, E or F.	Field inspection	N	Periodic		
1705.13.1 Structural Steel Testing for Seismic Resistance					
1. Nondestructive testing of structural steel in the seismic force-resisting systems in accordance with AISC 341 in structures assigned to SDC B, C, D, E or F.	Field test	N	Periodic		
2. Nondestructive testing of structural steel elements in the seismic force-resisting systems not covered in 1 above including struts, collectors, chords and foundation elements in accordance with AISC 341 in structures assigned to SDC B, C, D, E or F.	Field test	N	Periodic		

SCHEDULE OF SPECIAL INSPECTIONS SERVICES					
PROJECT	LAWRENCEVILLE PUBLIC WORKS SHED EXPANSION				
MATERIAL / ACTIVITY	SERVICE	APPLICABLE TO THIS PROJECT			
		Y/N	EXTENT	AGENT*	DATE COMPLETED
1705.13.2 Seismic Certification of Nonstructural Components					
Review certificate of compliance for designated seismic system components in structures assigned to SDC B, C, D, E or F.	Certificate of compliance review	N	Each submittal		
1705.13.3 Seismic Certification of Designated Seismic Systems					
Review certificate of compliance for designated seismic system components in structures assigned to SDC C, D, E or F	Certificate of compliance review	N	Each submittal		
1705.13.4 Seismic Isolation Systems					
Test seismic isolation system in accordance with ASCE 7 Section 17.8 in structures assigned to SDC B, C, D, E or F.	Prototype testing	N	Per ASCE 7		
1705.14 Sprayed Fire-resistant Materials					
1. Verify surface condition preparation of structural members	Field inspection	N	Periodic		
2. Verify minimum thickness of sprayed fire-resistant materials applied to structural members	Field inspection	N	Periodic		
3. Verify density of the sprayed fire-resistant material complies with approved fire-resistant design	Field inspection and testing	N	Per IBC Section 1705.14.5		
4. Verify the cohesive/adhesive bond strength of the cured sprayed fire-resistant material	Field inspection and testing	N	Per IBC Section 1705.14.6		
5. Condition of finished application	Field inspection	N	Periodic		
1705.15 Mastic and Intumescent Fire-Resistant Coatings					
Inspect and test mastic and intumescent fire-resistant coatings applied to structural elements and decks per AWCI 12-B	Field inspection and testing	N	Periodic		
1705.16 Exterior Insulation and Finish Systems (EIFS)					
Inspection of water-resistive barrier over sheathing substrate	Field inspection	N	Periodic		
1705.17 Fire-Resistant Penetrations and Joints					
1. Inspect penetration firestop	Field testing	N	Per ASTM E2174		
2. Inspect fire-resistant joint systems	Field testing	N	Per ASTM E2393		
1705.18 Smoke Control Systems					
1. Leakage testing and recording of device locations prior to concealment	Field testing	N	Periodic		
2. Prior to occupancy and after sufficient completion, pressure difference testing, flow measurements, and detection and control verification	Field testing	N	Periodic		
* INSPECTION AGENTS					
FIRM	ADDRESS		TELEPHONE NO.		
1. TO BE DETERMINED BY OWNER					
2.					
3.					
4.					
<p>Notes: 1. The inspection and testing agent(s) shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official prior to commencing work. The qualifications of the Special Inspector(s) and/or testing agencies may be subject to the approval of the Building Official and/or the Design Professional.</p> <p>2. The list of Special Inspectors may be submitted as a separate document, if noted so above.</p> <p>3. Shop Inspections of fabricated items are not required where the fabricator is approved in accordance with IBC Section 1704.2.5.1 and listed in activity 1709.2.</p> <p>4. Observe: Observe on a random basis, operations need not be delayed pending these inspections. Perform: These tasks shall be performed for each welded joint, bolted connection, or steel element.</p> <p>5. NDT of welds completed in an approved fabricator's shop may be performed by that fabricator when approved by the AHJ. Refer to AISC 360, N6.</p>					
Are Special Inspections for Seismic Resistance included in the Statement of Special Inspections?				Yes	<input checked="" type="radio"/>
Are Special Inspections for Wind Resistance included in the Statement of Special Inspections?				Yes	<input checked="" type="radio"/>
DATE: 4/13/23					

SECTION 01 25 00

PROCEDURES FOR CONTRACT MODIFICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Change Proposal Request
- B. Change Proposal
- C. Change Order/Supplemental Agreement
- D. Time and Materials Work
- E. Architect's Field Directives

1.03 DEFINITIONS

- A. Change Proposal Request: Any written request from the Owner or Architect to the Contractor for a quotation, material and labor cost breakdown on a change that is proposed but not yet ordered.
- B. Change Proposal: Any written proposal from the Contractor to the Owner or Architect setting forth a change in the Scope of Work and the effect of such change on Contract Time and/or Contract Sum. This document shall identify the scope of work performed by the Contractor and/or subcontractor(s) and be broken down into quantities and cost of material along with the corresponding labor hours and rates.
- C. Change Order: A written order to the Contractor, prepared by the Architect and issued by the Owner for directing changes in the Scope of Work of the Contract, adjustments in the Contract Sum or extensions of Contract Time. When executed by all parties, this item, also referred to herein as a Supplemental Agreement to the Contract, is an amendment to the Contract.
- D. Modifications: Include Change Orders (Supplemental Agreements to the Contract) prepared by the Architect and signed by the Owner and Contractor; written field directives issued by the Architect to the Contractor, which change the Scope of Work and may affect Contract Sum, but are necessary because of situations described elsewhere in this section; and written orders issued by the Architect for minor changes in the Work with no cost or schedule implications.
- E. Time and Material Work: Work which will be paid for on the basis of the actual costs, including materials, labor, equipment and other expenses defined elsewhere herein; and documented by detailed records. This effort is only related to Architect directed Work that is safety related or is determined by the Architect that is time sensitive.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 CHANGE PROPOSAL REQUEST

- A. The Change Proposal Request is the method by which Owner directed changes in the Scope of work are initiated. These requested changes may originate with the Owner or Architect, may be responses to unexpected site conditions, or may be responses to issues raised by the Contractor through its requests for information or document clarifications.
- B. Change Proposal Requests are not directions to change the Work.
- C. Unless specified differently on the Change Proposal Request, the Contractor will be expected to respond to all requests within ten (10) calendar days of receipt.

3.02 CHANGE PROPOSAL

- A. The Contractor will submit Change Proposals in response to Change Proposal Requests, in response to Architect's field directives as applicable, in accompaniment of substitution requests, and as follow up to previously filed claims for extra cost or time.
- B. Every Change Proposal shall include the following information as applicable:
 - 1. The amount of change in the Contract Sum, if any.
 - 2. The amount of change in the Contract Time, if any. The change in Contract Time shall be explained relative to the approved Construction Schedule and shall be justified in terms of the critical path of the Work and the requirements of the Contract. Changes in time shall not be allowed for Work that does not affect the critical path of project completion.
 - 3. Cost breakdowns detailing the applicable work items and inclusive of quantities and unit prices for labor, materials, products, equipment usage, expenses for bonds, insurance and taxes; and overhead and profit. Subcontractor(s) and second tier subcontractor(s) expenses shall be presented at the same level of detail.
 - 4. The period of time within which the proposed changes in Contract Sum or Time will be valid.
 - 5. A statement describing the effect the change may have on the work of other prime contractors or the Owner.
- C. Fees for administration, overhead and profit shall be limited to 10% for the Contractor or subcontractor performing the work. On work performed by a subcontractor, the Contractor may mark up said work for purposes of administration, overhead and profit by no more than 10%. On work performed by a second tier subcontractor the subcontractor mark-up said work for purposes of administration, overhead and profit by no more than 10%; the prime Contractor shall not mark up the work of second tier subcontractors by more than 10%.
- D. The Contractor shall not place a reservation on a Change Proposal that holds open the Contractor's right to claim additional costs for indirect or impact damages related to the change such as alleged costs for disruption, interference, delay, acceleration or remobilization.
- E. If the Change Proposal is related to a claim for additional cost or time, Contractor shall indicate the origin and date of the initial claim notice and detail the basis of the claim and the associated costs.

3.03 CHANGE ORDER/SUPPLEMENTAL AGREEMENT

- A. A Change Order or Supplemental Agreement is the only instrument by which the Contract can be modified to increase or decrease the Contract Sum or Contract Time. For a Change Order to be effective it must be executed by the Owner and Contractor. The cost basis of a Change Order may

be a lump sum, unit prices, or time and materials, also referred to as force account. Lump sum changes must be supported by the cost breakdowns required by the Change Proposal.

3.04 TIME AND MATERIALS WORK

- A. When no agreement is reached for extra work to be done at lump sum or unit prices, such work may be authorized by the Owner to be done on a Time and Material basis. A Time and Materials estimate that identifies all anticipated costs shall be prepared by the Contractor on forms provided by the Architect. Work shall not begin until the Time and Materials account is approved by the Architect. Payment for Time and Materials work will be in accordance with the following:
1. Labor: For all labor, equipment operators and supervisors, excluding superintendents, in direct charge of the specific operations; the Contractor shall receive the rate of wage agreed to for all hours the designated labor, equipment operators and supervisors are actually engaged in the work. The Contractor shall receive the actual costs paid to the workers inclusive of wages, allowances, health and welfare benefits and pension fund benefits.
 2. Bond, Insurance and Tax: For property damage, liability, and worker's compensation insurance premiums, unemployment, insurance contributions, and social security taxes on the Time and Materials work, the Contractor shall receive the actual cost.
 3. Materials: For materials and products incorporated in the Work and accepted by the Architect, including Contractor paid freight or shipping expenses; the Contractor shall receive the actual cost.
 4. Equipment: For any machinery or special equipment (other than small tools), the use of which is essential to the work and approved by the Architect, the Contractor shall receive fair market rental rates for the actual time that such equipment is in operation on the Work or required to stand by.
 5. Overhead and Profit: On the total of all costs described above, the Contractor will be allowed to add 10% of that value as compensation for administration, overhead and profit.
 6. Miscellaneous: No additional allowance will be made for general requirements costs, superintendence, use of small tools or other costs for which no specific allowance is herein provided.
 7. Subcontract Time and Material Work: For work performed by a subcontractor or second-tier subcontractor, all provisions of this section that apply to the Contractor in respect to labor, materials and equipment shall govern. The prime Contractor shall coordinate the work of its subcontractors and will be allowed an amount to cover administrative costs and profit equal to 10% of the subcontractor's amount earned. Mark-up for second-tier subcontractor work will be limited to 10% of the amount earned.
 8. Compensation: The Contractor shall maintain records on the cost of all work done each day as ordered on a Time and Material basis and shall provide such records to the Architect.
 9. Statements: No payment will be made on work performed on a Time and Material basis until the Contractor has furnished the Architect with itemized statements of the cost of such Time and Materials work detailed as follows:
 - a. Name, classification, date, daily hours, rate and extension for each laborer, equipment operator and supervisor.
 - b. Cost of property damage, liability and worker's compensation insurance premiums, unemployment insurance contributions and social security tax.
 - c. Quantity of materials, prices and extensions.
 - d. Designation, dates, daily hours, total hours, rental rate and extension for each unit of machinery and equipment.

Statements shall be accompanied and supported by invoices for all materials used, including evidence of transportation charges and taxes. However, if materials used on Time and Materials work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were

taken from stock, that quantity claimed was actually used and price claimed represents actual cost to the Contractor.

3.05 ARCHITECT'S FIELD DIRECTIVES

- A. The Architect may issue written field directives to the Contractor, which may change the Scope of Work and may affect Contract Sum but are necessary because of any of the following reasons: 1) situations that threaten life and safety, 2) the need to address unknown conditions at the site of the Work, or 3) the need to maintain the timely and orderly sequencing of the Work.
- B. The Contractor shall proceed with the work requested in such field directives and if there is a cost associated with such work, Contractor shall submit a Change Proposal as described herein. These costs, when mutually acceptable to the Owner and Contractor, shall be incorporated into the Contract by Change Order.

END OF SECTION 01 25 00

SECTION 01 27 00

UNIT PRICE ALLOWANCES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section includes:
 - 1. Definition
 - 2. Administrative and procedural requirements for unit prices.
 - 3. Schedule of Unit Prices, at the end of this Section.

1.03 DEFINITION

- A. A unit price is an amount calculated and proposed by the Contractor in the Bidding Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event certain unexpected work items are encountered or certain estimated quantities of work required by the Contract Documents are increased or decreased.

1.04 ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS

- A. Unit prices as included in the Contract Documents shall include all expenses related to the unit price work items, that is materials, labor, equipment, transportation, general requirements, overhead, profit, taxes and any other costs incidental to the work items.
- B. The individual Specification Sections for the construction activities requiring the establishment of unit prices provide for the conditions under which said unit prices will be authorized and the methods of determining payment-quantities. The Contractor will be compensated only for the quantities of unit price work completed.
- C. The Schedule of Unit Prices is included with the Bidding Form. Any Specification Sections referenced in that Schedule contain the requirements for materials and/or methods described for each unit price.
- D. The Schedule of Unit Prices may be used to determine changes to the Contract Sum. Where quantities of items for which unit prices are provided, they are estimates; and are included in the scope of the Work upon which the Contract Sum is based. The Contractor will be compensated for the actual quantities of unit price items completed at the established unit price rates. These actual extensions of unit prices for work completed, whether requiring a decrease or an increase in the Contract Sum, will be incorporated into the Contract Sum through a modification to the Contract by Change Order. Procedures for such modifications are included in Specification Section 01 25 00 Contract Modifications.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

SCHEDULE OF UNIT PRICE ALLOWANCES

Unit Prices shall be included for the following items and **must** be listed on the Bidding Form.

Quantities indicated shall be carried as unit price allowances in the base bid amount, and will be required to be listed on the schedule of values as separate allowance line items. If these unit price allowances are not used, they will be credited back to the Owner by deductive change order at the end of the project.

<u>ITEM</u>	<u>QUANTITY</u>
<p><u>Unit Price No. 1 – Unsuitable Material:</u> Removal and disposal off-site of unsuitable materials. Removal must be approved by, monitored, and quantified by the Owner’s Geotechnical Engineer.</p> <p><u>Note:</u> Contractor shall include 200 cubic yards of removal and disposal off-site of unsuitable materials in the base bid price in addition to what is required to achieve design grades.</p>	200 CY
<p><u>Unit Price No. 2 – Trench Rock:</u> Excavate, haul off-site and dispose of trench rock. Excavation and haul off must be approved by, monitored, and quantified by the Owner’s Geotechnical Engineer.</p> <p><u>Note:</u> Contractor shall include 200 cubic yards of excavation, haul off-site and disposal of trench rock in the base bid price.</p>	200 CY
<p><u>Unit Prices No. 2 – Paving:</u> Provide a unit price for heavy duty paving in accordance with the detail section listed on drawing sheet C3.1.</p> <p>Note: Contractor shall include an additional 100 square yards of full depth heavy duty paving in the base bid price as a unit price allowance. The term “Additional” is defined as material and labor over that listed in the contract documents.</p>	100 SY

These Unit Prices are submitted as part of the Lump Sum Bid: The BIDDER declares that they understand that the Contract Sum may be decreased at the unit prices listed above. The BIDDER declares that they understand that the quantities of work shown are subject to either increase or decrease, and that should the quantities of any of the items of work be increased, the BIDDER proposed to do the additional work at the unit prices listed herein; and should the quantities be decreased, the BIDDER also understands that payment will be made on the basis of actual quantities at the unit price proposal and will make no claim for anticipated profits for any decrease in quantities and that the actual quantities will be determined upon completion of the work; at which time adjustment will be made to the Contract Sum.

END OF SECTION 01 27 00

SECTION 01 29 00

PROCEDURES FOR PAYMENT APPLICATIONS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specifications Sections, apply to this Section.

1.02 SUMMARY

- A. The Contractor's Application for Payment shall break out the project into related site improvements for all trades.
- B. Section specifies administrative and procedural requirements governing Contractor's Applications for Payment and includes:
 - 1. Schedule of Values
 - 2. Applications for payment
 - 3. Procedures for first payment
 - 4. Procedures for payment application at Substantial Completion
 - 5. Procedures for payment application at Final Completion

1.03 DEFINITIONS

- A. Schedule of Values: A detailed breakdown of the Contract Sum into individual cost items that will serve as the basis for evaluation of applications for progress payments made during construction.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 SCHEDULE OF VALUES

- A. Use only the Schedule of Values as the basis for the Contractor's Application for Payment.
- B. Correlate the Schedule of Values with other administrative schedules and submittals including:
 - 1. Contractor Schedule.
 - 2. List of subcontractors.
 - 3. Schedule of alternates.
 - 4. List of principal suppliers and fabricators.
 - 5. Schedule of submittals.
- C. Prepare a Schedule of Values on AIA Document G-703 "Continuation Sheet," and submit it to the Architect for review no later than ten (10) days prior to the submission of the first Contractor's Application for Payment. Submit three (3) copies and identify with the names of the Project, Architect, Owner, and Contractor and the date of submittal.
- D. In preparing the Schedule of Values, break down costs into line items for which the Contractor wishes to receive payment in the application for payment. Schedule of Values shall include sufficient detail to allow the Architect to estimate % complete. Coordinate the line items in the schedule of values with the units or subdivisions of work identified in the Specifications and reference those section numbers from the Specifications. Further divide major work subdivisions

and subcontractors into individual cost items. Include in each line item its proportional share of overhead and profit.

- E. Costs for General Requirements shall be identified separately and shall be itemized so that costs are identified for the following general items at a minimum:
 - 1. Performance and Payment Bonds
 - 2. Field Supervision
 - 3. Engineering and Layout
 - 4. Temporary Facilities and Services
 - 5. Final Cleaning
- F. Where applications for payment are likely to include products purchased or fabricated but not yet installed, provide individual line items for material cost, installation cost and other applicable phases of completion. Place cost of production materials delivered and unloaded at Project site with taxes paid under Column F, G-703. List total installed cost, with overhead and profit under Column C, G-703.
- G. For each line item indicate the dollar value to the nearest whole dollar. Indicate the proportion of the Contract Sum represented by this item to the nearest one-hundredth percent.
- H. Unit Price Values: Submit a sub-schedule of unit prices and quantities for items of Work identified in the Bid Form (Section 00 03 00) – Unit Prices. The form of submittal shall parallel that of the Schedule of Values, and the installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values. The standards and procedures for payment of Unit Price Items are described in Specification Section 01 27 00.
- I. The Architect will review the Schedule of Values and determine its acceptability. Contractor shall revise and resubmit an acceptable schedule.
- J. Submit a revised Schedule of Values when modifications change the Contract Sum or individual line items. Make each modification a new line item and show all information for that line item required for the original submittal.

3.02 APPLICATIONS FOR PAYMENT

Detailed requirements for processing Applications for Payment are outlined below and will be discussed in further detail at the preconstruction conference.

- A. Prepare and submit Applications for Payment on Application and Certification for Payment, AIA Document G-702. Include the Schedule of Values modified in format to enable indications of the value of work completed in the application period and for the Contract period. Base the initial application on the accepted Schedule of Values and make all other applications consistent with previous applications as certified and paid.
 - 1. Submit one initial draft of the pay application to the Owner and Architect electronically before the site visit. The Application for Payment shall coincide with the monthly project meeting for initial review.
 - 2. Include amounts of Contract modifications fully executed before end of application period. Do not bill for claims or proposals that have not been officially accepted by the Owner.
 - 3. If billing for materials stored on site, attach legible copies of relevant receipts and documentation. Billing for materials stored off-site, shall not be allowed unless approved by the Owner.
 - 5. The Contractor shall prepare and submit an Interim Release of Lien with each Application for Payment.

- B. Provide the following information with every application for payment which involves work completed on a time and material basis:
 - 1. Detailed records of work done, including:
 - a. Dates and times work was performed, and by whom.
 - b. Time records and wage rates paid.
 - c. Invoices and receipts for products.
 - 2. Provide similar detailed records for subcontracts.
- C. No later than five (5) days prior to the date of the Application for Payment, submit a draft of the application for review by the Architect. Coordinate this submission and subsequent review with Architect's monthly inspection of the Work in place to determine the acceptability of the proposed application. Make any changes if requested by Architect in his review and resubmit the Application for Payment, to the Architect signed, notarized and with a transmittal form itemizing attached documentation.

3.03 PROCEDURES FOR FIRST APPLICATION FOR PAYMENT

- A. The first Application for Payment will not be reviewed until the following submittals from the Contractor have been received and accepted by the Architect or Owner as applicable.
 - 1. Schedule of values.
 - 2. Contractor's construction schedule.
 - 3. Submittal schedule.
 - 4. List of subcontractors and principal suppliers and fabricators.

3.04 PROCEDURES FOR PAYMENT APPLICATION AT SUBSTANTIAL COMPLETION

- A. Administrative actions and submittals that shall precede or coincide with the Application for Payment include:
 - 1. Occupancy permits and similar approvals.
 - 2. Issuance and execution of Certificate of Substantial Completion inclusive of list of incomplete Work recognized as exceptions to the Certificates.
 - 3. Evidence that operations and maintenance training has been provided to Owner.
 - 4. Final report on testing, adjusting and balancing HVAC system.
 - 5. All submittals specified in the Contract Documents to be completed before Substantial Completion.

3.05 PROCEDURES FOR PAYMENT APPLICATION AT FINAL COMPLETION

- A. Administrative actions and submittals that shall precede or coincide with this Application for Payment include:
 - 1. Completion of Closeout Procedures in Section 01 77 00

END OF SECTION 01 29 00

SECTION 01 31 00

PROJECT COORDINATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and other general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This section specifies administrative and supervisory requirements necessary for coordination of the Work for the duration of construction, but not necessarily limited to:
 - 1. Coordination
 - 2. Administrative and supervisory personnel
 - 3. General installation provisions
 - 4. Cleaning and protection

1.03 COORDINATION

- A. Coordination Among Trades: Contractor shall coordinate construction activities included under the Drawings and various sections of these Specifications to insure efficient and orderly construction operations included under different sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.
 - 1. If necessary, inform each party involved, in writing, of procedures required for coordination; including requirements for giving notice, submitting reports, and attending meetings.
 - 2. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
 - 3. Where availability of space is limited, coordinate installation of different components to insure maximum accessibility for later installations and for required maintenance, service and repair.
 - a. Where limited available space may cause conflicts in the locations of installed products, and where required to coordinate installation of products and materials, prepare coordination drawings. Said coordination drawings shall show plan and cross-section dimensions of the available space and include obstructions caused by structural and systems elements.
 - b. Coordinate shop drawings and other submittals prepared by subcontractors, suppliers and other entities to facilitate installation of products and systems and avoid field conflicts in the Work.
 - c. Prepare plans or schedules describing installation sequences and provide said documents to affected parties.
 - 4. Make adequate provisions to accommodate items scheduled for later installation.
 - 5. Inform the Owner when coordination of Owner's work under separate contracts is required. Inform the Owner when Owner's work under separate contracts is incomplete, in non-compliance or prohibits efficient and orderly completion of work under this Contract.
 - 6. Coordinate dissemination of information between subcontractors or suppliers when information from one is needed by or is of assistance to the other. Distribute interrelated shop drawings between subcontractors or suppliers prior to shop drawing submittal to Architect.

- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of schedules
 - 2. Installation and removal of temporary facilities.
 - 3. Delivery and processing of submittals.
 - 4. Progress meetings.
 - 5. Project close-out activities.

- C. Continue coordination procedures by actively controlling Project conditions as follows:
 - 1. Verify and insure that products and materials of all trades are stored in an orderly fashion, under conditions complying with manufacturers' instructions and at planned locations.
 - 2. Verify and insure execution of the Work is in compliance with environmental conditions established by manufacturers' instructions and specific requirements of relevant Sections of these Specifications.
 - 3. Verify and insure adherence to tolerances required by these Specifications as the Work progresses.
 - 4. Inspect job conditions before one trade follows another in compliance with these requirements:
 - a. Plan and conduct joint inspections involving the affected trades.
 - b. Notify Architect at least one week in advance of such inspections and provide opportunity for Architect's participation in the inspection.
 - c. While the Architect may confine his observations and inspections to only limited areas, the Contractor shall be responsible for similar inspections in all involved areas.
 - d. Review of job conditions, in whole or in part, by Architect in no way relieves Contractor of his obligation to provide various stages of the Work as well as finished Work complying with Contract Documents.
 - e. Allow no work to proceed over unsatisfactory conditions that would prevent execution of new work as specified.

1.04 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. Contractor shall designate a Project Manager for the Project who shall be the primary point of contact and communication for the Owner and Architect the project site. The Project Manager shall be assigned full time to the Project until completion of Final Contract Close-Out. All written communications to the Architect shall be by or through the Project Manager. Architect shall address all his written communications to the Contractor to the Project Manager, unless authorized by Project Manager to communicate directly to others.

- B. Contractor shall provide adequate supervision at the Project site at all times.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION PROCEDURES

- A. Inspection of Conditions: Require the installer of each component to inspect both the substrate and conditions under which work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

- B. Manufacturers' Instructions: Comply with manufacturers' installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Connection: Provide attachment and connection devices and methods necessary for securing work. Secure work true to line and level. Allow for expansion and building movement.
- D. Visual Effects: Provide uniform joints widths in exposed work. Arrange joints in exposed work to obtain the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- E. Temporary Enclosures: Provide and coordinate placement of temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- F. Mounting Height: Where mounting heights are not indicated, contact the Architect for direction prior to proceeding with the work.
- G. Access panels: Where access panels are required in any wall or ceiling, and the panel is not specifically located on a drawing, contact the Architect prior to proceeding with the work.
- H. Joints: Plan and coordinate work to provide caulk joints at all junctions of dissimilar materials, even if such joints are not called for on Drawings or elsewhere in these Specifications.
- I. Costs for Adherence to all specified installation procedures are included in the Contract Sum.

3.02 CLEANING & PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective coverings where required to insure protection from damage or deterioration prior to Substantial Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to insure operability without damaging effects.
- C. Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to the following:
 - 1. Excessive static or dynamic loading.
 - 2. Excessive internal or external pressures.
 - 3. Excessive high or low temperatures.
 - 4. Excessive high or low humidity.
 - 5. Water or ice.
 - 6. Solvents.
 - 7. Chemicals.
 - 8. Light.
 - 9. Puncture.
 - 10. Abrasion.
 - 11. Heavy traffic.
 - 12. Soiling, staining, and corrosion.
 - 13. Rodent and insect infestation.
 - 14. Combustion.

15. Unusual wear or other misuse.
16. Contact between incompatible materials.
17. Destructive testing.
18. Misalignment.
19. Excessive weathering.
20. Unprotected storage.
21. Improper shipping or handling.
22. Vandalism.

END OF SECTION 01 31 00

SECTION 01 31 20
PROJECT MEETINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and other general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Contractor's duties
 - 2. Preconstruction conference
 - 3. Progress and coordination meetings
 - 4. Pre-installation conferences

1.03 CONTRACTOR'S DUTIES

- A. Scheduling and Notification: Contractor will notify Owner, Architect and other invited parties of meeting time and place at least five (5) days prior to the date of every progress and coordination meeting or special called meeting. The progress and coordination meetings shall be conducted once every week.
- B. Administration: The Contractor will prepare a meeting agenda for the progress and coordination meetings, record and promptly distribute copies of minutes of significant proceedings and decisions of the meetings to each participant no later than five (5) days after each meeting. The Contractor shall update construction schedule after each progress meeting to show current progress and documentation of any revisions that have been made or recognized; issue revised schedule, two week look-ahead with a list of the planned activities, submittal list and RFI list concurrently with report of each meeting.

1.04 PRE-CONSTRUCTION CONFERENCE

- A. A pre-construction meeting will be held prior to the start of construction of the project at a time and place designated by the Owner for the purpose of identifying responsibilities of the Contractor, Owner and Architect and explaining administrative procedures.
- B. Attendance:
 - 1. Owner's representatives
 - 2. Owner's Project Manager
 - 3. Architect and key subconsultants
 - 4. Contractor represented by Project Manager and Superintendent
 - 5. Major subcontractors if requested by Owner, Architect or Contractor
- C. Minimum Agenda:
 - 1. Identification and designation of responsible personnel from all parties.
 - 2. Tentative construction progress schedule (to be distributed by Contractor), with discussion of critical work sequencing and staging.

3. Procedures for correspondence and other communications, field decisions, requests for information, design bulletins, requests for changes in the work and claims.
4. Procedures for submittals, including shop drawings, samples and product data.
5. Procedures for preparing and maintaining required Record Documents and Operations & Maintenance Manuals.
6. List of major subcontractors and material suppliers.
7. Use of Project Site, including temporary offices, project staging, storage areas, parking, site use limitations or restrictions, and erosion control.
8. Material and equipment deliveries, storage, protection and priorities.
9. Safety procedures and responsibilities.
10. Security procedures and methods.
11. Housekeeping procedures and methods.
12. Special project requirements or conditions.

1.05 PROGRESS AND COORDINATION MEETINGS

- A. Scheduling: Unless otherwise requested by Owner or Architect, a progress and coordination meeting shall be held once every month at the Project Site.
- B. Attendance:
 1. Owner (once a month)
 2. Owner's Project Manager
 3. Architect and consultants if determined necessary by progress of the Work.
 4. Contractor as represented by Project Manager and Superintendent.
 5. Sub-contractors and material suppliers as requested by Owner or Architect or as applicable to progress of the Work.
- C. Minimum Agenda (topics to be covered as applicable):
 1. Review minutes of previous meeting.
 2. Status of submittals and impending submittals.
 3. Off-site fabrication and delivery schedules; subcontractor schedules.
 4. Actual progress of activities in relation to the schedule. Submit schedule updates as required.
 5. Actual and anticipated delays, their impact on the schedule, and corrective actions taken or proposed.
 6. Field observations; actual and potential problems affecting construction or job progress; status of RFI's (Requests for Interpretation).
 7. Site Utilization; housekeeping, temporary facilities/services.
 8. Safety; hazards or risks.
 9. Status of corrective work ordered by the Architect; quality and work standards.
 10. Change Orders and change order proposals.
 11. Documentation of information for payment application (as applicable).
- D. Contractor to provide a table for layout of Drawings and chairs for each attendee.

1.06 PROGRESS AND COORDINATION SITE VISITS

- A. Scheduling: Unless otherwise requested by Owner or Architect, a progress and coordination site visit shall be held once every week at the Project Site.
- B. Attendance:
 1. Owner's Project Manager
 2. Architect and consultants if determined necessary by progress of the Work.

4. Contractor as represented by Project Manager and Superintendent.

1.07 PREINSTALLATION CONFERENCES

- A. Scheduling: Conduct a pre-installation conference at the project site before each construction activity that requires coordination with other construction or existing conditions. Comply with particular requirements elsewhere in the Specifications that describe specific pre-installation or pre-demolition meetings and associated notifications to the Architect and Owner.
- B. Attendance: The installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Notify the Architect and Owner of the scheduled meeting dates as required elsewhere in the Specifications.
- C. Prior to the work or installations of, at a minimum, the components listed below, hold a pre-installation meeting for review and observation attended by each entity involved or affected by planned work. Schedule these meetings with Architect at least five (5) working days prior to meeting.
- D. Agenda:
 1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for the following:
 - a. Contract Document requirements
 - b. Purchases
 - c. Deliveries
 - d. Shop drawings, product data and samples
 - e. Review of mockups
 - f. Possible conflicts
 - g. Compatibility of materials
 - h. Acceptability of substrates
 - i. Schedule
 - j. Weather limitations
 - k. Space and access limitations
 - l. Temporary facilities
 - m. Safety
 - n. Manufacturer's recommendations
 - o. Warranty requirements
 - p. Inspecting and testing requirements
 - q. Required performance results
 - r. Recording requirements
 - s. Protection
 2. The Contractor will record significant discussions and agreements and disagreements of each conference and the agreed to schedule for the work. The Contractor will promptly distribute the record to everyone concerned, including the subconsultants as required.
 3. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene conference at earliest feasible date.
 4. Regardless of whether the Specifications explicitly require a particular pre-installation conference, the Contractor is responsible for said conferences as an element of his coordination of the Work. Information that can be obtained through a consideration of the items in Paragraph C. of this sub-section is the responsibility of the Contractor and must be included in implementation of the Work.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 31 20

SECTION 01 32 00

CONSTRUCTION SCHEDULES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and other general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. General description
 - 2. Form and content of schedules
 - 3. Updating of schedules

1.03 GENERAL DESCRIPTION

- A. The Construction Schedule is a required submittal, which is subject to the approval of the Architect and which shall be revised periodically as specified herein. The Construction Schedule shall be in a bar-chart or network type form that shall provide complete sequence of construction by activity and allow for up-dating and revisions. Schedule shall be based on critical path method (CPM), and shall be prepared with input and cooperation of all subcontractors.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 FORM AND CONTENT OF SCHEDULES

- A. Submit Construction Schedule as described above within 10 days after Notice to Proceed.
- B. Provide Construction Schedule with the following format and content:
 - 1. Provide schedule in the form of a bar chart with individual horizontal lines representing the duration of each major activity. Use vertical lines to scale the schedule at one (1) week intervals.
 - 2. Use the same items of work as shown on schedule of values or in accordance with Section numbers of Specifications.
 - 3. Where related activities must be performed in sequence, show relationship graphically.
 - 4. Incorporate the submittal schedule specified elsewhere.
 - 5. In developing the schedule, take into account administrative reviews.
 - 6. Show dates for the following:
 - a. Each major activity that influences the construction time (critical path items).
 - b. Specified pre-installation meetings and progress review meetings.
 - c. Procurements and delivery dates for products requiring long lead time.
 - d. Start and completion dates of all major work elements.
 - e. Time frame for substantial and final completion procedures, including inspections, reviews and punch list activities.
 - 7. Use the same terminology as that used in Contract Documents and provide legend of symbols or abbreviations used.
 - 8. Submit Construction Schedule in clear, legible, reproducible format and with a minimum of three (3) opaque copies.

- C. Architect will advise Contractor if originally submitted Construction Schedule is not satisfactory. If so, Contractor shall revise and resubmit within five (5) days.
- D. Prepare and distribute copies of approved Schedule to Architect, Owner, subcontractors and other entities whose work will be influenced by schedule dates. Maintain a copy of approved Construction Schedule at Project site office.

3.02 UPDATING OF CONSTRUCTION SCHEDULES

- A. Update the Construction Schedule whenever changes occur or are made, or when new information is received, but not less often than at the same intervals at which progress meetings are conducted.
- B. In revising the Schedule show all changes **by saving the original schedule as a base line**. Indicate the actual progress or delay of each activity and show revised completion dates. Highlight the activities modified since previous submittal and indicate major changes in scope or revised projections due to changes in the Work (if applicable).

3.03 SCHEDULE AND CONTRACTOR'S REQUESTS FOR CHANGES TO CONTRACT SUM OR TIME

- A. The Contractor shall indicate in his Change Proposals for all Contract modifications, if the durations of activities are affected, or if activities are added or activities deleted. The effect shall be indicated for each activity in cost and time as applicable. The Change Proposal shall indicate all additional costs and time impacts of whatever nature; reservations for future determination of impacts will not be allowed or considered. The Contractor shall submit a diagram of that portion of the Construction Schedule affected by the change showing the activities and their costs, man loading, durations and subcontractor or trade responsibility. While changes of a minor nature may require little or no documentation of schedule impact, the Contractor shall be aware that in cases where time is involved, failure to submit such a diagram with the Change Proposal shall constitute a waiver of any claims for time extensions associated with the subject of that Change Proposal. When modifications in the Work are necessitated by Field Directives or other Architect's authorizations prior to Change Proposal submissions to avoid delay, the Contractor shall furnish the Architect within ten (10) days of receipt of the authorizations which changed the Work the same information required for Change proposals. Failure to do so shall constitute a waiver of any claims for time extensions associated with the subject of the work authorization or directive.
- B. As applicable, the Contractor shall adjust the Schedule monthly to reflect any adjustments in time related to negotiated or approved Contract modifications. The updated Schedule shall provide revised completion dates by incorporation of approved change order work and excusable delays, and re computation of all dates, durations and float in accordance with the newly incorporated dates. Such revised completion dates shall be the sole basis for time extensions and adjustments to the Contract completion date. Modified activity times to be used to determine the revised Project completion dates shall be agreed to by the Contractor, Architect and Owner.

END OF SECTION 01 32 00

SECTION 01 32 20

CONTRACT REPORTING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for reports required for proper performance of the Work.
- B. Reports required include:
 - 1. Daily construction reports.
 - 2. Field correction reports.
 - 3. Special reports.

1.03 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report, recording the following information concerning events at the site; and submit duplicate copies to the Architect at weekly intervals:
 - 1. List of subcontractors at the site.
 - 2. List of separate contractors at the site.
 - 3. Approximate count of personnel by trade at the site.
 - 4. High and low temperatures, precipitation, and general weather conditions.
 - 5. Accidents (refer to Special Reports).
 - 6. Meetings and significant decisions.
 - 7. Unusual events (refer to Special Reports).
 - 8. Stoppages, delays, shortages, losses.
 - 9. Emergency procedures.
 - 10. Orders and requests of governing authorities.
 - 11. Field Directives, or Change Proposal Requests received; Change Proposals implemented.
 - 12. Services connected, disconnected.
 - 13. Equipment or system tests and start-ups.
- B. Field Correction Report: When the need to take corrective action that requires a departure from the Contract Documents arises, prepare a detailed report including a statement describing the problem and recommended changes. Indicate reasons the Contract Documents cannot be followed. Submit a copy to the Architect immediately.
- C. Special Reports: When an event of an unusual and significant nature occurs at the Project site, prepare and submit a special report. List the chain of events, persons participating, and response by the Contractor's personnel, an evaluation of the results or effects and similar pertinent information. Advise the Owner in advance when such events are known or predictable.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 32 20

SECTION 01 33 00

SUBMITTALS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Definitions
 - 2. General requirements
 - 3. Submittal schedule
 - 4. Submittal coordination
 - 5. Submittal format and preparation
 - a. Shop drawings
 - b. Samples
 - c. Product data
 - 6. Contractor review and responsibilities
 - 7. Architect's review
 - 8. Return, resubmission and distribution
- B. Refer to individual Specification Sections for identified equipment and material for which submittals are required.
- C. Submittal will be required for each building structure separately.
- D. Do not submit on equipment or materials not requested in the Specifications.

1.03 DEFINITIONS

- A. Submittals: General term including samples, shop drawings and product data, as applicable.
- B. Samples: Physical examples prepared to illustrate materials, equipment or workmanship to be installed in the Project and to establish standards by which work will be judged as complying with Contract requirements.
- C. Shop Drawings: Drawings, diagrams, illustrations, schedules and performance charts, prepared by the entity that is to do the work to illustrate that portion of the Work in detail.
- D. Product Data: Dated, printed literature of a product manufacturer which describes product and installation procedures. Product data may include test and performance data, illustrations, standard brochures and special details.
- E. Informational Submittals: Submittals indicated in the Contract Documents as to be submitted for information only.

1.04 GENERAL REQUIREMENTS

- A. Submittals shall be in orderly sequence and timed to cause no delay in the Work.

- B. Contractor shall commence no portion of the Work requiring submittals until submittal has been reviewed and accepted by Architect.
- C. Do not utilize submittal review process as a means of requesting substitutions or changes in the scope of the Work.
- D. Job delays occasioned by requirement of re-submission of samples, shop drawings and product data not in accordance with Contract Documents are Contractor's responsibility, and will not be considered valid justification for extension of Contract time.
- E. The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's review of shop drawings, product data, samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in shop drawings, product data, samples or similar submittals by the Architect's review thereof.
- E. The Contractor shall direct specific attention, in writing or on resubmitted shop drawings, product data, samples or similar submittals to revisions other than those requested by the Architect on previous submittals.
- F. Resubmitted shop drawings, product data, samples or similar submittals shall be complete and shall cloud or highlight the changes.

1.05 SUBMITTAL SCHEDULE

- A. Submit to the Architect a list of all required submittals organized and referenced by the sections of these Specifications. On the list, indicate the timing for submission of the required submittals and relationship to the construction sequence. Submit the schedule to the Architect within the date required for establishment and submission of Contractor's Construction Schedule.
- B. Following approval by the Architect of the submittal schedule, print and distribute copies to the Architect, Owner, subcontractors, suppliers and others required to comply with the submittal dates indicated. Maintain a copy in the field. When revisions are made, distribute to same parties that received initial document.
- C. Maintain updated submittal schedule during course of the Work that shows status of all submittals. Provide copies for Architect at progress meetings and when requested.

1.06 SUBMITTAL COORDINATION

- A. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal well in advance of performance of related construction activities to avoid delay.
- B. Coordinate each submittal with other submittals and related activities--purchasing, fabrication, testing, delivery, etc.--that require sequential activity. Coordinate transmittal of different types of submittals for related elements of the Work so submittals can be reviewed concurrently. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- C. Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for re-submittals. If submittal must be reviewed within a certain time in order to maintain the progress of the Work, state so clearly on the submittal. Nevertheless, allow a minimum of one (1) week for the first processing of each submittal and

allow even more time if the submittal must be coordinated with later submittals. Allow a minimum of one (1) week for processing of resubmittals. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 SUBMITTAL FORMAT AND PREPARATION

A. Transmittals:

1. Submittals will be accepted only through transmittal from the Contractor. Submittals received from other entities will be returned without review or action.
2. Submittals must be accompanied by a transmittal form containing the following information:
 - a. Project name.
 - b. Submittal date.
 - c. Transmittal number.
 - d. Applicable Specifications Section number.
 - e. To: Architect's name and address.
 - f. From: Contractor's name and address.
 - g. Name of applicable subcontractor(s), supplier(s) or manufacturer(s).
 - h. Submittal type (shop drawing, sample, product data, informational submittal).
 - i. Description of submittal.
 - j. Record of distribution.
 - k. Action marking.
 - l. List of any deviations from Contract Document requirements.
 - m. Comments.

B. Form, Size and Quantity:

1. Label each submittal with the following information:
 - a. Project name.
 - b. Date of submittal.
 - c. Contractor's name and address.
 - d. Architect's name and address.
 - e. Subcontractor's name and address.
 - f. Supplier's name and address.
 - g. Manufacturer's name.
 - h. Specification section where the submittal is specified.
 - i. Numbers of applicable drawings and details.
 - j. Other necessary identifying information.
2. Provide a space on each submittal for approval stamp and notations.
3. For Shop Drawing or Product Data submittals larger than 8½" x 14" four (4) copies of blue or black-line prints.
4. For Shop Drawing or Product Data submittals on smaller sheets (minimum size acceptable: 8½" x 11"; maximum size acceptable 8½" x 14") submit four (4) opaque copies.
5. For Samples submit three (3) sets.
6. Contractor shall stamp and sign in red ink on all copies.

C. Shop Drawing Preparation and Format:

1. Shop Drawings shall conform to the following content requirements:
 - a. Number drawings consecutively
 - b. Indicate working and erection dimensions and relationship to adjacent work at accurate scale.
 - c. Show arrangements and sectional views, where applicable.
 - d. Show compliance with specific referenced standards, such as materials, gauges, thickness, finishes, and characteristics.
 - e. Name specific products or materials used.
 - f. Indicate anchoring and fastening details, including information for making connections to adjacent work.
 - g. Contractor shall make any and all modifications in red ink and shall sign in red ink.
2. Reference applicable details, sections and similar information from Drawings from which shop drawing data was developed; include applicable Specification Section numbers and names.
3. Do not reproduce Contract Documents or copy standard information as basis of shop drawings. Standard information prepared without specific reference to the Project is not considered shop drawings.

D. Sample Preparation:

1. Required samples shall be submitted for the Architect's selection and review so as to maintain construction progress. Acceptance and color selections will not be made unilaterally where selections regarding adjacent materials must be made for purpose of aesthetics. Submit samples for adjacent and inter-related materials concurrently.
2. Prepare samples in sizes, shapes and finishes in accordance with provisions of individual Specification sections; attach documentation showing compliance. Where samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product. Submittals will be reviewed and returned with Architect's selection indicated and other action as appropriate.
3. Samples furnished under this section are not to be confused with full-size, on-the-site "mock-ups," which may be specified in certain sections of the Specifications.
4. Keep final approved samples or sample sets at Project site for use during progress of the Work.

E. Product Data Preparation and Format:

1. When Product Data submittals are prepared specifically for the Project (in the absence of standard printed information) submit such information as Shop Drawings.
2. Content:
 - a. Submit manufacturer's standard printed data sheets.
 - b. Identify the particular product being submitted; submit only pertinent pages.
 - c. Show compliance with properties specified.
 - d. Identify which options and accessories are applicable.
 - e. Include recommendations for application and use.
 - f. Show compliance with the specific standards referenced.
 - g. Show compliance with specified testing agency listings; show the limitations of their labels or seals, if any.
 - h. Identify dimensions which have been verified by field measurement.
 - i. Show special coordination requirements for the product.

3.02 CONTRACTOR'S REVIEW AND RESPONSIBILITIES

- A. Review submittals and stamp with approval prior to submission to the Architect. Contractor's stamp shall bear the Contractor's name and word "Approved," date of the approval, and shall be initialed by the individual responsible for reviewing submittals. Enter stamp on a blank, unmarked area on the submittal.
- B. By approving submittals, Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.
- C. Where work is indicated "By others," Contractor shall indicate responsibility for providing and coordinating such work; whether by subcontractor or under separate contracts.
- D. Contractor agrees that submittals processed by Architect are not substitutions or changes in scope of the Work; that purpose of submittals by Contractor is to demonstrate that Contractor understands design concept; that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing fabrication and installation methods he intends to use.
- E. Contractor represents by submitting samples, shop drawing and product data that he has complied with provisions specified above. Submissions made without Contractor's approval indicated thereon will be returned without being reviewed for compliance with these requirements.
- F. Accompany submittal with transmittal letter containing Project name, Contractor's name, number of samples or drawings, titles and other pertinent data. Transmittal shall outline deviations, if any, in submittals from requirements of Contract Documents.
- G. No portion of the Work requiring submission of a shop drawing, product data or sample shall be commenced until the submittal has been reviewed and accepted by the Architect as specified herein. All such portions of the Work shall be executed in accordance with accepted submittals bearing the Architect's stamp.

3.03 ARCHITECT'S REVIEW AND ACCEPTANCE

- A. Architect's review and acceptance is only for conformance with design concept of Project and with information in Contract Documents. Architect's acceptance of a specific item shall not indicate acceptance of an assembly in which item is a component. The Architect's review is not conducted for the purpose of determining the accuracy and completeness of details such as dimensions and quantities, or for substantiating instructions for installation of equipment or systems, which remain the responsibility of the Contractor. When professional certification of performance characteristics of materials, systems, or equipment is required by the Construction Documents, the Architect shall be entitled to rely upon such certifications to establish the materials, systems or equipment will meet performance criteria required by the Construction Documents.
- B. Architect will review each submittal, mark it with appropriate action, and return it to Contractor with reasonable promptness, except where it must be held for coordination, and the Contractor is so advised. Submittals will be marked by Architect as follows:
 - 1. "Reviewed" indicates the drawings have been reviewed for conformance with design and no exceptions are taken. Proceed with the work.
 - 2. "Make Corrections as Noted" indicates Contractor may proceed with the work as noted.
 - 3. "Amend and Resubmit" indicates drawings to be revised and resubmitted for review prior to proceeding with the work.

4. "Rejected, See Remarks" indicates that the submittal does not comply with Contract Documents.
 5. The Architect shall make any and all comments in green ink and shall sign in green ink.
- C. Submittals required to be submitted "for Architect's information only" are required to demonstrate that the Work complies with performance requirements of the Contract Documents. Such submittals, if acceptable to Architect, will not be returned to Contractor.

3.04 SUBMITTAL RETURN, RESUBMISSION AND DISTRIBUTION

- A. Architect will return the following reviewed and accepted submittals for printing and distribution by Contractor:
1. Shop Drawings—Digital PDF
 2. Product Data—Digital PDF
 3. Samples—One Set
- B. Resubmissions: In making resubmissions, follow the same procedures and formats required for original submissions. Make corrections and changes indicated by Architect on unacceptable submissions. In resubmission transmittals, identify clearly and direct specific attention to any revisions other than corrections requested by Architect on previous submissions.
- C. Distribution:
1. Contractor is responsible for obtaining and distributing copies of submittals to his subcontractors and material suppliers after final acceptance. Prints of reviewed shop drawings shall be made from reproducibles that carry the Architect's appropriate stamp.
 2. Contractor shall maintain a file of accepted submittals bearing the Architect's stamp for duration of project, which shall be delivered to Owner as a part of the Project's Record Documents.
 3. The Contractor's superintendent also shall maintain an orderly file of all accepted submittals at the Project site. In the event that the Architect or Owner should question the installation of any aspect of the Work requiring accepted submittal data, the inability of the superintendent to produce the required accepted submittal data upon demand shall constitute cause for a "stop work" order to be issued on that particular questioned aspect of the Work and all relevant appurtenant work. The cause shall be equal to the Contractor's not having received required acceptance of the submittal data. If so issued, such "stop orders" shall not be considered valid justification for extensions of Contract time or claims for additional monetary compensation.

END OF SECTION 01 33 00

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Regulatory Requirements

1.03 REGULATORY REQUIREMENTS

- A. The following regulations are applicable to the Work:
 - 1. International Building Code – 2018 Edition with 2020, 2022 Georgia State Amendments
 - 2. National Electrical Code – 2020 Edition with 2021 Georgia State Amendments
 - 3. NFPA Codes and Standards Current Edition
 - 4. NFPA 101 Life Safety Code, 2018 Edition with Georgia Amendments
 - 5. International Fire Code – 2018 Edition with 2020 Georgia State Amendments
 - 6. 2010 ADA Standards for Accessible Design, Department of Justice, September 15, 2010
 - 7. O.C.G.A. Title 25 (State Fire Law)
 - 8. O.C.G.A. Title 30 (Access to and Use of Public Facilities by Persons with Disabilities)
- B. The Contractor shall have copies of these above referenced regulations at the Project site and said documents shall be readily available to all parties involved in the Project.
- C. Other statutory requirements and regulations may affect the Work and the performance of the Contractor. Many of these requirements are referenced or described elsewhere in the Contract Documents, but their absence from the Contract Documents does not relieve the Contractor of the responsibility to perform in accordance with said requirements.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 41 00

SECTION 01 42 00

DEFINITIONS AND EXPLANATIONS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Definitions
 - 2. Specifications format and content explanation
 - 3. Drawing symbols
 - 4. Industry standards

1.03 DEFINITIONS

- A. Certain terms used repetitiously in these Specifications and elsewhere in the Contract Documents are defined generally in this section. The definitions and explanations of this section are not necessarily either complete or inclusive, but are general for the Work to the extent such definitions or explanations are not stated more explicitly in another provision of the Contract Documents.
- B. Approve: The terms "approve," "review," "inspect" and their variations, where used in conjunction with the Architect's actions on the Contractor's submittals, applications and requests, are limited to the responsibilities and duties of the Architect stated in the General Conditions and elsewhere in these Specifications. Such approvals shall not release the Contractor from his responsibility to fulfill the requirements of the Contract Documents, unless otherwise provided in the Contract Documents.
- C. Directed, Requested, etc: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "required," and "permitted," mean directed by the Architect, requested by the Architect, and similar phrases. However, no such implied meaning shall be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.
- D. Indicated: The term "indicated" is a cross reference to details, notes or schedules on the Drawings, other paragraphs or schedules in the Specifications, and similar means of recording requirements in the Contract Documents. Where other terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.
- E. Refer: Used to indicate that the subject is defined or specified in further detail at another location in the Contract Documents, or elsewhere as indicated.
- F. Furnish: The term "furnish" is used to mean supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations, as applicable in each instance.
- G. Install: Except as otherwise defined in greater detail, the term "install" is used to describe operations at Project site including the unloading, unpacking, assembly, erection, placing,

anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable to a material, product or system in each instance.

- H. Provide: Except as otherwise defined in greater detail, the term "provide" means to furnish and install, complete and ready for the intended use as applicable in each instance.

1.04 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. General: This section is provided to help the user of the Specifications understand the format, language, implied requirements, and similar conventions. None of the explanations shall be interpreted to modify the substance of the Contract.
- B. Specifications Production: Portions of these Specifications have been edited by the Owner and Architect and may contain minor deviations from traditional formats. Such deviations are a normal result of the production technique, and no other meaning will be implied or permitted. References to Specifications or Technical Specification, shall mean the same.
- C. Specification Format: Although not all portions may fully comply, the format of these Specifications is principally as described below. No meaning or significance is attached to such compliance or non-compliance.
1. Sections and Divisions: For convenience, the basic unit of the Specifications is a "section," each unit of which is named and numbered. These sections are organized into related families of sections which are categorized as "divisions." These divisions are recognized as present construction industry practice on uniform organization and sequencing of specifications. Section titles are not intended to limit the meaning or content of a section, to be fully descriptive of the requirements therein, or to be an integral part of the text.
 2. Section Numbering: Sections are given a numeric sequence to assist in cross referencing information in the Contract Documents. The numbering sequence, however, is not complete.
 3. Parts: Each section has been divided into three or fewer "parts" (Part 1 - General, Part 2 - Products, and Part 3 - Execution). These titles do not limit the meaning of and are not an integral part of the text of the Specification requirements.
- D. Specifications Content: The Specifications have been produced employing conventions in the use of language and in the intended meaning of certain words, terms and phrase when used in particular situations or circumstances. These conventions are explained as follows:
1. Language used in the Specifications is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the full context of the Contract Documents so indicates.
 2. Specifying Methods: The techniques or methods of specifying requirements vary throughout the Specifications text, and may include "prescriptive," "open generic-descriptive," "compliance with standards," "performance," "proprietary," or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work. Except for cases of overlapping or conflicting requirements as described in the following paragraph 3, where more than one set of requirements are specified for a particular unit of work, the option is intended to be Contractor's regardless of whether specifically indicated as such.
 3. Overlapping and Conflicting Requirements: Where compliance with two (2) or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements is specified, and overlapping of those different standards or requirements establishes two (2) different or conflicting levels of quality, the most stringent requirement is intended and will be enforced, unless specifically detailed

language written into the Contract Documents clearly indicates that the less stringent requirement is to be fulfilled. Refer uncertainties as to which of the two (2) levels of quality is more stringent to the Architect for a decision before proceeding.

4. Imperative Language is generally used throughout the Specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
- E. Minimum Quality/Quantity: In every instance, the quality level or quantity shown or specified is intended as the minimum for work to be performed or provided. Except as otherwise specifically indicated, the actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with requirements, the indicated numeric values are either minimum or maximums as noted or as appropriate for the context of the requirements. Refer instances of uncertainty to the Architect for decision before proceeding.
- F. Assignment of Specialists: The Specifications require (or at least imply) that certain specific construction activities shall be performed by specialist or expert entities who must be engaged for the performance of those units of work. These must be recognized as special requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
 1. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
 2. Trade Names: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.

1.05 DRAWING SYMBOLS

- A. **Graphic symbols used on the Drawings are those recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., Tenth edition. Any symbol or graphic hatch pattern shown on the drawings not specifically labeled as to the material indicated shall be interpreted as follows:**
 - a. **Written Clarification by the Architect prior to Bid**
 - b. **Industry Standards**
 - c. **Drawing Symbol and Hatch Legends**
- B. **Clarifications shall be requested in writing by the proposer where written direction and clarification will be provided by the Architect in the Addenda issued prior to bid.**
- C. **Under no circumstances will additional compensation be considered for uncertainty and lack of clarification on the part of the Contractor regarding drawing symbols and hatch patterns, not clarified during the bid period.**
- D. Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical Drawings are generally aligned with symbols recommended by ASHRAE. They are supplemented by more specific symbols indicated in legends and, where appropriate, are further supplemented by technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding.

1.06 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where Contract Documents include explicit and more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference. Individual sections indicate which codes and standards apply and which the Contractor must keep available at the Project Site for reference.
1. Referenced standards (referenced directly in Contract Documents or by governing regulations) have precedence over non-referenced standards.
 2. Non-referenced Standards: Except as otherwise limited by the Contract Documents, standards not referenced but recognized in the construction industry as applicable will be enforced for performance of the Work. The Architect shall decide whether a code or standards is applicable or which of several are applicable.
- B. Publication Dates: Where compliance with an industry standard is required, comply with standard in effect as of the date of the Contract Documents.
- C. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
 2. Although copies of standards needed for enforcement of requirements may be part of required submittals, the Architect reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.
- D. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the publication provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 42 00

SECTION 01 45 00

QUALITY CONTROL PROCEDURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Contract conditions.
 - 2. Reference standards.
 - 3. Procedures for submittal of quality control documentation.
 - 4. Quality assurance provisions.
 - 5. Coordination, sequencing and scheduling.
 - 6. General quality control activities and requirements.
 - 7. Procedures for specific quality control activities:
 - a. Testing
 - b. Inspecting
 - c. Pre-installation review and inspection
 - d. Manufacturers' field services
 - 8. Repair and Protection.

1.03 CONTRACT CONDITIONS

- A. Certifications and inspections and testing services are required to verify compliance with requirements specified or indicated. These services whether provided by the Contractor or the Owner do not relieve the Contractor of responsibility for compliance with requirements of the Contract Documents.
 - 1. Certifications, inspections, tests and related requirements specified are not intended to limit the Contractor's other quality control procedures that facilitate compliance with Contract Document requirements.
 - 2. Requirements for the Contractor to provide certifications, inspections, testing and related services by the Architect, Owner and other authorities having jurisdiction are not limited by the provisions of this section.
- B. Testing Agencies, whether employed by the Owner or Contractor, shall not approve any portion of the Work and shall not change requirements of the Contract Documents.
- C. The Owner is responsible for geotechnical and materials testing services required by the Contract Documents and will employ and compensate a Testing Agency for that purpose. Cost of these services shall not be included in the Contract Sum.

1.04 DEFINITIONS

- A. Certificate: A written statement that a particular product or a portion of the Work as accomplished conforms to the requirements of the Contract Documents.

- B. Installer: Any entity that performs a construction activity, whether an employee, subcontractor, or sub-subcontractor of the Contractor.
- C. Testing Agency: Any independent testing and inspection agency employed by the Owner or Contractor to perform certain quality control activities.
- D. Reference Standard: Any document incorporated unto the Specifications by reference rather than inclusion of text; including, but not limited to, voluntary specifications prepared by standards and industry organizations.
- E. Reports: Certified written documentation of inspections, tests or similar services.

1.05 REFERENCE STANDARDS

- A. General: Comply with edition of standards indicated; if date is not indicated, comply with edition in effect as of date of Contract Documents. Compliance with standards that are revised or reissued after that date will not be required unless incorporated into the Contract Documents by modification. When applicable codes, laws or regulations require editions of different dates, obtain instructions from the governing authorities as to which edition is required.
- B. The requirements of reference standards are binding on Contractor, just as if they were copied into the Contract Documents, but no provisions of reference standards shall alter the contractual relationship of the parties to the Contract.
- C. Maintain at the Project site each reference standard that is indicated elsewhere as to be kept at the site.

1.06 SUBMITTALS

- A. Reports: The Owner's Testing Agency shall submit certified written reports of each inspection, test or similar service to the Owner, Architect and Contractor as applicable. If the Contractor is responsible for an inspection, test or similar services and has employed a Testing Agency for such, his reports shall comply with the following:
 - 1. Reports shall be submitted for informational purposes through the Contractor under cover to the Architect.
 - 2. Submit other copies of reports to governing or regulatory authorities if so directed.
 - 3. Submit the report within three (3) working days after date of inspection or test if practicable.
 - 4. Reports of inspections, tests or similar services shall include, but not limited to the following data:
 - a. Date of issue.
 - b. Project name.
 - c. Name, address and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making inspections or tests.
 - f. Name and signature of reviewing registered engineer and laboratory inspector if applicable.
 - g. Related Specifications section(s).
 - h. Test method or basis of evaluation.
 - i. Ambient conditions at time of sample-taking and testing.
 - j. Observations, comments or professional opinions regarding compliance with requirements of Contract Documents.
 - k. Recommendations on re-testing if required.

- B. Certificates: Submit for information only unless otherwise directed.
 - 1. Certificates should be signed by the product manufacturer, unless otherwise specified or not applicable.
 - 2. Include the following information:
 - a. Date of certificate.
 - b. Project name.
 - c. Description of the product or system certified.
 - d. Specification section(s) involved.
 - e. When actual materials to be used are to be certified, include lot identification markings, destination or shipment, and quantity in shipment.
 - f. Title, name, and signature of person authorized to make certification.
- C. Qualifications Statements: Submit for information only unless otherwise directed.
- D. Manufacturers' Instructions: Submit for information only unless otherwise directed. Contractor shall identify to Architect any conflicts between manufacturers' instructions and Contract Documents prior to proceeding with affected work.

1.07 QUALITY ASSURANCE.

- A. Qualifications of manufacturers and installers shall be as indicated in individual sections of the Specifications.
- B. Manufacturer's field personnel shall be employed directly by the manufacturers and normally perform the activities specified.
- C. Qualifications of a Testing Agency, if utilized by Contractor, shall include the following criteria:
 - 1. Testing Agency shall meet "Recommended Requirements for Independent Laboratory Qualification" latest edition, published by The American Council of Independent Laboratories.
 - 2. Testing Agency shall be acceptable to Architect and shall have been regularly engaged in services specializing in types of inspections and tests to be performed for a minimum of five years. If requested by Engineer, submit evidence of satisfactory completion of services performed on projects of similar type and scope within specified period.
 - 3. Testing Agency shall be authorized to perform services by authorities having jurisdiction in State of Georgia.
 - 4. Testing Agency's on-site personnel shall be qualified and certified in the fields of testing required for the Project.
- D. Testing Equipment shall be calibrated at reasonable intervals with devices of an accuracy traceable to the National Bureau of Standards (NBS) standards or to accepted values of actual physical constants.

1.08 COORDINATION, SEQUENCING AND SCHEDULING

- A. Contractor shall coordinate its sequence of activities with any Testing Agency engaged to perform inspections, tests and similar services to accommodate required work with a minimum delay. Contractor shall schedule and coordinate activities to avoid removing and replacing construction to accommodate inspections and tests. Other responsibilities of Contractor for testing are indicated elsewhere in this section.

PART 2 –PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 GENERAL

- A. Provide work of the specified quality level; where quality level is not indicated, provide work of quality customary in similar types of work.
 - 1. Where codes, laws, or regulations require work of higher quality or performance, provide work complying with those codes, laws, and regulations.
 - 2. Where two or more quality provisions of the Contract Documents conflict, comply with the most stringent requirement; where requirements are different but apparently equal, and where it is uncertain which requirement is most stringent, obtain clarification from the Architect before proceeding.
 - 3. Actual quality may exceed the specified quality; verify that such differences are acceptable to the County (other criteria may make excessive quality undesirable).
- B. Manage and control products, subcontractors, suppliers, manufacturers, site conditions, installers, and workmanship in such a manner as to produce work of the specified quality. Use installers who are capable of producing work of specified quality.
- C. Perform all quality control activities specified unless indicated to be performed by other entities.

3.02 TESTING

- A. The requirements indicated below in this section are the Contractor's responsibilities relative to testing performed by the Owner and his Testing Agency as well as testing under the direct supervision of the Contractor.
- B. Cooperate with Testing Agency personnel. Provide access to the Work and to material supplier's plant and operations.
- C. Provide representative samples of materials proposed for use in the Work, in quantities sufficient for accurate testing and as specified.
- D. As necessary for performance of the testing, furnish incidental labor and facilities including but not limited to the following:
 - 1. Providing access to the Work to facilitate inspections and tests.
 - 2. Obtaining and handling samples at the Project site under the direction of the Testing Agency or assisting the Testing Agency in taking samples.
 - 3. Provide facilities for storage and caring of test samples on-site and security and protection of samples and test equipment at site.
 - 4. Provide preliminary design mixes for materials mixes that require control by Testing Agency.
- E. Notify Testing Agency sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests. Notify Owner's Testing Agency three (3) working days prior to the date of inspection or testing.
- F. Where the Owner has engaged a Testing Agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related

element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.

- G. Contractor shall notify the Architect in writing and receive a written reply prior to proceeding with additional testing beyond that specified in the Contract Documents.
- H. Re-testing and Cancellation of Testing:
 - 1. Contractor shall be responsible for re-testing where results of required inspections, test or similar services are unsatisfactory and do not comply with requirements of Contract Documents, regardless of whether the original test was the Contractor's responsibility.
 - 2. Costs for correction of deficient work or construction and re-testing shall be borne by the Contractor.
 - 3. If the Testing Agency is scheduled by the Contractor to perform tests or monitor activities on-site and testing or work to be monitored gets cancelled by the Contractor after the on-site arrival of the Testing Agency, the cost of the Testing Agency from arrival on-site until they are sent back or utilized for another activity including the cost for travel time shall be borne by the Contractor.
- I. Materials and work covered without testing and approval, if required, shall be uncovered and subsequently recovered at the Contractor's expense.

3.03 INSPECTING

- A. Perform inspections specified. When inspections reveal unsatisfactory work, make whatever changes or repairs are necessary and reinspect. Submit a report of each original inspection and each reinspection.

3.04 MANUFACTURERS' FIELD SERVICES

- A. Manufacturers' field services are specified in other sections of the Specifications.
- B. If Architect should be present, provide Architect with a timely notice of site visit so Architect may be present. After site visit, submit a report that records 1) site conditions, installer procedures, and related activities that are not as recommended by the manufacturer; and 2) instructions and recommendations provided by the representative that differ from manufacturer's standard printed instructions.

3.05 REPAIR AND PROTECTION

- A. Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities or exposed finishes. Comply with requirements of any references to cutting and patching in other divisions of the Specifications.
- B. Contractor shall be responsible for repair and protection of Work regardless of assignment of responsibility for inspection, testing or similar services.

END OF SECTION 01 45 00

SECTION 01 50 00

TEMPORARY FACILITIES, CONTROLS AND SERVICES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 and 0 Specifications, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Definitions
 - 2. Project conditions and scheduling
 - 3. Temporary construction support facilities
 - 4. Temporary utilities and services
 - 5. Special protection requirements
 - 6. Security – Also refer to Division 0 for detailed requirements
 - 7. Vehicular access and parking
 - 8. Termination and removal

1.03 DEFINITIONS

- A. Temporary Construction Support Facilities--Construction, structures, fixtures and other built items required to accomplish the Work but which are not incorporated into the finished Work. Included are field offices, storage sheds, temporary roads and paving, temporary enclosures, hoists, dewatering facilities, temporary signs, construction aids and miscellaneous facilities.
- B. Temporary Utilities--Sources of electric power, water, natural gas, etc., obtained from public utilities, other main distribution systems or temporary sources that support the Contractor's activities but are not a part of the permanent construction or are not yet incorporated into the permanent construction.
- C. Temporary Services--Activities and services required during construction that do not directly accomplish the Work. Included are waste disposal services, rodent and pest control, security and miscellaneous services.

1.04 PROJECT CONDITIONS AND SCHEDULING

- A. Comply with requirements of regulations, governing authorities and public utilities as to type, quantity, location and use of temporary facilities, utilities and services. Secure and maintain copies of permits, inspection reports or approvals for installation and use of temporary facilities and utilities.
- B. Use of permanent facilities prior to date of Substantial Completion is subject to Owner's conditions. During said approved use, Contractor shall maintain and protect completed work. Specific warranties shall not be reduced or voided by Contractor's use of permanent facilities and systems.
- C. Maintain required temporary facilities until not needed or until Substantial Completion. Exceptions to this requirement may be made by Owner as indicated in above paragraph.

1.05 QUALITY ASSURANCE

- A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department, and rescue squad rules.
 - 5. Environmental protection regulations.
- B. Standards: Comply with NFPA 241 “Standard for Safeguarding Construction, Alterations, and Demolition Operations,” ANSI A10 Series standards for “Safety Requirements for Construction and Demolition,” and NECA Electrical Design Library “Temporary Electrical Facilities.”
 - 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 “National Electric Code.”
- C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

PART 2 – PRODUCTS

2.01 TEMPORARY CONSTRUCTION FACILITIES

- A. **Provide a construction trailer at the project site. Construction trailer shall be capable of holding project meetings in a conditioned space with table, chairs, toilet, sink, and internet connectivity.**
- B. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical or aerated recirculation. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- C. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- E. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, pilot light for connection of power tools and equipment.
- F. Tarpaulins: Provide waterproof fire-resistant UL labeled tarpaulins with flame spread rating of 15 or less.
- G. Fire Extinguishers: Provide hand-carried portable UL-rated Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated Class ABC, dry chemical extinguishers or a combination of extinguishers of NFPA recommended

classes for the exposures. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION

- A. Use qualified personnel or services for installation of temporary facilities. Provide each facility ready to use when needed to avoid delay. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as needed. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 CONSTRUCTION SUPPORT FACILITIES

- A. Temporary Storage Facilities – Provide weather tight storage facilities with raised floors and of types and sizes required by storage demands at the project site. Locations of temporary storage facilities shall be subject to Owner’s acceptance. All material storage and staging shall be within the designated limits of the Project site. Contractor is responsible for identifying Project site boundaries and insuring that staging and material storage does not occur outside of the site.
- B. Provide a dedicated area for the storage of tools and equipment within each phased work area. The Contractor will be required to secure all tools at the conclusion of each work day and maintain a log of equipment and tools located on site. Combustibles and hazardous materials shall not be stored inside the building overnight or at any time when construction personnel are not present. The Contractor shall notify the Owner and all such materials shall be approved prior to bringing items into the building.
- C. Temporary Enclosures – As required by the progress and sequencing of the Work, provide temporary enclosures for protection of construction in progress or completed, from exposure to foul weather or other construction operations.
 - 1. Maintain protective barriers, vehicular barriers, temporary fencing, dust control barriers and sound control devices as needed for all phases of construction until final completion of the Project. Contractor shall be responsible for replacing established protective barriers and devices damaged or removed during construction and shall install any additional protection devices as required to perform the Work under this Contract.
 - 2. Provide temporary signs as required. Install signs where needed to inform personnel, vendors and public seeking entrance to the Project.
 - 3. Security, access and working requirements will be discussed at length during the preconstruction meeting and are outlined in Division 0 of these specifications.
 - 4. The Contractor is responsible for all temporary construction, phasing, scheduling, material deliveries, and other items that affect the sequence of construction or scheduling of the project.
- D. Sanitary Facilities: Sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project’s needs. Provide applicable paper goods in support of each facility. Provide covered waste containers for used materials.
 - 1. Toilets: Provide and maintain temporarily sited and self-contained toilet units until Substantial Completion on all Work. Do not allow employees to use permanent toilet facilities of the new construction.

2. Wash Facilities: Provide and maintain a safety shower/eye wash facility with potable water at a location convenient for personnel.
3. Drinking Water Facilities: Provide drinking water canisters or fixtures at convenient locations on the Project site. Include cup supply.

3.03 TEMPORARY UTILITIES AND SERVICES

- A. General: Engage the appropriate local utility companies to install temporary services or connect to existing services. Where company will not be responsible for full operation of service, Contractor shall provide remainder with matching, compatible materials and equipment and comply with company recommendations. Contractor shall provide adequate capacity at each stage of construction. Costs for temporary utility connection are borne by the Contractor. **The utility usage cost for all utilities shall be included in the bid.**
- B. Telecommunications Services: Maintain cell phones for Project Manager and Superintendent.
- C. Water Services: Temporary water shall be provided and paid for by the Contractor.
- D. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere on Project site **DAILY. Dedicated dumpsters for construction debris shall be provided.** Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold waste materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

3.04 VEHICULAR ACCESS AND PARKING

- A. Haul Routes: The Contractor shall be responsible for insuring that trucks providing delivery and/or hauling services to or from the Project site shall properly cover loads. Contractor shall keep the roads to the Project site and the project site clear, free of mud, dirt, debris, or other materials that are deposited as a result of Contractor's hauling and delivery services. The Contractor is responsible for coordinating and scheduling hauling activities so that the traffic flow on the access road to the project site is not disrupted at any time.
- B. Parking Areas: All parking for Contractor's employees, subcontractors' employees, and for vendors, delivery men, and visitors shall be on the Project site and in designated areas of the phasing construction documents.
- C. Traffic Control: The Contractor shall provide all traffic control on streets or drives adjacent to or on the Project site that is needed to facilitate the Contractor's Work and protect the public from activities associated with such work. These controls shall include signs, signals, barricades and flagmen, as necessary. The Contractor shall comply with all local, state, federal rules and regulations concerning the placement and use of traffic control devices

3.05 TEMPORARY PROTECTION AND CONTROL

- A. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Maintain protective barriers, tree protection and erosion control devices until Final Completion of the Project. Contractor shall be responsible for replacing established protective barriers, tree protection and erosion control devices damaged or removed during construction and shall install any additional protection devices as required to perform the Work under the Contract.

3.06 MAINTENANCE, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities in good operating condition until project completion.
- C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference from the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
 - 2. Remove all trash and debris and restore areas to conditions required by the Contract.

END OF SECTION 01 50 00

SECTION 01 60 00

PRODUCT REQUIREMENTS AND SELECTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this section.

1.02 SUMMARY

A. Section Includes:

- 1. Administrative and procedural requirements for Contractor’s selection of products.

B. Related Sections: The following sections contain requirements that relate to this Section:

- 1. Division 1 Section Explanations and Definitions, specifies the applicability of industry standards to products specified.
- 2. Division 1 Section Product Substitutions, specifies administrative procedures for handling requests for substitutions made after award of the Contract.

1.03 DEFINITIONS

- A. Definitions used in this section are not intended to change the meaning of other terms used in the Contract Documents, such as “specialties,” “systems,” “structure,” “finishes,” “accessories,” and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.

- 1. “Products” are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term “product” includes the terms “material,” “equipment,” “system,” and terms of similar intent. “Named Products” are item identified by manufacturer’s product name, including make or model number or other designation, shown or listed in the manufacturer’s published product literature, that is current as of the date of the Contract Documents.
- 2. “Materials” are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
- 3. “Equipment” is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

1.04 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.

- 1. When specified products are available only from sources that do not, or cannot, produce a quantity adequate to complete project requirements in a timely manner, consult with the Architect to determine the most important product qualities before proceeding. Qualities may include attributes, such as visual appearance, strength, durability, or compatibility. When a determination has been made, select products from sources producing products that possess these qualities, to the fullest extent possible.

- B. Compatibility of Options: When the Contractor is given the option of selecting between two (2) or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Name Plates: Except for required labels and operating date, do not attach or imprint manufacturer or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
 - 1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.

PART 2 – PRODUCTS

2.01 PRODUCT SELECTION

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
 - 1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
 - 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Product Selection Procedures: The Contract Documents and standards, codes and regulations govern product selection. Procedures governing product selection include the following:
 - a. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted, except when the product is unavailable, and then the substitution must be under the terms provided in Section 01 63 00, Product Substitution Procedures.
 - b. Descriptive Specification Requirements: Where Specifications described a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
 - c. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and that are recommended by the manufacturer for the application indicated.
 - d. Manufacturer's recommendation may be contained in published product literature or by the manufacturer's certification of performance.
 - 4. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
 - 5. Visual Matching: Where Specifications require matching an established sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.

- a. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning “Substitutions” for selection of a matching product in another product category.
6. Visual Selection: Where specified product requirements include the phrase “...as selected from manufacturer’s standard colors, patterns, textures...” or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
7. Contractor Option: Where several products or manufacturers are specified as being acceptable, Contractor has the option of choosing among these named.
8. Comparable or Equal: Where one or more products or manufacturers are specified by name and accompanied by the term “or approved equal,” or “or equal”, “equal to”, or “comparable to”, the Contractor may submit a request for substitution prior to bid in accordance with Section 01 63 00, Product Substitution Procedures for any equivalent product or manufacturer that is not specifically named.

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01 60 00

SECTION 01 63 00

PRODUCT SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this section.

1.02 SUMMARY

- A. Section Includes:
1. Procedures for substitution requests during bidding.
 2. Substitution requests outside of bidding period.
 3. Product evaluations.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PROCEDURES FOR SUBSTITUTION REQUESTS DURING BIDDING

- A. If Contractor wishes to use products different from those indicated in the Contract Documents, the Contractor shall make a written application as described herein. The burden of proving equality of proposed substitutions shall rest with the Contractor. **Substitution requests submitted directly by subcontractors or suppliers will NOT be considered.** Substitutions will not be considered for acceptance when acceptance will require substantial revision of Contract Documents.
- B. Except as described elsewhere herein, requests for substitution will be considered only during the bidding period. **Requests for substitutions must reach the Architect by the deadline established in the Instructions to Bidders for the receipt of questions and interpretations.** Requests received by the Architect after this date will not be considered. Acceptable substitutions will be added to the Contract Documents by addendum; no verbal approvals will be valid.
- C. Contractor shall submit written request with complete data substantiating compliance of the proposed product with requirements of Contract Documents. Submit request to Architect on a standard form, with three (3) copies of each request and supporting data. Only one request for each product will be considered. Include the following data with the request:
1. Project name.
 2. Contractor name.
 3. Date of request.
 4. Identification of product by Specification reference.
 5. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature; identify:
 - 1) Product description.
 - 2) Reference standards.
 - 3) Performance and test data.

- 4) Manufacturer's recommendations for use and installation.
 - 5) Dimensions and space requirements.
 - c. Samples, as applicable.
 - d. Drawings, as applicable.
 - e. Name and address of similar projects on which product has been used, and date of each installation.
 - f. Reports from independent testing laboratories, verified experience records from previous users and other printed or written information valid in the circumstances will be considered.
6. **Provide an itemized comparison between proposed substitution and product specified; list all variations AND a detailed explanation of how the proposed product meets or exceeds the requirements of the specifications. Website addresses are NOT an acceptable means of compliance with this requirement. The Architect will not perform ANY research in connection with product substitutions. It is the responsibility of the proposer/ contractor to demonstrate full compliance with these specifications and basis of design products.**
- 7. Net amount of change in Contract Sum (if applicable)
 - 8. Information on any changes caused in construction schedule.
 - 9. Description of any changes that will be required in other work or products if substitute product is accepted.
 - 10. Designation of availability of maintenance services and sources of replacement materials.

NOTE: SUBMISSIONS THAT DO NOT INCLUDE ALL INFORMATION WILL BE DEEMED INCOMPLETE AND NOT CONSIDERED.

- D. Architect's determination of acceptability of proposed submissions will be made based only on data submitted. In accepting a substitution, the Architect does not warrant that the product meets all express requirements of the Contract Documents. The approved substitution is subject to the same subsequent review and approval procedures as the products originally specified.
- E. Contractor shall coordinate all required components and accessories required to make any substitution complete and operable as intended by the basis of design product indicated in the contract documents including all work required for installation of accepted substitutions with interfacing work. The contractor shall bear any and all design costs required to make approved changes in the Work to properly incorporate substitutions. The contractor shall waive all claims for time and additional costs related to use of acceptable substitutions which become apparent following acceptance, including electrical, structural, mechanical, and plumbing requirements associated with the proposed substitution.
- F. Substitute products shall not be ordered or installed without written acceptance by the Architect. Unless substitutions are received and approved as described above, the Contractor shall be responsible for furnishing materials or products in accordance with the Contract Documents.

3.02 SUBSTITUTION REQUESTS OUTSIDE OF BIDDING PERIOD

- A. Substitutions will not be considered between the bid date and award of the Contract.
- B. In the event that specified items cannot be delivered to the Project site and incorporated into the Work at such times and in such quantities as to cause no delay, provided timely orders are placed, then Contractor may request a substitution in the manner described in this section. Should the accepted substitution provide a cost savings, the contract sum will be adjusted by Supplemental Agreement with Owner receiving the benefit of the net savings. No increase in the Contract Sum will be allowed on substitutions made after the receipt of bid except where the Contractor can verify a timely placement of orders appropriate to the materials and conditions involved. Contractor's inability to obtain specified items due to failure to place timely orders will not be considered reason for authorizing substitutions. Also, substitutions will not be considered when

they are indicated or implied on shop drawings or product data submitting without a separate written request.

- C. A substitution also may be considered after contract award when the proposed substitution provides a definitive reduction in the Contract Sum. Submittal and consideration of said substitutions shall be at the direction and discretion of the Owner. The process for review of such substitutions will be as described in this section.

3.03 PRODUCT EVALUATIONS

- A. In making a formal request for a substitution the Contractor represents that:
 - 1. He has investigated the proposed product and has determined that it is equal to or superior in all respects to that specified.
 - 2. He shall provide the same warranties for substitutions as for product specified.
 - 3. He shall be responsible for determining that materials requested for substitution are free of known hazardous substances.
 - 4. He shall coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be completed in all respects.

END OF SECTION 01 63 00

SECTION 01 65 00

MATERIAL AND EQUIPMENT HANDLING AND STORAGE

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Procedures for transportation and handling.
 - 2. Procedures for delivery and receiving.
 - 3. Procedures for storage.

1.03 DESCRIPTION

- A. Requirements of this Section are general in nature. Refer to individual sections of the Specifications for additional, specific requirements.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 PROCEDURES FOR TRANSPORTATION AND HANDLING

- A. Require suppliers to deliver manufactured Products to project site in manufacturers' original packaging with labels and seals intact. Labels shall indicate manufacturer, product name, application instructions and fire resistive classifications.
- B. Require suppliers to package products and materials in a manner that will protect them from damage during shipping, handling and storage. Arrange to transport products and materials by methods that avoid damage.

3.02 PROCEDURES FOR DELIVERY AND RECEIVING

- A. Provide labor and equipment adequate to handle delivery of products and materials by methods that prevent damage. Provide additional protection as necessary during handling to prevent damage to products and packaging. Lift large and heavy components at designated lift points only.
- B. Schedule deliveries to minimize long-term storage at the Project site and prevent over-crowding of construction spaces. Coordinate deliveries with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged or sensitive to deterioration, theft and other losses.
- C. Promptly inspect all materials and products upon delivery to ensure proper material, color, type and quantity, and to ensure that materials are undamaged and properly protected. Verify compliance with requirements of Contract Documents and approved submittals.

- D. Clearly mark partial deliveries to identify contents, permit easy accumulation of entire delivery and facilitate assembly.

3.03 PROCEDURES FOR STORAGE

- A. Store materials and equipment in a safe and protected manner. Observe manufacturer's recommendations for positioning, separation and ventilation, as applicable.
- B. Store materials at the Project site in a manner that will facilitate inspection, measurement, or counting of units. Store unpacked or loose products on shelves, in bins, or in neat groupings of like items.
- C. Where materials are required to be stored in protected conditioned environments, maintain temperatures and humidity within ranges required by manufacturer's instructions unless otherwise specified.
- D. Store heavy materials in manner that will not endanger supporting construction.
- E. Prevent corrosion, soiling, damage, deterioration, or breakage of materials or contact with deleterious materials.
- F. Deliver finish materials only to enclosed and conditioned spaces and where adequate indoor storage facilities are available.
- G. Store and handle paints and similar products subject to spillage in areas where spills will not deface finished surfaces or other work.
- H. Flammable or Hazardous Materials:
 - 1. Store minimum quantities in protected areas.
 - 2. Provide appropriate type fire extinguisher near said storage areas.
 - 3. Observe manufacturer's precautions and applicable ordinances and regulations.
 - 4. Flammable and Hazardous Materials shall not be stored inside the building.
- I. Comply with manufacturer's product data in all aspects of basic material storage, usage, handling, and installation, except where more stringent requirements are specified.
- J. Provide Material Safety and Data (MSDS) Sheets for all items, materials and products as required by laws, rules, regulations, ordinances or codes.

END OF SECTION 01 65 00

SECTION 01 72 00

FIELD ENGINEERING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. General: This Section specifies administrative and procedural requirements for field-engineering services including, but not limited to, land survey work.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 01 31 00 Project Coordination, for procedures for coordinating field engineering with other construction activities.
 - 2. Section 01 78 40 Project Record Documents, for submitting Project record surveys.

1.03 SUBMITTALS

- A. Certificates: Submit a certificate signed by the land surveyor or professional engineer certifying the location and elevation of improvements.
- B. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of Project Record Documents and Project Closeout Sections and as required to obtain Certificates of Occupancy.

1.04 QUALITY ASSURANCE

- A. Surveyor Qualifications: Engage a land surveyor registered in the state of Georgia to perform required land-surveying services as required.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Identification: The Owner will furnish a survey of the Project site that identifies existing control points.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 - 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.

2. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points.
- C. Establish and maintain a minimum of 2 permanent benchmarks on the site, referenced to data established by survey control points.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Drawings.
- D. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction.
1. Prior to construction, verify the locations and invert elevations at points of connection of storm sewer piping.
 2. Owner will not be responsible for costs of rework incurred because of Contractor's failure to verify said points.

3.02 PERFORMANCE

- A. Work from lines and levels established by the property survey. Establish benchmarks and markers to set lines and levels at each stage of construction and elsewhere as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
1. Advise all entities engaged in construction activities of marked lines and levels provided for their use.
 2. As construction proceeds, check every major element for line, level, and plumb.
- B. Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.
1. Record deviations from required lines and levels, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
- C. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, detention pond construction, fill and topsoil placement, utility slopes, invert elevations, and exterior lighting locations.
- D. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels, and control lines and levels required for mechanical and electrical work.
- E. Existing Utilities: Furnish information necessary to adjust, move, or relocate existing structures, utility poles, utility lines, utility services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.

END OF SECTION 01 72 00

SECTION 01 73 00

CONSTRUCTION EXECUTION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. General examination requirements.
 - 2. General installation procedures and requirements
 - 3. Installation requirements for building components.
 - 4. Hot work permit and Safety Requirements
 - 5. Safety precautions and requirements
 - 6. Phasing Requirements

1.03 DEFINITIONS

- A. Concealed Spaces: Spaces not accessible after completion of construction.
- B. Damage: Any sort of deterioration whether due to weather, normal wear and tear, accident, or abuse; resulting in soiling, marring, breakage, corrosion, rotting or impairment of function.
- C. Debris: Rubbish, waste materials, litter, volatile wastes, and similar materials.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 GENERAL EXAMINATION REQUIREMENTS

- A. Prior to performing work, examine the applicable substrates and the conditions under which the work is to be performed. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding.
- B. Contractor shall be responsible for verifying and obtaining proper substrate conditions, tolerances and material alignments to receive applied or attached materials and construction.
- C. Conditions that could have been discovered by examination of Project site and Drawings will not be allowed as cause for claims for extra work. In particular these conditions include:
 - 1. Underground utilities.
 - 2. Existing facilities, structures and appurtenances, on the site of the Project with which the Contractor must coordinate during construction and that can be reasonably discerned.
 - 3. Space requirements of items shown diagrammatically on Drawings.
 - 4. Limitations on transport and storage of materials and equipment.
 - 5. Locations of points of connections to utilities.

3.02 GENERAL PREPARATION REQUIREMENTS

- A. Take field measurements as required to fit work properly and recheck measurements prior to installing each product. Notify Architect promptly of any discrepancy in dimensions between Drawings and field measurements that will affect a current or anticipated installation.

3.03 WORKING TIMES

- A. The basic hours of work for the Contractor shall be 7:30 a.m. through 5:00 p.m., Monday through Friday. No work will be allowed outside of these hours unless scheduled in advance. The Contractor shall notify the Owner in advance for scheduling off-hours work.

3.03 GENERAL INSTALLATION PROCEDURES

- A. All construction shall be in accordance with all applicable federal, state, and local codes and regulations.
- B. Accurately locate the work and components of the work; make vertical work plumb; make horizontal work level. Align materials to give smooth uniform surface planes within specified tolerances.
- C. The Contractor is responsible for all temporary construction, phasing, scheduling, material deliveries, and other items that affect the sequence of construction or scheduling of the project and shall coordinate with the Owner's facility operations.
- D. Shut down of some utilities will be required in order to construct this project. These shut down activities may need to be performed after business hours and are to be coordinated with the Owner in advance.
- E. All mechanical, electrical and plumbing sub-contractors shall submit affidavits for each building permit to the building permits section at least two (2) days before requesting inspections. Affidavit forms are available at building permits department.
- F. The Contractor shall verify location of existing utilities before commencing work, and care shall be taken to protect all utilities which are to remain.
- G. Where space is limited, install components to maximize space available for maintenance and to maximize ease of removal for replacement.
- H. Install work in such manner and sequence as to preclude cutting and patching wherever possible.
- I. Install products only at the time and sequence, and under the environmental conditions that will insure best possible results.
- J. In finished areas, conceal pipes, ducts, and wiring within construction, unless otherwise indicated.

3.04 INSTALLATION OF COMPONENTS

- A. Install all products in accordance with manufacturer's instructions and recommendations, whether conveyed in the Contract Documents or not.
- B. Where mounting heights are not indicated, and there is no guidance for mounting, obtain Architect's instructions before proceeding.
- C. Separate incompatible materials with suitable materials or spacing. Prevent cathodic corrosion.

- D. Provide all anchors and fasteners required and use methods necessary to securely fasten work. In assemblies and installation, allow for thermal expansion and contraction, and for building movement.
- E. After installation, adjust operating components to provide for proper operation.
- F. The site shall remain secured for the duration of the project.

3.05 CLEANING AND PROTECTION OF INSTALLATIONS

- A. Keep the work site free of waste materials and debris; remove such waste periodically. Maintain level of cleanliness necessary for proper execution of the work. Where dust would impair execution of work, broom clean the entire area and keep clean.
- B. Remove debris from concealed space prior to enclosing space.
- C. Keep installed work clean, and clean again when soiled by other operations. Protect installed work from damage.
 - 1. Provide protective coverings for work that may be damaged by subsequent operations. Where heavy abuse is expected, use minimum of plywood for protection.
 - 2. Maintain protective coverings until Date of Substantial Completion.

3.06 SAFETY PRECAUTIONS AND REQUIREMENTS

- A. Take precautions to prevent fires and to facilitate fire-fighting operations.
 - 1. Store flammable materials in non-combustible containers, store away from potential fire sources; remove flammable waste regularly; provide adequate ventilation when using flammable or explosive substances.
 - 2. Carefully supervise the operation of potential fire sources including on-site welding and cutting.
 - 3. Keep temporary and permanent fire fighting facilities readily accessible; keep fire fighting routes open.
- B. Take precautions to prevent accidents due to physical hazards.
 - 1. Provide barricades, signs and warning lights as required to protect personnel and public from hazards and inform them thereof. Barricades and temporary safety railings shall comply with applicable safety regulations.
 - 2. Provide and require use of safety equipment, clothing and accessories as required by the construction activity and applicable safety regulations. This is a hard hat job; protective headgear must be worn at all times in the construction period.
- C. Take precautions to prevent pollution of air, water and soil.
 - 1. Comply with government regulatory requirements for disposal of waste.
 - 2. Do not dispose of volatile wastes such as petroleum products or other chemicals in storm or sanitary drains or on the grounds surrounding the Project site.
 - 3. Do not handle or dispose of waste materials, debris, cleaning compounds or other chemicals in a manner that will be harmful to plant life on grounds adjacent to the Project site.
 - 4. Comply with regulations and authorities having jurisdiction over safety and environmental standards affecting the Project.

5. Special care shall be taken to prevent newly constructed building phases from dust, mud or other material that may soil or stain the finished building materials.
- D. Take precautions not to allow noxious fumes, gases, or excessive amounts of dust to leave the work area. Notify the Owner at least 24 hours in advance of any scheduled activities that might lead to such emissions.
- E. Provide temporary supports and construction as required to prevent movement, collapse, or structural failure of the building, site work or any elements thereof.

END OF SECTION 01 73 00

SECTION 01 73 50

CUTTING AND PATCHING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and other general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Description
 - 2. Submittals
 - 3. Materials
 - 4. Examination prior to implementation
 - 5. Preparation
 - 6. Workmanship
 - 7. Cutting
 - 8. Patching
 - 9. Cleaning

1.03 DESCRIPTION

- A. Contractor shall be responsible for cutting, fitting and patching required to complete the Work including the following:
 - 1. Making parts fit together properly.
 - 2. Uncovering portions of the Work to provide for installation of ill-timed work or to accommodate inspections as required.
 - 3. Removing and replacing defective work or work not conforming to requirements of Contract Documents.
 - 4. Removing samples of installed work as specified for testing.
- B. Costs incurred for ill-timed work or uncovering of work shall include costs for services of Owner's consultants.

1.04 SUBMITTALS

- A. Prior to cutting and patching of work in place, the Contractor shall submit a written proposal to the Architect. This proposal shall be submitted at least three days in advance of performing any cutting or alterations and shall meet the requirements set forth in this section.
 - 1. The written proposal must be submitted in advance of any cutting that affects the following:
 - a. Work of Owner or any separate contract.
 - b. Structural elements of the Project.
 - c. Integrity or effectiveness of weather-exposed or waterproofed or moisture-resistant elements and systems.
 - d. Life expectancy, maintenance, efficiency or safety of operational elements.
 - e. Aesthetic qualities of visually exposed elements.
 - 2. The Contractor shall include the following information in the proposal:

- a. Identification of Project.
 - b. Description of affected work.
 - c. Extent of cutting and patching and how it is to be performed; indication of why it cannot be avoided.
 - d. Anticipated results in terms of changes to construction; including changes to other significant visual elements.
 - e. Products proposed for use.
 - f. Firms or entities that will perform the work.
 - g. Utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
 - h. Alternate methods, if applicable.
 - i. Dates and times when cutting and patching work is to be performed.
3. Should conditions of the work or the schedule indicate a change of products from the original installation, Contractor shall submit a request for substitution as specified in Product Options and Substitutions Section.
- B. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Materials for patching and replacement of work removed: Comply with Specification Sections for type of work to be performed. Use materials identical to original installed materials. If identical materials cannot be used where exposed surfaces are involved, use materials that match original adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of original materials installed.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Prior to proceeding with work, examine Project conditions and surfaces to receive work including elements subject to damage or movement during cutting and patching operations. Take corrective action if unsafe or unsatisfactory conditions are encountered or anticipated.
- B. After cutting, uncovering or removing, inspect conditions affecting installation of products or performance of further work. If unsatisfactory or questionable conditions are encountered, report such conditions in writing to Architect and do not proceed with work until Architect has provided further instructions.

3.02 PREPARATION

- A. Temporary Supports: Provide adequate temporary supports for work to be cut and as necessary to insure the structural integrity of the affected portion of the work.

- B. Protection:
 - 1. Protect adjacent construction during cutting and patching work to prevent damage. Provide all materials, devices and methods as required to protect work and adjacent surfaces.
 - 2. Take precautions necessary to avoid cutting operable pipes, conduits or ductwork serving the building including those scheduled to be removed or relocated until provisions have been made to bypass them.
 - 3. Protect portions of the work that may be exposed to the elements by cutting and patching.

3.03 WORKMANSHIP

- A. Employ skilled workers to perform cutting and patching work. To the greatest extent possible, retain installers or fabricators to perform cutting and patching work, especially for visually exposed finished surfaces and weather-exposed, waterproofed or moisture resistant elements.
- B. Perform demolition and cutting work by methods that will not damage adjacent construction and will provide proper surfaces for patching work.
- C. Execute work, by methods which will prevent settlement or damage to other work.
- D. Elements of a structural or supporting nature, including those which are concealed and exposed after removal of work for repairs or patching, shall be inspected and the Architect notified should additional work be indicated due to loss of structural integrity, rot, rust, corrosion or other similar conditions.
- E. Restore work that has been cut and removed so that completed Work is in accordance with requirements of Contract Documents. Perform all installations, fittings, and adjustments of materials or products to comply with manufacturers' product data, its intended functions, specified tolerances and finishes.
- F. Fit restored work airtight around pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- G. Refinish surfaces to provide an even, uniform finish to match adjacent finishes. For continuous surfaces, refinish to nearest intersection. For an assembly, refinish entire unit.

3.04 CUTTING

- A. Perform cutting using methods least likely to damage adjoining construction or elements to be retained. Where possible, review proposed procedures with original installer; comply with original installer's recommendations.
- B. Where cutting is required, use tools designed for sawing, cutting and grinding, not hammering or chopping. Cut openings neat to sizes required with minimum disturbances to adjacent surfaces. Cut or drill from exposed or finished side into concealed surfaces to avoid marring finished surfaces.
- C. Perform cutting through concrete or masonry using cutting machines designed for this purpose such as carborundum saws or diamond core drills.

- D. Where operable utility services are required to be removed, relocated or abandoned, bypass services such as pipes or conduits before cutting. Cut off pipes or conduits in walls or partitions to be removed; and cap, plug and seal remaining portions of pipe after by-passing.

3.05 PATCHING

- A. Patch with methods and materials that are the least obvious. Restore exposed finishes of patched areas and adjacent areas in a manner that will be indistinguishable in the finished Work.
- B. Where possible, inspect and test patched areas to demonstrate integrity of installation.
- C. Gypsum wallboard hot patches are not allowed on this project. All patches shall be from stud to stud.

3.06 CLEANING

- A. Clean areas and spaces where cutting and patching has been performed or where such work areas were accessed.
- B. Remove excess paint, mortar, oils, putty or other items of similar nature from patched work and adjoining surfaces.
- C. Restore any and all damaged or displaced insulation or coverings on pipe, ductwork or in walls or ceiling spaces.

END OF SECTION 01 73 50

SECTION 01 74 00

CLEANING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for cleaning during construction and final cleaning prior to Substantial Completion.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 01 73 00 Construction Execution.
 - 2. Special cleaning requirements for specific construction elements are included in appropriate Sections of Divisions 2 through 33.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 – EXECUTION

3.01 CLEANING DURING CONSTRUCTION

- A. During construction period, Contractor shall keep the building, Project site, and adjacent properties free from accumulation of debris and waste materials at all times. The Contractor shall execute all cleaning procedures necessary to maintain these conditions.
- B. Provide adequate on-site containers for waste collection. Place all waste materials and debris in said containers in an expeditious manner to prevent accumulation. Remove waste from Project site when containers become full. Legally dispose of all such waste and debris off Project site. Dispose of no materials in adjacent waterways.
- C. Control windblown dust and materials subject to blowing. Wet down materials as necessary to prevent such occurrences.
- D. Allow no accumulation of food scraps or organic debris that may contribute to spread of rats, roaches, and other vermin. Contractor shall be responsible for securing services of any pest extermination during construction through Substantial Completion.
- E. Allow no graffiti or similar distasteful comments or illustrations to be authored on building materials or on any temporary or permanent construction on the Project site. Contractor shall monitor the Project for violations of this item, and shall take action to clean, cover, or replace subject materials as necessary.

3.02 FINAL CLEANING

- A. Prior to Date of Substantial Completion, clean all finished surfaces in accordance with manufacturers' product data and requirements of applicable sections of Specifications. All said cleaning shall be performed prior to Contractor's request that the Project or portion thereof be inspected for Substantial Completion. For the "final cleaning" employ experienced workers or professional cleaners. Quality of cleaning work shall be as expected in standard commercial building cleaning and maintenance programs.
- B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or a portion of the Project.
 - 1. Clean the Project Site, yard and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and foreign substances.
 - 2. Sweep paved areas and concrete surfaces broom clean. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - 3. Remove petrochemical spills, stains, and other foreign deposits.
 - 4. Remove tools, construction equipment, machinery, and surplus material from the site.
 - 5. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces.
 - 6. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - 7. Broom clean concrete floors in unoccupied spaces.
 - 8. Remove labels that are not permanent labels.
 - 9. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 10. Wipe surfaces of electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - 11. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs and defective parts.
 - 12. Leave the Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and treatment rid the Project of rodents, insects, and other pests. Comply with regulations of local authorities.
- D. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.
- E. Compliances: Comply with governing regulations and safety standards for cleaning operations. Make Material Safety Data Sheets (MSDS) available as required by applicable legal requirements for all cleaning agents used on the Project site. Remove waste materials from the site and dispose of lawfully. Comply fully with federal, state and local environmental and antipollution regulations.

3.03 GENERAL SITE MAINTENANCE

- A. Take precautions to prevent pollution of air, water and soil.
 - 1. Do not burn or bury waste materials or debris on Project site. Comply with government regulatory and legal requirements for disposal of waste.
 - 2. Do not dispose of volatile wastes such as paint, mineral spirits, oils or paint thinner in storm or sanitary drains, on pavements or in gutters of Project site.

3. Do not handle or dispose of waste materials, debris, cleaning compounds or other chemicals in a manner that will contaminate the soil or be harmful to plant life on the Project site.
 4. Comply with laws, rules regulations, ordinances, codes and authorities having jurisdiction over safety and environmental standards affecting the Project.
- B. Minimize discharge of rainwater and effluent into sewer and adjacent waterways.
1. Provide temporary means of drainage to prevent flooding and ponding on the Project site.
 2. Prevent site erosion due to stormwater runoff.
 3. Control sediment discharges; filter out soil, debris and contaminants.
 4. Comply with all laws, rules, regulations, ordinances, codes and other legal requirements governing erosion control and stormwater runoff both on the Project site and leaving the Project site.
- C. Keep adjacent public ways free of debris, hazardous and unsanitary conditions and nuisances. Provide adequate traffic control by means of signs, signals and flagmen, as necessary.

END OF SECTION 01 74 00

SECTION 01 77 00

CONTRACT CLOSE-OUT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
 - 1. Substantial Completion Procedures
 - 2. Final Completion Procedures

1.03 DEFINITIONS

- A. Substantial Completion: The time at which the Work is sufficiently complete in accordance with the Contract Documents so that the County can occupy or use the Work for its intended purpose.
- B. Final Completion: The stage at which all the Work has been satisfactorily completed in accordance with the Contract Documents.
- C. List of Incomplete Work: A comprehensive list of items to be completed or corrected, prepared by the Contractor for the purpose of obtaining certification of Substantial Completion. This list is also referred to as a "punch list."

1.04 SUBSTANTIAL COMPLETION PROCEDURES

- A. The Architect will perform one (1) inspection for Substantial Completion upon the request of the Contractor. One (1) Certificate of Substantial Completion will be issued for the project; this certificate will include all of the Work and not a portion or portions. If the Architect is unable to issue the Certificate of Substantial Completion because the Work is not considered to be substantially complete, the Contractor shall pay all subsequent inspection costs, including compensation for the Architect's services.
- B. Prior to requesting Architect's inspection for Certificate of Substantial Completion, complete the following activities and list all known exceptions in the request:
 - 1. Obtain and submit the Certificate of Occupancy and any applicable operating permits from authorities having jurisdiction. Said certificates and permits (if applicable) shall enable County to have full and unrestricted use of the Work, and unrestricted access to services and utilities.
 - 2. Touch up and otherwise repair and restore marred exposed finishes and conduct the final cleaning of the Project as directed elsewhere in these Specifications.
 - 3. Inform Owner of necessary procedures for changing over utilities and services and other operational and maintenance responsibilities.
 - 4. Conduct for the Owner's personnel the demonstrations of equipment and systems and provide the operations and maintenance training required by the Contract Documents.
 - 5. Complete all graphics and signage, paving marking, and traffic control signage.
 - 6. Remove all temporary facilities from the Project site.

7. Deliver to the Owner all tools, spare parts, extra stocks of materials, and similar physical items as required by the Contract Documents.
 8. Place fire extinguishers charged and ready to use. Extinguishers shall bear tags showing the date tested and by whom.
 9. Make changeover to permanent locking system, transmit keys to Owner, and advise Owner's personnel of changeover in security. Accompany keys with Finish Hardware Schedule and tag each key to indicate which lock it operates.
 10. Complete all other activities specified by the Contract Documents to be completed before Substantial Completion.
- C. Prior to requesting Architect's inspections for Substantial Completion, complete the following submittals (in triplicate unless specified otherwise):
1. List of incomplete work.
 2. Reports on operations and maintenance training for Owner's personnel.
 3. All submittals specified in the Contract Documents to be completed before Substantial Completion.
- D. On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following the inspection or advise the Contractor of construction that must be completed or corrected before the Certificate will be issued. In the latter case, any follow-up inspections that must occur prior to granting Substantial Completion will be considered additional services by the Architect and will be compensated by the Contractor. The Certificate of Substantial Completion will be accompanied as necessary by a list of deficient work items (a Punch list) that must be completed or corrected by the Contractor prior to his requesting an inspection by the Architect for final acceptance and final completion of the Project.
- E. Upon completion of the inspection and determination that the Work is substantially complete; the Architect's shall prepare a Certificate of Substantial Completion (on AIA Form No. G704, 2000 edition, or its equivalent) establishing a date when the Project is sufficiently complete and suitable for the use it is intended, and identifying a Punch list. The Architect and County shall execute said Certificate.

1.05 FINAL COMPLETION PROCEDURES

- A. The Contractor's request for final inspection and final application for payment may coincide. The Architect will perform only one inspection for Final Completion, upon the request of the Contractor. The Contractor should take care that all requirements for Final Completion as indicated in the paragraphs below have been completed prior to submitting their request. If the Architect is unable to issue the certificate for final payment because the Work is not complete, the Contractor shall pay all subsequent inspection costs, including compensation for the Architect's services.
- B. Prior to requesting Architect's final inspection for certificate of Final Completion and Final Payment, complete the following items and list any known exceptions in the request:
1. Submit a copy of the Punch list of itemized work to be completed or corrected, stating that each item has been completed, corrected or otherwise resolved for acceptance.
 2. Submit final pay application accounting for all changes in Contract Sum, with final releases and support not previously submitted and accepted, including Consent of Surety to Final Payment.
 3. Submit special warranties, workmanship bonds, maintenance agreements, final certifications and similar documents required by Contract Documents or related to installed equipment and materials. Submit required closeout submittals listed herein.

C. Closeout Submittals:

1. Warranties: In accordance with Contract Documents, Contractor shall furnish his one-year warranty in writing, on the form bound hereinafter. Warranties for a longer period of time may be required by the Specifications. These warranties of a longer period also shall be assembled and submitted. Unless otherwise specified, all warranties shall commence on the Date of Substantial Completion. The warranties shall state the date on which they expire.
2. Statutory Affidavit: Before final closeout of the Work, the Contractor and Subcontractors shall furnish a Statutory Affidavit in the form attached to this section.
3. Inspection Reports: Secure and submit to the Owner, through the Architect, a certification from the local government agency or agencies having jurisdiction that the construction has been inspected as required by laws or ordinances, and that the Project is acceptable to the following authorities:
 - Local Building Inspector
 - Local Electrical Inspector
 - Local Dept. of Public Utilities
 - Local Development Inspector
 - Local Fire Marshal
4. Certificate of Substantial Completion and Certificate of Final Completion: A Certificate of Substantial Completion including an accompanying Punch list for the Project will be prepared by the Architect for the purpose of establishing a date when the Project is sufficiently complete and suitable for the use it is intended. On final inspection of the Project, submit a Certificate of Final Completion verifying that Punch list items are complete and that all closing documents and payments are in order (as shown by the accompanying project close-out check list), and establishing a Date of Final Acceptance.
5. Project Record Documents: Submit to the Owner through the Architect the Project Record Documents (Drawings and Project Manual) specified elsewhere in these Specifications.
6. Maintenance & Operations Manuals: Submit to the Owner through the Architect the Operations and Maintenance Manuals specified elsewhere in these Specifications.
7. Materials and Services List: In addition to the Maintenance and Operations Manuals, prepare and submit to the Owner through Architect a list of all subcontractors and major suppliers who provided products, materials and services for the Project. Indicate company names, addresses, phone numbers, and personnel to contact for information or in case of problems. The list shall be typed in legible and organized format.
8. Close Out Documents:
 1. Special Warranties in excess of (1) year sections 2 to 33.
 2. Attic Stock.
 3. Operations and maintenance data.
 4. Project Record documents

PROJECT CLOSE-OUT

CHECK OFF LIST

<u>DOCUMENTS</u>	<u>NO. OF COPIES</u>	<u>DATE RECEIVED</u>
Contractor's Warranty	_____	_____
Statutory Affidavit (Contractor's)	_____	_____
Statutory Affidavit (Sub-contractors')	_____	_____
Inspection Reports:		
City Building Inspector	_____	_____
City Electrical Inspector	_____	_____
City Dept. of Public Utilities	_____	_____
City Development Inspector	_____	_____
Fire Marshal Occupancy Certificate	_____	_____
Planning & Development Occupancy Certificate	_____	_____
Record Drawings and Specifications	_____	_____
Operations and Maintenance Manuals & related Submittals	_____	_____

PROJECT CLOSE-OUT
CHECK-OFF LIST
(Continued)

	<u>NO. OF COPIES</u>	<u>DATE RECEIVED</u>
Special Warranties (beyond one-year limit): (List appropriate warranties)		
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
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PROJECT CLOSE-OUT

CHECK OFF LIST
(Continued)

	<u>NO. OF COPIES</u>	<u>DATE RECEIVED</u>
<u>DOCUMENTS</u>		
Punchlist Items Completed	_____	_____
Certificate of Substantial Completion	_____	_____
Certificate of Final Completion	_____	_____
Consent of Surety of Final Payment	_____	_____

I certify that, being familiar with the Contract Documents for this Project, to the best of my knowledge, the items checked off hereinabove constitute all that are applicable to this Project.

Date Submitted to the Architect: _____

Date Submitted to the Owner: _____

Contractor:

Architect: Precision Planning, Inc.

STATUTORY AFFIDAVIT

STATE OF _____, COUNTY OF _____

FROM: _____

TO: _____

RE: Contract entered into the _____ day of _____ 20 ___, between the above mentioned parties for the construction of _____ at _____

KNOW ALL MEN BY THESE PRESENTS:

- 1. The Undersigned hereby certifies that all work required under the above contract has been performed in accordance with the terms thereof, that all material, men, subcontractors, mechanics, and laborers have been paid and satisfied in full, and that there are no outstanding claims of any character arising out of the performance of the contract which have not been paid and satisfied in full.
- 2. The undersigned further certifies that to the best of his knowledge and belief there are no unsatisfied claims for damages resulting from injury or death to any employees, subcontractors, or the public at large arising out of the performance of the contract, or any suits or claims for any other damage of any kind, nature, or description which might constitute a lien upon the property of the County.

The undersigned makes this affidavit as provided by law and for the purpose of receiving final payment in full settlement of all claims arising under or by virtue of the contract, and acceptance of such payment is acknowledged as a release of the County from any and all claims under or by virtue of the contract.

IN WITNESS WHEREOF, the undersigned has signed and sealed this instrument this day of _____, 20 __.

Personally appeared before the undersigned, _____ who, after being duly sworn, depose(s) and say(s) that the facts stated in the above affidavit are true.

Notary Public

This _____ date of _____, 20__.

My commission expires _____

CERTIFICATE OF FINAL COMPLETION

OWNER: _____ CONTRACTOR: _____

ARCHITECT: _____ BONDING CO.: _____

PROJECT NAME: _____

CONTRACTOR: _____

(Name, Address) _____

TO (OWNER):

THIS CERTIFICATE COVERS THE ENTIRE PROJECT

By execution of this document, the Contractor and Architect each certify that the work performed under this Contract has been reviewed at a final inspection on _____, and found to be complete as verified by the attached project Close-Out Check-Off list, and the County accepts the Project as complete on the last date of this Certificate. Final payment to the Contractor is authorized. Execution and acceptance of this Certificate by the County, shall in no way waive or void any conditions of the Contract Documents.

A certificate of Substantial Completion has been issued establishing _____, as the date of beneficial use and the commencement of all Warranties and Guarantees required by the Contract Documents.

ARCHITECT BY DATE

CONTRACTOR BY DATE

OWNER BY DATE

END OF SECTION 01 77 00

SECTION 01 78 20

OPERATIONS AND MAINTENANCE DATA

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for operation and maintenance manuals, including the following:
 - 1. Preparing and submitting operation and maintenance manuals for building operating systems and equipment.
 - 2. Preparing and submitting instruction manuals covering the care, preservation, and maintenance of architectural products and finishes.
 - 3. Instruction of the Owner's operating personnel in the operation and maintenance of building systems and equipment.
- B. Related Sections: The following sections contain requirements that relate to this section:
 - 1. Division 1 Section, Submittals, specifies preparation of Shop Drawings and Product Data.
 - 2. Division 1 Section, Contract Closeout, specifies general closeout requirements.
 - 3. Division 1 Section, Project Record Documents, specifies record document requirements.
 - 4. Appropriate Sections of Divisions 2 through 33 specify special operation and maintenance data requirements for specific pieces of equipment or building operating systems.

1.03 QUALITY ASSURANCE

- A. Maintenance Manual Preparation: In preparation of maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of equipment or system involved.
 - 1. Where maintenance manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.
 - 2. Where maintenance manuals require drawings or diagrams, use draftsmen capable of preparing drawings clearly in an understandable format.
- B. Instructions for the Owner's Personnel: Use experienced instructors thoroughly trained and experienced in operation and maintenance of equipment or system involved to instruct the Owner's operation and maintenance personnel.

1.04 SUBMITTALS

- A. Submittal Schedule: Comply with the following schedule for submitting operation and maintenance manuals:

1. Before Substantial Completion, when each installation that requires operation and maintenance manuals is nominally complete, submit a draft copy of each manual to the Architect for review. Include a complete index or table of contents of each manual. The Architect will return the draft with comments within 15 days of receipt.
 2. Contractor must incorporate all of Architect's revisions and comments and submit final acceptable operations and maintenance manuals to Architect prior to requesting Final Completion on the Project.
- B. Form of Submittal: **Prepare operation and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel and two (2) electronic versions in PDF format.** Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.
1. Binders: For each manual, provide heavy-duty, commercial-quality, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-1/2-by-11- inch paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.
 - a. Where 2 or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.
 - b. Identify each binder on front and spine, with the printed title "Operation and Maintenance Manual," Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.
 2. Dividers: Provide heavy paper dividers with celluloid-covered tabs for each separate Section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the section on each divider.
 3. Text Material: Where maintenance manuals require written material, use the manufacturer's standard printed material. If manufacturer's standard printed material is not available, provide specially prepared data, neatly typewritten, on 8-1/2-by-11-inch white bond paper.
 4. Drawings: Where maintenance manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.
 - a. Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.
 - b. If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents, and drawing location at the appropriate location in the manual.

1.05 MANUAL CONTENT

- A. In each manual include information specified in the individual Specification Section and the following information for each major component of building equipment and its controls:
1. General system or equipment description.
 2. Design factors and assumptions.
 3. Copies of applicable shop drawings and product data.
 4. System or equipment identification, including:
 - a. Name of manufacturer.
 - b. Model number.
 - c. Serial number of each component.
 5. Operating instructions.
 6. Emergency instructions.
 7. Wiring diagrams.

8. Inspection and test procedures.
 9. Maintenance procedures and schedules.
 10. Precautions against improper use and maintenance.
 11. Copies of warranties.
 12. Repair instructions including spare parts listing.
 13. Sources of required maintenance materials and related services.
 14. Manual index.
- B. Organize each manual into separate sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of product data, supplemented by drawings and written text; and copies of each warranty, bond, and service contract issued.
1. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:
 - a. Subject matter covered by the manual.
 - b. Name and address of the Project.
 - c. Date of submittal.
 - d. Name, address, and telephone number of the Contractor.
 - e. Name and address of the Architect.
 - f. Cross-reference to related systems in other operation and maintenance manuals.
 2. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.
 - a. Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.
 3. General Information: Provide a general information section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or installer and the maintenance contractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.
 4. Product Data: Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one item in a tabular format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
 5. Written Text: Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.
 6. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in Project Record Drawings to assure correct illustration of the completed installation.
 - a. Do not use original Project Record Documents as part of operation and maintenance manuals.
 7. Warranties, Bonds, and Service Contracts: Provide a copy of each warranty, bond, or service contract in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to follow in the event of product

failure. List circumstances and conditions that would affect validity of warranty or bond.

1.06 MATERIAL AND FINISHES MAINTENANCE MANUAL

- A. **Submit two (2) copies of each manual and one (1) electronic PDF**, in final form, on material and finishes to the Architect for distribution. Provide one section for architectural products, including applied materials and finishes. Provide a second section for products designed for moisture protection and products exposed to the weather.
1. Refer to individual Specification Sections for additional requirements on care and maintenance of materials and finishes.
- B. Architectural Products: Provide manufacturer's data and instructions on care and maintenance of architectural products, including applied materials and finishes.
1. **Manufacturer's Data:** Provide complete information on architectural products, including the following, as applicable:
 - a. Manufacturer's catalog number.
 - b. Size.
 - c. Material composition.
 - d. Color.
 - e. Texture.
 - f. Reordering information for specially manufactured products.
 2. **Care and Maintenance Instructions:** Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information on cleaning agents and methods that could prove detrimental to the product. Include manufacturer's recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Products Exposed to the Weather: Provide complete manufacturer's data with instructions on inspection, maintenance, and repair of products exposed to the weather or designed for moisture-protection purposes.
1. **Manufacturer's Data:** Provide manufacturer's data giving detailed information, including the following, as applicable:
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Installation details.
 - d. Inspection procedures.
 - e. Maintenance information.
 - f. Repair procedures.
- D. **Schedule:** Provide complete information in the materials and finishes manual on products specified in the following sections:

1.07 EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL

- A. **Submit two (2) copies of each manual and one (1) electronic PDF**, in final form, on equipment and systems to the Architect for distribution. Provide separate manuals for each unit of equipment, each operating system, and each electric and electronic system.
1. Refer to individual Specification Sections for additional requirements on operation and maintenance of the various pieces of equipment and operating systems.

- B. Equipment and Systems: Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.
1. Description: Provide a complete description of each unit and related component parts, including the following:
 - a. Equipment or system function.
 - b. Operating characteristics.
 - c. Limiting conditions.
 - d. Performance curves.
 - e. Engineering data and tests.
 - f. Complete nomenclature and number of replacement parts.
 2. Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following:
 - a. Printed operation and maintenance instructions.
 - b. Assembly drawings and diagrams required for maintenance.
 - c. List of items recommended to be stocked as spare parts.
 3. Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following:
 - a. Routine operations.
 - b. Troubleshooting guide.
 - c. Disassembly, repair, and reassembly.
 - d. Alignment, adjusting, and checking.
 4. Operating Procedures: Provide information on equipment and system operating procedures, including the following:
 - a. Startup procedures.
 - b. Equipment or system break-in.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Instructions on stopping.
 - f. Shutdown and emergency instructions.
 - g. Summer and winter operating instructions.
 - h. Required sequences for electric or electronic systems.
 - i. Special operating instructions.
 5. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.
 6. Controls: Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.
 7. Coordination Drawings: Provide Contractor's coordination drawings.
 - a. Provide as-installed, color-coded, piping diagrams, where required for identification.
 8. Circuit Directories: For electric and electronic systems, provide complete circuit directories of panelboards, including the following:
 - a. Electric service.
 - b. Controls.
 - c. Communication.
- C. Schedule: Provide complete information in the equipment and systems manual on products specified in the following sections:

1.08 INSTRUCTIONS FOR THE OWNER'S PERSONNEL

- A. Refer to Section 01 81 50 System Demonstration and Training for additional requirements.
- B. Prior to the Date of Substantial Completion, instruct personnel designated by the Owner in the operation and maintenance of equipment and systems.

1. Systems shall include but not necessarily be limited to:
 - a. Electrical power and lighting
 2. For equipment and operable systems, explain all modes of operation. Demonstrate all functions, including startup, operation, control, adjustment, shutdown, servicing, and maintenance.
 3. For other building elements and systems describe the installation and indicate manufacturer's directed or otherwise preferred means of cleaning, servicing, maintaining or repairing.
 4. Review terms of warranties and procedures for obtaining warranty service.
 5. Have operating and maintenance data available for use during instruction. Review contents with Owner's personnel. Prepare and insert additional data when need becomes apparent during instruction.
- C. Arrange times and places for instruction with Owner. Provide instruction by qualified personnel of Contractor, their subcontractor, or applicable manufacturer's representative.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION (NOT APPLICABLE)

END OF SECTION 01 78 20

SECTION 01 78 30

WARRANTIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 Section, Contract Closeout, specifies contract closeout procedures.
 - 2. Divisions 2 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.
 - 3. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 DEFINITIONS

- A. Contractor's Warranty: Contractor shall provide a warranty on the Project that warrants that all labor and materials furnished and work performed are in accordance with the Contract Documents and will be free from defects due to defective materials and/or workmanship for a period of one year from the Date of Substantial Completion. Warranty shall be provided on the form provided in this Specification Section.
- B. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- C. Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.04 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

- C. Replacement Cost: Upon determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether the Owner has benefited from use of the work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the work or part of the work, the Owner reserves the right to refuse to accept the work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.05 SUBMITTALS

- A. Submit written warranties to the Architect effective on the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
- B. When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution. Refer to Specifications Divisions 2 through 33 for specific Contract requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: Compile two (2) copies of each required warranty properly executed by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the installer.
 - 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
 - 3. Provide additional copies of each required warranty, as necessary, for inclusion in each required Operations and Maintenance Manual.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.01 LIST OF WARRANTIES

A. Schedule: Provide warranties on products and installations as specified in the following Sections:

All utilized Sections 1 through 33 as indicated.

3.02 CONTRACTOR’S WARRANTY

A. The format of submission of the Contractor’s Warranty is included on the subsequent page in this Specification Section.

CONTRACTOR WARRANTY FORM

PROJECT: _____

LOCATION: _____

OWNER: _____

We, _____, Contractor
(Contractor's Name)

for the above referenced project, do hereby warrant that all labor and materials furnished and work performed are in accordance with the Contract Documents and authorized modifications thereto, and will be free from defects due to defective materials and/or workmanship for a period of one year from the Date of Substantial Completion. This Warranty commences on:

(Date of Substantial Completion)

and expires on:

(One Year from Commencement Date)

Should any defect develop during the warranty period due to improper materials, workmanship or arrangement; the same, including adjacent work displaced, shall be made good by the undersigned at no expense to the Owner.

The Owner will give the Contractor written notice of defective work. Should Contractor fail to correct defective work within sixty (60) days after receiving notice, the Owner may at its option, correct defects and charge Contractor costs for such correction. Contractor agrees to pay such charges upon demand.

Nothing in the above shall be deemed to apply to work that has been abused or neglected by the Owner or that was installed by another contractor.

For: _____
(Company Name)

By: _____

Title: _____

Date: _____

END OF SECTION 01 78 30

SECTION 01 78 40

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes:
1. Maintenance of project record documents
 2. Record drawings or "as-builts".
 3. Record specifications
 4. Operations and Maintenance manuals.

1.02 SUBMITTALS

- A. Project Record Documents: Project record documents consist of three submittals: Record Drawings, Record Specifications and Operations and Maintenance Manuals. These submittals shall be provided to the Owner through the Architect after the Date of Substantial Completion inspection.
1. For Record Drawings, submit one set to the Architect in form of opaque prints, marked and altered as required in this Section and Digital format PDF. Submit all drawings, whether or not they have been modified.
 2. For Record Specifications, submit to Architect one legible set marked or altered as required in this Section.
 3. For Operations and Maintenance Manuals, submit to Architect three complete sets prepared in the manner described herein.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 MAINTENANCE OF PRODUCT RECORD DOCUMENTS

- A. Assign a person responsible for preparing and maintaining all record documents. Maintain the record documents in a secure location at the Project site but insure that they are accessible to Contractor and Architect during normal working hours. Do not use the record documents for any type of construction purposes in the field.
- B. Record information on record documents as soon as possible after it is obtained. Mark Drawings and Specifications with a red pencil; make certain all notations are clearly legible. Incorporate into existing sets all new Drawings or Specifications issued by Architect. Mark shop drawings if better suited to show the actual work.

3.02 RECORD DRAWINGS

- A. Maintain a complete set of opaque prints of the Drawings, including all sheets issued by Architect for addenda, clarifications or modifications. Record all information that indicates how the actual work differs from the Drawings and shows the details of installation that will not be obvious upon completion of construction, including:
1. Existing conditions in variance with Contract Documents.
 2. Locations and depths of underground utilities.

3. Actual equipment locations.
 4. Actual duct size and routing.
 5. Changes made by Change Order.
 6. Changes made following the Architect's written order or directives.
 7. Details not on original Contract Drawings.
 8. Dimensional or location changes.
 9. Finish changes.
 10. New and revised details for assemblies, attachments, fittings, adjacencies, etc.
 11. Actual routings of plumbing piping and electrical conduits.
 12. Revisions to electrical circuits.
 13. Sizes and routings of HVAC equipment.
 14. Locations particular on other critical system elements concealed in construction.
 15. Changes made by Contract modifications, cross-referenced to applicable modification.
 16. New information that may be useful to the Owner, which was not shown in Contract Documents or subsequent product submittals, including details or clarifications issued by Architect as responses to Contractor's requests.
- B. Where a record drawing also is required as part of Operations and Maintenance Manuals, copy notations and marks to another copy of applicable drawings for said purpose. Also mark shop drawings as may be necessary for use in such manuals.
- C. Responsibility for Markup: The individual or entity who obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, shall prepare the markup on Record Drawings. Contractor has responsibility to ensure that this record is maintained.
1. Accurately record information in an understandable drawing technique.
 2. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.
 3. At time of Final Completion, submit Record Drawings to the Architect for the Owner's records.

3.03 RECORD SPECIFICATIONS

- A. Maintain a complete set of Specifications, including all pages issued by Architect for addenda, clarifications, and modifications. Record all information that indicates how the actual work differs from the Specifications, including:
1. Product substitutions.
 2. Changes made by Contract modifications, cross-referenced to applicable modifications.
 3. New information that may be useful to the Owner, which was not shown in Contract Documents or subsequent product submittals, including details or clarifications issued by Architect as responses to Contractor's requests.

3.04 RECORD PRODUCT DATA

- A. During the construction period, maintain one (1) copy of each Product Data submittal for Project Record Document purposes.
1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation.
 2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 3. Note related Change Orders and markup of Record Drawings, where applicable.

4. Upon Final Completion, submit a complete set of Record Product Data to the Architect for the Owner's records.
5. Where Record Product Data is required as part of maintenance manual, submit marked-up Product Data as an insert in the manual instead of submitting as Record Product Data.

3.05 MISCELLANEOUS RECORD SUBMITALS

- A. Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Final Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Architect for the Owner's records.
 1. Categories of requirements resulting miscellaneous records include, but are not limited to, the following:
 - a. Field records on excavations and foundations.
 - b. Field records on underground construction in similar work.
 - c. Survey showing locations and elevations of underground lines.
 - d. Survey showing invert elevations of drainage piping.
 - e. Surveys establishing building lines and levels.
 - f. Ambient and substrate condition tests.
 - g. Certifications received in lieu of labels on bulk products.
 - h. Batch mixing and bulk delivery records.
 - i. Testing and qualification of tradesmen.
 - j. Documented qualification of installation firms.
 - k. Load and performance testing.
 - l. Inspections and certifications by governing authorities.
 - m. Leakage and water-penetration tests.
 - n. Fire-resistance and flame-spread test results.
 - o. Final inspection and correction procedures.

3.06 OPERATIONS AND MAINTENANCE MANUALS

- A. Assemble and submit One (1) set of hard-bound and a digital PDF file. Hard copy shall be loose-leaf operations and maintenance manuals for the systems, equipment, finishes and other building components listed below in this section and otherwise provided for in the Specifications. Bind in individual heavy-duty, two-inch, three-ring binders, with pocket folders for folded sheet information and dividers with labeled index tabs. Label each manual on front and spine, indicating the project name and the nature of the information included in the manual. All text, drawings and diagrams shall be legible and presented in an organized and coherent fashion.
- B. The Operations and Maintenance Manuals shall include information on the following building components:
 1. Electrical power system, including equipment, distribution, receptacles and connections.
 2. Electrical lighting.
 3. Electrical powered equipment purchased and installed by Contractor.
 4. Miscellaneous equipment purchased and installed by Contractor.
 5. Building accessories.
 6. Finishes, including paints and any other finishes requiring special treatment.
- C. For each of these components provide the following information as applicable to the component:
 1. Responsible subcontractor with address and phone number.
 2. Local supplier(s) with address and phone number.
 3. Nearest service organization (if applicable) with address and phone number.
 4. Operating instructions.

5. Emergency instructions.
6. Spare parts/stock list.
7. Warranties
8. Preventive maintenance requirements.
9. Cleaning requirements and instructions.
10. Product data and shop drawings (referenced if maintained elsewhere.)
11. Wiring diagrams.
12. Fixture schedule.

END OF SECTION 01 78 40

SECTION 01 81 50

SYSTEM DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.01 The work of this section consists of demonstrating systems and equipment to operating personnel. It also includes training of personnel.

1.02 COORDINATION

- A. Schedule demonstrations and training periods with Owner. Conduct training sessions after the equipment or system has been fully completed and operational, approved by inspections of manufacturer and/or authorities having jurisdiction as required. Schedule and provide training by manufacturer's representatives where required and as requested at no additional cost to the Owner.
- B. Training Schedule: This schedule lists the minimum system requirements for training and demonstration.
 - 1. Electrical and Lighting equipment and Controls Systems

1.03 CLOSEOUT SUBMITTALS

- A. As specified in Specification Section 01 77 00.
- B. For each training session, the Contractor shall submit for approval a proposed outline of the subjects to be covered. The training shall not be conducted until the outline is approved.
- C. Recordings of demonstrations and training sessions:
 - 1. Provide two digital copies of each recorded training session.
 - 2. Label each digital copy with the date of demonstration or training, the instructor's name, and provide an index of the contents. The index shall list the start and end time of each subject covered during the training session. The sequence of the training subjects shall follow the sequence listed in the approved training outline or as actually conducted.
 - 3. Provide a separate digital copy for each separate training session.

PART 2 – PRODUCTS

2.01 MEDIA REQUIREMENTS

- A. Digital video format on portable digital media storage device. Video format shall be in .wmv, .mp4, .mpg, or .mpeg format.

PART 3 – EXECUTION

3.01 TRAINING

- A. As specified herein and in individual sections, furnish the services of instructors to train designated personnel in adjustment, operation, including seasonal and emergency operations, if applicable, maintenance, and safety requirements of equipment and systems. Instructors shall be thoroughly trained in operating theory as well as practical operation and maintenance work for each type of equipment or system. The sequence of the training shall follow the approved training outline.
- B. Individual sections specify the duration of training required.
- C. Use Operating and Maintenance Data as a training guide.

3.02 TAPING/RECORDING

- A. Document all of the above sessions with highest resolution picture. The instructor's voice shall be clearly audible and understandable on the recording. Utilize a supplemental microphone worn by the instructor.
- B. Digital videos with poor video or audio quality will be rejected and the training re-recorded.

END OF SECTION 01 81 50

SECTION 02 32 13

REPORT OF GEOTECHNICAL EXPLORATION



SAILORS ENGINEERING ASSOCIATES, INC.

1675 SPECTRUM DRIVE • LAWRENCEVILLE, GEORGIA 30043 • TEL (770) 962-5922 • FAX 962-7964

April 15, 2016

Precision Planning, Inc.
Attn: Bob Bennewitz
P.O. Box 2210
Lawrenceville, GA 3004

RE: Preliminary Geotechnical Investigation
Lawrenceville Public Utilities
West Pike Street
Lawrenceville, GA; Gwinnett County
SEA Job #161-023

Gentlemen:

In accordance with your written authorization, Sailors Engineering Associates, Inc. has completed the preliminary geotechnical investigation for the subject project and is pleased to submit this report with our conclusions and recommendations. We previously submitted a preliminary geotechnical report dated July 10, 2014. At your request we have returned to the project area and performed thirty-six additional soil test borings with one additional offset boring and ninety-three auger probings with seven offsets to further evaluate the subsurface conditions in the project area. This report includes all of the information obtained in our original investigation and the recent visits.

GENERAL

The site under investigation is located to the northeast of Georgia Highway 120 (a.k.a., West Pike Street) between its intersections with Old Norcross Road and Honeysuckle Avenue in Lawrenceville, Gwinnett County, Georgia. The property is bordered on the south/southeast by commercial properties and on the north/northwest by a railroad and on the east by commercial property and single family residential properties.

The western portion of the site is presently occupied by several existing buildings with associated outbuildings surrounded by a paved parking and drive areas. Multiple underground and overhead utilities were observed along Georgia Highway 120 and extending to the existing structures within the site.

The eastern half of the site was used as a borrow area for fill used to construct a shopping center during 2005 and 2006. Areas of exposed rock are present in the former borrow area due to the previous borrow operations (see historical aerial photographs from 2006 through 2008 and attached Exposed Rock photographs).

Site topography in the western half of the site consists of two relatively flat plateaus with moderate to steep slopes descending to the north separating them. In the eastern half of the site, moderate to steep slopes along the southern, southeastern, eastern and northeastern property boundaries descend to the middle of the eastern half of the site which is relatively flat. Topographic relief across the property is approximately 86 feet, from an elevation of 1076.0 feet near the middle of the eastern property boundary, to an elevation of 990.0 feet near the northwestern property corner. Site vegetation consists of a mixture of medium to small pines and deciduous trees with a light to moderate underbrush around the perimeter of the existing structures in the western half of the site and medium grasses and weeds with a mixture of medium to small pines and deciduous trees and a light to heavy underbrush in the eastern half of the site. Forested areas border the steep slopes in the eastern half of the site.

A public utilities facility consisting of six buildings with accompanying parking and driveway areas at various locations is proposed for the site. Two storm water detention ponds are proposed in the north westernmost and north easternmost portions. Four retaining walls are proposed near the northwestern property corner, near the southeastern corner of the middle of the site and to the north and south of the eastern property boundary. According to the preliminary grading plan provided by Precision Planning, Inc. via email on April 6, 2016, the finish floor elevations of the proposed structures will range from 1009 feet to 1017 feet. Finish grades in the parking and drive areas will range from 1006.0 feet to 1020.0 feet. The base elevations of the storm water detention ponds proposed in the north westernmost and north easternmost portions will be 986 feet and 1002 feet, respectively. These elevations will result in maximum cuts and maximum fills of approximately 25 feet.

The purpose of our investigation was to determine the presence of unsuitable soil conditions, near surface ground water or rock that would adversely affect construction costs, and to provide recommendations for site preparation and foundation design.

AREA GEOLOGY

Gwinnett County, Georgia is located in the physiographic province known as the Piedmont which extends from the Hudson River at the north to Alabama at the south. The Piedmont is the least mountainous part of the Appalachian Highlands. The surface of the Piedmont can be described as a broadly undulating or rolling topography with low knobs or ridges, and valleys 30 to 300 feet thick. The underlying crystalline rocks of the Piedmont are metamorphic schists, gneisses, quartzites and slates, and igneous granites and gabbros. According to the Geologic Map of Georgia (1976) the base rock, in the area surrounding the subject site, consists of Quartzite.

FIELD INVESTIGATION

In June, 2014, twelve soil test borings and sixteen test pits had been performed at the locations shown on the attached Boring Plans. Recently, at your request, we have performed thirty-six additional soil test borings with one additional offset boring and ninety-three auger probings with seven offsets. The test borings were extended through soils by mechanical drilling procedures using continuous spiral hollow auger flights with a steel fingered Hawthorne bit as the cutting device. The consistencies of the underlying soils were determined by Standard Penetration Testing in accordance with ASTM Specification D1586. Samples were obtained with a standard 1.4 inch I.D., 2.0 inch O.D., split tube sampler as illustrated in the Appendix. The sampler was first seated 6.0 inches to penetrate any loose cuttings; then it was driven an additional foot with blows of a 140 pound hammer falling 30.0 inches. The number of hammer blows required to drive the sampler each 6.0 inch increment is recorded in the Boring Logs. The number of blows required to drive the sampler the final foot is the standard penetration resistance, an indicator of soil strength.

The test pits were dug by a small track-mounted excavator (mini-excavator) provided by the City of Lawrenceville. Photographs taken of the test pits are indicated in the appendix. The depths penetrated by the hoe were limited due to the small size of the hoe and were as tabulated in the Conclusions and Recommendations and as shown on the attached boring plans.

The auger probings were advanced with continuous flight hollow stem augers using a cutting head with carbide faced harden steel bits. The cuttings generated during augering were described in the field by our drilling personnel. Materials encountered as well as drilling difficulty and location of ground water noticed during drilling were as shown on the attached Logs of boring in the appendix.

Water level observations were made during and after the drilling operations. The elevation of the water table fluctuates during the year and is directly related to the amount of rainfall in the months prior to observation.

The elevations shown on the Logs of Boring were interpolated from a two foot contour interval topographic map and are presumed accurate within +/- 1.0 feet. This map was provided by Precision Planning, Inc. via email on January 26, 2016.

SUBSURFACE CONDITIONS

The subsurface conditions encountered on site, as determined by our drilling program, were as follows:

Surface cover & topsoil: A layer of surface cover consisting of 6.0 to 6.5 inches of concrete was encountered at boring locations NB-1 and NB-3. A layer of surface cover consisting of about 2.0 to 3.0 inches asphaltic concrete over 1.0 to 5.0 inches gravel was encountered at boring locations B-1, B-4, B-6, E-13, I-7, J-6, L-8, L-9, L-10, M-7, M-8, M-10, N-8 and O-6. A layer of surface cover consisting of about

3.0 to 5.0 inches of gravel was encountered at boring locations NB-5, NB-6, B-5, B-7, F-10, G-10, G-11, J-28, J-29, J-29A, K-24, K-25, K-26, N-15, P-7, P-8, P-9, Q-7 and R-6. A layer of topsoil approximately 1.0 to 6.0 inches in thickness and consisting of dark brown sand with a little silt and a trace of organics was encountered at the other soil test boring locations.

Fill materials: Encountered at the surface and extending to depths of about 1.0 to 8.0 feet at soil test borings NB-1, NB-2, NB-3, NB-5, NB-6, NB-8, NB-11, NB-12, NB-14, NB-19, NB-33, B-1, B-2 and B-6 were reddish brown, brown, dark brown, greyish brown and grey sands with varying amounts of silt and sandy silts, some with varying amounts of rock pieces and a trace of organics and phone wires. These were fill materials that appear to have been placed with a moderate to light compactive effort. Standard penetration resistance values in the fill materials encountered were generally indicative of medium to soft consistency.

Residual materials and saprolites: Beneath the materials mentioned above and extending to penetration depth of all borings were light reddish brown, reddish brown, light to dark brown, greyish brown, grey, white and black sands with varying amounts of silt and silts with varying amounts of sand, some with varying amounts of rock fragments. These were residual materials and saprolites weathered in place from the parent rock. Standard penetration and drilling resistances in these materials were indicative of soft to hard consistency.

Ground water, hard drilling materials and auger refusal were encountered as noted on the individual Logs of Boring and in the Conclusions and Recommendations section of this report.

CONCLUSIONS AND RECOMMENDATIONS

At the time of our investigation, a final grading plan for the site had not been completed. The purpose of our investigation was to determine the general site conditions with respect to near surface rock, ground water and soft soils which would affect construction costs and to provide general recommendations for site preparation and foundation design. The final grading plan for the project should be reviewed by Sailors Engineering Associates, Inc. to further evaluate conditions and to determine if any additional recommendations concerning site preparation and foundation design are needed. The following general conclusions have been reached based on our investigation and the preliminary grading information.

1. After demolition of the existing structures, all areas to receive pavement, structures or fill material should be stripped of organic material and topsoil prior to the commencement of construction. The topsoil should be stockpiled on-site for future use in landscaped areas (if approved by the owner), disposed of in a designated area on-site, or wasted off-site. Topsoil should not be used as structural fill. (Portland cement) Concrete debris (and asphaltic concrete pavement) can be crushed or broken down to usable size for fill and left on site. Generally, Portland cement concrete, concrete blocks and brick can be crushed to usable size for fill and left on site.

2. After demolition of the existing structures, all areas to remain at grade or to receive fill should be proof-rolled with a loaded tandem-axle dump truck in the presence of a representative of the Geotechnical Engineer. Cut areas should be proof-rolled once rough subgrade has been reached. Any soft soils encountered during proof-rolling should be stabilized by compaction or undercut and replaced with suitable compacted materials.
3. Soft in-place soils were encountered at the locations and depths shown in the following table.

Boring No.	Depths of Soft Soil Layers	(Cut)/Fill Depth	Water Table Depth
NB-13	0.0-1.0	6.0	7.0
NB-18	0.0-2.0,4.5-12.0	(2.0)	10.7
NB-27	0.0-2.0	(1.0)	3.5
NB-31	0.0-1.0	(2.0)	5.3
NB-33	0.0-1.0	(2.0)	4.5
NB-35	0.0-1.0	0.0	---
B - 6	12.0-20.0	(6.5)	---
B - 7	12.0-17.0	(10.0)	---

The soft surface materials encountered to depths of about 1.0 to 2.0 feet beneath the existing ground surface at NB-13, NB-18, NB-27, NB-31, NB-33 and NB-35 are not considered adequate for support of the proposed structures. It is recommended that they be undercut and replaced with suitable fill compacted.

NB-13 was drilled in an area that will receive 6 feet of fill to reach subgrade elevation. The soft soil in this boring is not of consequence for building design. The soft soil at NB-18 is relatively shallow. Once a final grading plan has been developed and structural and floor loads determined for Building 500, a few additional borings should be performed to isolate the soft soil condition and arrive at the most economical solution to reduce the affect of this soil on building performance. The need for surcharging a portion of the building area and areas to receive a lower allowable bearing pressure for foundation design will be determined.

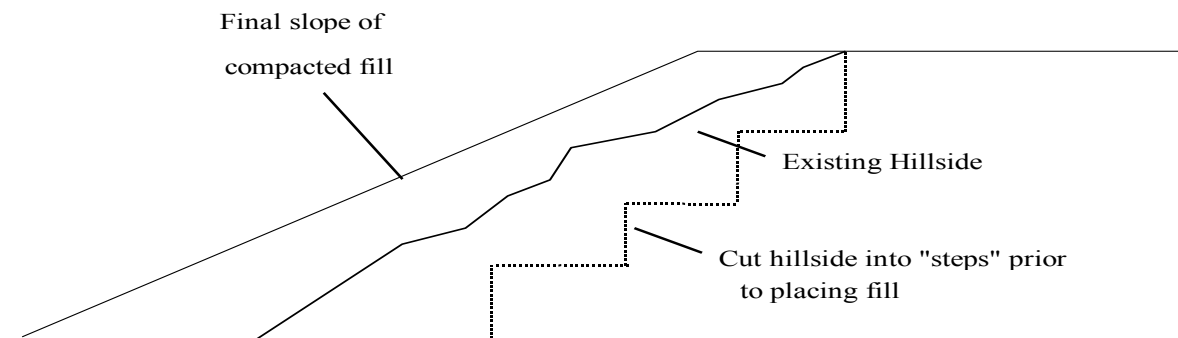
4. Multiple utilities were observed along adjacent roadways. It is likely that service lines extend to the existing structures. If any existing utilities or service lines underlie the proposed structure, the Geotechnical Engineer should be contacted concerning the need to remove them or to pressure-grout and abandon them in-place. Some utility lines, such as electrical, telephone and television cables, could remain in-place without problems. Any storm or sanitary sewer lines that lie beneath a 1H:1V line extending from the base of free-standing columns and columns along the external walls should be removed or pressure-grouted in-place. A decision regarding shallow, small diameter sewer lines underlying individual wall footings should be made by the Geotechnical Engineer at the beginning of construction.

- All fill material to be utilized on the project should be free of organic or otherwise deleterious materials and compacted to minimum dry densities corresponding to 95% of maximum dry density, and at moisture contents within +/- 3% of optimum moisture content, as obtained by Standard Proctor, ASTM D698. The top 2.0 feet of all areas to receive pavement or structures should be compacted to 98% of its standard proctor value.

Fill should be placed in lifts not to exceed 6.0 inches in compacted fill thickness in mass fill areas, and as needed to obtain the required compaction in ditch lines and foundation wall backfill.

All soils encountered on site, with the exception of the topsoil, will be suitable for use as structural fill if they are at +/- 3% of their optimum moisture content and free of organic or otherwise deleterious materials.

- Cut or fill slopes should not be steeper than 2.0H:1.0V. Fill slopes should be compacted in horizontal lifts not to exceed 6.0 inches in compacted thickness as fill is placed. Fill materials to be placed on existing slopes should be benched in as shown below.



- All fill operations should be monitored by a representative of the Geotechnical Engineer. He should perform sufficient density tests to verify that specified compaction is obtained.
- Once the above site preparation items have been accomplished the proposed buildings can be founded on spread or strip footings designed as follows:
Maximum allowable soil bearing pressures:
 - Building 100: 2,000 psf
 - Buildings 200, 300, 400 and 600: 3,000 psf
 - Building 500 near NB-18 area: 1,500 psf

The remainder of the Building 500: 3000 psf

The final recommendations for Building 500 should be made after additional borings have been performed as mentioned in Item 2 above.

Footing widths should be in accordance with the structural engineer's design but should be no less than 18.0 inches for continuous footings and 24.0 inches for individual footings.

The prevailing building code for the subject site is the 2012 edition of the International Building Code with the Georgia Amendments. This code requires a minimum embedment depth of 12.0 inches for perimeter foundations. The frost penetration depth for this area is less than 6.0 inches.

Based on table 1613.5.2 of the 2006 International Building Code and the standard penetration resistance values obtained in our borings, we recommend the seismic site class as follows:

Site Class C – Building 600

Site Class D – Buildings 100, 200, 300, 400, 500

9. The base of all footings should be inspected by a representative of the Geotechnical Engineer immediately prior to the placement of reinforcing steel or concrete. He should verify that soil capable of supporting the design bearing pressure has been obtained in each case.
10. All areas to receive pavement should be proof-rolled in the presence of a representative of the Geotechnical Engineer immediately prior to the placement of base course. Soft areas encountered during proof-rolling should be stabilized by compaction or undercut and replaced with suitable compacted fill.
11. The ground water table was encountered at the following depths and elevations at the indicated interval after drilling. Cut/fill depths based on the preliminary grading plan also are included below.

Boring No.	(Cut)/Fill Depth (ft)	Water Table (ft)	Water Table Elevation (ft)	Time After Drilling Measured (hrs)
New Borings				
NB-12	15.0	7.8	990.2	48+
NB-13	11.0	7.0	995.0	48+
NB-15	13.0	6.0	994.0	48+
NB-16	10.0	5.9	997.1	48+
NB-17	2.0	5.8	1008.2	0.0
NB-18	(1.0)	10.7	1006.3	48+
NB-20	1.0	6.4	1008.6	0.0
NB-21	4.0	9.2	1002.8	48+
NB-22	5.0	5.0	1005.0	48+
NB-23	5.0	5.1	1006.9	48+
NB-24	8.0	1.8	1007.2	48+
NB-26	3.5	3.7	1009.8	48+
NB-27	1.0	3.5	1012.5	48+

NB-31	(2.0)	5.3	1010.7	0.0
NB-32	0.0	8.4	1005.6	48+
NB-33	(1.0)	4.5	1011.5	0.0
Auger Probings*				
C-24	(3.0)	15.0	1004.0	48+
C-26	1.0	0.4	1007.6	48+
C-26A	(2.0)	4.1	999.9	0.0
D-21	0.0	14.8	1001.2	0.0
D-26	4.0	7.7	1002.3	0.0
D-27	8.0	1.9	1004.1	0.0
D-28	8.0	1.6	1004.4	0.0
E-13	(8.0)	8.0	990.0	48+
E-15	2.5	7.0	992.5	0.0
E-16	6.0	9.1	992.9	0.0
E-25	4.0	4.2	1005.8	48+
F-10	2.0	12.4	983.6	48+
F-21	4.0	9.7	1002.3	48+
F-22	4.5	12.2	999.3	0.0
F-23	5.0	1.8	1009.2	0.0
F-24	5.5	5.1	1005.4	0.0
G-17	1.0	7.0	1007.0	0.0
H-21	3.5	6.5	1006.5	0.0
I-7	(1.0)	12.3	980.7	48+
I-21	2.0	10.1	1003.9	0.0
J-6	6.0	13.2	980.8	48+
J-20	2.0	6.6	1007.4	48+
J-21	2.0	8.8	1005.2	0.0
J-22	3.5	5.7	1007.8	0.0
J-29A	(3.0)	4.5	1014.5	48+
K-21	0.5	7.8	1007.7	0.0
K-25	0.5	5.6	1009.9	0.0
N-11	(24.0)	3.3	1029.7	0.0
* The cut depths for the auger probings are depths to reach subgrade elevations and do not reflect the excavation depths to reach the invert elevations of the proposed storm and sanitary sewer lines.				

The shallow ground water table encountered at NB-24, C-26, D-27, D-28 and F-23 is likely surface run-off water. Ground water should be anticipated during excavations to reach base of storm water pond for the east end of the elongated pond along the railroad in the northwest portion of the site and in the pond in the northeast portion of the site.

Ground water requiring crushed stone bedding for sewer lines should also be anticipated in portions of the site. Ground water could also be encountered in the excavation to reach design grade in the cut at the east end of Building 600 where rock removal is anticipated. The need for installation of a French drain at the toe of the cut slope east of Building 600 will be determined during grading.

12. Auger refusal, hard drilling materials and weathered rock were encountered in many of the test borings and auger probings performed across the site. The following table lists locations, depths of hard consistency soils and depths of penetration for each location.

Boring No.	(Cut)/Fill Depth	Hard Consistency Soil or Weathered Rock		Auger Refusal		Penetration Without Refusal Being Encountered	
		Depth	Elevation	Depth	Elevation	Depth	Elevation
	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
New Borings							
NB-1	1.0	3.5	1004.5	4.5	1003.5	-----	-----
NB-3	3.0	12.0	994.0	12.0	994.0	-----	-----
NB-4	(1.0)	0.5	1009.5	1.5	1008.5	-----	-----
NB-4A	(1.0)	0.5	1009.5	2.0	1008.0	-----	-----
NB-6	0.0	11.0	998.0	12.0	997.0	-----	-----
NB-8	0.0	2.0	1009.0	-----	-----	15.0	996.0
NB-13	11.0	12.0	990.0	-----	-----	14.0	988.0
NB-18	(1.0)	12.0	1005.0	-----	-----	14.0	1003.0
NB-19	(6.0)	8.0	1012.0	-----	-----	15.0	1005.0
NB-20	1.0	12.5	1002.5	13.5	1001.5	-----	-----
NB-21	4.0	14.5	997.5	-----	-----	15.0	997.0
NB-22	5.0	3.0	1007.0	-----	-----	14.5	995.5
NB-23	5.0	2.0	1010.0	11.0	1001.0	-----	-----
NB-24	8.0	10.5	998.5	11.5	997.5	-----	-----
NB-25	(9.0)	0.5	1025.5	2.0	1024.0	-----	-----
NB-26	3.5	6.0	1007.5	11.0	1002.5	-----	-----
NB-27	1.0	14.0	1002.0	-----	-----	14.4	1001.6
NB-28	(5.0)	1.5	1020.5	5.0	1017.0	-----	-----
NB-29	5.0	0.0	1012.0	3.0	1009.0	-----	-----
NB-30	3.0	7.0	1007.0	7.5	1006.5	-----	-----
NB-31	(2.0)	9.5	1006.5	11.5	1004.5	-----	-----
NB-32	0.0	11.0	1003.0	12.5	1001.5	-----	-----
NB-34	(1.0)	0.5	1015.5	-----	-----	13.5	1002.5

Previous Borings							
B - 1	0.0	11.0	997.0	-----	-----	20.0	988.0
B - 2	3.0	7.5	998.5	7.5	998.5	-----	-----
B - 3	15.0	9.5	984.5	11.5	982.5	-----	-----
B - 7	(8.0)	17.0	981.0	-----	-----	18.8	979.2
B - 9	3.0	12.0	995.0	12.0	995.0	-----	-----
B - 12	(2.0)	12.0	1008.0	-----	-----	20.0	1000.0
Auger Probings*							
A-25	3.0	4.5	1010.5	8.5	1006.5	-----	-----
B-23	(5.5)	10.5	1009.0	12.0	1007.5	-----	-----
B-24	(6.0)	7.0	1013.0	9.0	1011.0	-----	-----
B-25	(14.0)	13.0	1003.0	14.0	1002.0	-----	-----
C-17	4.0	4.5	1001.5	5.5	1000.5	-----	-----
C-24	(3.0)	17.0	1002.0	18.0	1001.0	-----	-----
C-26	1.0	2.5	1005.5	6.5	1001.5	-----	-----
D-16	(6.5)	8.0	993.5	9.0	992.5	-----	-----
D-17	8.0	11.0	995.0	11.5	994.5	-----	-----
D-18A	6.0	11.0	997.0	12.0	996.0	-----	-----
D-26	4.0	11.0	999.0	11.5	998.5	-----	-----
D-27	8.0	2.5	1003.5	3.0	1003.0	-----	-----
D-28	8.0	4.0	1002.0	5.0	1001.0	-----	-----
D-29	0.0	3.0	1011.0	4.0	1010.0	-----	-----
D-30	(4.5)	3.0	1016.5	4.0	1015.5	-----	-----
E-13	(8.0)	17.0	981.0	18.5	979.5	-----	-----
E-15	2.5	17.0	982.5	18.0	981.5	-----	-----
E-16	6.0	13.0	989.0	13.5	988.5	-----	-----
E-31	(9.0)	0.0	1025.0	1.0	1024.0	-----	-----
F-18	0.0	14.5	999.5	-----	-----	14.7	999.3
F-23	5.0	3.0	1008.0	4.0	1007.0	-----	-----
F-24	5.5	4.5	1006.0	11.0	999.5	-----	-----
G-19	(1.0)	7.0	1009.0	7.5	1008.5	-----	-----
G-21	3.5	4.5	1008.0	7.5	1005.0	-----	-----
H-18	0.0	12.0	1003.0	14.0	1001.0	-----	-----
H-21	3.5	10.0	1003.0	11.0	1002.0	-----	-----
J-22	3.5	10.0	1003.5	11.0	1002.5	-----	-----
J-29	(3.0)	0.0	1019.0	3.0	1016.0	-----	-----
K-21	0.5	17.0	998.5	18.0	997.5	-----	-----
K-24	1.0	4.0	1011.0	4.5	1010.5	-----	-----
K-25	0.5	8.0	1007.5	8.5	1007.0	-----	-----
K-26	0.5	5.0	1010.5	7.0	1008.5	-----	-----

K-28	(2.0)	1.5	1014.5	2.0	1014.0	-----	-----
N-10	(20.0)	8.0	1020.0	10.0	1018.0	-----	-----
N-11	(24.0)	3.0	1030.0	3.5	1029.5	-----	-----
N-11A	(23.0)	2.0	1029.0	3.0	1028.0	-----	-----
O-7	(3.5)	1.5	1010.0	1.5	1010.0	-----	-----
O-8	(4.0)	8.0	1004.0	8.5	1003.5	-----	-----
O-9	(5.5)	10.0	1003.5	11.5	1002.0	-----	-----
O-10	(19.0)	23.0	1005.0	24.0	1004.0	-----	-----
O-11	(16.0)	19.0	1013.0	20.0	1012.0	-----	-----
O-12	(16.5)	17.0	1019.5	18.0	1018.5	-----	-----
P-6	(1.0)	4.0	1006.0	4.5	1005.5	-----	-----
P-7	(3.0)	10.0	1001.0	12.0	999.0	-----	-----
Q-7	(1.0)	12.0	996.0	12.5	995.5	-----	-----
* The cut depths for the auger probings are depths to reach subgrade elevations and do not reflect the excavation depths to reach the invert elevations of the proposed storm and sanitary sewer lines.							

General excavation below hard drilling will be difficult and may require the use of a Caterpillar D-8 or equivalent with single tooth ripper or large track mounted excavators the equivalent of Komatsu 300. Trench excavations below hard drilling depths will be difficult and may require blasting. Excavations below auger refusal will require blasting.

Areas of anticipated mass rock removal are indicated on the Boring Plan. Areas of surface rock exposed by previous borrow site activities in 2006 are present throughout the borrow area shown in the historical photographs. Attempts have been made during development of the grading plan to reduce excavations in these areas. Excavations to reach storm and sanitary sewer invert elevations and in some cases interior sanitary, water, electric and gas lines for Building 600 and a portion of Building 100 will encountered either rip rock or mass rock that will result in trench rock removal. We recommend that the information shown in the above table and listed on the boring logs be carefully reviewed during site design and cost estimating for the project.

Extensive use of large dozers with rippers, large track excavators and large self propelled compactors will be needed during mass grading. Difficulty will also be encountered during utility and footing trench excavations.

Areas of large boulders exposed by borrow site activities in 2006 are present on site and other large rock pieces are likely to be generated in the areas of anticipated mass rock removal shown on the boring plan. Some reducing of boulder sizes by hoe ram will be required. The use of an on site crusher to process the concrete slabs of the buildings on the west end of the site during demolition and to break down the on site rock to usable size could help to reduce site development costs.

12. The following table lists the depths penetrated during excavation of test pits using the small track mounted hoe supplied by the city:

Test Pit No.	Termination Depth (ft)	Termination Material
1	4.5	Rock
2	1.5	Rock
3	3.5	Rock
4	4.5	Rock
5	10	Soil
6	10	Rock
7	0.5	Rock
8	0.8	Rock
9	6.0	Rock
10	13.0	Stiff soil
11	1.5	Rock
12	13.0	Stiff soil
13	4.5	Stiff soil
14	0.5	Rock
15	1.5	Rock
16	1.5	Stiff soil
17	2.5	Rock

As stated earlier these excavations were made using a mini-excavator. Refusal depths do not necessarily indicate materials that could not be removed using a large track mounted excavator (Komatsu 300) or a Caterpillar D-8 dozer with a single toothed ripper.

If we can be of further service to you on this project, please contact us at your convenience.

Respectfully submitted,

SAILORS ENGINEERING ASSOCIATES, INC.

Jonghee Kim

Jong Hee Kim, Ph.D., P.E.
Project Engineer



Jim D. Sailors
Jim D. Sailors, P.E.
Principal Engineer

APPENDIX

SOIL CONSISTENCY DESIGNATIONS

(Based on results of Standard Penetration Tests performed according to ASTM Specification D-1586-84)

NUMBER OF BLOWS (“N”): Shall be defined as the number of blows of a 140 pound hammer falling free a distance of 30 inches required to drive a standard split spoon sampler (2” O.D. and 1.4” I.D.) 1 foot.

When the sample is primarily cohesionless, use the following consistency table:

<u>NUMBER OF BLOWS (N)</u>	<u>CONSISTENCY DESIGNATION</u>
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium
31 - 50	Dense
51 or more	Very Dense

When the sample is primarily cohesive, use the following consistency table:

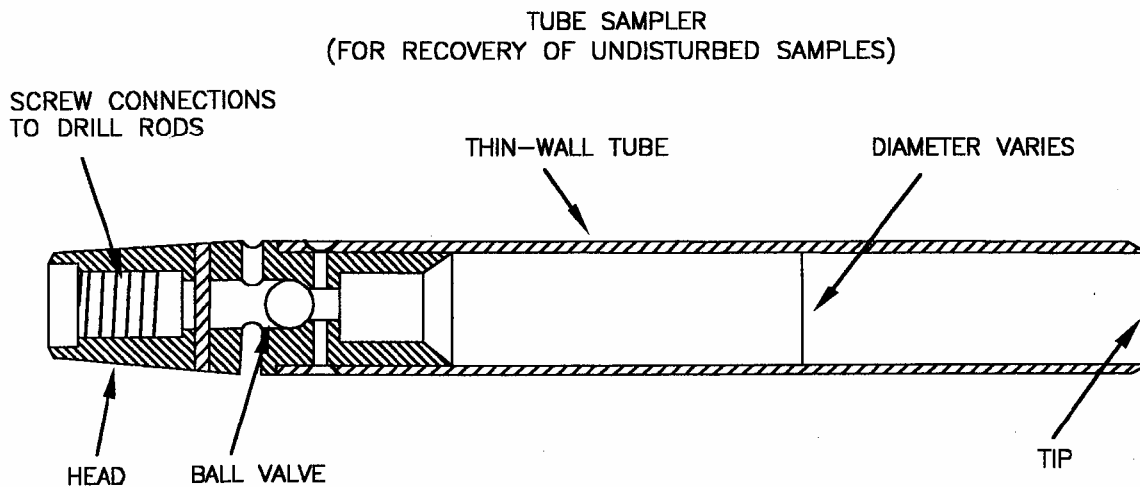
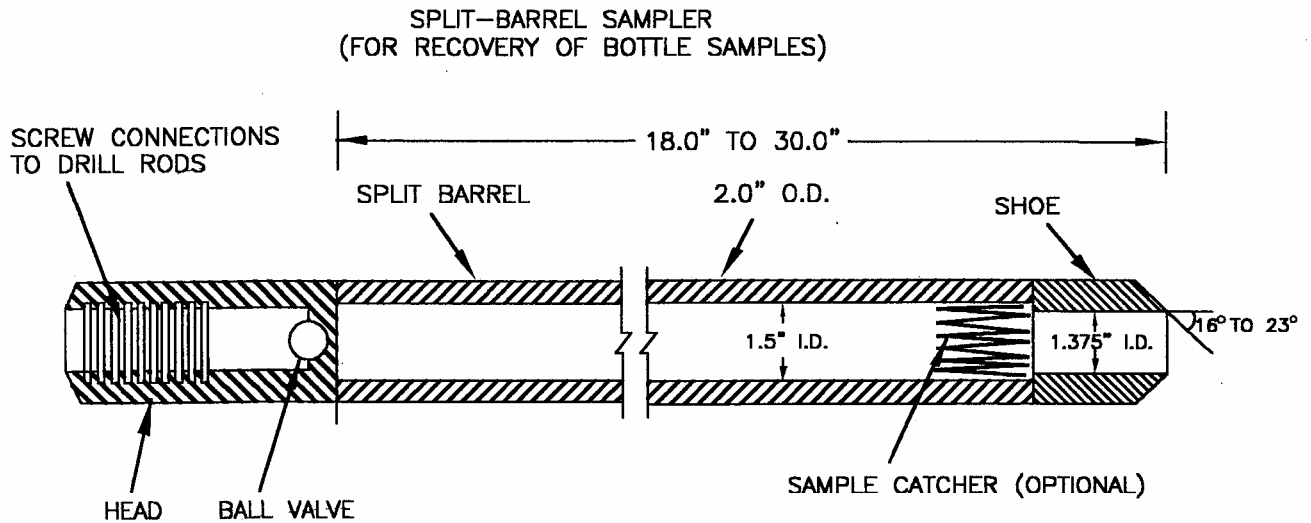
<u>NUMBER OF BLOWS (N)</u>	<u>CONSISTENCY DESIGNATION</u>
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Medium
9 - 15	Stiff
16 - 30	Very Stiff
30 or more	Hard

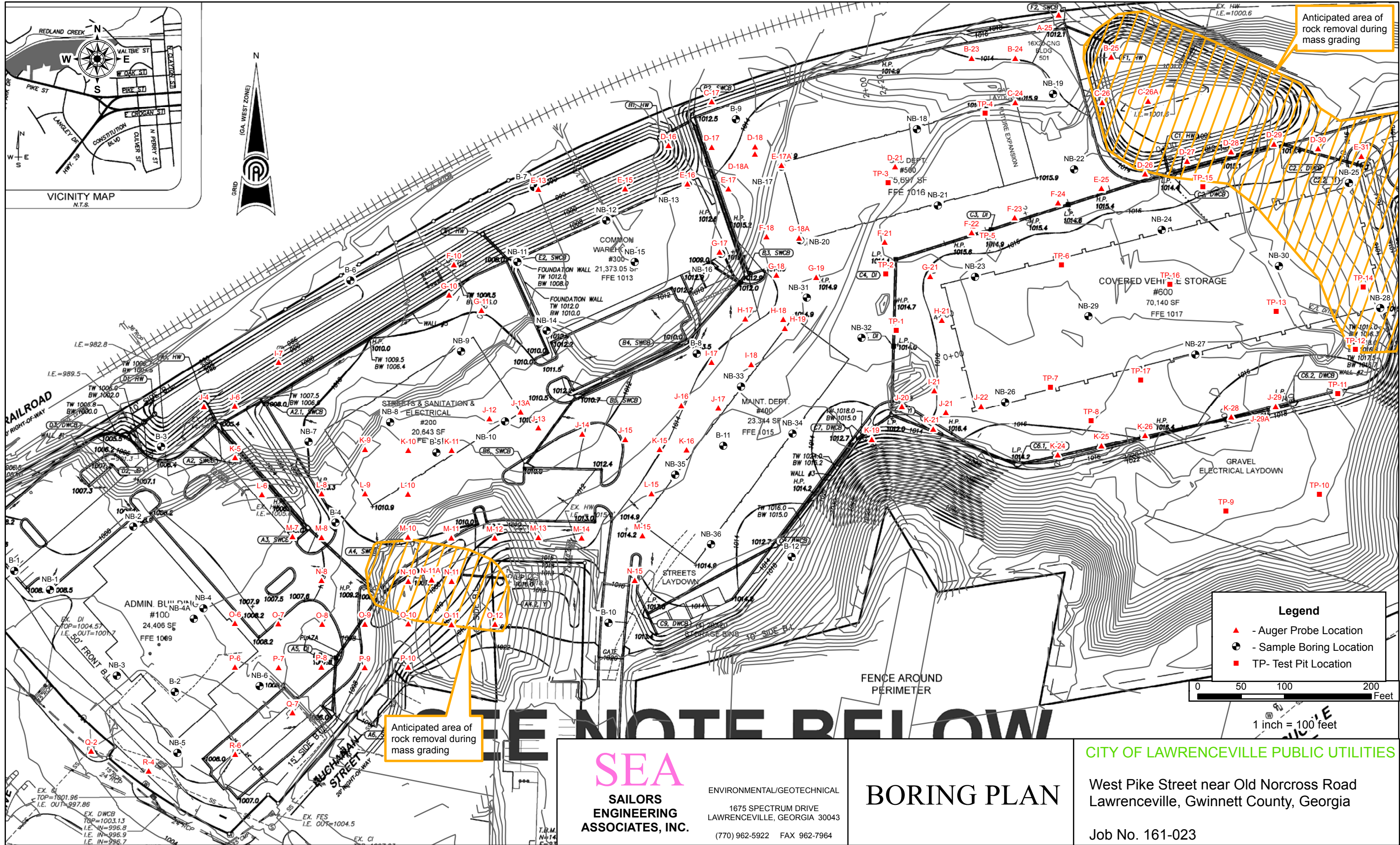
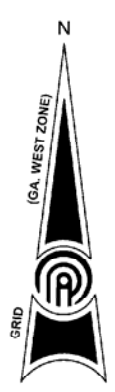
SAMPLING PROCEDURES

Soil Sampling & Penetration Testing is performed in accordance with ASTM D1586-84.

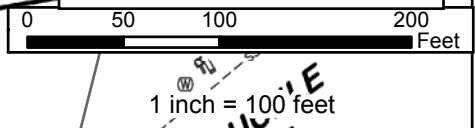
The Standard Penetration Resistance is the number of blows of a 140 pound hammer falling 30 inches to drive a 2.0 inch O.D., 1.375 inch I.D. split barrel sampler one foot.

The Undisturbed Sampling Procedure is performed in accordance with ASTM Specification D1587-83.





Legend	
▲	- Auger Probe Location
●	- Sample Boring Location
■	TP- Test Pit Location



Anticipated area of rock removal during mass grading

SEE NOTE BELOW

SEA
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ASSOCIATES, INC.

ENVIRONMENTAL/GEOTECHNICAL
1675 SPECTRUM DRIVE
LAWRENCEVILLE, GEORGIA 30043
(770) 962-5922 FAX 962-7964

BORING PLAN

CITY OF LAWRENCEVILLE PUBLIC UTILITIES

West Pike Street near Old Norcross Road
Lawrenceville, Gwinnett County, Georgia

Job No. 161-023



SEA
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ENVIRONMENTAL/GEOTECHNICAL
 1675 SPECTRUM DRIVE
 LAWRENCEVILLE, GEORGIA 30043
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BORING PLAN
ON
2013 AERIAL

CITY OF LAWRENCEVILLE PUBLIC UTILITIES

West Pike Street near Old Norcross Road
 Lawrenceville, Gwinnett County, Georgia

Job No. 161-023



Legend

- ▲ - Auger Probe Location
- ⊕ NB- Sample Boring Location
- ⊙ B- Sample Boring Location (Previously Drilled)
- TP- Test Pit Location

0 50 100 200
Feet

1 inch = 100 feet

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ENVIRONMENTAL/GEOTECHNICAL
1675 SPECTRUM DRIVE
LAWRENCEVILLE, GEORGIA 30043
(770) 962-5922 FAX 962-7964

**BORING PLAN
ON
2010 AERIAL**

CITY OF LAWRENCEVILLE PUBLIC UTILITIES
West Pike Street near Old Norcross Road
Lawrenceville, Gwinnett County, Georgia
Job No. 161-023





Legend

- ▲ - Auger Probe Location
- ⊕ NB- Sample Boring Location
- ⊙ B- Sample Boring Location (Previously Drilled)
- TP- Test Pit Location

0 50 100 200
Feet

1 inch = 100 feet

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ENVIRONMENTAL/GEOTECHNICAL
1675 SPECTRUM DRIVE
LAWRENCEVILLE, GEORGIA 30043
(770) 962-5922 FAX 962-7964

**BORING PLAN
ON
2006 AERIAL**

CITY OF LAWRENCEVILLE PUBLIC UTILITIES
West Pike Street near Old Norcross Road
Lawrenceville, Gwinnett County, Georgia
Job No. 161-023



*Lawrenceville Public Utilities
SEA Job #161-023*





Lawrenceville Public Utilities

SEA Job #161-023

OLD BORINGS

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
B-1

CONTRACTED WITH: City of Lawrenceville

JOB NO. DATE:
141-100 07/01/14

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1008.0	Surface cover – 2.0" asphaltic concrete over 5.0" gravel						
988.0	Brown sand with some silt (fill)	1	1	SS	3-3-4	Drilling medium	
	Reddish brown/dark brown sandy silt (fill)	2					
		3	2	SS	4-4-4		
			4				
			5				
			6	3	SS	2-3-4	Drilling firm
			7				
			8	4	SS	8-10-15	
			9				Drilling hard
	Light brown sand with a little rock fragments and a trace of silt (saprolite)	10	5	SS	6-30-50/2"		
		11					
			12				Drilling medium
	Reddish brown sandy silt (saprolite)	13					
		14	6	SS	5-7-9		
			15				Drilling medium
			16				
			17				
		Reddish brown silty sand (saprolite)	18				Drilling medium
			19	7	SS	2-4-4	
		20					
	Boring terminated at 20.0 feet	21				Note: hole plugged at 10.4 ft at 0 hr(s) - no water encountered above that depth	
		22					
		23					
		24					
		25					
		26					
		27					
		28					
		29					
		30					
		31					
		32					
		33					
		34					
		35					
		36					
		37					
		38					
		39					
		40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
B-2

CONTRACTED WITH: City of Lawrenceville

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
141-100 07/01/14

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1006.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
998.5	Brown sand with some silt (fill)	1	1	SS	6-7-5	Drilling medium Drilling hard Note: hole plugged at 3.3 ft at 0 hr(s) - no water encountered above that depth
		2				
	Reddish brown sandy silt (residuum)	3	2	SS	3-5-7	
		4				
	Reddish brown/grey sandy silt (saprolite)	5				
		6	3	SS	3-7-9	
		7				
	Auger refusal at 7.5 feet	8				
		9				
		10				
	11					
	12					
	13					
	14					
	15					
	16					
	17					
	18					
	19					
	20					
	21					
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	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
B-3

CONTRACTED WITH: City of Lawrenceville

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
141-100 07/01/14

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
994.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown silty sand (saprolite)	1	1	SS	6-6-8	Drilling medium Drilling hard
		2				
	Brown sand with some silt (saprolite)	3	2	SS	3-5-5	
		4				
	Brown/grey sand with some silt (saprolite)	5				
		6	3	SS	2-4-3	
		7				
		8				
		9				
		10	4	SS	3-7-50/3"	
982.5	Auger refusal at 11.5 feet	11				Note: hole plugged at 5.0 ft at 0 hr(s) - no water encountered above that depth
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
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		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
B-4

CONTRACTED WITH: City of Lawrenceville

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
141-100 07/01/14

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.0	Surface cover – 2.0" asphaltic concrete					
992.0	Reddish brown sandy silt (residuum)	1	1	SS	5-4-5	Drilling medium
		2				
	Reddish brown sand with some silt (saprolite)	3	2	SS	4-5-6	
		4				
	Brown sand with some silt (saprolite)	5	3	SS	5-6-4	
		6				
	Light brown sand with some silt (saprolite)	7				
		8	4	SS	4-5-4	
	Boring terminated at 20.0 feet	9				
		10				
		11				
		12				
		13				
		14	5	SS	5-5-6	
		15				
		16				
		17				
		18				
		19	6	SS	3-4-8	
		20				
		21			Note: hole plugged at 9.5 ft at 0 hr(s) - no water encountered above that depth	
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
B-5

CONTRACTED WITH: City of Lawrenceville

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
141-100 07/01/14

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.0	Surface cover – 3.0" gravel					
992.0	Light reddish brown sandy silt (saprolite)	1	1	SS	6-7-12	Drilling firm
		2				
	Light reddish brown sand with some silt (saprolite)	3	2	SS	4-8-11	
		4				
		5				
		6	3	SS	7-8-9	
		7				Drilling medium
	Reddish brown/light brown sand with some silt (saprolite)	8				
		9	4	SS	4-5-6	
		10				
		11				
		12				
	Brown sandy silt (saprolite)	13				Drilling firm
		14	5	SS	2-4-6	
		15				
		16				
		17				
	Light brown sand with some silt (saprolite)	18				Drilling firm
		19	6	SS	6-10-9	
	Boring terminated at 20.0 feet	20				Note: hole plugged at 8.4 ft at 0 hr(s) - no water encountered above that depth
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
B-6

CONTRACTED WITH: City of Lawrenceville

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
141-100 07/01/14

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
992.5	Surface cover – 2.0" asphaltic concrete					
972.5	Brown silty sand (fill)	1	1	SS	4-3-3	Drilling medium
		2				
	Reddish brown sandy silt (residuum)	3	2	SS	2-3-3	
		4				
	Reddish brown silty sand (residuum)	5	3	SS	3-5-7	
		6				
		7				
	Light brown sandy silt (saprolite)	8				
		9	4	SS	4-4-3	
		10				
		11				
	Light brown silt with a little sand (saprolite)	12				Drilling soft
		13				
		14	5	SS	1-1-1	
		15				
		16				
		17				
	Light brown sandy silt (saprolite)	18				
		19	6	SS	4-1-2	
Boring terminated at 20.0 feet	20				Note: hole plugged at 11.0 ft at 48 hr(s) - no water encountered above that depth	
	21					
	22					
	23					
	24					
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
B-7

CONTRACTED WITH: City of Lawrenceville

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
141-100 07/01/14

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
998.0	Surface cover – 5.0" gravel					
979.2	Reddish brown sandy silt (residuum)	1	1	SS	9-5-10	Drilling medium
		2				
		3	2	SS	4-5-8	
	4					
	Brown sandy silt (residuum)	5				
		6	3	SS	4-8-10	
	7					
	Light brown/grey silt with a little sand (saprolite)	8				
		9	4	SS	3-5-5	
		10				
	Light brown sandy silt (saprolite)	11				Drilling soft
		12				
		13				
		14	5	SS	4-1-1	
		15				
	Dark brown sand with a little silt and rock fragments (saprolite)	16				Drilling hard
		17				
		18	6	SS	50/3"	
	Boring terminated at 18.8 feet	19				Note: hole plugged at 10.4 ft at 48 hr(s) - no water encountered above that depth
		20				
	21					
	22					
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
B-8

CONTRACTED WITH: City of Lawrenceville

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
141-100 06/30/14

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1013.0	Topsoil - 2.0" dark brown sand with a little silt and organics						
993.0	Reddish brown silty sand (residuum)	1	1	SS	5-8-8	Drilling medium	
		2					
	Brown sandy silt (saprolite)	3	2	SS	10-9-5		
		4					
		5					
		6	3	SS	4-5-8		
		7					
	Light brown/black sand with some silt (saprolite)	8					Drilling firm
		9	4	SS	4-10-11		
		10					
		11					
	Light brown sand with some silt (saprolite)	12					
		13					
		14	5	SS	5-7-9		
		15					
		16					
	Light brown sand with a little silt (saprolite)	17					
		18					
		19	6	SS	9-18-22		
	Boring terminated at 20.0 feet	20				Note: hole plugged at 7.3 ft at 24 hr(s) - no water encountered above that depth	
	21						
	22						
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
B-9

CONTRACTED WITH: City of Lawrenceville

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
141-100 06/30/14

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1008.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light brown sand with a little silt (saprolite)	1	1	SS	4-7-4	Drilling medium
		2				Drilling firm
	Brown sand with some silt and a little rock fragments (saprolite)	3	2	SS	8-10-8	
		4				Drilling medium
	Brown sandy silt (saprolite)	5				
		6	3	SS	9-5-7	
		7				Drilling firm
	Brown sand with a little silt and rock fragments (saprolite)	8				
		9	4	SS	7-17-12	
		10				
		11				
996.0	Auger refusal at 12.0 feet	12				Drilling hard
		13				Note: hole plugged at 4.3 ft at
		14				24 hr(s) - no water
		15				encountered above that depth
		16				
		17				
		18				
		19				
		20				
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		23				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. B-10

CONTRACTED WITH: City of Lawrenceville

JOB NO. DATE:
141-100 06/30/14

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1019.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light brown/black sand with some silt (saprolite)	1	1	SS	4-5-6	Drilling medium
		2				Drilling firm
	Grey sand with some rock fragments and a trace of silt (saprolite)	3	2	SS	6-37-19	
		4				Drilling medium
	Reddish brown/light brown sand with some silt (saprolite)	5				
		6	3	SS	2-4-5	
		7				
		8				
		9	4	SS	3-3-4	
		10				
		11				
		12				
		13				
		14	5	SS	6-3-4	
		15				
		16				
	Light brown/black sand with a little silt (saprolite)	17				Drilling firm
		18				
		19	6	SS	16-32-31	
999.0	Boring terminated at 20.0 feet	20				
		21				
		22				
		23				
		24				Note: hole plugged at 10.2 ft at 24 hr(s) - no water encountered above that depth
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. B-11

CONTRACTED WITH: City of Lawrenceville

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. 141-100 DATE: 06/30/14

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
996.0	Light brown sand with some silt (saprolite)	1	1	SS	9-14-13	Drilling firm
		2				Drilling medium
		3	2	SS	4-4-7	
		4				
		5				
		6	3	SS	4-5-6	
		7				
		8				
		9	4	SS	5-8-8	
		10				
		11				
		12				Drilling firm
		13				
		14	5	SS	10-10-10	
		15				
		16				
		17	Light brown/grey sand with some silt (saprolite)	18		
19	6	SS		6-6-8		
	Boring terminated at 20.0 feet	20				
		21				
		22				
		23				
		24				
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Note: hole plugged at 7.3 ft at 24 hr(s) - no water encountered above that depth

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. B-12

CONTRACTED WITH: City of Lawrenceville

JOB NO. DATE:
141-100 06/30/14

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1020.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown/light brown silty sand (saprolite)	1	1	SS	3-5-8	Drilling medium
	Brown sand with some silt (saprolite)	2				Drilling firm
		3	2	SS	9-10-12	
		4				
	Reddish brown/light brown sand with some silt (saprolite)	5	3	SS	4-11-12	
		6				
		7				
	Light brown silty sand (saprolite)	8				
		9	4	SS	6-7-12	
		10				
		11				
	Light brown sand with a little silt (saprolite)	12				Drilling hard
		13				
		14	5	SS	50/4.3"	
		15				
		16				
		17				Drilling firm
	Reddish brown sand with some silt (saprolite)	18				
		19	6	SS	8-9-14	
1000.0	Boring terminated at 20.0 feet	20				
		21				
		22				
		23				
		24				
		25				
		26				
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		39				
		40				

Note: hole plugged at 8.0 ft at 24 hr(s) - no water encountered above that depth

SEA

NEW BORINGS

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. NB-1

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023
DATE: 03/17/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1008.0	Surface cover – 6.0" concrete					
1003.5	Reddish brown/grey sandy silt with a little rock pieces (fill)	1	1	SS	8-8-5	Drilling medium
	Reddish brown sandy silt with a trace of silt (fill)	2				
	Weathered rock	3	2	SS	3-4-50/5"	Drilling hard
	Auger refusal at 4.5 feet	4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
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Note: hole plugged at 2.4 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. NB-2

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023 DATE: 03/17/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1008.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
988.0	Greyish brown sand with some silt (fill)	1	1	SS	3-3-2	Drilling medium
		2				
	Reddish brown sandy silt (fill)	3	2	SS	3-5-4	
		4				
	Reddish brown sandy silt with phone wires (fill)	5	3	SS	2-3-3	
		6				
	Reddish brown sandy silt (saprolite)	7				
		8	4	SS	4-6-7	
		9				
	Reddish brown silty sand (saprolite)	10				
		11	5	SS	6-6-7	
		12				
	Reddish brown sand with some silt (saprolite)	13				
		14	6	SS	6-7-6	
		15				
		16				
		17				
		18				
		19	7	SS	5-7-9	
	20					
	Boring terminated at 20.0 feet	21			Note: hole plugged at 7.1 ft at 48+ hr(s) - no water encountered above that depth	
		22				
		23				
		24				
		25				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. NB-3

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023 DATE: 03/17/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1006.0	Surface cover – 6.5" concrete						
994.0	Reddish brown/grey sandy silt with a trace of organics (fill)	1	1	SS	5-3-3	Drilling medium	
	Grey sandy silt with a trace of organics (fill)	2					
		3	2	SS	4-4-4		
		Grey sand with some silt with a trace of organics (fill)	4				Drilling firm
			5				
			6	3	SS	3-7-11	
			7				
		Reddish brown silty sand (residuum)	8	4	SS	7-12-15	
			9				Drilling hard Note: hole plugged at 3.5 ft at 48+ hr(s) - no water encountered above that depth
			10				
			11	5	SS	7-7-10	
		Auger refusal at 12.0 feet	12				
		13					
		14					
		15					
		16					
		17					
		18					
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. NB-4

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023 DATE: 03/17/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.0	No topsoil					
1008.5	Brown sand with some silt (saprolite)	1	1	SS	27-50/4"	Drilling hard
	Auger refusal at 1.5 feet	2				Note: hole plugged at 0.5 ft at 0 hr(s) - no water encountered above that depth
		3				
		4				
		5				
		6				
		7				
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		9				
		10				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-4A

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/17/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.0	No topsoil					
1008.0	Brown sand with some silt (saprolite)	1				Drilling hard Note: hole plugged at 1.0 ft at 0 hr(s) - no water encountered above that depth
	Auger refusal at 2.0 feet	2				
		3				
		4				
		5				
		6				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-5

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/17/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1004.0	Surface cover – 4.0" gravel						
984.0	Brown sand with some silt with a little rock pieces (fill)	1	1	SS	14-11-14	Drilling firm	
		2					
	Reddish brown sandy silt (residuum)	3	2	SS	8-8-12		
		4					
		5					
		6	3	SS	7-11-13		
		7					
	Reddish brown sand with some silt (saprolite)	8					Drilling medium
		9	4	SS	4-6-7		
		10					
		11					
	Brown sand with some silt (saprolite)	12					
		13					
		14	5	SS	4-7-6		
		15					
		16					
	Grey sand with some silt (saprolite)	17					
		18					
		19	6	SS	4-4-6		
	Boring terminated at 20.0 feet	20				Note: hole plugged at 5.5 ft at 48+ hr(s) - no water encountered above that depth	
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. NB-6

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023 DATE: 03/17/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1009.0	Surface cover – 3.0" gravel					
997.0	Reddish brown sandy silt with a little rock pieces (fill)	1	1	SS	10-4-4	Drilling medium Drilling hard Note: hole plugged at 5.3 ft at 48+ hr(s) - no water encountered above that depth
		2				
	Reddish brown silty sand (saprolite)	3	2	SS	2-3-4	
		4				
		5				
		6	3	SS	3-4-5	
		7				
	Reddish brown/grey sand with some silt (saprolite)	8				
		9	4	SS	3-4-7	
		10				
		11				
	Auger refusal at 12.0 feet	12				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. NB-8

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023 DATE: 03/17/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1011.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
996.0	Reddish brown sandy silt (fill)	1	1	SS	3-3-4	Drilling medium
		2				Drilling hard
	Weathered rock	3	2	SS	50/1"	
	Reddish brown sandy silt (residuum)	4				Drilling medium
		5				
		6	3	SS	2-3-7	
		7				Drilling firm
		8				
		9	4	SS	6-13-17	
		10				
		11				
		12				
	Reddish brown silty sand (saprolite)	13				
		14	5	SS	4-5-6	
	Boring terminated at 15.0 feet	15				
	16					
	17					
	18					
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Note: hole plugged at 5.4 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-10

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/18/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.0	Topsoil - 1.0" dark brown sand with a little silt and organics					
	Reddish brown silt with some sand (residuum)	1	1	SS	3-5-7	Drilling medium
		2				
	Reddish brown silty sand (saprolite)	3	2	SS	6-8-8	
		4				
		5				
		6	3	SS	3-4-6	
		7				
	Brown sand with some silt (saprolite)	8				
		9	4	SS	4-3-5	
		10				
		11				
	Light reddish brown sand with some silt (saprolite)	12				
		13				
		14	5	SS	2-7-12	
995.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-11

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/18/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
997.0	Topsoil - 1.0" dark brown sand with a little silt and organics					
	Reddish brown sandy silt (fill)	1	1	SS	5-6-7	Drilling medium
	Reddish brown sand with some silt (saprolite)	2				Drilling firm
		3	2	SS	8-21-29	
		4				Drilling medium
		5				
		6	3	SS	6-4-7	
		7				
	Reddish brown/grey sand with some silt (saprolite)	8				
		9	4	SS	3-3-3	
		10				
		11				
	Brown sand with some silt (saprolite)	12				
		13				
		14	5	SS	1-3-6	
		15				
982.0	Boring terminated at 15.0 feet	16				Note: hole plugged at 8.5 ft at 48+ hr(s) - no water encountered above that depth
		17				
		18				
		19				
		20				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-12

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/17/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
998.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with some silt (fill)	1	1	SS	5-12-6	Drilling medium
	Light brown silt with some sand (saprolite)	2				
		3	2	SS	3-3-6	
		4				
		5				
		6	3	SS	7-7-6	
		7				
	Light brown sandy silt (saprolite)	8				Water table at 48+ hrs
		9	4	SS	3-8-4	
		10				Drilling firm
		11				
	Brown/grey sand with some rock fragments and a little silt (saprolite)	12				
		13				
		14	5	SS	20-22-26	
983.0	Boring terminated at 15.0 feet	15				Note: hole plugged at 7.8 ft at 48+ hr(s)
		16				
		17				
		18				
		19				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. NB-13

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. 161-023
DATE: 03/16/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1002.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown/grey sand with some silt and a little rock fragments (saprolite)	1	1	SS	2-2-6	Drilling soft Drilling medium Drilling firm
		2				
	Brown/grey sand with a little silt and rock fragments (saprolite)	3	2	SS	12-16-14	
		4				
		5				
		6	3	SS	9-12-7	Water table at 48+ hrs Drilling medium
		7				
	Brown/black/white sand with some silt and a little rock fragments (saprolite)	8				Drilling hard
		9	4	SS	3-2-3	
		10				
		11				
	Brown/grey sand with a little silt and rock fragments (saprolite)	12				
		13				
988.0	Boring terminated at 14.0 feet	14	5	SS	50/6"	
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
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Note: hole plugged at 8.0 ft at 48+ hr(s)

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-14

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/18/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1006.0	Topsoil - 1.0" dark brown sand with a little silt and organics					
991.0	Brown sandy silt (fill)	1	1	SS	3-2-5	Drilling medium
		2				
	Reddish brown silt with some sand (residuum)	3	2	SS	6-8-12	Drilling firm
		4				Drilling medium
		5				
		6	3	SS	4-7-10	Drilling firm
		7				Drilling medium
	Brown sandy silt (saprolite)	8				
		9	4	SS	4-2-5	
		10				
		11				
	Brown/black silty sand (saprolite)	12				
		13				
		14	5	SS	5-4-5	
	Boring terminated at 15.0 feet	15				
	16					
	17					
	18					
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Note: hole plugged at 6.5 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. NB-15

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/17/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1000.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
985.0	Light brown silt with some sand (saprolite)	1	1	SS	4-5-9	Drilling medium
		2				
	Brown sand with some silt (saprolite)	3	2	SS	3-7-12	Drilling firm
		4				
		5				
		6	3	SS	3-14-11	Water table at 48+ hrs
		7				
		8				Drilling medium
		9				
		10				
		11				
		12				
		13				
		14				
		15		5	SS	2-5-11
	Boring terminated at 15.0 feet	16				
		17				
		18				
		19				
		20				
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		22				
		23				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-16

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/16/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1003.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt (residuuum)	1	1	SS	4-3-2	Drilling medium
		2				
	Brown/grey sand with some silt and rock fragments (saprolite)	3	2	SS	5-7-8	Drilling firm Water table at 48+ hrs
		4				
		5				
		6	3	SS	10-14-10	Drilling medium
		7				
	Brown sand with some silt (saprolite)	8				Note: hole plugged at 7.1 ft at 48+ hr(s)
		9	4	SS	10-7-8	
		10				
		11				
	Greyish brown sand with some silt (saprolite)	12				
		13				
		14	5	SS	4-7-8	
988.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-17

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO.
161-023

DATE:
03/16/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1014.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown silt with some sand (residuum)	1	1	SS	4-4-6	Drilling medium Drilling firm Water table at 0 hr Note: hole plugged at 5.8 ft at 0 hr(s)
		2				
	Reddish brown sand with some silt (saprolite)	3	2	SS	14-8-9	
		4				
	Reddish brown silty sand (saprolite)	5				
		6	3	SS	12-7-11	
		7				
	Brown sand with some rock fragments and a little silt (saprolite)	8				
		9	4	SS	2-16-27	
		10				
		11				
		12				
		13				
		14	5	SS	22-28-39	
999.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-18

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/11/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1017.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sandy silt (residuum)	1	1	SS	1-2-2	Drilling soft
		2				Drilling medium
	Reddish brown sand with a little silt (saprolite)	3	2	SS	3-4-5	
		4				Drilling soft
	Reddish brown silty sand (saprolite)	5				
		6	3	SS	1-2-1	
		7				
		8				
		9				
		10	4	SS	2-1-2	
		11				Water table at 48+ hrs Drilling hard
	Weathered rock	12				
		13				
1003.0	Boring terminated at 14.0 feet	14	5	SS	50/6"	
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
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Note: hole plugged at 10.7 ft at 48+ hr(s)

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-19

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/15/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1020.0	Topsoil - 3.0" dark brown sand with a little silt and organics					
	Reddish brown silty sand (fill)	1	1	SS	5-7-4	Drilling medium
		2				Drilling firm
	Reddish brown silt with some sand (residuum)	3	2	SS	9-8-12	
		4				
	Brown sand with some silt and a little rock fragments (saprolite)	5	3	SS	12-13-4	
		6				
		7				
	Weathered rock	8				Drilling hard
		9	4	SS	50/5"	
		10				
	Greyish brown sand with some silt (saprolite)	11				Drilling firm
		12				
		13				
		14	5	SS	12-27-15	
1005.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
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		22				
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Note: hole plugged at 4.8 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-20

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/16/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1015.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown/brown silty sand (saprolite)	1	1	SS	2-5-4	Drilling medium
		2				
		3	2	SS	3-4-7	
		4				
	Brown sand with some silt (saprolite)	5				Drilling firm Water table at 0 hr
		6	3	SS	7-15-27	
	Greyish brown sand with some silt (saprolite)	7				Drilling hard
		8				
		9	4	SS	5-8-13	
		10				
1001.5	Auger refusal at 13.5 feet	11				Note: hole plugged at 6.4 ft at 0 hr(s)
		12				
		13				
		14				
		15				
		16				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-21

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/11/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sand with some silt (saprolite)	1	1	SS	2-12-17	Drilling firm
		2				
	Brown sand with a little silt and rock fragments (saprolite)	3	2	SS	28-27-11	
		4				
		5				
		6	3	SS	16-17-15	
		7				
		8				
		9	4	SS	7-10-5	
		10				
		11				
	Greyish brown sand with some silt (saprolite)	12				Water table at 48+ hrs
		13				
		14				
		15	5	SS	4-5-50/6"	
997.0	Boring terminated at 15.0 feet	16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
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Note: hole plugged at 10.4 ft at 48+ hr(s)

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-22

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/15/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.0	Topsoil - 1.0" dark brown sand with a little silt and organics					
	Brown/grey sand with some silt and a little rock fragments (saprolite)	1	1	SS	8-7-5	Drilling medium
		2				Drilling firm
	Brown sand with some silt (saprolite)	3	2	SS	19-50/4.5"	Drilling hard
		4				Drilling firm
	Brown/greyish brown sand with some silt (saprolite)	5				Water table at 48+ hrs
		6	3	SS	19-13-11	
	Brown sand with some silt (saprolite)	7				
		8				
	Brown sand with some silt (saprolite)	9	4	SS	26-18-21	
		10				
	Boring terminated at 14.5 feet	11				
995.5		12				
		13				
		14	5	SS	11-50/6"	Drilling hard
		15				
		16				
		17				
		18				
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		20				
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		22				
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Note: hole plugged at 7.0 ft at 48+ hr(s)

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-23

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/11/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown/black sand with some silt (saprolite)	1	1	SS	3-5-8	Drilling medium
		2				Drilling hard
	Brown/grey sand with some silt (saprolite)	3	2	SS	50/4"	
		4				
		5				Water table at 48+ hrs
		6	3	SS	25-50/1"	
		7				
	Grey sand with a little silt and rock fragments (saprolite)	8				
		9	4	SS	13-50/1.5"	
1001.0	Auger refusal at 11.0 feet	10				
		11				Note: hole plugged at 7.2 ft at 48+ hr(s)
		12				
		13				
		14				
		15				
		16				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-24

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/15/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1009.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
997.5	Brown/grey sand with a little silt and rock fragments (saprolite)	1	1	SS	20-15-7	Drilling firm Drilling hard Water table at 48+ hrs Drilling hard Note: hole plugged at 3.2 ft at 48+ hr(s)
		2				
		3	2	SS	7-22-18	
		4				
		5				
		6	3	SS	9-9-25	
		7				
		8				
		9				
		10	4	SS	24-18-17	
		11				
	Auger refusal at 11.5 feet	12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-25

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/15/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1026.0	No topsoil					
1024.0	Brown/grey sand with some rock fragments and a little silt (saprolite)	1	1	SS	27-50/3"	Drilling hard
	Auger refusal at 2.0 feet	2				Note: hole plugged at 0.3 ft at 48+ hr(s) - no water encountered above that depth
		3				
		4				
		5				
		6				
		7				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. NB-26

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023 DATE: 03/11/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1013.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Grey sand with a little silt (saprolite)	1	1	SS	2-3-4	Drilling medium
		2				Drilling firm
		3	2	SS	17-17-11	Water table at 48+ hrs
		4				
		5				
		6	3	SS	3-4-50/4"	Drilling hard
		7				
		8				
		9	4	SS	8-29-50/3"	
		10				
1002.5	Auger refusal at 11.0 feet	11				Note: hole plugged at 3.7 ft at 48+ hr(s)
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		13				
		14				
		15				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-27

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO.
161-023

DATE:
03/11/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt (saprolite)	1	1	SS	2-2-2	Drilling soft
		2				Drilling medium
	Brown/grey sandy silt (saprolite)	3	2	SS	4-6-6	Water table at 48+ hrs
		4				
		5				Drilling firm
		6	3	SS	6-9-17	
		7				Drilling hard
		8				
		9	4	SS	17-17-25	
		10				
		11				Drilling hard
		12				
	Brown sand with some silt (saprolite)	13				Drilling hard
		14	5	SS	17-50/3.5"	
1001.6	Boring terminated at 14.4 feet	15				Note: hole plugged at 8.7 ft at 48+ hr(s)
		16				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-28

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/15/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1022.0	Topsoil - 1.0" dark brown sand with a little silt and organics					
1017.0	Brown sand with a little silt and rock fragments (saprolite)	1	1	SS	12-27-50	Drilling firm
		2				
	Light brown/brown sand with some silt and a little rock fragments (saprolite)	3	2	SS	27-13-23	Drilling hard
		4				
	Auger refusal at 5.0 feet	5	3	SS	50/0"	
		6				Note: hole plugged at 2.0 ft at 48+ hr(s) - no water encountered above that depth
		7				
		8				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-29

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/11/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1009.0	Greyish brown sand with a little silt and rock fragments (saprolite)	1	1	SS	50/3"	Drilling hard Note: hole plugged at 1.8 ft at 48+ hr(s) - no water encountered above that depth
	Grey sand with a trace of silt (saprolite)	2				
	Auger refusal at 3.0 feet	3	2	SS	50/1"	
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-30

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/15/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1014.0	Topsoil - 1.0" dark brown sand with a little silt and organics					
1006.5	Brown sand with some silt (saprolite)	1	1	SS	3-5-16	Drilling medium
	Brown/grey sand with a little silt and rock fragments (saprolite)	2				Drilling firm
		3	2	SS	28-17-10	
	Greyish brown sand with some silt (saprolite)	4				Drilling hard
		5	3	SS	4-10-14	
	Auger refusal at 7.5 feet	6				Note: hole plugged at 4.7 ft at 48+ hr(s) - no water encountered above that depth
		7				
		8				
		9				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-31

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/16/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with some silt (saprolite)	1	1	SS	2-2-3	Drilling soft Drilling medium
		2				
		3	2	SS	5-7-9	Drilling firm
		4				
	Brown/white sand with some silt (saprolite)	5	3	SS	12-17-33	Water table at 0 hr
		6				
		7				Drilling hard
		8				
	Auger refusal at 11.5 feet	9	4	SS	7-27-50/5"	Note: hole plugged at 5.3 ft at 0 hr(s)
		10				
		11				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-32

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/11/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1014.0	Topsoil - 2.0" dark brown sand with a little silt and organics						
1001.5	Dark brown sand with some silt (saprolite)	1	1	SS	2-6-5	Drilling medium	
		2				Drilling firm	
	Greyish brown sand with some silt (saprolite)	3	2	SS	19-20-16		
		4					
		5					
		6	3	SS	13-14-17		
		7					
		8	▽			Water table at 48+ hrs	
		9	⚡	4	SS	4-4-6	Drilling medium
		10					
		11				Drilling hard	
		12					
	Auger refusal at 12.5 feet	13					
		14					
		15			Note: hole plugged at 8.7 ft at 48+ hr(s)		
		16					
		17					
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-33

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/11/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with some silt (fill)	1	1	SS	2-2-3	Drilling soft Drilling medium Drilling firm Water table at 0 hr Drilling medium Note: hole plugged at 4.5 ft at 0 hr(s)
		2				
	Light brown/black sand with a little silt (saprolite)	3	2	SS	9-16-17	
		4				
		5				
		6	3	SS	11-7-8	
		7				
	Light brown/brown/black sand with some silt (saprolite)	8				
		9	4	SS	2-3-4	
		10				
		11				
	Brown/grey sand with some silt (saprolite)	12				
		13				
		14	5	SS	6-7-7	
1001.0	Boring terminated at 15.0 feet	15				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-35

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/11/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1014.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
999.0	Brown sand with some silt (saprolite)	1	1	SS	2-2-3	Drilling soft Drilling medium
		2				
	White sand with some silt (saprolite)	3	2	SS	5-4-5	Drilling firm
		4				
		5	3	SS	8-8-7	
			6			
			7			
	Reddish brown sand with some silt (saprolite)	8				Drilling firm
		9	4	SS	5-10-11	
			10			Drilling medium
			11			
			12			
	Light reddish brown sand with some silt (saprolite)	13				Drilling firm
		14	5	SS	5-7-12	
	Boring terminated at 15.0 feet	15				Note: hole plugged at 10.1 ft at 48+ hr(s) - no water encountered above that depth
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
NB-36

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/10/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1018.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light reddish brown sand with some rock fragments and a trace of silt (saprolite)	1	1	SS	19-19-21	Drilling firm
		2				
	Light reddish brown/white silty sand (saprolite)	3	2	SS	19-23-29	
		4				
		5				
		6	3	SS	11-16-22	
		7				
		8				
		9	4	SS	16-17-21	
		10				
		11				
	Light reddish brown silty sand (saprolite)	12				
		13				
		14	5	SS	7-10-15	
1003.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
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Note: hole plugged at 7.9 ft at 0 hr(s) - no water encountered above that depth

AUGER PROBINGS

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. A-25

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/07/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1015.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium
		2				
		3				
		4				
	Weathered rock	5				Drilling hard
		6				
	Brown sand with a little silt	7				
1006.5	Auger refusal at 8.5 feet	8				
		9				Note: hole plugged at 6.4 ft at 0 hr(s) - no water encountered above that depth
		10				
		11				
		12				
		13				
		14				
		15				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. B-23

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO.
161-023

DATE:
03/07/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1019.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
	Grey sand with a trace of silt	11				Drilling hard
1007.5	Auger refusal at 12.0 feet	12				
		13				
		14				
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Note: hole plugged at 8.2 ft at 48+ hr(s) - no water encountered above that depth

SEA

LOG OF BORING

SHEET 1 OF 1
BORING NO. B-24

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/07/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1020.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
	Grey sand with a little rock fragments and a trace of silt	8				Drilling hard
1011.0	Auger refusal at 9.0 feet	9				
		10				Note: hole plugged at 7.7 ft at 48+ hr(s) - no water encountered above that depth
		11				
		12				
		13				
		14				
		15				
		16				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.

CONTRACTED WITH: Precision Planning, Inc.

B-25

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO.
161-023

DATE:
03/07/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
	Weathered rock	6				Drilling firm Drilling medium
	Brown sand with some silt	7				
		8				
		9				
	Grey sand with a trace of silt	10				Drilling hard
		11				
		12				
		13				
		14				
1002.0	Auger refusal at 14.0 feet	15				Note: hole plugged at 13.0 ft at 48+ hr(s) - no water encountered above that depth
		16				
		17				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. C-17

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/22/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1006.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium
		2				
		3				
		4				
	Weathered rock	5				Drilling hard
1000.5	Auger refusal at 5.5 feet	6				
		7				Note: hole plugged at 4.0 ft at 48+ hr(s) - no water encountered above that depth
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. C-24

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/07/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1019.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium Water table at 48+ hrs Drilling hard Note: hole plugged at 16.1 ft at 48+ hr(s)
		2				
		3				
		4				
		5				
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		16	3			
1001.0	Auger refusal at 18.0 feet	18				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. C-26

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/07/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1008.0	Topsoil - 2.0" dark brown sand with a little silt and organics	1				
	Brown sandy silt	2				Drilling medium Water table at 48+ hrs Drilling hard
	Grey sand with some rock fragments and a trace of silt	3				
		4				
		5				
		6				
1001.5	Auger refusal at 6.5 feet	7				Note: hole plugged at 3.7 ft at 48+ hr(s)
		8				
		9				
		10				
		11				
		12				
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		15				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

C-26A

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

03/29/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1004.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium Water table at 0 hr
		2				
		3				
		4	▽			
		5	⚡			
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
989.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. D-16

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/22/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1001.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
992.5	Weathered rock	9				Drilling hard
	Auger refusal at 9.0 feet	10				
		11				Note: hole plugged at 5.4 ft at 48+ hr(s) - no water encountered above that depth
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. D-17

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/30/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1006.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
994.5	Auger refusal at 11.5 feet	11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. D-18

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/30/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1008.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
996.0	Auger refusal at 12.0 feet	12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
D-18A

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/22/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1008.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
993.0	Brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
	Grey sand with a little rock fragments and a trace of silt	10				Drilling firm
		11				
		12				
		13				
		14				
		15				
Boring terminated at 15.0 feet		16			Note: hole plugged at 13.9 ft at 0 hr(s) - no water encountered above that depth	
17						
18						
19						
20						
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SEA

LOG OF BORING

SHEET 1 OF 1

DATE:

D-21

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

02/22/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a little silt	1				Drilling medium Water table at 0 hr Note: hole plugged at 14.9 ft at 0 hr(s)
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
1001.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

D-26

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

03/29/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Dark brown sand with some silt	1				Drilling medium Water table at 0 hr
		2				
		3				
		4				
		5				
		6				
		7				
		8	▽ 3			
		9				
		10				
998.5	Weathered rock	11				Drilling hard Note: hole plugged at 8.3 ft at 0 hr(s)
	Auger refusal at 11.5 feet	12				
		13				
		14				
		15				
		16				
		17				
		18				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

D-27

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1006.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1003.0	Brown sand with a little silt	1				Drilling medium Water table at 0 hr Drilling hard
		2				
	Auger refusal at 3.0 feet	3				Note: hole plugged at 2.7 ft at 0 hr(s)
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

D-28

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1006.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a little silt	1 ∇				Drilling medium
		2 $\frac{3}{5}$				Water table at 0 hr
		3				
		4				Drilling hard
1001.0	Auger refusal at 5.0 feet	5				
		6				
		7				
		8				Note: hole plugged at 2.0 ft at 0 hr(s)
		9				
		10				
		11				
		12				
		13				
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		16				
		17				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

D-29

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1014.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1010.0	Brown sand with a little silt	1				Drilling medium
		2				
		3				
		4				Drilling hard
	Auger refusal at 4.0 feet	5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
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		38				
		39				
		40				

Note: hole plugged at 3.1 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

D-30

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1019.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
1015.5	Dark grey sand with a little silt	1				Drilling medium
		2				
		3				Drilling hard
		4				
	Auger refusal at 4.0 feet	5				Note: hole plugged at 2.2 ft at 48+ hr(s) - no water encountered above that depth
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. E-15

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
998.0	Surface cover – 3.0" asphaltic concrete					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
	Light reddish brown sand with a little silt	8	▽			Water table at 48+ hrs
		9	3			
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				Drilling hard
979.5	Auger refusal at 18.5 feet	19				Note: hole plugged at 12.1 ft at 48+ hr(s)
		20				
		21				
		22				
		23				
		24				
		25				
		26				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. E-15

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/22/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
999.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
	Brown sand with a little silt	6				
		7	▽			
		8	3			
		9				
		10				
	Light brown/grey silty clay with a little silt	11				
		12				
		13				
		14				
	Grey sandy silty clay	15				
		16				
	Light brown/grey silty clay with a little silt	17				
981.5	Auger refusal at 18.0 feet	18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
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		38				
		39				
		40				

Water table at 48+ hrs

Drilling hard

Note: hole plugged at 7.3 ft at 48+ hr(s)

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. E-16

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/22/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1002.0	Topsoil - 2.0" dark brown sand with a little silt and organics						
	Brown sandy silt	1				Drilling medium	
		2					
		3					
		4					
		5					
		6					
		7					
		8					
		9	▽				Water table at 0 hr
		10	3				
		11					
		12					
988.5	Auger refusal at 13.5 feet	13					Drilling hard Note: hole plugged at 12.1 ft at 0 hr(s)
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
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		40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

E-25

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a little silt	1				Drilling medium Water table at 48+ hrs
		2				
		3				
		4	▽			
		5	⚡			
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
995.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
E-31

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/09/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1025.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1024.0	Weathered rock	1				Drilling hard Note: hole plugged at 0.4 ft at 0 hr(s) - no water encountered above that depth
	Auger refusal at 1.0 feet	2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
F-10

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
996.0	Surface cover – 4.0" gravel					
	Reddish brown silt with a little sand	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
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		9				
		10				
		11				
		12	▽			
		13	↘			
		14				
		15				
		16				
		17				
		18				
		19				
976.0		Boring terminated at 20.0 feet	20			
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. F-18

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/22/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1014.0	Topsoil - 2.0" dark brown sand with a little silt and organics						
999.3	Reddish brown sandy silt (saprolite)	1	1	SS	2-3-3	Drilling medium	
		2				Drilling firm	
	Reddish brown silty sand (saprolite)	3	2	SS	20-30-24		
		4					
	Brown/grey sand with some silt (saprolite)	5	3	SS	12-10-11		
		6					
		7					
		8					
		9		4	SS	30-16-17	
		10					
		11					
	Reddish brown/grey sand with some silt (saprolite)	12					
		13					
		14	5	SS	17-20-50/2"	Drilling hard	
	Boring terminated at 14.7 feet	15					
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
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	40						

Note: hole plugged at 9.1 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

F-22

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

03/29/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1011.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light brown sand with a little silt	1				Drilling medium Water table at 48+ hrs Note: hole plugged at 12.9 ft at 0 hr(s)
		2				
		3				
		4				
	White sand with a trace of silt	5				
		6				
		7				
		8				
		9				
		10				
		11				
		12	▽			
		13	/			
		14				
996.5	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

F-23

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1011.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1007.0	Brown sand with a little silt	1 2 3 4				Drilling medium Water table at 0 hr Drilling hard Note: hole plugged at 2.7 ft at 0 hr(s)
	Auger refusal at 4.0 feet	5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1

DATE:

F-24

CONTRACTED WITH: Precision Planning, Inc.

JOB NO.

161-023

DATE:

03/29/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Dark brown sand with some silt	1				Drilling medium Water table at 0 hrs
		2				
		3				
		4				
	Weathered rock	5				
		6				
	Brown sand with a little silt	7				
		8				
		9				
	Weathered rock	10				
999.5	Auger refusal at 11.0 feet	11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
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		37				
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		40				

Note: hole plugged at 8.9 ft at 0 hr(s)

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
G-19

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a little silt	1				Drilling medium
		2				Drilling firm
		3				
		4				
		5				
		6				
	Weathered rock	7				Drilling hard
1008.5	Auger refusal at 7.5 feet	8				
		9				
		10				Note: hole plugged at 5.2 ft at 48+ hr(s) - no water encountered above that depth
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. G-21

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/29/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a little silt	1				Drilling medium
		2				Drilling firm
		3				
		4				
		5				Drilling hard
	Grey sand with a trace of silt	6				Drilling firm
	Weathered rock	7				Drilling hard
1005.0	Auger refusal at 7.5 feet	8				
		9				
		10				Note: hole plugged at 7.3 ft at 48+ hr(s) - no water encountered above that depth
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
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		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. H-17

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 02/19/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1014.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
999.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
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		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. H-18

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1015.0	Topsoil - 2.0" dark brown sand with a little silt and organics						
	Brown sand with a little silt	1				Drilling medium	
		2					
		3					
		4					
		5					
		6					
		7					
		8					
		9					
		10					
		11					
	Weathered rock	12					Drilling hard
		13					
		14					
1001.0	Auger refusal at 14.0 feet	15				Note: hole plugged at 12.3 ft at 48+ hr(s) - no water encountered above that depth	
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
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		37					
		38					
		39					
		40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. H-19

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a trace of silt	1				Drilling medium
		2				
	Light brown sand with a trace of silt	3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
	Weathered rock	13				
		14				
1001.0	Light brown sand with a trace of silt	15				Drilling firm Drilling medium Note: hole plugged at 13.9 ft at 0 hr(s) - no water encountered above that depth
	Boring terminated at 15.0 feet	16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
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		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. H-21

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/29/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1013.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a little silt	1				Drilling medium
		2				
		3				
		4				
	Grey sand with a trace of silt	5				
		6	▽			
		7	3			
		8				
		9				
		10				
1002.0	Auger refusal at 11.0 feet	11				Drilling hard Note: hole plugged at 6.8 ft at 0 hr(s)
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
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		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
I-7

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
993.0	Surface cover – 3.0" asphaltic concrete						
	Brown sandy silt	1 2 3 4 5 6 7				Drilling medium Water table at 48+ hrs	
	Reddish brown sandy silt	8 9					
	Orange silt with some sand	10 11					
		12 13					
		14 15 16 17 18 19					
973.0	Boring terminated at 20.0 feet	20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40					Note: hole plugged at 15.0 ft at 48+ hr(s)

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
I-17

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1013.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
	Light reddish brown sand with some silt	10				
		11				
		12				
		13				
		14				
998.5	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

Note: hole plugged at 13.9 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
I-21

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/29/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1014.0	Topsoil - 2.0" dark brown sand with a little silt and organics						
	Brown sand with a little silt	1				Drilling medium	
		2					
		3					
		4					
		5					
		6					
		7					
		8					
		9					
		10	▽				Water table at 0 hrs
		11	↘				
		12					
		13					
		14					
999.0	Boring terminated at 15.0 feet	15				Note: hole plugged at 11.3 ft at 0 hr(s)	
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					
		26					
		27					
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		29					
		30					
		31					
		32					
		33					
		34					
		35					
		36					
		37					
		38					
		39					
		40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-6

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
994.0	Surface cover – 3.0" asphaltic concrete					
	Brown silt with some sand	1				Drilling medium Drilling firm Water table at 48+ hrs
		2				
		3				
	Reddish brown sandy silt	4				
	Grey sand with a little silt and rock fragments	5				
		6				
		7				
		8				
		9				
		10				
		11				
	Brown sand with a trace of silt	12				
		13	▽			
		14	3			
		15				
		16				
		17				
		18				
		19				
974.0	Boring terminated at 20.0 feet	20				Note: hole plugged at 13.4 ft at 48+ hr(s)
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-12

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.0	Topsoil - 3.0" dark brown sand with a little silt and organics					
	Light brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
995.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
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		30				
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		38				
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		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. J-13

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/22/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown silt with a little sand	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
995.5	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-13A

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 02/22/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
995.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
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		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-14

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/22/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1011.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown silt with a little sand	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
996.5	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-15

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1013.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sand with a little silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
	Brown/light grey sand with a trace of silt	11				
		12				
		13				
		14				
998.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
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		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

Note: hole plugged at 9.9 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-16

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1014.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sand with a little silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
999.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-17

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1015.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light reddish brown sand with a little silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
	Brown sand with a trace of silt	12				
		13				
		14				
1000.5	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
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		38				
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Note: hole plugged at 13.0 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-21

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/18/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1014.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a trace of silt	1				Drilling medium Water table at 0 hrs
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9	▽ 3			
		10				
		11				
		12				
		13				
		14				
999.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-22

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/29/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1013.5	Topsoil - 2.0" dark brown sand with a little silt and organics						
	Light reddish brown sand with a trace of silt	1				Drilling medium	
		2					
		3					
		4					
		5					
		6	▽ /				Water table at 0 hrs
		7					
		8					
		9					
		10					
1002.5	Auger refusal at 11.0 feet	11				Note: hole plugged at 9.1 ft at 0 hr(s)	
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
J-29

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/29/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1019.0	Surface cover – 4.0" gravel					
1016.0	Weathered rock	1				Drilling hard
	Brown sand with a trace of silt	2				Drilling firm
	Auger refusal at 3.0 feet	3				Drilling hard
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. J-29A

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1019.0	Surface cover – 4.0" gravel					
	Light reddish brown sand with a little silt	1				Drilling medium
	Weathered rock	2				Drilling hard
		3				
		4	▽			
	Brown sand with a trace of silt	5	⚡			Drilling firm Water table at 48+ hrs
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
1004.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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		37				
		38				
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		40				

Note: hole plugged at 7.3 ft at 48+ hr(s)

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
K-9

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/18/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1011.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium
		2				
		3				
		4				
	Brown sand with a little silt	5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
996.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
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		23				
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		36				
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		38				
		39				
		40				

Note: hole plugged at 13.0 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. K-10

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023
DATE: 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
997.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
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		23				
		24				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. K-11

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023
DATE: 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light brown silt with some sand	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
997.5	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. K-15

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023
DATE: 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1014.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light brown sand with a little silt	1				Drilling medium
		2				
		3				
	White sand with a little silt and rock fragments	4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
999.5	Boring terminated at 15.0 feet	15				
		16				
		17				
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		23				
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		40				

Note: hole plugged at 12.2 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.

CONTRACTED WITH: Precision Planning, Inc.

K-16

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO.
161-023

DATE:
02/19/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1015.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a little silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
1000.5	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
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		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. K-19

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. DATE:
161-023 03/29/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1015.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light brown sand with a little silt	1				Drilling medium Drilling firm
		2				
		3				
	White sand with a trace of silt	4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
1000.5	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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		39				
		40				

Note: hole plugged at 12.6 ft at 0 hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. K-21

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023
DATE: 03/18/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1015.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light grey sand with a trace of silt	1				Drilling medium
		2				
		3				
		4				Drilling firm
		5				
		6				
		7				
		8	▽ 3			Water table at 0 hrs
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				Drilling hard
997.5	Weathered rock	18				
	Auger refusal at 18.0 feet	19			Note: hole plugged at 10.9 ft at 0 hr(s)	
		20				
		21				
		22				
		23				
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		39				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. K-24

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. 161-023
DATE: 03/29/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1015.0	Surface cover – 4.0" gravel					
1010.5	Brown sand with a little silt	1				Drilling medium
		2				
		3				Drilling hard
	Weathered rock	4				
	Auger refusal at 4.5 feet	5				Note: hole plugged at 4.1 ft at 0 hr(s) - no water encountered above that depth
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. K-25

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023 DATE: 02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1015.5	Surface cover – 4.0" gravel						
1007.0	Light brown sand with a little silt	1				Drilling medium Water table at 48+ hrs Drilling hard Note: hole plugged at 8.0 ft at 48+ hr(s)	
		2					
		3					
		White sand with a little silt and rock fragments	4				
			5				
			6	▽ 3			
			7				
			8				
		Auger refusal at 8.5 feet	9				
			10				
			11				
			12				
			13				
			14				
			15				
			16				
			17				
			18				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. K-28

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. 161-023
DATE: 02/25/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1014.0	Light brown sand with a trace of silt	1				Drilling firm Drilling hard Note: hole plugged at 1.8 ft at 0 hr(s) - no water encountered above that depth
	Auger refusal at 2.0 feet	2				
		3				
		4				
		5				
		6				
		7				
		8				
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		10				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
L-6

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/18/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1008.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown silt with some sand	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
993.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
L-8

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.5	Surface cover – 3.0" asphaltic concrete					
	Reddish brown silt with a little sand	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
995.5		Boring terminated at 15.0 feet	15			
	16					
	17					
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SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
L-9

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.5	Surface cover – 2.5" asphaltic concrete					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
	Brown sand with a trace of silt	15				Note: hole plugged at 18.9 ft at 48+ hr(s) - no water encountered above that depth
		16				
		17				
		18				
		19				
		20				
992.5	Boring terminated at 20.0 feet	21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. L-10

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1013.5	Surface cover – 3.0" asphaltic concrete					
	Light brown sand with a trace of silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
	Light grey sand with a little silt	13				
		14				
		15				
		16				
		17				
		18				
		19				
993.5	Boring terminated at 20.0 feet	20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
					Note: hole plugged at 18.9 ft at 0 hr(s) - no water encountered above that depth	

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.

CONTRACTED WITH: Precision Planning, Inc.

L-15

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO.
161-023

DATE:
02/19/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1016.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light brown sand with a trace of silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
	Light grey sand with a little silt	13				
		14				
1001.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

Note: hole plugged at 10.7 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
M-7

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/18/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.5	Surface cover – 3.0" asphaltic concrete					
	Brown sand with a little silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
995.5	Boring terminated at 15.0 feet	15				Note: hole plugged at 14.7 ft at 48+ hr(s) - no water encountered above that depth
	16					
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
M-8

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1011.5	Surface cover – 3.0" asphaltic concrete					
996.5	Reddish brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

Note: hole plugged at 13.9 ft at 48+ hr(s) - no water encountered above that depth

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.

CONTRACTED WITH: Precision Planning, Inc.

M-10

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO.
161-023

DATE:
02/24/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1025.0	Surface cover – 3.0" asphaltic concrete					
	Reddish brown silt with some sand	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
	Brown sand with a little silt	12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
995.0	Boring terminated at 30.0 feet	30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
					Note: hole plugged at 27.3 ft at 48+ hr(s) - no water encountered above that depth	

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.

CONTRACTED WITH: Precision Planning, Inc.

M-11

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO.
161-023

DATE:
02/24/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1028.0	Topsoil - 3.0" dark brown sand with a little silt and organics					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
	Brown sand with a little silt	16				
		17				
		18				
		19				
		20				
		21				
		22				
	Brown sand with a trace of silt	23				
		24				
		25				
		26				
		27				
		28				
		29				
998.0	Boring terminated at 30.0 feet	30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
					Note: hole plugged at 26.7 ft at 48+ hr(s) - no water encountered above that depth	

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. M-12

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/24/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1030.5	Topsoil - 3.0" dark brown sand with a little silt and organics					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
	Light brown sand with a little silt	8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
1000.5	Boring terminated at 30.0 feet	30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
					Note: hole plugged at 26.0 ft at 48+ hr(s) - no water encountered above that depth	

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. M-14

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1015.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown/grey sand with a little silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
	Brown sand with some silt	12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
995.5	Boring terminated at 20.0 feet	20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

Note: hole plugged at 13.0 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. M-15

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/19/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1017.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
	Dark brown/grey sand with a little silt	16				
		17				
		18				
		19				
997.0	Boring terminated at 20.0 feet	20				Note: hole plugged at 14.9 ft at 48+ hr(s) - no water encountered above that depth
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
N-8

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.0	Surface cover – 3.0" asphaltic concrete					
	Brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
997.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. N-10

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/24/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES	
			No.	TYPE	BLOWS/6"		
1028.0	Topsoil - 2.0" dark brown sand with a little silt and organics						
	Reddish brown sandy silt	1				Drilling medium	
		2					
		3					
		4					
		5					
		6					
		7					
	Weathered rock	8					Drilling hard
		9					
1018.0	Auger refusal at 10.0 feet	10					
		11					
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					
		26					
		27					
		28					
		29					
		30					
		31					
		32					
		33					
		34					
		35					
		36					
		37					
		38					
		39					
		40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. N-11

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/24/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1033.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1029.5	Brown sandy silt	1				Drilling medium Drilling hard Water table at 0 hr Note: hole plugged at 3.4 ft at 0 hr(s)
	Light brown sand with a trace of silt	2				
		3	▽			
	Auger refusal at 3.5 feet	4	⚡			
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
	21					
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	25					
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
N-11A

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/24/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1031.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1028.0	Reddish brown sandy silt	1				Drilling medium
		2				Drilling hard
	Auger refusal at 3.0 feet	3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

Note: hole plugged at 2.8 ft at 0 hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. N-15

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. 161-023 DATE: 02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1018.0	Surface cover – 4.0" gravel					
	Reddish brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
998.0	Boring terminated at 20.0 feet	20				Note: hole plugged at 19.6 ft at 48+ hr(s) - no water encountered above that depth
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
O-7

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1011.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
1010.0	Reddish brown sand with some silt	1				Drilling medium Drilling hard Note: hole plugged at 1.2 ft at 0 hr(s) - no water encountered above that depth
	Auger refusal at 1.5 feet	2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
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		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
O-8

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1012.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1003.5	Reddish brown sand with some silt	1				Drilling medium Drilling hard Note: hole plugged at 8.0 ft at 48+ hr(s) - no water encountered above that depth
		2				
		3				
		4				
		5				
		6				
		7				
		8				
	Auger refusal at 8.5 feet	9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
O-9

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1013.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Light brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
1002.0	Auger refusal at 11.5 feet	12				Drilling hard Note: hole plugged at 10.0 ft at 48+ hr(s) - no water encountered above that depth
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO. O-12

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/24/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1036.5	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown silt with some sand	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		Auger refusal at 18.0 feet	17			
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
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	27					
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	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
P-6

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1010.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
1005.5	Reddish brown sand with some silt	1				Drilling medium Drilling hard Note: hole plugged at 3.4 ft at 0 hr(s) - no water encountered above that depth
		2				
		3				
		4				
	Auger refusal at 4.5 feet	5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
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		19				
		20				
		21				
		22				
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		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
P-7

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/23/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1011.0	Surface cover – 2.0" gravel					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
	White sand with a trace of silt	11				Drilling hard
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
999.0	Auger refusal at 12.0 feet	21				Note: hole plugged at 2.7 ft at 48+ hr(s) - no water encountered above that depth
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
P-9

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 02/25/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1014.0	Surface cover – 2.0" gravel					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
	Brown sand with some silt	11				
		12				
		13				
		14				
999.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

Note: hole plugged at 14.0 ft at 48+ hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
P-10

CONTRACTED WITH: Precision Planning, Inc.

PROJECT NAME: City of Lawrenceville Public Utilities

JOB NO. 161-023
DATE: 02/23/16

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1024.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Reddish brown sandy silt	1				Drilling medium
		2				
		3				
	Reddish brown silt with a little sand	4				
		5				
		6				
		7				
	Light reddish brown sand with a trace of silt	8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
999.0	Boring terminated at 25.0 feet	25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				
					Note: hole plugged at 23.6 ft at 48+ hr(s) - no water encountered above that depth	

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
Q-2

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 04/06/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1004.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a little silt	1				Drilling medium
		2				
		3				
		4				
		5				
	Reddish brown sandy silt	6				
		7				
		8				
	Light reddish brown sand with a little silt	9				
		10				
		11				
		12				
		13				
		14				
989.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
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		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

Note: hole plugged at 13.9 ft at 0 hr(s) - no water encountered above that depth

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
Q-7

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 03/30/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1008.0	Surface cover – 2.0" gravel					
995.5	Reddish brown sand with some silt	1				Drilling medium
		2				
		3				
		4				
		5				
		6				
		7				
		8				
		9				
		10				
		11				
	Auger refusal at 12.5 feet	12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
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		38				
		39				
		40				

SEA

L O G O F B O R I N G

SHEET 1 OF 1
BORING NO.
R-4

CONTRACTED WITH: Precision Planning, Inc.

JOB NO. DATE:
161-023 04/06/16

PROJECT NAME: City of Lawrenceville Public Utilities

LOCATION: West Pike St., Lawrenceville, GA; Gwinnett Co.

ELEV. (ft)	DESCRIPTION	DEPTH IN FEET	SAMPLES			NOTES
			No.	TYPE	BLOWS/6"	
1004.0	Topsoil - 2.0" dark brown sand with a little silt and organics					
	Brown sand with a little silt	1				Drilling medium
		2				
		3				
		4				
	Reddish brown sandy silt	5				
		6				
		7				
	Light reddish brown sand with a little silt	8				
		9				
		10				
		11				
		12				
		13				
		14				
989.0	Boring terminated at 15.0 feet	15				
		16				
		17				
		18				
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
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		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				
		39				
		40				

Note: hole plugged at 13.1 ft at 0 hr(s) - no water encountered above that depth

SEA

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Includes: Work under this Section consists of providing reinforced and non-reinforced concrete as indicated on the drawings.
1. Materials shall be free from defects impairing strength, durability or appearance.
 2. Exposed surfaces throughout project shall have the same texture and color for like locations.
- B. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division One Sections of these Specifications, apply to the work of this Section.

1.02 REFERENCES

- A. Codes and Standards: Comply with standards specified in this Section.
1. ACI 301-10, "Specifications for Structural Concrete".
 2. ACI 304R-00 (Reapproved 2009), "Guide for Measuring, Mixing, Transporting and Placing Concrete".
 3. ACI 305R-10, "Hot Weather Concreting".
 4. ACI 306R-10, "Cold Weather Concreting".
 5. ACI 309R-05, "Guide for Consolidation of Concrete".
 6. ACI 315-99, "Details and Detailing of Concrete Reinforcement".
 7. ACI 318-14, "Building Code Requirements for Reinforced Concrete".
 8. ASTM A82-02, "Steel Wire, Plain, for Concrete Reinforcement".
 9. ASTM A615M-07, "Deformed and Plain Carbon Steel Bars for Concrete Reinforcement".
 10. ASTM C31/C31M-10, "Making and Curing Concrete Test Specimens in the Field".
 11. ASTM C33-07, "Concrete Aggregates".
 12. ASTM C42-10, "Obtaining and Testing Drilled Cores and Sawed Beams of Concrete".
 13. ASTM C78/C78M-10e1, "Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)".
 14. ASTM C94-11, "Ready Mixed Concrete".
 15. ASTM C143-10, "Test Method for Slump of Hydraulic Cement Concrete".
 16. ASTM C150-07, "Portland Cement".
 17. ASTM C171-07, "Sheet Materials for Curing Concrete".
 18. ASTM C172-08, "Sampling Freshly Mixed Concrete".
 19. ASTM C173-10, "Test Method For Air Content of Freshly Mixed Concrete by the Volumetric Method".
 20. ASTM C192-07, "Making and Curing Concrete Test Specimens in the Laboratory".
 21. ASTM C231-09a, "Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method".
 22. ASTM C260-10a, "Air-Entraining Admixtures for Concrete".
 23. ASTM C309-11, "Liquid Membrane-Forming Compounds for Curing Concrete".
 24. ASTM C494-11, "Chemical Admixtures for Concrete".
 25. ASTM E329-09, "Agencies Engaged in Construction Inspection and/or Testing".
 26. AWS-D1.4-2005, "Structural Welding Code - Reinforcing Steel".
 27. CRSI "Manual of Standard Practice".

1.03 SUBMITTALS

- A. General: Comply with the provisions of Section 01 33 00 Submittals.
- B. Manufacturers' Data: Submit:
Mix designs for each type and class of concrete. Submittal shall include independent lab test verifying the design strength in accordance with ACI 318 Chapter 5. Verify the design mix in accordance with Chapter 4 of ACI 301. Previous Field Experience or Trial Mixtures; Concrete proportions may be established on the basis of previous field experience if sufficient and timely data is available for full compliance with Section 4.2.3 of ACI 301. Where acceptable records are not available, trial mixtures shall be submitted to an approved testing laboratory for proposed mix designs in accordance with Section 4.2.3 of ACI 301.
- C. Submittals: Submit complete information for all materials proposed to be provided under this Section. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures." Include:
 - 1. Bar schedules, stirrup spacing, diagrams of bent bars, arrangement and assemblies. Show wall reinforcement in elevation.
 - 2. Special reinforcement required around openings throughout concrete structures.
 - 3. Location of all proposed construction joints, keying, and water stops.
 - 4. Locations of all openings, depressions, construction and control joints, trenches, sleeves, inserts, and other items affecting the reinforcement and placing of concrete.
 - 5. The contractor shall check shop drawings prior to submittal. Unchecked drawings will be rejected.
 - 6. Fabrication shall not begin until shop drawings have been stamped "No Exceptions" or "Make Corrections Noted" and corrections have been made and corrected file copies delivered to Designer.
- D. Mill Certificates: Accompanying the Shop Drawings, submit steel producer's certificates of mill analysis, tensile, and bend tests for reinforcing steel.
- E. Placement Schedule: Submit schedule for all pours in project. Number each pour in schedule and cross reference schedule number to test report submittals indicating location for each pour.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Provide at least one person thoroughly familiar with specification requirements, completely trained and qualified to perform the work, who shall be present at all times on the project site directing the work. Provide additional skilled personnel to ensure installation in strict accordance with design Documents.
- B. Quality Control: Sampling during placement shall be accomplished either by an employee of an independent Testing Laboratory or by an individual, approved by the Architect, qualified to perform operations as described herein. Testing shall be accomplished by an independent laboratory as described in Division 1. Testing Agency personnel and procedures shall be qualified in accordance with the requirements of ASTM E329.
 - 1. Sampling and Testing shall include the following:
 - a. Slump: ASTM C143; one test for each concrete load at point of discharge.
 - b. Air Content: ASTM C173, volumetric method; for lightweight or normal weight concrete.
 - c. ASTM C231 pressure for normal weight concrete; one for each set of compressive test specimens.

- d. Concrete Temperature: Record hourly when air temperature is 40 degrees F. and below, or when 80 degrees F. and above, and each time a set of strength test specimens are made.
 - e. Compression Test Specimen: ASTM C31; one set of four standard cylinders for each compressive strength test, unless otherwise directed. Mold, cure and store as directed by the Testing Laboratory.
2. Field Test Specimens: Samples of concrete mixtures shall be taken to determine the adequacy of control of materials, proportioning, consistency, mixing, and air content of the concrete. Sufficient quantities shall also be tested for curing strength as follows:
- a. Compression Test Cylinders: One (1) set of four cylinders shall be made from the same batch for each 50 cubic yards, or fraction thereof, for each type of concrete placed daily, and not less than four (4) cylinders for each day's operation or for each 5000 square feet of surface area placements.
3. Field Sampling Reports: Forward to the Architect, on the same day sampling is performed, one Field Sample Report for each set of field test specimens made or a Daily Summary Report, listing each set of field test specimens, containing the following information:
- a. Project name and number
 - b. Name of individual performing sampling
 - c. Date
 - d. Weather conditions
 - e. For each of test specimens:
 - 1 Time
 - 2 Temperature
 - 3 Air Content
 - 4 Slump
 - 5 Type and class of concrete
 - 6 Location of batch in structure
 - 7 Specimen numbers
4. Of cylinders made in accordance with section 1.4 B.2a, one shall be broken at 7 days for information and two at 28 days for strength compliance. Hold one cylinder for 56 days. All cylinders shall be weighed and unit weight calculated prior to compression test. Information regarding weight shall be included on test report sent to Architect and Structural Engineer.

C. Allowable Tolerances for Concrete Placement:

1. Finish all interior concrete elevated slabs and slabs on grade using techniques which will provide the following flatness criteria:
- | | <u>Overall:</u> | <u>Minimum Local:</u> |
|---------------|-----------------|-----------------------|
| Slab on Grade | FF25/FL20 | FF17/FL15 |
- a. Refer to ACI 301, "Specification for Structural Concrete for Buildings".
 - b. All flatness tests for a given slab shall be performed within 72 hours of pour.
 - c. Slabs which do not meet the required flatness (FF) and levelness (FL) criteria shall be repaired by fringing, planing, surface repair, retopping, or removal of the slab. Detailed drawings showing repair action and manufacturer's specification of repair materials to be used shall be submitted and approved prior to corrective action. Measures shall be taken to adjust finishing techniques to obtain the flatness and levelness criteria specified prior to additional placement of additional elevated slab or slab on grade.
2. Variation of the linear building lines from established position in plan and related position of columns, walls and partitions:
- | | |
|--|----------|
| <u>1</u> In any bay | 1/4 inch |
| <u>2</u> In any 20 ft. length | 3/8 inch |
| <u>3</u> Maximum for the entire length | 1/2 inch |
3. Variation in the sizes and location of sleeves, floor openings, and wall openings 1/4 inch

4.	Variation in the thickness of slabs	1/4 inch
5.	Footings, variations in:	
	a. Dimensions in plan	1 inch
	b. Misplacement or eccentricity: 2 percent of the footing width in the direction of misplacement but not more than	2 inches
	c. Thickness:	
	<u>1</u> Decrease	lessor of 5% or 2 inches
	<u>2</u> Increase	No limit
6.	Steps, variations in:	
	a. Each flight:	
	<u>1</u> Rise	1/8 inch
	<u>2</u> Run	1/4 inch
	b. Consecutive steps:	
	<u>1</u> Riser	1/16 inch
	<u>2</u> Tread	1/8 inch

1.05 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect materials specified in this Section before, during, and after installation and to protect installed work and materials of other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary, with the Architect's approval, at no additional cost.

1.06 JOB CONDITIONS

- A. Cold Weather Concreting: Equipment shall be provided for protection of the concrete during freezing or near-freezing weather. No frozen materials or materials containing ice shall be used. Whenever the temperature is below 40 degrees F., all concrete placed in the forms shall have a temperature of between 70 and 80 degrees F., and means shall be provided for maintaining a temperature of not less than 70 degrees F., for three (3) days, or 50 degrees F. for five (5) days, or for more time to insure curing of the concrete. Work shall be in accordance with ACI 306, "Recommended Practice for Cold Weather Concreting."
- B. Hot Weather Concreting: During hot weather when atmospheric temperature rises higher than 90 degrees F., attention shall be given to ingredients, production method, handling, placing, protection and curing to prevent excessive concrete temperatures or water evaporation in accordance with ACI 305, "Recommended Practice for Hot Weather Concreting."

PART 2 - PRODUCTS

2.01 FORMWORK

- A. Design of formwork is the Contractor's responsibility. Forms for footings may be cut into earth, provided that earth is dry, level and sound.

2.02 CONCRETE

- A. Concrete shall be produced at a central batching plant, mixed in transit, and delivered to the forms.
- B. Concrete shall be class, weights, and strength as listed herein, shown in the drawings, and as otherwise directed and specified.

C. Concrete Strength:

<u>Item Description</u>	<u>Minimum Strength at 28 days</u>	<u>Slump</u>	<u>Weight</u>
All concrete, u.n.o.	3,500 psi	3-5 inches	normal, 145-150 pcf
Mud slabs	1,500 psi	3-5 inches	normal, 145-150 pcf

D. Concrete Materials:

1. Portland Cement: Meeting ASTM C 150, Type I or II, and using one brand of cement throughout project.
2. Fine Aggregates: Conform to ASTM C 33, for normal weight.
3. Coarse Aggregate: Crushed stone or gravel conforming to ASTM C 33, maximum size shall be 1" for slabs; 1-1/2" for reinforced footings; or not more than 1/5 the narrowest dimension between the sides of the forms or 3/4 the minimum clear distance between parallel reinforcing--whichever is smaller.
4. Fly Ash meeting ASTM C-648 Class F may be used to replace up to 25% of Portland Cement.
5. Ground Granulated Blast-Furnace Slag (GGBFS): ASTM C989-95, Grade 100 or Grade 120 is permitted to maximum amounts indicated below replacing non-architectural concrete incorporated to replace equivalent cement weight:
 - a. Footings: 50%, maximum.
 - b. Foundation Walls: 40%, maximum.
 - c. Flatwork: 40%, maximum.

2.03 REINFORCEMENT

- A. Reinforcing bars: Comply with ASTM A 615, Grade 60.
- B. Steel wire: Comply with ASTM A 82, plain cold-drawn steel wire.
- C. Welded wire fabric: Comply with ASTM A 185.
- D. Supports for reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place.
 1. Use wire bar type supports complying with CRSI specifications, or concrete bricks. Do not use wood, brick, and other unacceptable materials.
 2. Surfaces exposed-to-view, provide supports contacting forms with either hot-dipped galvanized or plastic protected legs.
 3. Rebar stakes shall not be used as supports.

2.04 CURING MATERIAL

- A. Curing Compound: Conform to ASTM C309, Type II, Class B curing compound shall be compatible with floor finishes and flooring adhesives. Contractor responsible for verifying material is compatible for all floor finishes and adhesives. Curing and sealing compounds, if used, shall likewise be compatible with floor finishes and flooring adhesives.
- B. Sheet materials shall conform to ASTM C 171.

- C. Burlap Cloth made from jute or kenaf and weighing approximately 9 oz. per sq. yd. for moist curing. Provide two layers.

2.05 SEALER

- A. Sealer shall be wax free, resin free and varnish free compound, which seals and hardens the concrete surface. Submit manufacturer's data sheet for approval.

2.06 OTHER MANUFACTURERS

- A. Acceptable Manufacturers: Other manufacturers for a particular material may be submitted for consideration to the Architect, provided products are of comparable design, quality and accompanied by satisfactory evidence as defined in Division 1. Materials described herein are based on manufacturer's product and industry standards in order to establish standards of design and quality.
- B. Provide Manufacturer technical field service during initial pours, at no cost to the Owner by a person experienced in the adjustment of concrete mixes for the particular admixtures being used.
- C. Air Entraining Admixtures: Conform to the requirements of ASTM C260 and shall contain no chloride. Submit manufacturer's data for approval.
- D. Water Reducing Admixture: ASTM C 494, Type A for normal setting or Type D for retarding admixture; contain no chloride, and free of organic acids, (or salts of organic acids) and compatible with air entraining admixture. Submit manufacturer's data for approval.
- E. Retarding or Accelerating Admixtures: Conform to ASTM C 494, Type B or Type D; contain no chloride and free of organic acids or salts; and compatible with air entraining admixture. Submit data for approval.
 - 1. Euclid Chemical Company, Eucon Retarder 75 (Type B or D)
 - 2. Master Builders, Pozzololith
 - 3. Sika 161 R (Type D)
- F. Nonshrink Grout:
 - 1. Characteristics: High flow, non-metallic, controlled expansive type grout.
- G. Water: Clean, potable and free of deleterious amounts of acids, alkalis, and organic matter.
- H. All other materials, not specifically described, but required for a complete and proper installation, shall be as selected by the Contractor subject to the Architect's approval.

2.07 PROPORTIONING OF CONCRETE MIXTURES

- A. Proportion ingredients for concrete by weight when both the air content and slump are the maximum permitted to produce an average compressive strength at 28 days which exceeds by 25% the compressive test strength specified.
- B. Air content of freshly mixed air-entrained concrete as determined by the method of ASTM C 173 shall be 5%. A field tolerance of 1% plus or minus is acceptable. Only concrete permanently exposed to possible freezing shall be air entrained.
- C. Water reducing admixture may be used in all concrete to reduce the total water requirement per cubic yard of concrete without loss of workability or test strength.

- D. Retarding admixture shall be used to retard the setting time when anticipated ambient temperature exceeds 75 degrees F. during placing or finishing operations.

2.08 BATCHING AND MIXING

- A. Measure cement by weight on a scale separate from those used for other materials. Cement may be measured in bags of standard weight of 94 pounds; however, no fraction of a bag shall be used in any batch.
- B. Measure aggregates by weight. Batch weights shall be based on saturated surface dry materials corrected for the actual moisture condition of the aggregate.
- C. Measure water by volume or by weight by devices not subject to variation due to variable pressure in the water supply line. Measuring tanks shall be provided with means for checking their calibration.
- D. Devices for measuring quantities of cement, aggregates, water and admixtures shall be accurate within 1% under operating conditions.
- E. Furnish delivery ticket for each batch of concrete before unloading at the site. Weights of fine and coarse aggregate, amount of cement, and total water as batches shall be printed on ticket by an automatic printing device. Delivery tickets shall, in addition, include the following:
 - 1. Name of batch plant.
 - 2. Serial number of ticket.
 - 3. Date and truck number.
 - 4. Name of contractor.
 - 5. Job name of location.
 - 6. Class of concrete and slump.
 - 7. Cubic yards of concrete.
 - 8. Time loaded.
 - 9. Amount water added at job.
 - 10. Initials of Job Superintendent.
- F. Ready-mixed concrete shall be produced and delivered in accordance with the requirements of ASTM C 94.

2.09 CONCRETE MIXTURES

- A. General: The concrete shall be proportioned by one of the following methods: Trial mixtures method or historical data method. Proportioning shall be based on the requirements of a plastic and workable mix within the slump range for class and strength as specified.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the substrate and conditions under which work of this Section is to be performed, and correct unsatisfactory conditions which would prevent proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Conduit Work:
 - 1. Electrical conduits shall not be buried in elevated concrete slabs. In slabs on grade, conduits may be placed in a single layer, at mid-depth of slab. Increase slab thickness by diameter of

conduit at conduit locations, minimum. No aluminum or other material which may react with concrete shall be used.

3.02 REINFORCING PLACEMENT

A. General:

1. Comply with the specified standards for details and methods of reinforcement placement and supports, and as herein specified.
2. Clean reinforcement to remove loose rust and mill scale, earth, and other materials which reduce or destroy bond with concrete.
3. Position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.
4. Place reinforcement to obtain the minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports together with 16 gauge wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.
5. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh space.
6. Provide sufficient numbers of supports of the strength required to carry reinforcement. Prefabricated accessories shall comply with CRSI Manual of Standard Practice, Class E at exposed surfaces and Class A unexposed. Legs of all accessories used in exposed concrete shall be solid plastic or plastic coated. Footing and slab on ground reinforcement may be supported on solid concrete bricks. Support bars to maintain height for top reinforcement shall be #5 minimum with supports of greater than 4'-0" on center. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

B. Splices: Provide standard reinforcement splices by lapping ends, placing bars in contact and tightly wire tie.

3.03 JOINTS

A. Construction Joints:

1. Horizontal construction joints will not be permitted except as shown on the Drawings.
2. If construction joints necessary for the progress of the work are not shown on the Drawings, show them in complete detail on Shop Drawings.
3. For slabs on grade, locate joints as indicated on the drawings.
4. Provide keyways at least mid depth in all construction joints in walls, slabs, and between footings and walls.

B. Isolation Joints in Slabs On Grade: Provide isolation joints in slabs on grade at points of contact between slabs on grade and vertical surfaces where indicated.

C. Control Joints in Slabs On Grade: Provide control joints in slabs on grade to form panels or patterns as shown. Joints shall be constructed as shown on drawings. Except where floor covering is required, construction and expansion joints in slabs shall be filled with joint sealant meeting the requirements of Division 7.

3.04 CONCRETE PLACEMENT

A. General:

1. Place concrete in compliance with practices and recommendations of ACI 304, and as herein specified.
2. Provide notification 48 hours before placing concrete in any portion of the structure to permit inspection of the forms and reinforcement. All embedded items of any nature shall be in place prior to inspection.

B. Procedures:

1. Do not place any concrete which does not meet slump requirements for concrete specified.
2. Deposit concrete continuously in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness.
3. If a section cannot be placed continuously, provide construction joints as herein specified.
4. Perform concrete placing at such rate that concrete which is being integrated with fresh concrete is still plastic.
5. Deposit concrete as nearly as practicable in its final location to avoid segregation due to rehandling and flowing.
6. Do not subject concrete to any procedure which will cause segregation.
7. Screed concrete which is to receive other construction to the proper level to avoid excessive skimming and grouting.
8. Do not use concrete which becomes nonplastic and unworkable, or does not meet the required quality control limits, or which has been contaminated by foreign materials.
9. Remove rejected concrete from the site and dispose of it in an approved location.

C. Placement Schedule: Place concrete in conformance with the placement schedule to ensure an even distribution of loads throughout the entire structure.

D. Concrete Conveying:

1. Handle concrete from the point of delivery and transfer to concrete conveying equipment, and to the locations of final deposit, as rapidly as practicable and by methods which will prevent segregation and loss of concrete mix materials.
2. Keep interior surfaces of conveying equipment, including chutes and tremies, free from hardened concrete, debris, water, and other deleterious materials.
3. Use chutes or tremies for placing concrete where a drop of more than 72 inches is required.
4. Where free drop through tremies exceeds 18 inches, use flow checking devices.

E. Placing Concrete in Wall, Beam, or Column Forms:

1. Deposit concrete in forms in horizontal layers not deeper than 24 inches, avoiding inclined construction joints.
2. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
3. Remove temporary spreaders in forms when concrete placing has reached the elevation of such spreaders.
4. Do not place concrete in supporting elements until the concrete previously placed in columns and walls is no longer plastic.

F. Placing Concrete Slabs:

1. Immediately before placing concrete, ensure that any required subgrade, waterproofing, vapor barriers, bond breaks, and/or joint forms have been properly installed.
2. Install wire mesh and/or steel reinforcement as indicated and specified.

3. Deposit and consolidate concrete in a continuous operation, within the limits of the construction joints, until the placing of a panel or area is complete.
4. Consolidate concrete during placement by use of Contractor approved equipment, thoroughly working concrete around the reinforcement and into corners.
5. Consolidate concrete placed against bulkheads of slabs on grade, as specified for formed concrete.
6. Consolidate concrete in remainder of slabs by vibrating bridge screeds, roller pipe screed, or other methods acceptable to the Architect.
7. Screed to correct level with straightedge to bring surface to the required finish elevation with no coarse aggregate visible.
8. Immediately following screeding finish the surface to a true even plane using bullfloats or darbies. After concrete has stiffened sufficiently to support one man's weight without imprint and the water sheen has disappeared, it shall be wood floated.
9. Unless noted otherwise on the drawings, immediately following wood floating, the surfaces shall be steel troweled to produce a smooth, dense surface free from blemishes including trowel marks. In lieu of hand finishing, an approved power finishing machine may be used in accordance with the directions of the machine manufacturer. A final hard steel troweling shall be done by hand.
10. Do not sprinkle water on the plastic surface; do not disturb the slab surfaces prior to start of finishing operations.

3.05 HOT AND COLD WEATHER CONCRETING

- A. See Job Conditions, paragraph 1.06 elsewhere herein.

3.06 CONSOLIDATION

- A. General:
 1. Consolidate all concrete in forms in accordance with provisions of ACI 309.
 2. Consolidate each layer of concrete immediately after placing, by use of internal concrete vibrators supplemented by hand spading, rodding, or tamping.
 3. Do not use vibrators to transport concrete.
 4. Maintain a frequency of not less than 10,000 vibrations per minute for internal vibrators.
 5. Do not vibrate forms or reinforcement.
- B. Equipment: Provide adequate number of units and power source at all times. Maintain spare units on hand.
- C. Procedures:
 1. Limit the duration of vibration to the time necessary to produce satisfactory consolidation without causing segregation of aggregate.
 2. Insert the vibrator so as to penetrate the lift immediately below the one being placed, and manipulated to blend the two lifts.
 3. Use the vibrator to melt force the concrete as it is being placed, and use the vibrator to consolidate concrete masses.

3.07 CURING

- A. General:
 1. All concrete shall be cured by an approved method for the period of time given below.

Type III cement	3 days
Type I, II, IP of IS cement	7 days

2. Immediately after placement, concrete shall be protected from premature drying extremes in temperatures, rapid temperature change, mechanical injury from rain and flowing water. All materials and equipment needed for adequate curing and protection shall be available and accessible prior to placing concrete. No fire or shall be permitted near or in direct contact with the concrete at any time. Curing shall be accomplished by any of the following methods, or combination thereof, as approved by Contractor.
- B. Moist Curing: Concrete to be moist-cured shall be maintained continuously wet for the entire curing period. If water or curing materials used, stains or discolors concrete surfaces which are to be permanently exposed, the concrete surfaces shall be cleaned. When wooden forms are left in place during curing, they shall be kept wet at all times. If the forms are removed before the end of the curing period, curing shall be carried out as on unformed surfaces, using suitable materials. Horizontal surfaces shall be cured by covering with waterproof paper, polyethylene sheet, polyethylene-coated burlap or saturated burlap.
- C. Membrane Curing:
1. Membrane curing shall not be used on surfaces that are to receive any subsequent treatment depending on adhesion or bonding to the concrete. Contractor shall verify material is compatible with other floor finishes.
 2. Membrane curing compound shall not be used on surfaces that are maintained at curing temperatures with free steam.
 3. The curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface.
 4. The surfaces shall be thoroughly moistened with water and the curing compound shall be applied to slab surface as soon as the bleeding water has disappeared, with the tops of joints being temporarily sealed to prevent entry of the compound and to prevent moisture loss during the curing period.
 5. The compound shall be applied in a one-coat continuous operating, at a uniform coverage in accordance with manufacturer's printed instructions.
 6. Concrete surfaces which have been subjected to rainfall within three hours after curing compound has been applied shall be recoated at the same coverage rate and method herein specified. On surfaces permanently exposed to view, the surface shall be shaded from direct rays of the sun for the duration of the curing period. Surfaces coated with curing compound shall be kept free of foot and vehicular traffic and from other sources of abrasion and contamination during the curing period.

3.08 FINISH OF FORMED SURFACES

- A. Rough Form Finish:
1. Provide as cast rough form finish to formed concrete surfaces that are to be concealed in the finish work or by any other construction.
 2. Standard rough form finish shall be the concrete surface having the texture imparted by the form facing material used, with tie holes and defective area repaired and patched, and all fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish:
1. Provide as-cast smooth form finish for formed concrete surfaces that are to be exposed to view, or that are to be covered with a coating material other than cement plaster applied directly to the concrete.
 2. Produce smooth form finish by selecting form material to impart a smooth, hard, uniform texture and arranging them orderly and symmetrically with a minimum of seams.

3. Repair and patch defective areas with all fins and other projections completely removed and smoothed.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a smooth troweled finish.

3.09 MONOLITHIC SLAB FINISHES

A. Scratch Finish:

1. Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for bonded applied cementitious-finish flooring material.
2. After placing slabs, plane the surface to a tolerance not exceeding 1/4" in 24" when tested with a straightedge.
3. Slope uniformly to drains where required.
4. After leveling, roughen the surface before its final set by using a stiff broom, a brush, or a rake.

B. Float Finish:

1. Apply float finish to monolithic slab surfaces that are to receive trowel finish and other finishes as specified, and to slab surfaces which are to be covered with insulation, and as otherwise shown on the Drawings or in the schedules.
2. After placing concrete slabs, do not work the surface further until ready for floating.
3. Begin floating when the surface water has disappeared and when the concrete has stiffened sufficiently to permit operation of a power-driven float, or both.
4. Consolidate the surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units.
5. Check and level the surface plan to a tolerance not exceeding that specified in 1.4C1a, unless further finishing is specified.
6. Cut down high spots and fill low spots.
7. Uniformly slope to drains where required.
8. Immediately after leveling, refloat the surfaces to a smooth, uniform, granular texture.

C. Trowel Finish:

1. Apply trowel finish to monolithic slab surfaces that are to be exposed to view, unless otherwise shown, and to slab surfaces that are to be covered with resilient flooring, carpeting, paint or other thin-film finish coating system.
2. After floating, begin the first trowel finish operation using a power-driven trowel. Begin final troweling when the surface produces a ringing sound as the trowel is moved over the surface.
3. Consolidate the concrete surface by the final hand troweling operation, free from trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding that specified in 1.04C1a.
4. Grind smooth those surface defects which would telegraph through applied floor covering system.

D. Nonslip Broom Finish:

1. Apply nonslip broom finish to exterior concrete paving, steps, and ramps, and elsewhere as shown on the Drawings or in the schedules.
2. Immediately after trowel finishing, slightly roughen the concrete surface by brooming in the direction perpendicular to the main traffic route. Use a fiberbristle broom.

3.10 SEALER

- A. All interior slabs which serve as the finish floor shall be covered with one coat of liquid sealer compatible with curing compound specified under "Products". Liquid sealer shall be applied in accordance with the manufacturer's recommendations immediately before releasing the building to the Owner.

3.11 PROTECTION

- A. Areas shall be barricaded after the curing and sealing compound has been applied. As soon as the compound has dried, adequately cover floor surface to prevent staining, discoloration or physical damage which may be difficult to correct. Use scuff-proof non-staining building paper or polyethylene film, suitably weighted or ballasted with sand as necessary.
- B. Where other concrete structures are to be poured on to or adjacent to finished surfaces, take all necessary precautions to prevent damage from erection of form work or staining from concrete laitance.
- C. Alert other trades to the need for special protection against rolling or sliding heavy loads across the surface, oil drippings from pipe threaders, spillage of paint, plaster and mortar. Ensure that the covering is not damaged or removed during the progress of the work.

3.12 QUESTIONABLE CONCRETE

- A. The strength level of the concrete will be considered satisfactory if the averages of three (3) consecutive strength test results equal or exceed the required 28-day strength, and no individual strength test result falls below the required 28-day strength by more than 500 pounds per square inch.
- B. Failure to comply with the evaluation procedure shall constitute questionable concrete, and core tests shall be made at no cost to the Owner in accordance with ACI Building Code 318, Chapter 5, ASTM C 42, and as directed by the Architect. If core tests fail to demonstrate the strength required by the contract documents, load tests shall be made in accordance with Chapter 20 of the ACI Building Code 318. If concrete again fails to demonstrate strength required, the materials shall be removed and new materials provided. The Contractor shall pay all costs of the load test and all costs of corrective measures to make the work conform to the Contract Documents.
- C. The term "Building Official" in ACI Building Code 318 shall be interpreted to mean the Architect.

3.13 CORRECTIVE WORK

- A. Any careless or improper application of curing compounds, variations in finishing, curing, staining, marring or other damage from ensuring construction operations shall be corrected at no cost to the Owner.
- B. Corrective work shall be performed in accordance with procedures and utilizing materials recommended by approved manufacturer. Corrective work shall produce a texture, color and finish which will match adjacent accepted surface as approved by the Architect.

END OF SECTION 03 30 00

SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes surface preparation and field painting of exposed interior items and surfaces.
- B. This section includes the painting of defined areas for projection purposes. Coordination with other trades is required.

1.02 SUBMITTALS

- A. General: Submittals shall be in accordance with Specification Section 01 33 00.
- B. Product Data: For each product indicated.
- C. Samples: For each type of finish-coat material indicated.

1.03 QUALITY ASSURANCE

- A. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample for each type of coating and substrate required. Comply with procedures specified in PDCA P5.
 - 1. Wall Surfaces: Provide samples on at least 100 sq. ft. (9 sq. m).
 - 2. Final approval of colors will be from benchmark samples which upon approval can be incorporated into final Project finish.

1.04 PROJECT CONDITIONS

- A. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain storage containers in a clean condition, free of foreign materials and residue.
- B. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F (10 and 32 deg C).
- C. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).
- D. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.05 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
 - 1. Quantity: Five (5%) percent, but not less than 1 gal. (3.8 L), or one (1) case, as appropriate, of each material and color applied.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. In other PART 2 articles where titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
 - 2. Acceptable Manufacturers:
 - a. Basis of Design:
 - 1) Sherwin-Williams Co. (Sherwin-Williams).
 - b. Optional:
 - 1) PPG Industries, Inc. (Pittsburgh Paints)
 - 2) Porter Paint Co.
 - 3) Duron
 - 4) Or Architect approved equal prior to Bid.
- B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names may be listed other PART 2 articles:

2.02 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- C. Colors: As indicated in the Finish Schedule.

2.03 PREPARATORY COATS

- A. Concrete Unit Masonry Block Filler: High-performance latex block filler of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
- B. Exterior Primer: Exterior latex-based primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
 - 1. Ferrous-Metal and Aluminum Substrates: Rust-inhibitive metal primer.
 - 2. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.
- C. Interior Primer: Interior latex-based of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
 - 1. Ferrous-Metal Substrates: Quick drying, rust-inhibitive metal primer.
 - 2. Zinc-Coated Metal Substrates: Galvanized metal primer.
 - 3. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
- C. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- D. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
 - 1. Provide barrier coats over incompatible primers or remove and reprime.
 - 2. Cementitious Materials: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 - 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood, including cabinets, counters, cases, and paneling.
 - c. If transparent finish is required, backprime with spar varnish.
 - d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on back side.
 - e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
 - 4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
 - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to SSPC-SP 6/NACE No. 3.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
 - 5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- E. Material Preparation:

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
- F. Exposed Surfaces: Include areas visible when permanent or built-in fixtures, grilles, convactor covers, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
1. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 2. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
 3. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 4. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
- G. Sand lightly between each succeeding enamel or varnish coat.
- H. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. Omit primer over metal surfaces that have been shop primed and touchup painted.
 2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance.
- I. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
- J. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.
- K. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- L. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- M. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- O. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections-

3.02 CLEANING AND PROTECTING

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

- B. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- C. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.03 EXTERIOR PAINT SCHEDULE

a. Ferrous Metal:

- 1. Acrylic Urethane: Two (2) finish coats over a rust-inhibitive primer.

Semi-Gloss Finish:

1st Coat: S-W Pro Industrial™ Pro-Cryl Universal Primer, B66-310 Series
(5.0 – 10.0 mils wet, 2.0 – 4.0 mils dry)

2nd Coat: S-W Macropoxy 646-100 Epoxy, B58 Series
(5.0 – 10.0 mils dry per coat)

3rd Coat: S-W Pro Industrial Waterbased Acrolon 100, B65 Series
(4.0 – 8.0 mils wet per coat)

END OF SECTION 09 91 00

SECTION 10 44 00

FIRE EXTINGUISHERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fire extinguishers.
 - 2. Fire extinguisher brackets.

1.3 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.
- C. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain extinguishers from one source from a single manufacturer.
- B. UL-Listed Products: Fire extinguishers shall be UL listed with UL listing mark for type, rating, and classification of extinguisher.
- C. Conform to NFPA 10 requirements for portable fire extinguishers.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - i. Failure of hydrostatic test according to NFPA 10.
 - ii. Faulty operation of valves or release levers.
 - 2. Warranty Period: 6 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. J. L. Industries, Inc., a division of Activar Construction Products Group.
2. Larsen's Manufacturing Company (basis of design).
3. Architect approved equal prior to bid.

2.2 FIRE EXTINGUISHERS

- A. General: Provide fire extinguishers for each cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard that comply with authorities having jurisdiction.
- B. Multipurpose Dry Chemical Type: UL-rated 4A -80BC, 10-lb nominal capacity, in enameled steel container.

2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine rough-in for hose vales, hose racks, and cabinets to verify locations of piping connections prior to cabinet installation.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Follow manufacturer's printed instructions for installation.
- B. Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with applicable regulations of governing authorities.
 1. Fasten mounting brackets to structure, square and plumb.

END OF SECTION 10 44 00

SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal Building System:
 - 1. Structural steel framing system.
 - 2. Metal roof system.

1.02 RELATED REQUIREMENTS

- A. Division 5 – Structural Steel Framing

1.03 REFERENCE STANDARDS

- A. American Institute of Steel Construction (AISC):
 - 1. AISC 360 - Specification for Structural Steel Buildings.
 - 2. AISC 341 – Seismic Provisions for Structural Steel Buildings (when appropriate).
 - 3. AISC Design Guide 3 – Serviceability for Steel Buildings
- B. American Iron and Steel Institute (AISI):
 - 1. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members.
- C. American Welding Society (AWS):
 - 1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.
 - 2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel.
- D. Association for Iron & Steel Technology (AISE):
 - 1. AISE 13 – Specifications for Design and Construction of Mill Buildings.
- E. ASTM International (ASTM):
 - 1. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - 2. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 4. ASTM B 117 – Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - 5. ASTM C 518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 6. ASTM C 1363 – Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
 - 7. ASTM D 522 – Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
 - 8. ASTM D 523 – Standard Test Method for Specular Gloss.
 - 9. ASTM D 968 – Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive.
 - 10. ASTM D 1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
 - 11. ASTM D 2244 – Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.

12. ASTM D 2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
 13. ASTM D 2794 – Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
 14. ASTM D 3361 – Standard Practice for Unfiltered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
 15. ASTM D 4214 – Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
 16. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 17. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.
 18. ASTM E 1592 – Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
 19. ASTM G 87 – Standard Practice for Conducting Moist SO₂ Tests.
- F. Metal Building Manufacturers Association (MBMA):
1. MBMA Metal Building Systems Manual.
 2. Seismic Design Guide for Metal Building Systems.
- G. North American Insulation Manufacturers Association (NAIMA):
1. NAIMA 202 – Standard For Flexible Fiber Glass Insulation to be Laminated for Use in Metal Buildings.
- H. The Society for Protective Coatings (SSPC):
1. SSPC-Paint 15 - Primer for Use Over Hand Cleaned Steel performs to SSPC-Paint 15 standards.
 2. SSPC-SP2 – Hand Tool Cleaning.
- I. Underwriters Laboratories (UL):
1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies.
 2. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials.
- 1.04 PREINSTALLATION MEETINGS
- A. Convene preinstallation meeting two (2) weeks before start of installation of metal building system.
 - B. Require attendance of parties directly affecting work of this section, including Contractor, Architect, Engineer, installer, and metal building system manufacturer’s representative.
 - C. Review materials, installation, protection, and coordination with other work.
- 1.05 SUBMITTALS
- A. Comply with Division 01, Section “Submittals”
 - B. Product Data: Submit metal building system manufacturer’s product information, specifications, and installation instructions for building components and accessories.
 - C. Erection Drawings: Submit metal building system manufacturer’s erection drawings, including plans, elevations, sections, and details, indicating roof framing, transverse cross-sections, covering and trim details, and accessory installation details to clearly indicate proper assembly of building components.
 - D. Certification: Submit written “Certificate of design and manufacturing conformance” prepared and signed by a Professional Engineer, registered to practice in Georgia, verifying that the metal building system design and metal roof system design (including panels, clips, and support system components) meet indicated loading requirements and codes of authorities having jurisdiction.

1. Certification shall reference specific dead loads, live loads, snow loads, wind loads/speeds, tributary area load reductions (if applicable), concentrated loads, collateral loads, seismic loads, end-use categories, governing code bodies, including year, and load applications.
 2. Submit certification 1 week before bid date on the metal building system manufacturer's letterhead.
- E. Submit certification verifying that the metal roof system has been tested and approved by Underwriter's Laboratory as Class 90.
- F. Dealer Certification: Submit certification 1 week before bid date that the metal building system supplier or metal roof system supplier is a manufacturer's authorized and franchised dealer of the system to be furnished.
1. Certification shall state date on which authorization was granted.
- G. Installer Certification: Submit certification 1 week before bid date that the metal building system or roof system installer has been regularly engaged in the installation of building systems of the same or equal construction to the system specified.
- H. Warranty Documentation: Submit manufacturer's standard warranty.

1.06 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
1. Manufacturer regularly engaged, for past 10 years, in manufacture of metal building systems of similar type to that specified.
 2. Accredited based on IAS Accreditation Criteria AC472 and requirements in International Building Code (IBC), Chapter 17.
- B. Installer's Qualifications:
1. Installer regularly engaged, for past 5 years, in installation of metal building systems of similar type to that specified.
 2. Employ persons trained for installation of metal building systems.
- C. Material Testing:
1. In addition to material certifications of structural steel, metal building system manufacturer shall provide, upon request at time of order, evidence of compliance with specifications through testing.
 2. This quality assurance testing shall include testing of structural bolts, nuts, screw fasteners, mastics, and metal coatings (primers, metallic coated products, and painted coil products).

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
1. Store and handle materials in accordance with manufacturer's instructions.
 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 3. Do not store materials directly on ground.
 4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
 5. Protect materials and finish during storage, handling, and installation to prevent damage.

1.08 WARRANTY

- A. Metal building system manufacturer shall provide a written weathertightness warranty for a maximum of 25 years against leaks in standing seam roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.

1. Warranty shall be signed by both the metal roof system manufacturer and the metal roof system installer.
 2. Maximum liability of warranty shall be no less than \$0.70 per square foot of roof area.
- B. Metal building system manufacturer shall provide a written warranty for 25 years against perforation of metal roof panels due to corrosion under normal weather and atmospheric conditions.
1. Warranty shall be signed by metal roof system manufacturer.
- C. Metal building system manufacturer shall provide a paint film written warranty for 25 years against cracking, peeling, chalking, and fading of exterior coating on painted roof and wall panels.
1. Warranty shall be signed by metal building system or roof system manufacturer and state that the coating contains 70 percent “Kynar 500” or “Hylar 5000” resin.
 2. Metal building system manufacturer shall warrant that the coating shall not peel, crack, or chip for 25 years.
 3. For a period of 25 years, chalking shall not exceed ASTM D 4214, #8 rating and shall not fade more than five (5) color difference units in accordance with ASTM D 2244.
- D. Metal Building System Manufacturer’s Certification: Metal building system manufacturer shall submit a signed written Certification one (1) week before bid date, stating that the metal roof system manufacturer or approved representative will provide warranties and Inspection and Report Service specified in this specification section.
1. Warranty terms shall be submitted with bid.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Metal Building System Manufacturer: Butler Manufacturing, PO Box 419917, Kansas City, Missouri 64141. Phone 816-968-3000. Website www.butlermfg.com.
- B. Or Architect approved equal.

2.02 BUILDING DESCRIPTION

- A. Building Dimensions: Indicated on the Drawings.
 1. Horizontal Dimensions: Measure to inside face of wall sheets.
 2. Eave Height: Measure from top of finished floor to intersection of insides of roof and sidewall sheets.
 3. Clear Height Between Finished Floor and Bottom of Roof Beams: Indicated on the Drawings.
- B. Primary Structural Members:
 1. Primary Framing System: Butler Manufacturing framing system as specified in this specification section.
 2. Frames: Welded-up plate section columns and roof beams, complete with necessary splice plates for bolted field assembly as specified in this specification section.
 3. Bolts for Field Assembly of Primary Steel: High-strength bolts as indicated on erection drawings of metal building system manufacturer.
 4. Beam and Post Endwall Frames: Endwall corner posts, endwall roof beams, and endwall posts as required by design criteria.
 5. Exterior Columns: Welded-up "H" sections or cold-formed “C” sections.
 6. Interior Columns: “H” sections or tube columns.
 7. Connection of Primary Structural Members: ASTM A 325 bolts through factory-punched holes.
 8. Primary Structural Members: Paint with metal building system manufacturer's standard primer with surface preparation as specified in this specification section.

- C. Secondary Structural Members:
 - 1. Secondary Framing System: Butler Manufacturing framing system as specified in this specification section.
 - 2.
 - a. C/Z Purlins and Girts: Acrylic-coated G30 galvanized finish.
 - b. Truss Purlins: Acrylic-coated G30 galvanized finish.
- D. Metal Roof System: Butler Manufacturing metal roof system as specified in this specification section.
- E. Metal Wall System: Not Applicable
- F. Where metal panels are required to be painted, use coating system as specified in this specification section.

2.03 STRUCTURAL STEEL FRAMING SYSTEM

- A. General:
 - 1. Design of Structural System: Clear or multi-span rigid frame with tapered or straight columns and roof beams, with single-slope roof.
 - 2. Actual Building Length:
 - a. Structural line to structural line.
 - 3. Actual Building Width:
 - a. Structural line to structural line.
 - 4. Minimum Roof Slope: 1/4 inch in 12 inches.
 - 5. Maximum Roof Slope: 1/2 inch in 12 inches.
 - 6. Foundations:
 - a. Reactions for Proper Design of Foundations: Supplied by metal building system manufacturer.
 - b. Anchor Bolts:
 - 1) Anchor Bolt Diameter: Indicated on anchor bolt layout drawings furnished by metal building system manufacturer.
- B. Structural Steel Design:
 - 1. Structural Mill Sections or Welded-up Plate Sections: Design in accordance with AISC Specification for Structural Steel Buildings.
 - 2. Cold-Formed Steel Structural Members: Design in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
 - 3. Structural System: Design in accordance with specified building code (Refer to Design Loads and Building Codes).
- C. Primary Framing:
 - 1. Rigid Frames:
 - a. Frames: Welded-up plate section columns and roof beams, complete with necessary splice plates for bolted field assembly.
 - 1) Base Plates, Cap Plates, Compression Splice Plates, and Stiffener Plates: Factory welded into place and connection holes factory fabricated.
 - 2) Columns and Roof Beams: Fabricated complete with holes in webs and flanges for attachment of secondary structural members and bracing, except for fieldwork as noted on erection drawings furnished by metal building system manufacturer.
 - b. Bolts for Field Assembly of Frame Members: ASTM A 325 high-strength bolts as indicated on erection drawings furnished by metal building system manufacturer.
 - 2. Endwall Structural Members: Cold-formed channel members designed in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members or welded-up plate sections designed in accordance with AISC Specification for Structural Steel Buildings.
 - a. Endwall Frames: Endwall corner posts, endwall roof beams, and endwall posts as required by design criteria.
 - 1) Splice Plates and Base Clips: Shop fabricated complete with bolt connection holes.

- 2) Base Plates, Cap Plates, Compression Splice Plates, and Stiffener Plates: Factory welded into place and connection holes shop fabricated.
 - 3) Beams and Posts: Factory fabricated complete with holes for attachment of secondary structural members, except for field work as noted on erection drawings furnished by metal building system manufacturer.
 - b. Intermediate Frames: Substituted for end-wall roof beams, when specified.
 - 1) Factory fabricate necessary endwall posts and holes for connection to intermediate frame used in endwall.
- D. Secondary Structural Members:
- 1. Purlins:
 - a. Purlins:
 - 1) "Z"-shaped, precision-roll-formed, acrylic-coated G30 galvanized steel in different gauges to meet specified loading conditions.
 - 2) 8-1/2-inch-deep "Z" sections.
 - b. Outer Flange of Purlins: Factory-punched holes for panel connections.
 - c. Attach purlins to main frames and endwalls with 1/2-inch-diameter bolts.
 - d. Brace purlins at intervals indicated on erection drawings furnished by metal building system manufacturer.
 - e. Concentrated Loads: Hung at purlin panel points.
 - 2. Eave Members:
 - a. Eave Struts: Factory punched 7-inch, 8-1/2-inch, 10-inch, or 11-1/2-inch-deep "C" sections, precision-roll-formed, acrylic-coated G30 galvanized steel in different gauges to meet specified loading conditions.
 - 3. Girts:
 - a. "Z" or "C"-shaped, precision-roll-formed, acrylic-coated G30 galvanized steel in different gauges to meet specified loading conditions.
 - b. 8-1/2-inch-deep "Z" or "C" sections.
 - c. Outer Flange of Girts: Factory-punched holes for panel connections.
 - 4. Bracing:
 - a. Locate bracing as indicated on the Drawings.
 - b. Diagonal Bracing:
 - 1) Fixed-base wind posts or pinned-base portal frames shall be substituted for wall rod bracing on buildings as required.
 - c. Flange Braces and Purlin Braces: Cold formed and installed as indicated on the Drawings.
- E. Welding:
- 1. Welding Procedures, Operator Qualifications, and Welding Quality Standards: AWS D1.1 - Structural Welding Code – Steel and AWS D1.3 - Structural Welding Code – Sheet Steel.
 - 2. Welding inspection, other than visual inspection as defined by AWS D1.1, paragraph 6.9, shall be identified and negotiated before bidding.
 - 3. Certification of Welder Qualification: Supply when requested.
- F. Painting of Structural Steel Framing System:
- 1. General:
 - a. Structural Steel: Prime paint as temporary protection against ordinary atmospheric conditions.
 - b. Perform subsequent finish painting, if required, in field as specified in the painting section.
 - c. Before painting, clean steel of loose rust, loose mill scale, dirt, and other foreign materials.
 - d. Steel Fabricator: Not required to sand blast, flame clean, or pickle steel before painting, unless otherwise specified.
 - 2. Primary Frames:
 - a. Clean steel in accordance with SSPC-SP2.
 - b. Factory cover steel with one (1) coat of gray water-reducible alkyd primer paint formulated to equal or exceed performance requirements SSPC-Paint 15.
 - c. Minimum Coating Thickness: 1.0 mil.
 - 3. Secondary Structural Members – Roll-Formed:

- a. Hot-dipped zinc coating, ASTM A 653, G30; followed by 1 coat of clear acrylic finish.
- b. Acrylic-Coated G30 Galvanized Steel: Equal or exceed performance requirements of SSPC Paint-15.

2.04 METAL ROOF SYSTEM

- A. Metal Roof System: Butler Manufacturing “MR-24[®]” roof system.
- B. Roof System Design:
 - 1. Design roof panels in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
 - 2. Endwall Trim and Roof Transition Flashings: Allow roof panels to move relative to wall panels and/or parapets as roof expands and contracts with temperature changes.
- C. Roof System Performance Testing:
 - 1. UL Wind Uplift Classification Rating, UL 580: Class 90.
 - 2. Structural Performance Under Uniform Static Air Pressure Difference: Test roof system in accordance with ASTM E 1592.
- D. Roof Panels:
 - 1. Factory roll-formed, 24 inches wide, with 2 major corrugations, 2 inches high (2-3/4 inches including seam), 24 inches on center.
 - 2. Flat of the Panel: Cross flutes 6 inches on center, perpendicular to major corrugations in entire length of panel to reduce wind noise.
 - 3. Variable Width Panels:
 - a. For roof lengths not evenly divisible by the 2’-0” panel width, factory-manufactured variable-width (9-inch, 12-inch, 15-inch, 18-inch, and 21-inch-wide) panels shall be used to ensure modular, weathertight roof installation.
 - b. Minimum Length: 15 feet.
 - c. Supply maximum possible panel lengths.
 - 4. Panel Material and Finish:
 - a. 24-gauge galvanized steel, G90 coating, ASTM A 653, G90.
 - b. Paint with exterior colors of “Butler-Cote[™]” finish system, full-strength, 70 percent “Kynar 500” or “Hylar 5000” fluoropolymer (PVDF) coating.
 - c. PVDF Coating Warranty: Metal building system manufacturer shall warrant coating for 25 years for the following.
 - 1) Not to peel, crack, or chip.
 - 2) Chalking: Not to exceed ASTM D 4214, #8 rating.
 - 3) Fading: Not more than 5 color-difference units, ASTM D 2244.
 - 5. Extend eave panels beyond structural line of sidewalls.
 - 6. Factory punch panels at panel end to match factory-punched holes in eave structural member.
 - 7. Panel End Splices: Factory punched and factory notched.
 - 8. Panel End Laps: Locate directly over, but not fastened to, a supporting secondary roof structural member and be staggered, to avoid 4-panel lap-splice condition.
 - 9. End Laps: Floating. Allows roof panels to expand and contract with roof panel temperature changes.
 - 10. Self-Drilling Fasteners: Not permitted.
- E. Provision for Expansion and Contraction:
 - 1. Provision for Thermal Expansion Movement of Roof Panels: Clips with movable tab.
 - a. Stainless Steel Tabs: Factory centered on roof clip when installed to ensure full movement in either direction.
 - b. Maximum Force of 8 Pounds: Required to initiate tab movement.
 - c. Each Clip: Accommodates a minimum of 1.25-inch movement in either direction.

2. Roof: Provide for thermal expansion and contraction without detrimental effects on roof panels, with plus or minus 100-degree F temperature difference between interior structural framework of building and of roof panels.

F. Fasteners:

1. Make connections of roof panels to structural members, except at eaves, with clips with movable stainless steel tabs, seamed into standing seam side lap.

G. Accessories:

1. Accessories (i.e., ventilators, skylights, gutters, fascia): Standard with metal building system manufacturer, unless otherwise noted and furnished as specified.
2. Exterior Metal Coating on Gutters, Downspouts, Gable Trim, and Eave Trim: 70 percent "Kynar 500".
3. Location of Standard Accessories: Indicated on erection drawings furnished by metal building system manufacturer.
4. Material used in flashing and transition parts and furnished as standard by metal building system manufacturer may or may not match roof panel material.
 - a. Parts: Compatible and not cause corrosive condition.
 - b. Copper and Lead Materials: Do not use with Galvalume panels.

H. Energy Conservation:

1. Minimize heat loss (thermal short circuit) caused by compression of blanket insulation between structural members and roof panels by use of thermal block at each purlin location.

2.05 METAL WALL SYSTEM – Not Applicable

2.06 INSULATION – Not Applicable

2.07 INSULATION SUPPORT SYSTEM – Not Applicable

2.08 ROOF INSULATION SYSTEM – Not Applicable

2.09 METAL COATING SYSTEM

A. Metal Coating System: Butler Manufacturing™ "Butler-Cote™" finish system a factory-applied, exterior metal coating system

B. Substrate Preparation:

1. G90 Hot-Dipped Galvanized Steel or AZ50 Galvalume: Factory-controlled chemical-conversion treatment.

C. Coating:

1. Material: Full-strength, 70 percent, "Kynar 500" color coating.
2. After steel preparation, coat exterior exposed surface with primer and PVDF
 - a. Nominal Total Dry Film Thickness: 1.0 mil.
3. Interior Exposed Surfaces: Coat with polyester color coat.
4. Apply coatings to entire material dimensions of steel sheets before forming of panels.

D. Physical Characteristics of Exterior Coating:

1. Resistance to failure through cracking, checking, peeling, and loss of adhesion.
2. Measure by the following laboratory weather-simulating tests to obtain test results justifying metal building system manufacturer's 25-year warranty:
 - a. Humidity resistance at 100 degrees F and 100 percent relative humidity, ASTM D 2247.
 - b. Salt-spray resistance at 5 percent salt fog, ASTM B 117.
 - c. Reverse impact resistance, ASTM D 2794.

- d. Resistance to accelerated weathering, Atlas Model XW-R Dew Cycle Weather-O-Meter, ASTM D 3361.
- e. Resistance to dry heat.
- f. Abrasion resistance, ASTM D 968.
- g. Chemical/acid/pollution resistance, ASTM D 1308 and G 87.
- h. Maintain gloss of finish evenly over entire surface, ASTM D 523

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine area to receive metal building system.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.02 ERECTION – STRUCTURAL STEEL FRAMING SYSTEM

- A. Erect structural steel framing system in accordance with the Drawings and metal building system manufacturer’s erection drawings.
- B. Field Modifications:
 - 1. Require approval of metal building system manufacturer.
 - 2. Responsibility of building erector.
 - 3. Field Modifications to Truss Purlins: Not allowed, unless indicated on erection drawings furnished by metal building system manufacturer.
- C. Fixed Column Bases: Grout flush with floor line after structural steel erection is complete.

3.03 INSTALLATION – METAL ROOF SYSTEM

- A. Metal Roof System Installation: Butler Manufacturing™ “MR-24®” roof system.
 - 1. Install roof system in accordance with metal building system manufacturer’s instructions at locations indicated on the Drawings.
 - 2. Install roof system weathertight.
 - 3. Position panel clips by matching hole in clip with factory-punched holes in secondary structural members.
 - 4. Position and properly align panels by matching factory-punched holes in panel end with factory-punched holes in eave structural member and by aligning panel with panel clip.
 - 5. Field seam panel side laps by self-propelled and portable electrical lock-seaming machine.
 - a. Machine field forms the final 180 degrees of a 360-degree Pittsburgh double-lock standing seam.
 - b. Factory apply side lap sealant.
 - 6. Panel End Laps: Minimum of 6 inches, sealed with sealant (weather sealing compound), and fastened together by clamping plates.
 - a. Sealants: Contain hard nylon beads, which prevent mastic from flowing out due to clamping actions.
 - b. Join panel laps by 2-piece clamped connection consisting of a bottom reinforcing plate and a top panel strap.
 - c. Locate panel end laps directly over, but not fastened to, supporting secondary roof structural member and stagger, to avoid 4-panel lap-splice condition.
 - 7. Minimum Blanket Insulation Thickness: 2 inches.

3.03 INSTALLATION – METAL WALL SYSTEM – Not Applicable

3.04 INSTALLATION – INSULATION – Not Applicable

3.05 INSTALLATION – INSULATION SUPPORT SYSTEM – Not Applicable

3.06 INSTALLATION – ROOF INSULATION SYSTEM – Not Applicable

3.07 PROTECTION

- A. Protect installed metal building system to ensure that, except for normal weathering, metal building system will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 13 34 19

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SCOPE

- A. This section applies to all Sections of Divisions 26.
- B. The general provisions of the contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section and in all sections of this Division.

1.02 WORK INCLUDED

- A. Provide all labor, tools, and materials required for a complete and fully operational installation, as described on the drawings or in the specification.
- B. The work shall be installed in conformance with NEC Section 110-12, Mechanical Execution of Work, and NECA 1-2006, Standard Practices for Good Workmanship in Electrical Construction (ANSI).

1.03 WORK NOT INCLUDED UNDER DIVISION 26

- A. The following items of work are specified under other divisions of the specification:
 - 1. Temporary service for construction.
 - 2. Electric motors.
 - 3. Electric heaters unless otherwise noted on the drawings.
 - 4. Control and interlock wiring for work furnished under other divisions, except where specifically required under this division.
 - 5. Access panels in walls or ceilings.
 - 6. Field finish painting, except for field painting of electrical material with paint supplied by the manufacturer of the material.
 - 7. Starters for certain items of equipment are furnished under other divisions for installation under this division.
- B. Refer to other sections of this division for work required in connection with the above items.

1.04 DEFINITIONS

- A. "Provide": furnish and install, complete and ready for operation.
- B. "Install": receive, mount, and connect, complete and ready for operation.
- C. "Wiring": wires and cables installed with all required raceways, connectors, and fittings.
- D. "Concealed": not exposed to view; embedded in masonry or other construction; in furred spaces or above suspended ceilings; below grade.
- E. "Exposed": not concealed; not embedded or installed underground; under raised floors; inside trenches, tunnels, basements, inside built-up HVAC equipment, crawl spaces, and accessible attics.
- F. "The Drawings": that portion of the contract drawings annotated as electrical.

- G. “Furnish”: Supply, deliver to job site, protect and store.

1.05 ABBREVIATIONS

- A. The abbreviations used on the drawings and in the specification are defined as follows:
 - 1. “AC”: Alternating Current
 - 2. “AFF”: Height above Finished Floor
 - 3. “AIC”: Ampere Interrupting Capacity
 - 4. “AICR”: Ampere Interrupting Current Rating
 - 5. “AHJ”: Authority Having Jurisdiction
 - 6. “NEC”: National Electrical Code
 - 7. “NIC”: Not in the Contract
 - 8. “NF” or “N/F”: Non-fused
 - 9. “30A/2P”: Example of a circuit designation for a 30 Amp 2-Pole fused switch or a 30 Amp 2-Pole circuit breaker or device.
 - 10. “FBO”: Furnished by Others
 - 11. “EC”: Electrical Contractor
 - 12. “EX”: Existing to Remain
 - 13. “EXR”: Existing Relocated - new location indicated on the drawings.
 - 14. “HP”: Horsepower
 - 15. “kVA”: Kilovolt Ampere
 - 16. “kW”: Kilowatt
 - 17. “MCC”: Motor Control Center
 - 18. “MLO”: Main Lugs Only
 - 19. “NTS”: Not to Scale
 - 20. “WP”: Weatherproof

1.06 CODES, RULES, AND REGULATIONS

- A. Comply with the following:
 - 1. Local codes enforced by the local inspection authority.
 - 2. The edition of the National Electrical Code being enforced for this project by the local inspection authority.
 - 3. All applicable laws and ordinances.
 - 4. The rules and regulations of electric utility company serving the project applicable to the installation of service and metering equipment.
- B. Give all necessary notices, obtain all required permits, and pay all inspection and other fees imposed by Authorities Having Jurisdiction over the work.

1.07 STANDARDS

- A. International Building Code (IBC) - 2018 Edition with Georgia Amendments (Georgia State Minimum Standard Building Code).
- B. International Fire Code (IFC) - 2018 Edition with Georgia State Amendments (Chapter 120-3-3 - Rules and Regulations for the State Minimum Fire Safety Standards).
- C. International Energy Conservation Code (IECC) - 2015 Edition with Georgia Supplements and Amendments.
- D. American with Disabilities Act (ADA) with Georgia Amendments Chapter (120-3-20) - Georgia Accessibility Code for Buildings and Facilities).
- E. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning (ASHRAE - 90.1).

- F. Illumination Engineering Society (IES) - 10th Edition, Reference and Application Handbook.
- G. NFPA® - National Fire Protection Association®
 - 1. NFPA 101: Life Safety Code (LSC) - 2018 Edition with Georgia Amendments.
 - 2. NFPA 70: National Electrical Code (NEC) - 2020 Edition (2021 Georgia Amendments).
 - 3. NFPA 72: National Fire Alarm and Signaling Code - 2019 Edition with 2020 Georgia Amendments.
- H. IEC - International Electrotechnical Commission
- I. IESNA - Illumination Engineering Society of North America
- J. ASTM - American Society for Testing and Materials
- K. ANSI - American National Standards Institute
- L. IEEE® - Institute of Electrical and Electronic Engineers, Inc.®
- M. NEMA® - National Electrical Manufacturers Association®
- N. CEA - Insulated Cable Engineers Association
- O. UL® - Underwriters Laboratories, Inc.®
- P. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance
- Q. State of Georgia - Chapter 120-3-3: Rules and Regulations issued by The Safety Fire Commissioner.
- R. Comply with the latest editions of standards applicable to the work.

1.08 MATERIALS

- A. All material shall be new, and shall comply with the indicated standards.
- B. All material shall be UL labeled or UL listed, except where the material is of a type not included in the UL listing service, in which case the material shall comply with other applicable industry standards and the contractor shall provide any examinations or certifications required by the local inspection authority in lieu of UL listing.
- C. All material shall be of a suitable type and rating for the intended use, and shall be installed in conformance with the instructions and recommendations of the manufacturer.

1.09 DRAWINGS

- A. The drawings are schematic in nature and do not indicate all of the required details of the work. All materials customarily considered to be a part of the electrical work and normally required for a complete and operational installation, shall be provided without additional cost to the XYZ Corporation.
- B. Refer also to the drawings of all other Divisions to coordinate the electrical installation.
- C. Equipment of other Divisions is shown schematically on the electrical drawings. Examine the drawings of the Division providing the equipment before roughing in the connections for it. Connect the equipment where actually installed, including wiring through any line voltage controllers, without any additional cost to the Owner.
- D. Prior to roughing in circuits for equipment furnished by other trades, and prior to releasing for manufacture, panelboards, starters or motor control centers feeding such equipment, coordinate the

electrical provisions being planned with the trade providing the equipment and submit any conflicts in writing.

- E. At the direction of the Architect, the location of any electrical outlet, luminaire, or other equipment, may be relocated to a location within 10 feet of the location shown on the drawings at no additional cost to the Owner provided such relocation is made prior to the installation of the outlet, luminaire or equipment being relocated.

1.10 SUBMITTALS

- A. Submit shop drawings in the manner and form described elsewhere in the contract.
- B. Submittals are required for material as noted in other sections of this Division.
- C. Check shop drawings prior to submission and provide date and signature of checker on each item. Note all corrections. Note any requested deviation from the drawings or specification, or if none, then so indicate. The Architect shall return documents without any review, where submitted without prior review by the Contractor.
- D. Review of submittals will be only for general conformance with the design concept indicated on the Drawings and in the Specification and for general compliance with the information given in the Contract Documents. Review will be made only of information clearly and specifically indicated in the submittal, and does not imply the acceptability of details, which are not so described in the submittal. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and procedures of construction; coordination of the work of all trades; and performing all work in a satisfactory manner.
- E. Review of the submittal documents by the Architect does not relieve the Contractor of the responsibility to comply with all requirements of the Contract Documents.

1.11 PROJECT CLOSEOUT

- A. Furnish Closeout Documents in the manner and form described elsewhere in the Contract Documents.
- B. Closeout Documents shall include the following:
 - 1. Final shop drawings.
 - 2. As-built drawings including redlined as-built field layout and installation drawings.
 - 3. Operation and Maintenance Manuals.
 - 4. Receipts from the Owner stating that he has received satisfactory operational demonstrations and instruction for electrical systems as specified in other Sections.
 - 5. Signed receipts from the Owner for spare parts and materials that are specified to be furnished.
 - 6. Written warranty.
 - 7. All required certifications, including certificate of inspection approval from the code-enforcing Authority.
 - 8. All required test reports (include in Operations and Maintenance Manual).

1.12 AS-BUILT DRAWINGS

- A. Provide as-built drawings in the manner and form described elsewhere in the Contract Documents.
- B. As-built drawings shall be maintained at the jobsite, and shall be available for review during construction.

- C. As-built drawings shall be kept up-to-date and current during the course of construction of the work.
- D. Record the final arrangement of the work and exact locations of the work as installed.

1.13 OPERATION AND MAINTENCE MANUALS

- A. Provide a minimum of (3) copies of Operation and Maintenance Manuals in the manner and form described elsewhere in the Contract Documents. Manuals shall be typewritten, indexed, tabbed, and loose leaf bound in heavy duty 3-ring binders.
- B. Manuals shall include, as a minimum, the following:
 - 1. Operating instructions customized to this specific project
 - 2. Maintenance instructions
 - 3. Parts list
 - 4. Descriptive literature
 - 5. Location, telephone number and contact information of contractors, distributors, dealers and authorized service agents.
 - 6. Test reports and certifications.
 - 7. Record copies of all shop or submittal drawings and data
- C. Maintenance instructions and parts lists shall include the most detailed and advanced publications available from the equipment manufacturer.
- D. Demonstrate the operation of the equipment to the Owner, including instruction in its use and operation. Provide instruction by manufacturers representatives where specified in other Sections.
- E. Provide Operation and Maintenance Manuals for equipment and systems as specifically described within the Sections of Division 26 - Electrical.

1.14 GENERAL TESTING

- A. Test all parts of the work to verify compliance with the Drawings and Specification.
- B. Verify correct tightness of all mechanical and electrical connections.
- C. Verify integrity of all wiring systems to assure suitable continuity, absence of unintentional grounds, and integrity of required grounds.
- D. Perform any required special factory or field-testing as specified in the other Sections of this Division. Provide all wiring, instruments, labor and personnel, required to complete these tests.
- E. Where other requirements of this Division require testing in the presence of the Architect, provide at least seven (7) business days advance written notice of such testing to the Architect.
- F. Where other requirements of this Division require submission of written records of tests and test results, accumulate and submit all such reports and include as a separate section in the operations and maintenance manuals described elsewhere in this section.

END OF SECTION

SECTION 26 05 01

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 GENERAL

- A. This section covers items of work required by more than one section of Division 26 - Electrical.
- B. Refer to other Divisions for requirements pertaining to:
 - 1. Cutting and repairing
 - 2. Field painting
 - 3. Equipment furnished under other Divisions and installed under this Division

PART 2 - PRODUCTS

2.01 CONCRETE INSERTS

- A. Manufacturers:
 - 1. B-Line.
 - 2. Grinnell.
 - 3. Hohmann & Barnard.
 - 4. Kindorf.
 - 5. Unistrut.

2.02 DRILLED ANCHORS

- A. Manufacturers:
 - 1. Grinnell.
 - 2. Hilti.
 - 3. Rawl.
 - 4. Red-Head.
- B. All metal, heavy duty, non-caulking, expansion bolt anchor equivalent to Rawl #9650 Series.
- C. Minimum size used shall be 1/4" machine thread.

PART 3 - EXECUTION

3.01 SUPPORTS

- A. All work shall be supported from structural elements of the building.
- B. Size and spacing of supports shall be determined by the load to be supported such that the working load of supports will not exceed a safety factor of 4:1.
- C. Spacing intervals of supports shall in no case exceed intervals required by applicable codes.
- D. Plastic anchors, non-removable drive-in type expansion anchors and power actuated tool installed anchors are not acceptable.
- E. Work under this division shall not be supported from piping, ducts, or work of other trades.

- F. Drilled anchors in sides of concrete joists shall be at least 3" from bottom of joist in the vertical plane.
- G. Provide drilled expansion bolt anchors to support all material mounted on masonry construction.
- H. All hardware, nuts, bolts, channel, braces, etc., used on exterior of building shall be galvanized.
- I. Rod supports shall be constructed of minimum 3/8" nominal continuously threaded rod of a continuous length. Use of rod couplings to extend the length of hanger rod shall not be allowed.
- J. Work installed under Division 26 supported from or attached to structural steel members shall not be welded to steel member but shall be attached by clamping a device manufactured specifically for this purpose.
- K. Framework required to support electrical equipment shall be constructed of 1 1/2" x 1 1/2" steel framing channel bolted together with fittings provided by the framing channel manufacturer.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Wiring connectors.
- C. Electrical tape.
- D. Oxide inhibiting compound.
- E. Wire pulling lubricant.
- F. Cable ties.

1.02 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- C. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft 2011 (Reapproved 2017).
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation 2004 (Reapproved 2020).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape 2017.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy 2021.
- H. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems 2021.
- I. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 44 - Thermoset-Insulated Wires and Cables Current Edition, Including All Revisions.

- K. UL 83 - Thermoplastic-Insulated Wires and Cables Current Edition, Including All Revisions.
- L. UL 267 - Outline of Investigation for Wire-Pulling Compounds Most Recent Edition, Including All Revisions.
- M. UL 486A-486B - Wire Connectors Current Edition, Including All Revisions.
- N. UL 486C - Splicing Wire Connectors Current Edition, Including All Revisions.
- O. UL 486D - Sealed Wire Connector Systems Current Edition, Including All Revisions.
- P. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 26 05 26.
- H. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 - 3. Tinned Copper Conductors: Comply with ASTM B33.
- I. Minimum Conductor Size:
 - 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
 - 3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
 - 2. Control Circuits: 14 AWG.
- J. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- K. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.
 - d. For control circuits, comply with manufacturer's recommended color code.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 - 1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. General Cable Technologies Corporation: www.generalcable.com/#sle.
 - d. Southwire Company: www.southwire.com/#sle.
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
 - 1. Feeders and Branch Circuits: Stranded.
 - 2. Control Circuits: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN-2, except as indicated below.
 - a. Installed Underground: Type XHHW-2.

2.04 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 26 05 26.
- C. Wiring Connectors for Splices and Taps:
 - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 - 2. Copper Conductors Size 6 AWG and Larger: Use compression connectors.
- D. Wiring Connectors for Terminations:
 - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 - a. Use two hole, long barrel compression lug, copper construction.
 - 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
 - a. Where compression lugs will not fit, use copper alloy mechanical lug, T&B "Locktite" series.
 - 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
 - 4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
 - 5. Copper Conductors Size 8 AWG and Larger: Use compression connectors where connectors are required.
 - 6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
 - 7. Conductors for Control Circuits: Use crimped terminals for all connections.
- E. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.

- F. Mechanical Connectors: Provide bolted type or set-screw type.
- G. Compression Connectors: Provide circumferential type crimp configuration.
- H. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.05 ACCESSORIES

- A. Electrical Tape:
 - 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
 - 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
- B. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
- C. Wire Pulling Lubricant:
 - 1. Listed and labeled as complying with UL 267.
 - 2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 - 3. Suitable for use at installation temperature.
- D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
 - 3. Arrange circuiting to minimize splices.

4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
 5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
 6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
 7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is permitted, under the following conditions:
 - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
 - b. Increase size of conductors as required to account for ampacity derating.
 - c. Size raceways, boxes, etc. to accommodate conductors.
 8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Installation in Raceway:
1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 2. Pull all conductors and cables together into raceway at same time.
 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
1. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.
- G. Install conductors with a minimum of 12 inches of slack at each outlet.
- H. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- K. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 3. Do not remove conductor strands to facilitate insertion into connector.
 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.

5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
 - M. Insulate ends of spare conductors using vinyl insulating electrical tape.
 - N. Identify conductors and cables in accordance with Section 26 05 53.
 - O. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
 - P. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.04 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
 1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.
- C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.

1.02 RELATED REQUIREMENTS

- A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
 - 1. Includes oxide inhibiting compound.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 467 - Grounding and Bonding Equipment Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify exact locations of underground metal water service pipe entrances to building.
 - 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
 - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Grounding Electrode System:
 - 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
 - a. Provide continuous grounding electrode conductors without splice or joint.
 - b. Install grounding electrode conductors in raceway. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
 - 2. Metal In-Ground Support Structure:
 - a. Provide connection to metal in-ground support structure that is in direct contact with earth in accordance with NFPA 70.
- E. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 - 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 - 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 05 26:
 - 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use seven-strand, bare tinned copper conductors where installed underground in direct contact with earth.
 - 2) Use seven-strand, bare tinned copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use compression connectors or exothermic welded connections for accessible connections.
 4. Bonding jumpers: Flexible, copper braided jumper, Burndy B Series or equivalent, length as required for each application.
 5. Manufacturers - Mechanical and Compression Connectors:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Harger Lightning & Grounding: www.harger.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 6. Manufacturers - Exothermic Welded Connections:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. Cadweld, a brand of Erico International Corporation: www.erico.com/#sle.
 - c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC: www.thermoweld.com/#sle.
- D. Oxide Inhibiting Compound: Comply with Section 26 05 19.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.
 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
- D. MFMA-4 - Metal Framing Standards Publication 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.05 QUALITY ASSURANCE

- A. Comply with NFPA 70.

- B. Comply with applicable building code.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 3. Include consideration for vibration, equipment operation, and shock loads where applicable.
 - 4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 - 5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
 - 6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
 - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 - 2. Conduit Clamps: Bolted type unless otherwise indicated.
 - 3. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
 - d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - e. Thomas & Betts Corporation: www.tnb.com/#sle.
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
 - 1. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com/#sle.
 - d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - e. Thomas & Betts Corporation: www.tnb.com/#sle.
- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.

1. Comply with MFMA-4.
 2. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
 3. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
 4. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Thomas & Betts Corporation: www.tnb.com/#sle.
 - c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Equipment Supports: 1/2 inch diameter.
 - b. Busway Supports: 1/2 inch diameter.
 - c. Single Conduit: 3/8 inch diameter.
 - d. Trapeze Support for Multiple Conduits: 1/2 inch diameter.
 - e. Outlet Boxes: 1/4 inch diameter.
 - f. Luminaires: 1/4 inch diameter.
- F. Non-Penetrating Rooftop Supports for Low-Slope Roofs: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.
1. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 2. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
 3. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.
 4. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
- G. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
 3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
 4. Hollow Masonry: Use toggle bolts.
 5. Hollow Stud Walls: Use toggle bolts.
 6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
 7. Sheet Metal: Use sheet metal screws.
 8. Wood: Use wood screws.
 9. Plastic and lead anchors are not permitted.
 10. Powder-actuated fasteners are not permitted.
 11. Hammer-driven anchors and fasteners are not permitted.
 12. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 - a. Comply with MFMA-4.
 - b. Channel Material: Use galvanized steel.
 - c. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch minimum base metal thickness.
 - d. Manufacturer: Same as manufacturer of metal channel (strut) framing system.
 13. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.
 14. Manufacturers - Mechanical Anchors:
 - a. Hilti, Inc: www.us.hilti.com/#sle.
 - b. ITW Red Head, a division of Illinois Tool Works, Inc: www.itwredhead.com/#sle.

- c. Powers Fasteners, Inc: www.powers.com/#sle.
- d. Simpson Strong-Tie Company Inc: www.strongtie.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- H. Provide required vibration isolation and/or seismic controls in accordance with Section 26 05 48.
- I. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Unless otherwise indicated, mount floor-mounted equipment on properly sized 4 inch high concrete pad constructed in accordance with Section 03 30 00.
 - 5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- J. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
- K. Secure fasteners according to manufacturer's recommended torque settings.
- L. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.

- B. Inspect support and attachment components for damage and defects.
- C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 26 05 33.13

CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Galvanized steel intermediate metal conduit (IMC).
- C. Flexible metal conduit (FMC).
- D. Liquidtight flexible metal conduit (LFMC).
- E. Galvanized steel electrical metallic tubing (EMT).
- F. Rigid polyvinyl chloride (PVC) conduit.

1.02 RELATED REQUIREMENTS

- A. Section 07 84 00 - Firestopping.
- B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
- C. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC) 2020.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S) 2020.
- C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit 2018.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT) 2020.
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC) 2017.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
- H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit 2020.
- I. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing 2021.
- J. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 1 - Flexible Metal Conduit Current Edition, Including All Revisions.
- L. UL 6 - Electrical Rigid Metal Conduit-Steel Current Edition, Including All Revisions.

- M. UL 360 - Liquid-Tight Flexible Metal Conduit Current Edition, Including All Revisions.
- N. UL 514B - Conduit, Tubing, and Cable Fittings Current Edition, Including All Revisions.
- O. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings Current Edition, Including All Revisions.
- P. UL 797 - Electrical Metallic Tubing-Steel Current Edition, Including All Revisions.
- Q. UL 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations Current Edition, Including All Revisions.
- R. UL 1242 - Electrical Intermediate Metal Conduit-Steel Current Edition, Including All Revisions.
- S. UL 2419 - Outline of Investigation for Electrically Conductive Corrosion Resistant Compounds Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
 5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 1. Do not begin installation of conductors and cables until installation of conduit between termination points is complete.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
- B. Project Record Documents: Record actual routing for conduits installed underground and conduits embedded within concrete slabs.

1.06 QUALITY ASSURANCE

- A. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 - 1. Under Slab on Grade: Use rigid PVC conduit.
 - 2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit (RMC) or rigid PVC conduit.
 - 3. Exterior, Embedded Within Concrete: Use rigid PVC conduit.
 - 4. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) where emerging from underground.
 - 5. Where rigid polyvinyl (PVC) conduit larger than 2-inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit (RMC) elbows for bends.
 - 6. Where galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) is installed in direct contact with earth, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection.
- D. Embedded Within Concrete:
 - 1. Within Slab on Grade: Not permitted.
 - 2. Within Slab Above Ground: Use rigid PVC conduit. Embed within structural slabs only where approved by Structural Engineer.
 - 3. Within Concrete Walls Above Ground: Use rigid PVC conduit.
 - 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) or galvanized steel electrical metallic tubing (EMT) where emerging from concrete.
- E. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit (RMC) or galvanized steel electrical metallic tubing (EMT).
- F. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit (RMC) or galvanized steel electrical metallic tubing (EMT).
- G. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit (RMC) or galvanized steel electrical metallic tubing (EMT).
- H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit (RMC) or galvanized steel electrical metallic tubing (EMT).
- I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel intermediate metal conduit (IMC) or galvanized steel electrical metallic tubing (EMT).
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit (RMC).
 - 1. Locations subject to physical damage include, but are not limited to:
 - a. Where exposed below 8 feet, except within electrical and communication rooms or closets.

- K. Exposed, Exterior, Not Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC) or galvanized steel electrical metallic tubing (EMT).
- L. Exposed, Exterior, Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC).
 - 1. Exterior locations subject to severe physical damage include, but are not limited to:
 - a. Where exposed to vehicular traffic below 20 feet.
- M. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT).
- N. Hazardous/Classified Locations: Use galvanized steel rigid metal conduit (RMC).
- O. Flexible Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit (FMC).
 - 1. Maximum Length: 6 feet.
- P. Flexible Connections to Vibrating Equipment:
 - 1. Dry Locations: Use flexible metal conduit (FMC).
 - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
 - 3. Maximum Length: 6 feet unless otherwise indicated.
 - 4. Vibrating equipment includes, but is not limited to:
 - a. Transformers.
 - b. Motors.
- Q. Fished in Existing Walls, Where Necessary: Use flexible metal conduit (FMC) or galvanized steel electrical metallic tubing (EMT).

2.02 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70.
- B. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling mandrel through them.
- C. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for purpose intended.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. Branch Circuits: 3/4-inch trade size.
 - 2. Branch Circuit Homeruns: 3/4-inch trade size.
 - 3. Control Circuits: 3/4-inch trade size.
 - 4. Flexible Connections to Luminaires: 3/8-inch trade size.
 - 5. Underground, Interior: 3/4-inch trade size.
 - 6. Underground, Exterior: 1-inch trade size.
- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 - 2. Nucor Tubular Products: www.nucortubular.com/#sle.

3. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 4. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
1. Manufacturers:
 - a. ABB; T&B: www.electrification.us.abb.com/#sle.
 - b. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.us/#sle.
 - c. Bridgeport Fittings Inc: www.bptfittings.com/#sle.
 - d. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
 3. Hazardous/Classified Locations: Use fittings listed and labeled as complying with UL 1203 for classification of installed location.
 4. Material: Use steel or malleable iron.
 5. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.04 GALVANIZED STEEL INTERMEDIATE METAL CONDUIT (IMC)

- A. Manufacturers:
1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 2. Nucor Tubular Products: www.nucortubular.com/#sle.
 3. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 4. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- C. Fittings:
1. Manufacturers:
 - a. ABB; T&B: www.electrification.us.abb.com/#sle.
 - b. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.us/#sle.
 - c. Bridgeport Fittings, LLC: www.bptfittings.com/#sle.
 - d. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 2. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.
 3. Material: Use steel or malleable iron.
 4. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.05 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers:
1. AFC Cable Systems, a division of Atkore International: www.afcweb.com/#sle.
 2. Electri-Flex Company: www.electriflex.com/#sle.
 3. International Metal Hose: www.metalhose.com/#sle.
- B. Description: NFPA 70, Type FMC standard-wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems.
- C. Fittings:
1. Manufacturers:
 - a. ABB; T&B: www.electrification.us.abb.com/#sle.

- b. Bridgeport Fittings, LLC: www.bptfittings.com/#sle.
 - c. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 3. Material: Use steel or malleable iron.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers:
 1. AFC Cable Systems, a division of Atkore International: www.afcweb.com/#sle.
 2. Electri-Flex Company: www.electriflex.com/#sle.
 3. International Metal Hose: www.metalhose.com/#sle.
- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
 1. Manufacturers:
 - a. ABB; T&B: www.electrification.us.abb.com/#sle.
 - b. Bridgeport Fittings, LLC: www.bptfittings.com/#sle.
 - c. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 3. Material: Use steel or malleable iron.

2.07 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 2. Nucor Tubular Products: www.nucortubular/#sle.
 3. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 4. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
 1. Manufacturers:
 - a. ABB; T&B: www.electrification.us.abb.com/#sle.
 - b. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.us/#sle.
 - c. Bridgeport Fittings, LLC: www.bptfittings.com/#sle.
 - d. Emerson Electric Co; O-Z/Gedney: www.emerson.com/#sle.
 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 3. Material: Use steel or malleable iron.
 4. Connectors and Couplings: Use compression/gland type.
 - a. Do not use indenter type connectors and couplings.

2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:
 1. ABB; Carlon: www.carlon.com/#sle.
 2. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 3. Cantex Inc: www.cantexinc.com/#sle.
 4. Heritage Plastics, a division of Atkore International: www.heritageplastics.com/#sle.

5. JM Eagle: www.jmeagle.com/#sle.
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
 1. Manufacturer: Same as manufacturer of conduit to be connected.
 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.09 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil, 0.020 inch.
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.
- C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- D. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf.
- E. Sealing Compound for Hazardous/Classified Location Sealing Fittings: Listed for use with particular fittings to be installed.
- F. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- G. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.
- H. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.
- I. Duct Bank Spacers: Nonmetallic; designed for maintaining conduit/duct spacing for concrete encasement in open trench installation; suitable for conduit/duct arrangement to be installed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in accordance with NECA 1.
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

- D. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- E. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- F. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conceal conduits unless specifically indicated to be exposed.
 - 4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Mechanical equipment rooms.
 - c. Within joists in areas with no ceiling.
 - 5. Unless otherwise approved, do not route exposed conduits:
 - a. Across floors.
 - b. Across top of parapet walls.
 - c. Across building exterior surfaces.
 - 6. Conduits installed underground or embedded in concrete may be routed in shortest possible manner unless otherwise indicated. Route other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
 - 7. Arrange conduit to maintain adequate headroom, clearances, and access.
 - 8. Arrange conduit to provide no more than equivalent of four 90-degree bends between pull points.
 - 9. Arrange conduit to provide no more than 150 feet between pull points.
 - 10. Route conduits above water and drain piping where possible.
 - 11. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
 - 12. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
 - 13. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters.
 - b. Hot water piping.
 - c. Flues.
 - 14. Group parallel conduits in same area on common rack.
- G. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 26 05 29.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 - 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
 - 5. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 - 6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
 - 7. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
 - 8. Use nonpenetrating rooftop supports to support conduits routed across rooftops, where approved.
 - 9. Use of spring steel conduit clips for support of conduits is not permitted.
 - 10. Use of wire for support of conduits is not permitted.
- H. Connections and Terminations:

1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 3. Use suitable adapters where required to transition from one type of conduit to another.
 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 6. Where spare conduits stub up through concrete floors and are not terminated in box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
 7. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
 8. Secure joints and connections to provide mechanical strength and electrical continuity.
- I. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Seal interior of conduits entering building from underground at first accessible point to prevent entry of moisture and gases.
 6. Provide suitable sealing system where conduits penetrate exterior wall below grade.
 7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 8. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
 9. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 07 84 00.
- J. Underground Installation:
1. Minimum Cover, Unless Otherwise Indicated or Required:
 - a. Underground, Exterior: 24 inches.
 - b. Under Slab on Grade: 12 inches to bottom of slab.
 2. Provide underground warning tape along entire conduit length; see Section 26 05 53.
- K. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):
1. Maximum Conduit Size: 1-inch trade size unless otherwise approved.
 2. Install conduits within middle one third of slab thickness.
 3. Secure conduits to prevent floating or movement during pouring of concrete.
- L. Backfill material: Fluidized thermal backfill with maximum 90 degree C - cm / W thermal resistivity (RHO) at 5% moisture content.
- M. Hazardous/Classified Locations: Where conduits cross boundaries of hazardous/classified locations, provide sealing fittings located as indicated or in accordance with NFPA 70.
- N. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.

2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where conduits are subject to earth movement by settlement or frost.
- O. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at accessible point near penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
 3. Where conduits penetrate coolers or freezers.
- P. Provide pull string in each empty conduit and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- Q. Provide grounding and bonding; see Section 26 05 26.
- R. Identify conduits; see Section 26 05 53.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 05 33.16

BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

1.02 RELATED REQUIREMENTS

- A. Section 08 31 00 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
- B. Section 26 05 29 - Hangers and Supports for Electrical Systems.
- C. Section 26 05 33.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- D. Section 26 05 48 - Vibration and Seismic Controls for Electrical Systems.
- E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 26 27 26 - Wiring Devices:
 - 1. Wall plates.
 - 2. Additional requirements for locating boxes for wiring devices.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices 2016.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable 2014.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports 2013 (Reaffirmed 2020).
- E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports 2013 (Reaffirmed 2020).
- F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 514A - Metallic Outlet Boxes Current Edition, Including All Revisions.
- H. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for floor boxes and underground boxes/enclosures.
- C. Project Record Documents: Record actual locations for pull boxes, floor boxes, and underground boxes/enclosures.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 2. Keys for Lockable Enclosures: Two of each different key.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:

1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.

2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
 4. Use nonmetallic boxes where exposed rigid PVC conduit is used.
 5. Use suitable concrete type boxes where flush-mounted in concrete.
 6. Use suitable masonry type boxes where flush-mounted in masonry walls.
 7. Use raised covers suitable for the type of wall construction and device configuration where required.
 8. Use shallow boxes where required by the type of wall construction.
 9. Do not use "through-wall" boxes designed for access from both sides of wall.
 10. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 11. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 12. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
 13. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 14. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 15. Minimum Box Size, Unless Otherwise Indicated:
 - a. Wiring Devices: 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.
 - b. Ceiling Outlets: 4 inch octagonal or square by 2-1/8 inch deep (100 by 54 mm) trade size.
 16. Wall Plates: Comply with Section 26 27 26.
 17. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com/#sle.
 - c. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com/#sle.
 - d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - e. Thomas & Betts Corporation: www.tnb.com/#sle.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide separate boxes for emergency power and normal power systems.
- E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- H. Box Locations:
 - 1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 31 00 as required where approved by the Architect.
 - 2. Unless dimensioned, box locations indicated are approximate.
 - 3. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 27 26.
 - 4. Locate boxes so that wall plates do not span different building finishes.
 - 5. Locate boxes so that wall plates do not cross masonry joints.
 - 6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
 - 7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
 - 8. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.
 - 9. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 05 33.13.
 - 10. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
 - a. Concealed above accessible suspended ceilings.
 - b. Within joists in areas with no ceiling.
- I. Box Supports:
 - 1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide required seismic controls in accordance with Section 26 05 48.
 - 3. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
 - 4. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
- J. Install boxes plumb and level.
- K. Flush-Mounted Boxes:

1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- L. Install boxes as required to preserve insulation integrity.
- M. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- N. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
- O. Close unused box openings.
- P. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- Q. Provide grounding and bonding in accordance with Section 26 05 26.
- R. Identify boxes in accordance with Section 26 05 53.

3.03 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.04 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Wire and cable markers.

1.02 RELATED REQUIREMENTS

- A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- B. Section 26 27 26 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate or identification label to identify new boxes and wiring devices.
 - a. Panelboards:
 - 1) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
- B. Identification for Conductors and Cables:
 - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
 - 2. Use identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
- C. Identification for Boxes:
 - 1. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
- D. Identification for Devices:
 - 1. Wiring Device and Wallplate Finishes: Comply with Section 26 27 26.

2.02 IDENTIFICATION LABELS

- A. Format for Receptacle Identification:
 - 1. Minimum Size: 3/8 inch by 1.5 inches.
 - 2. Legend: Power source and circuit number or other designation indicated.
 - 3. Text: All capitalized unless otherwise indicated.
 - 4. Minimum Text Height: 3/16 inch.
 - 5. Color: Black text on clear background.

2.03 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: 1/8 inch.
- F. Color: Black text on white background unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Boxes: Outside face of cover.
 - 2. Conductors and Cables: Legible from the point of access.
 - 3. Devices: Outside face of cover.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- E. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

SECTION 26 24 06

NEW OVERCURRENT DEVICES IN EXISTING EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE

- A. This section covers the installation of new short-circuit over-current protective devices in existing equipment.

1.02 DESCRIPTION OF WORK

- A. Provide new over-current protective devices, hardware and associated components as required for a complete installation in existing switchboards and panelboards as indicated on the plans.

PART 2 - PRODUCTS

2.01 AVAILABILITY OF DEVICES

- A. Where a device is obsolete and the manufacturer does not offer an equivalent replacement device, provide written notice to the Architect.
- B. New device voltage and fault current interrupting ratings (SCCR) shall equal, or exceed, existing switchboard or panelboard ratings unless otherwise noted elsewhere in the specification or on the drawings.

2.02 HARDWARE

- A. Bus bars, draw-out and plug-in assemblies, connectors, adapters, lugs, and other hardware shall be of the same type and manufacture as existing equipment.
- B. New closure panels and doors shall match existing equipment.

PART 3 - EXECUTION

3.01 Extend, modify, brace and install all new busing to match existing busing.

- A. All hardware, doors, panels and closure plates shall be mounted in alignment with existing equipment.
- B. Provide new typewritten directory in branch circuit lighting and receptacle panelboards where circuits have been modified under this scope of work.

END OF SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.01 SCOPE

- A. This section describes receptacles, faceplates, and other wiring devices.
- B. Outlet boxes are specified in another section.

1.02 STANDARDS

- A. All devices shall be UL labeled.
- B. All devices shall meet applicable NEMA wiring device standards.
- C. All special-purpose receptacles shall be NEMA Standard configuration.

1.03 SUBMITTAL DOCUMENTS

- A. Submit manufacturer catalog cut sheets of wiring devices specified in this section.

1.04 OPERATION AND MAINTENANCE MANUAL

- A. Provide record copy of device submittal incorporated into the project O&M Manuals.

PART 2 - PRODUCTS

2.01 MANUFACTURE

- A. Switches, receptacles, plates:
 - 1. Arrow-Hart
 - 2. Bryant
 - 3. Hubbell
 - 4. P&S/LeGrand

2.02 DESCRIPTION

- A. The color of all devices shall be selected by the Architect.
- B. Receptacles:
 - 1. Duplex receptacles shall be commercial specification grade 125 volt, 20 amp, 3-wire grounding, nylon face, with self-grounding attachment, with ground bonding screw terminal, Hubbell #BR20 Series, back wired using screw and clamp.
 - 2. Individual duplex receptacles on separate 20 Amp circuits shall be rated 20 Amp.
 - 3. Special purpose receptacles shall be of NEMA type indicated, heavy-duty, with nylon face where available.
 - 4. G.F.C.I. Type receptacles shall be rated 20 Amp, Hubbell #GF20 Series.
- C. Device plates/covers for exterior exposed outlets:

1. Weatherproof, heavy-duty cast aluminum, "in-use" type where required by the location to be applied, Hubbell #WPxxx Series, or cast iron for FS/FD box mounting.
2. Weatherproof receptacle covers shall be suitable for the specific application.

PART 3 - EXECUTION

3.01 GENERAL

- A. Refer to Section 26 0535, BOXES, for outlet box requirements.
- B. All devices shall be installed in appropriate boxes designed for the purpose, in accordance with manufacturer's directions.

3.02 INSTALLATION

- A. Locations, unless otherwise required by local codes or noted on the drawings (dimensions in center):
 1. Receptacles: 1 ft. 6 in. above finished floor, except where indicated above a countertop.
- B. Grounding: Provide AWG 12, green color, insulated copper ground bonding jumpers for all switches and receptacles, bonded to the grounding screw provision within the box with separate grounding screw or lug.
- C. Device Labeling (applies to branch circuit devices wiring outlets under this section):
 1. Provide adhesive backed label on each receptacle device outlet coverplate indicating panelboard served from and circuit number (i.e.: L-6).
 2. Labels shall be made on 3/8" or 1/2" inch stock, black color letters with clear background.
 3. Label system shall be Brother "P-Touch" System or equivalent.
 4. Labels shall not be applied until final touch-up painting is complete and covers are permanently mounted.
 5. Provide labels using a black permanent marking pen on each associated receptacle box and switch box indicating panelboard number and circuit number.

END OF SECTION

SECTION 26 50 00

LIGHTING

PART 1 - GENERAL

1.01 SCOPE

- A. Lighting fixtures and associated equipment.

1.02 STANDARDS

- A. All material shall bear the label of the Underwriters Laboratories, Inc.

1.03 VOLTAGE

- A. Fixture voltage is indicated by circuit in which it is connected. Contractor shall determine fixture voltage from drawings.

1.04 CEILING INTERFACE

- A. Specific catalog numbers shown for fixtures do not necessarily describe all mounting hardware or accessories required for a particular installation. Determine ceiling types from the finish schedule specified under another division, and furnish all required materials for a complete and proper installation. Provide plaster frames for wet plaster or stucco ceilings.

1.05 SUBMITTAL

- A. Furnish a bill of material cover sheet and original data sheet, combined into binder, describing each fixture type. If a catalog page describes more than one fixture, the page shall be appropriately marked identifying the exact item being submitted. Photometric data shall be submitted for each fixture type that has a reflector or lens for directing the light output. Drawings larger than 8 ½ x 14 shall be submitted in 8 ½ x 11 envelopes bound into the submittal brochure.
- B. Point by point plot on a scaled drawing to indicate the foot-candle performance of all interior and exterior fixtures.
- C. Where equivalent manufacturers for lighting fixtures are not indicated or scheduled, the specified manufacturer's fixture shall be provided.

1.06 OPERATING and MAINTENANCE MANUAL

- A. Provide record copy of submittal documents.
- B. Bind all information together with other Division 26000 manuals.

PART 2 - PRODUCTS

2.01 LUMINAIRES

- A. LED Luminaires
 1. UL or ETL Listed and labeled.
 2. Minimum 80 CRI.

3. Tested to LM-79 and LM-80 standards minimum.
4. Lumen maintenance: 70% lumen output for 50,000 hours
5. Efficacy: minimum 60 lumens/watt
6. Constructed such that the LED modules may be replaced or repaired without replacement of the entire fixture.
7. Power Factor: 0.9
8. Manufacturer of LED systems shall utilize an advanced production LED binning process to maintain color consistency. All LED individual fixture types must be shipped at the same time and stored on site to ensure that products have been produced from the same bin. Tolerances greater than 200K will not be acceptable
9. For exterior application, all white LED's shall have a color temperature of 70 and above.
10. Fixtures used on the exterior building facades shall have a minimum IP65 rating. All LED fixtures and power/data supplies shall be provided by a single manufacturer to ensure compatibility.
11. All LED fixtures (100% of each lot) shall undergo a minimum eight hour burn in test during manufacturing.
12. All LEDs used in the LED fixture shall be high brightness and proven quality from established and reputable LED manufacturers in business for greater than 5 years.
13. Manufacturer shall provide optical performance, polar diagrams, and relevant luminance and illuminance photometric data based on test results from an independent testing lab.
14. White LED sources must meet the following requirements:
 - a. Luminaires must be rated for -40°C to +50°C operation
 - b. Duv tolerance of 0.001 ± 0.006
15. Luminaire manufacturer must submit reliability reports indicating that the manufacturer of the LED (chip, diode, or package) has performed JEDEC (Joint Electron Devices Engineering Council) reliability tests on the LEDs as follows:
 - a. High Temperature Operating Life (HTOL)
 - b. Room Temperature Operating Life (RTOL)
 - c. Low Temperature Operating Life (LTOL)
 - d. Powered Temperature Cycle (PTMCL)
 - e. Non Operating Thermal Shock (TMSK)
 - f. Mechanical shock
 - g. Variable vibration frequency
 - h. Solder Heat Resistance (SHR)
16. Electronic driver for LED fixtures shall comply with UL 1310 Class 2 requirements for dry and damp locations. include the following:
 - a. Rated for 50,000 hours of life
 - b. Sound Rating: Class A
 - c. Total Harmonic Distortion: 15% or less
 - d. Current Crest Facto: 1.5 or less
 - e. 0-10V Dimming

2.02 FIXTURE TYPES:

- A. As scheduled on the drawings.

2.03 ACCESSORIES:

- A. Provide fixtures with onboard accessories as indicated on the drawings. Accessories may include integral occupancy sensors and/or integral photocells.

PART 3 - EXECUTION

3.01 LOCATION

- A. The exact location of all fixtures in finished areas shall be as shown on the reflected ceiling plans. If the location shown on the reflected ceiling plan for a fixture differs from the location shown on the electrical plans, the fixture shall be installed as shown on the reflected ceiling plan.

3.02 SUPPORTS AND ANCHORS

- A. Refer to Section 26 05 29 - Hangers and Supports for Electrical Equipment for additional support requirements.
- B. Fixtures shall not be supported from ducts or piping of other trades.
- C. Suspended Luminaires: Provide minimum of two supports for each luminaire equal to or exceeding 4 feet nominal length, with no more than 4 feet between supports.
- D. Hardware and unpainted metal used for mounting of exterior fixtures shall be electrogalvanized.
- E. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.03 OCCUPANCY BASED LIGHTING CONTROLS COMMISSIONING

- A. Upon completion of the installation, the system shall be completely commissioned by the manufacturer's factory authorized technician who will verify all adjustments and sensor placement to ensure a trouble-free occupancy-based lighting control system.
- B. The manufacturer's factory authorized technician shall, upon completion of the commissioning, provide a written report to the Contractor, Design Professional, Commissioning Agent, and Project Manager indicating completion of the work. This report shall also indicate any correction actions required on the part of the contractor.

3.04 ACCEPTANCE

- A. Adjust locations of fixtures shown in mechanical equipment rooms to best suit the actual conditions based on final placement of equipment of other trades. Install in a manner and location to obtain optimum illumination.
- B. Target and focus adjustable fixtures in the presence of the Architect.
- C. All fixture trims shall be free of light leaks as viewed from the occupied space. Suitably seal around trims to eliminate any light leakage around downlight trims and fluorescent fixtures. Louvers and lens shall be clean and free from fingerprints, dust, and physical damage.

END OF SECTION

SECTION 31 11 00

CLEARING AND PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This section covers the following:
 - 1. Clearing and removal and disposal of items.
 - 2. Protection of existing items
- B. Related Work Specified Elsewhere:
 - 1. Refer to all sections in Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.
 - 2. Site excavating, filling, disposal of surplus earth and debris and finishing grading is covered in Section 31 23 00, EARTHWORK.

1.02 JOB CONDITIONS

- A. Condition of Premises:
 - 1. Accept the premises as found and clear the site as specified. The Owner assumes no responsibility for condition of site nor continuation in condition existing at time of proposal or thereafter. Assume risk regarding damage or loss, whether by reason of fire, theft, or other casualty or happening.
 - 2. Assume all risk for downstream adjoiners from damage due to erosion, sediment or pollution.
- B. Protection:
 - 1. Existing Vegetation. Thoroughly protect from damage, existing individual trees, groups of trees, shrubbery, lawns and other vegetation to remain. Replace at no cost to the Owner, any trees, shrubs or sod in the same quantity and size as existing to remain which are severely damaged or destroyed.
 - 2. Public and Property. Accomplish all Work in a manner that provides for the safety of the public and all workmen and provide for the protection of all property.
 - 3. Protect all downstream adjoiners from erosion, sediment and pollution.
 - 4. Contact the Utility Protection at (811) in ample time to have all existing utilities located. Field verify the horizontal and vertical location of all utilities prior to construction operations. Protect all utilities from damage or interruption. Contractor is solely responsible for any damages occasioned due to his failure to verify the location or protection of utilities.
 - 5. Bench Marks and Monuments: Maintain carefully all benchmarks, monuments and other reference points. If disturbed or destroyed, replace as directed, at no additional cost to the Owner. If found at variance with the drawings, notify the Architect immediately prior to continuing with construction activities.
 - 6. Fill material placed against drainage structures or back-filled around utility pipes shall be placed and compacted by methods which will not cause any damage. Any damage which does occur shall be repaired or replaced by the Contractor at no additional cost to the Owner.
 - 7. Protection of Existing Work Remaining: All existing curbs, sidewalks, buildings, utilities, and paving damaged in performance of this work shall be restored without extra cost to the Owner.

8. Graded Areas: Any settlement or washing that occurs prior to acceptance of the work shall be repaired and grades re-established to the required elevations and slopes. Fill to required subgrade levels any areas where settlement occurs.

C. Access:

1. Maintain vehicular access throughout the duration of the project to all adjacent or nearby properties.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.01 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A. Clearing:

1. Removal. Remove all cleared materials completely away from the site. Do not store or permit debris to accumulate on the site. If the Contractor fails to remove excess debris promptly, the Owner reserves the right to cause same to be removed at Contractor's expense.
 - a. Remove all temporary structures when they are no longer required.
 - b. Legally dispose of all items removed from site.

END OF SECTION 31 11 00

SECTION 31 22 00

GRADING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 DESCRIPTION OF WORK

- A. This Section covers excavation, fill, disposal of surplus earth and debris, finished grading and rock.
- B. Related Work Specified Elsewhere:
 - 1. Division 02, Section Demolition.
 - 2. Division 31, Section Clearing and Grubbing.
 - 3. Division 31, Section Erosion and Sedimentation Control.

1.03 QUALITY ASSURANCE

- A. Workmanship:
 - 1. Perform all Work in accordance with requirements of the Drawings and Specifications and in a manner which will insure reasonable accuracy in preserving lines and levels shown.
- B. Tests:
 - 1. Sufficient tests to ascertain that the specified density is being obtained, throughout the fill and backfill, will be made by a Geotechnical Engineer selected by the Owner and paid by the Owner.
- C. Observations & Instruction:
 - 1. Removal of unsuitable material shall be made at the direction and under the observation of the Geotechnical Engineer.
- D. Conform to applicable Local, State and Federal (OSHA) rules and regulations.
- E. A Georgia Registered Land Surveyor will lay out all work and survey and maintain all property lines and bench marks throughout construction.

1.04 SUBMITTALS

- A. General: Submittals shall be in accordance with Specification Section 01 33 00.
- B. Contractor shall submit a detailed time schedule of all earthwork operations to the Architect/ Geotechnical Engineer for review prior to commencing work.
- C. Any deviations from earthwork design concept shall be represented by the submittal of detailed engineered Shop Drawings which clearly illustrate the intent and scope of said deviation(s) for review and approval prior to proceeding with same.

1.05 NOTIFICATION

- A. Contractor shall notify Architect/Geotechnical Engineer 24 hours prior to commencing grading, excavation, land clearing and removal operations.
- B. Contractor shall notify all utilities in ample time for necessary measures to be taken to prevent interruption of service when utility lines which are to be removed, relocated and/or severed are encountered.

1.06 JOB CONDITIONS

- A. Contractor shall survey and establish all property lines, property documentation, clearing boundaries, and existing grades and lay out grade stakes for structures and appurtenances. If existing grades are at variance with Drawings, Contractor shall promptly notify Architect and receive instructions prior to proceeding further with the Work. Contractor shall be fully responsible for conditions resulting from his failure to do so. Contractor shall utilize a Registered Land Surveyor currently registered to practice land surveying in the State of Georgia.
- B. Contractor, upon becoming aware of subsurface or latent physically changed conditions, shall promptly notify Owner and the Architect verbally to permit verification of the conditions, and follow immediately in writing to describe the nature and extent of the differing conditions. No claim by Contractor for any conditions differing from those anticipated in the Drawings and Specifications shall be allowed, unless Contractor has so notified Owner, verbally and in writing, as required above, of such changed conditions.
- D. Contractor is solely responsible for all earth quantities and to render the finished grade elevations of the Project as indicated on the Drawings. Exportation (i.e. "haul off") of "excess" soil materials to achieve final design grade shall be included in the Contract Sum export of unsuitable materials at the direction of Geotechnical Engineer will be compensated at the unit price allowance in the Bid Form.
- E. Environmental Requirements:
 - 1. Burning. No burning of waste from clearing or grubbing will be permitted.
 - 2. Newly Graded Areas. Take every precaution and temporary measure necessary, such as temporary seeding, to prevent damage from erosion of freshly graded areas. Repair any settlement or washing that may occur prior to completion of the work and re-establish the grades to the required elevations and slopes at no additional cost to the Owner. This shall apply to damage to the newly graded areas within the construction limits and damage to adjacent properties by eroded materials.
 - 3. Any underground utilities found to exist within the earthwork and not shown on the Drawings shall be removed and/or relocated in accordance with the General Requirements.
- F. Utility Location:
 - 1. Notify all utility companies by calling the Utility Protection Center at 811 in ample time for necessary measures to be taken to prevent interruption of service when utility lines which are to be removed are encountered.
 - 2. Move, relocate, reroute any and all said utilities, poles, guys, appliances or appurtenances as required or coordinate said relocation as part of the base bid.
- G. Protection:
 - 1. Trees.
 - a. General Protection. The Contractor shall be responsible for the protection of tops, trunks and roots of existing trees on project site that are to remain. Box, fence or protect existing trees subject to construction damage before any work is started,

remove boxing when directed. Do not permit heavy equipment or stockpiles within branch spread. Remove interfering branches without injury to trunks and cover scars with tree paint.

- b. Grading Around Trees. Where excavating, fill or grading is required within the branch spread of trees that are to remain, the Work shall be performed as follows:
- (1) Trenching. When trenching occurs around trees to remain, do not cut the tree roots but tunnel the trench under or around the roots by careful hand digging and without injury to the roots.
 - (2) Raising Grades. When the existing grade at tree is below the new finished grade, and fill not exceeding 6 inches is required, place clean washed gravel graded from 1 to 2 inch size directly around the tree trunk. The gravel shall extend out from trunk on all sides a minimum of 18 inches and finish approximately 2 inches above the finished grade at tree. Install gravel before any earth fill is placed. New earth fill shall not be left in contact with the trunks of any trees requiring fill.
 - (3) Trees marked for preservation that are buried in fills over 6 inches deep shall have an open dry well of durable masonry (without mortar) situated at least 12 inches from the tree trunk. Drain all wells properly. Before fills of over 6 inches are made upon the tree root areas, spread at least a 6 inch layer of broken stone or coarse gravel covered by inverted sods to facilitate proper drainage and aeration.
 - (4) Lowering Grades. Under the drip-line of existing trees in areas where the new finished grade is to be lowered, regrading Work shall be done by hand to elevation as indicated. Cut roots as required cleanly 3 inches below finished grade and cover scars with tree paint.
 - (5) Trees marked for preservation that are located more than 6 inches above proposed grades shall stand on broad rounded mounds and be graded smoothly into the lower level. Cut exposed or broken roots clean and cover with topsoil.

- H. Maintain vehicular access to all properties nearby and adjacent throughout the duration of the Project.
- I. Contractor shall provide dewatering and drainage as required to accomplish the Work. No excavation may proceed until a suitable dewatering plan has been provided and approved by the Architect/Geotechnical Engineer and the Owner. Contractor shall take care to ensure that ponding of water does not occur. In the event that ponding of water does occur, Contractor shall immediately take the necessary measures to eliminate said ponding. Submit dewatering procedures to Architect for review. All dewatering shall be included in the Contract Sum.
- J. All expenses related to removal, relocation, replacement and/or rerouting of any and all existing utilities or other built, stored, stockpiled items of any kind, surface or subsurface is the responsibility of Contractor and shall be included in the Contract Sum.

PART 2 – PRODUCTS

2.01 TOPSOIL

- A. Topsoil shall consist of local, fertile, friable, natural soil of loamy character, free of clay lumps, stones in excess of 3" in greatest dimension, typical of project locality, and containing no chemicals harmful to plant growth.

2.02 UNSUITABLE SOIL

- A. Unsuitable soil materials shall consist of materials not capable of being compacted to density required; rock, debris and organic material including muck, which is a wet organic material which cannot

support rolling or light trawler tractor type of equipment and requires removal by power shovels or draglines; or material otherwise identified, classified and quantified as unsuitable by the Geotechnical Engineer.

- B. Non-organic materials are considered as unsuitable include non-organic debris not capable of being compacted to density required including, but not limited to, metal objects such as appliances, metal fencing, tires, etc.
- C. Wet soil is not considered unsuitable soil; Contractor must dry wet soil out to render it usable and must be capable of being compacted to the density requirements.
- D. Suitability of materials encountered on site relates only to the utility of said materials within the context of this project, on the subject site. Suitability to be determined by the Geotechnical Engineer.

2.03 FILL

- A. Suitable fill material shall consist of local, clean, non-active, organic free subsoil, free from debris, roots, topsoil, frozen material and rock fragments equal to or less than 3". In areas of massive fills or disposal pits, the Geotechnical Engineer shall determine the maximum size of rock. The soil should exhibit a plasticity index of 30 or less and a dry unit weight of at least 90 pcf. Residual material to be used as fill material shall be tested and approved by Geotechnical Engineer for degree of compaction specified for its intended use.
- B. For fill soils to be imported, the Contractor is responsible to provide samples of same for laboratory testing by the Geotechnical Engineer to determine moisture/density relationship (Proctor value). Additionally, the Contractor shall identify the location of any "borrow pits" so that the Geotechnical Engineer may inspect same to determine suitability of the general soils which the Contractor intends to import to the project site.

2.04 GRAVEL

- A. Gravel fill shall consist of crushed stone or gravel, graded so that 100% passes 1-1/2" sieve, meeting ASTM C33 specification for #57 stone.

2.05 CRUSHED STONE (CRUSHER RUN)

- A. Crushed stone shall consist of sound durable particles of crusher run rock, passing a two inch sieve and not more than seven percent passing a No. 200 sieve and free from unsuitable materials.

2.06 GRANULAR BEDDING

- A. Granular bedding and backfill material shall consist of a granular soil, sand, chert, crushed stone or mixture of these, all of which passes a 3/4 inch sieve, 80% passing a 3/8 inch sieve and not more than 12% passing a No. 200 sieve. Material shall be free of organic matter and debris.

2.07 ROCK

- A. Rock consists of three (3) types: Rippable Weathered Rock, Mass Rock and Trench Rock. Rippable Weathered Rock is part of the Work and shall be included in the Contract Sum. Mass Rock and Trench Rock removal are not included in this Contract. If Mass Rock and Trench Rock are encountered, Contractor shall stop work and notify Owner and Architect immediately. All rock shall be classified, qualified and quantified by Geotechnical Engineer.

- 1. Rippable Weathered Rock is defined as residual material having a volume greater than one cubic yard that, in the opinion of the Geotechnical Engineer, can be effectively plowed,

- spaded, or removed with power driven excavating equipment having been first loosened with a track-mounted bulldozer equipped with a ripper shank.
2. Mass Rock and Trench Rock are defined as residual material having a volume greater than 1 cubic yard for mass excavation or $\frac{3}{4}$ cubic yard for trench or pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, or blasting.
 - a. Mass Rock – Mass Excavation: Late-model, track mounted bulldozer equipped with single-tooth ripper shank; rated at not less than 230 HP flywheel power and developing a min. of 50,000-lbf pryout force; measured according to SAEJ-732.
 - b. Trench Rock – Excavation of Trenches and Pits: Late-model., track-mounted hydraulic excavator; equipped with a 42-inch wide, short-tip-radius rock bucket; rated at not less than 120-hp flywheel power with bucket-curling force of not less than 25,000 lbf and stick-crown force of not less than 18,700 lbf; measures according to SAEJ-1179.

PART 3 – EXECUTION

3.01 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

A. Grading.

1. When fills are to be constructed over cultivated or fallowed land, the entire area upon which the fill is to be constructed shall first be cleared of vegetation and then smoothed with a blade grader. When fills are to be constructed over sodded surfaces, strip the sod to a depth of 2 inches. Then roll these smoothed or stripped surfaces to the specified density required for fill prior to the fill material placement. Dispose of stripped material as waste and completely remove from the site.
2. Conservation of Topsoil. Excavate the topsoil as necessary to reach underlying non-organic soils and spread on areas already graded and prepared for topsoil or deposit in storage piles convenient to the areas which are subsequently to receive application of topsoil. All landscape areas to receive 4 inches of topsoil. Stockpile topsoil free of roots, stones and other undesirable material. Keep topsoil, when stored, separate from other excavated materials. Cover storage piles as required to prevent wind blown dust. Topsoil stockpiles are to be contained with at least one row of type 'A' silt fence and are to be seeded and mulched to prevent erosion.
3. Proofrolling. After the site has been properly drained, and all organic surface soils have been removed, the site shall be inspected by a Geotechnical Engineer and proofrolled at that time. Proofrolling shall consist of several overlapping passes of a loaded 25 ton dump truck. The purposes of the proofrolling will be to detect any areas where soft or unstable soils are present, as well as to improve the density of the loose near-surface soils. Proofrolling shall be performed in the presence of the Geotechnical Engineer who can observe any areas where remedial action may be required. Any soft or yielding area shall be thoroughly undercut and replaced with structural fill compacted to meet the requirements of the area being undercut as directed by a Geotechnical Engineer. The groundwater level should be maintained at a depth of at least 2 feet below the depth of vibratory rolling operations. This work should be anticipated. A minimum of four complete overlapping passes shall be made in each of two perpendicular directions.
4. Excavation. Perform excavation of material of every description and of whatever substances encountered within the grading limits of the project to the lines and grades indicated on the Drawings. Any material excavated that is not required to achieve final grade elevations shall be considered excess and is the responsibility of the Contractor. Perform excavation and filling in a manner and sequence that will provide drainage at all times.
 - a. Rock: If rock is encountered, as described in Article 2.7, clear away earth and expose materials. Notify Architect/Geotechnical Engineer and receive written instructions prior to excavations. Geotechnical Engineer shall identify, qualify and

- verify quantity and extent of rock to be excavated. Only rock excavation done in accordance with Architect/Geotechnical Engineer's instructions will be paid for by Owner in accordance with Specifications. Contractor shall remove rock in accordance with the following:
- i. To a depth of six inches (6") below proposed sidewalks and pavement.
 - ii. Twenty four inches (24") on each side of and below footings.
 - iii. Six inches (6") below and eight inches (8") to each side, conduits, ducts and pipes installed in utility trenches, with minimum width of thirty six inches (36").
 - iv. Twelve inches (12") below finished design level in areas to receive landscaping and seeding.
- b. Suitable Soils: Transport to and place all suitable excavated material in the fill areas within the limits of the work as specified and as shown on the Drawings.
 - c. Unsuitable Material: If unsuitable materials are encountered, notify Architect/Geotechnical Engineer and receive written instructions prior to excavations. Geotechnical Engineer shall identify, qualify and verify quantity and extent of unsuitable materials to be removed. Only unsuitable materials excavation done in accordance with Architect/Geotechnical Engineer's instructions will be paid for by Owner in accordance with Specification Section 01 27 00 Unit Prices of the Contract.
5. Preparation of Ground Surface for Fill. Sloped ground surfaces steeper than 5 to 1 upon which fill is to be placed shall be plowed, stepped or broken up in such a manner that fill material will bond with the existing surfaces. Wet and compact prepared surfaces as specified.
 6. Fills. Construct fills at the locations and to the lines and grades indicated on the Drawings. Make sure that the completed fill corresponds to the shapes shown on the Drawings or meets the requirements of the particular case. Use all suitable material removed from the excavation in forming the necessary fill. All fill material shall be reasonably free from logs, stumps, sod, weeds, or other perishable material, trash, frozen material and from all stones having a maximum dimension greater than 6 inches. No stones shall be permitted in the top 12 inches of fills. Place the material in successive horizontal layers to a depth that will allow required compaction to be achieved throughout the full depth of the lift and in no case exceeding 12 inches in loose depth. Keep fill material spread uniformly. Remove any soft sections, and fill holes or depressions to required grades with approved material and shape the entire area to line, grade, and cross section and thoroughly compact as specified. The Contractor is responsible for adjustment of the moisture content of the fill material if necessary so that the specified compaction can be obtained. The rough grade for the entire site or portion thereof shall be approved by the Architect before placement of any topsoil.
 - a. Subgrade Preparation. Shape, dress, moisten and compact as specified subgrades for all drives, parking areas, sidewalks and other structures. Test the subgrade for crown, elevation and density in advance of placing pavement.
 - b. Spreading of Topsoil. Upon completion of rough grading, spread the stockpiled topsoil for a uniform depth of 4 inches, after settlement, over all areas graded under this Contract not receiving other surfacing, just prior to the seeding or landscaping operation. Before spreading the topsoil, scarify the graded areas for a depth of 3 inches and repair all settlements and washes.
 7. Finished Grading. Accomplish uniformly smooth grading of all areas covered by the Project, including excavated and filled sections and adjacent transition areas so that the finished surface is smooth, compacted and free from irregular surfaces changes. The degree of finish shall be that ordinarily obtainable from blade-grader operations except as otherwise specified. The finished surface shall be not more than 2 inches above or below the established grade or approved cross section. Finish all swales so as to drain readily.
 8. Backfill material shall be the same as specified for fill and shall be placed and compacted as specified for fill unless otherwise noted.
 9. Granular Fill.

- a. Construct granular fill material when called for on the Drawings on the previously prepared subgrade to the lines and grades and thicknesses and dimensions shown on the Drawings.
 - b. Place and spread materials on previously prepared subgrade that has been moistened sufficiently to prevent moisture loss in foundation materials but not enough to cause soft spots. Place sufficient material so that when spread, struck off by an approved template and compacted as required herein, the resulting granular fill shall be of the required thickness and shape.
 - c. After compaction, check the surface with template and straightedge and correct and recompact all high or low spots.
10. Blasting will not be allowed on this project.

3.02 FIELD QUALITY CONTROL

A. Compaction.

- 1. Compact each layer of fill by rolling with approved rollers to at least the following percentages of maximum density at a moisture content no less than 3 percent above to 3 percent below optimum moisture as determined by ASTM D 698.

MINIMUM PERCENT OF MAXIMUM DENSITY

<u>Material</u>	<u>Percent</u>
Fill	95% of Standard Proctor
Subgrade – top 24 inches beneath pavements, slabs and footings	98% of Standard Proctor

- 2. In cut sections, compact top 12 inches of subgrade under pavements and top 6 inches of subgrade under sidewalks to the same density as required for fill hereinbefore.
- 3. Crushed stone is to be placed in maximum 18” lifts and consolidated with hand compaction equipment.

B. Testing. A Geotechnical Engineer selected and compensated by the Owner shall make the following tests:

- 1. Soil compaction testing frequencies as follows:
 - a. (1) test per 2’ depth per 2000 sf. Under footings.
 - b. (1) test per 2’ depth per 5000 sf. under paved areas.
 - c. (1) test per 2’ depth per 10000 sf. elsewhere.
 - d. (1) test per 2’ depth per 50 lf. of trench backfill.

END OF SECTION 31 22 00

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROL

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.02 SCOPE

A. Submittals and Permits:

1. General: Submittals shall be in accordance with Division 1, Section “Submittals”.
2. The Owner will obtain Land Disturbance Permits from the appropriate authority and shall pay any fees for said permits. All fines imposed for improper erosion, sedimentation and pollution control shall be paid by the Contractor.
3. Land disturbance activity shall not commence until the Land Disturbance Permit is issued.
4. Submit with the required Schedule of Values a monthly monetary figure for maintenance of all erosion, sediment and erosion controls and Best Management Practices (BMP’s) controls.
5. Include within the overall project schedule all erosion, sediment and pollution control operations. Illustrate understanding that all said measures are to be continuously maintained throughout the duration of the project until vegetation is stabilized and all sources of pollution are rendered non-active.
6. All replacement of measures as operations progress or are sequenced are part of the scope of this contract.
7. The Contractor shall adhere to all NPDES measures and requirements.
8. The extent of all erosion, sediment, and pollution control measures are the Contractor’s responsibility.

B. Basic Principles:

1. Contain all erosion, sediment and pollution on the project sites.
2. Conduct the earthwork and excavation activities in such a manner to fit the topography, soil type and condition.
3. Minimize the disturbed area and the duration of exposure to erosive elements.
4. Stabilize disturbed areas immediately.
5. Safely convey run-off from the site to an outlet such that erosion will not be increased off site.
6. Do not encroach upon watercourses or any downstream properties.
7. Hold and treat the first one inch (1") of rainfall for pollutants such as, but not limited to, petroleum and heavy metals through the effective use of Best Management Practices (BMP’s).
8. Install and/or replace erosion, sediment and pollution control measures concurrent with or prior to any land disturbance activities.

C. Temporary Erosion and Sedimentation Control: In general, temporary erosion and sedimentation control procedures shall be directed toward:

1. Preventing soil erosion at the source.
2. Preventing silt and sediment from entering any waterway if soil erosion cannot be prevented.
3. Preventing silt and sediment from migrating downstream in the event it cannot be prevented from entering the waterway.

- D. Permanent Erosion Control: Permanent vegetative cover shall be established on all non-paved disturbed areas and permanent erosion control measures shall be implemented to prevent sedimentation of the waterways and to prevent erosion of the Project site.

1.03 QUALITY ASSURANCE

- A. General: Perform all work under this Section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated herein and these Specifications.
- B. All work shall conform to the “Manual for Erosion and Sediment Control in Georgia published by the Georgia Soil and Water Conservation Commission.
- C. Acquire a copy of “Field Manual for Erosion and Sediment Control in Georgia, Vegetation and Structural Best Management Practices (BMP’s) for Land Disturbing Activities” as published by the Georgia Soil and Water Commission, latest edition.
- D. Conflicts: Where provisions of pertinent rules and regulations conflict with these Specifications, the more stringent provisions shall govern.

PART 2 – PRODUCTS

2.01 TEMPORARY EROSION AND SEDIMENTATION CONTROL MATERIALS

- A. Silt Fence: Silt fence shall meet the requirements of Section 171 - Temporary Silt Fence of the Department of Transportation, State of Georgia, Standard Specification, latest edition. Silt fence fabric must be on the Georgia DOT qualified Product List.
- B. Erosion Control Blanket:
 - 1. Slopes > 3:1 (33% or greater) as shown on the Drawings
 - a. Biodegradable netting impregnated with excelsior woodfiber such as manufactured by “Curlex”.
 - b. “Ero-Mat” by Verdyol
 - c. “Bon Terra CS2” (slopes > 3:1)
 - d. Or Equal as approved by Architect or Architect’s engineer
 - 2. Slopes < 3:1 (33% of less) as shown on the Drawings
 - a. “Bon Terra CS1”
- C. Filter stone shall be crushed stone conforming to Georgia Department of Transportation Table 800.01H, Size Number 3.
- D. Colloidal Polymer applied as a liquid such as silt stop APS 600 series as manufactured by Applied Polymer Systems, Norcross, GA or approved equal.
- E. Colloidal Polymer applied in a dry form such as Silt Stop 700 Series as manufactured by Applied Polymer Systems, Norcross, GA or approved equal.

2.02 RIP RAP

- A. Stone Rip Rap: Use sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Specific gravity shall be 2.0 or greater. Rip rap shall have less than 66 percent wear when tested in accordance with AASHTO T-96. Unless shown or specified otherwise, stone rip rap shall be Type 3 rip rap.

1. Type 1 Rip Rap: The largest pieces shall have a maximum volume of two cubic feet. At least 35 percent of the mass shall be comprised of pieces which weigh 125 pounds or more. The remainder shall be well graded down to the finest sizes. Rock fines shall comprise a maximum of 10 percent of the total mass. Rock fines are defined as material passing a No. 4 sieve. Rip rap size shall conform to Georgia Department of Transportation Section 805.01 Stone Dumped Rip Rap, Type 1.

2.03 FILTER FABRIC

- A. The filter fabric for use under rip rap shall be a monofilament, polypropylene woven fabric meeting the specifications as established by Task Force 25 for the Federal Highway Administration. The filter fabric shall have an equivalent opening size (EOS) of 70.
- B. Filter fabric under rip rap shall be equal to Mirafi, Amoco or Exxon.
- C. Filter fabric shall not be used under rip rap at stream crossings.

2.04 CONCRETE

- A. Concrete shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches. Ready-mixed concrete shall be mixed and transported in accordance with ASTM C 94. Reinforcing steel shall conform to the requirements of ASTM A 615, Grade 60.
- B. Provide a concrete mix design for job mixed concrete for the Architect's approval.

PART 3 – EXECUTION

3.01 GENERAL

- A. Standards: Provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Georgia Erosion and Sedimentation Act of 1975 as amended in 1989, local enforcing agency guidelines and these Specifications.
- B. Implementation: The work shown on the Drawings shall be considered a minimum requirement. What is shown does not relieve the Contractor of the responsibility to actively take all steps necessary to control soil erosion, sedimentation and pollution.

3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Temporary erosion and sedimentation control procedures should be initially directed toward preventing silt and sediment from departing the site boundaries or enter any drainage ways.
- B. Silt dams, silt fences, traps, barriers, rock, check dams, appurtenances and other temporary measures and devices shall be installed as indicated on the Drawings, shall be maintained until no longer needed, and shall then be removed. Deteriorated hay bales and dislodged filter stone shall be replaced with new materials.
- C. Where permanent grassing is not appropriate, and where the Contractor's temporary erosion and sediment control practices are inadequate, the Architect may direct the Contractor to provide temporary vegetative cover. Such temporary vegetative cover shall be provided by the Contractor in accordance with the Vegetative Schedules shown on the Drawings.

- D. All erosion and sedimentation control devices, including check dams, shall be inspected by the Contractor at least weekly and after each rainfall occurrence and cleaned out and repaired by the Contractor as necessary or as directed by the Architect.
- E. Temporary erosion and sedimentation control devices shall be installed and maintained from the initial land disturbance activity until the satisfactory completion and establishment of permanent erosion control measures and permanent vegetative cover is established on all non-paved disturbed areas. At that time, temporary devices shall be removed.
- F. For all newly disturbed, graded or exposed soil surfaces, apply 1.5 gals/acre of APS 600 Series Silt Stop as manufactured by Applied Polymer Systems, Norcross, GA or equal in a hydroseeder mix of appropriate seed, fertilizer, lime, and mulch for the same acre. Follow all manufacturer's instructions and recommendations. Do not mechanically disturb treated areas after application. (This does not include foot traffic as necessary to install erosion control blanket). Contractor shall furnish and install as necessary a minimum 200 lbs. of APS 700 Series Silt Stop as manufactured by Applied Polymer Systems, Norcross, GA. or equal for incidental "touch-up" or point source erosion areas.

3.03 PERMANENT EROSION CONTROL

- A. Permanent erosion control shall include:
 - 1. Restoring the work site to its original contours, unless shown otherwise on the Drawings or directed by the Architect.
 - 2. Permanent vegetative cover shall be performed in accordance with Article 3.04 Grassing of this Section.
- B. Permanent erosion control measures shall be implemented as soon as practical after the completion of pipe installation or land disturbance for each segment of the Project. In no event shall implementation be postponed when no further construction activities will impact that portion or segment of the Project. Partial payment requests may be withheld for those portions of the Project not complying with this requirement.

3.04 GRASSING

- A. General:
 - 1. All references to grassing shall relate to establishing permanent vegetative cover as specified herein for seeding, fertilizing, mulching, etc.
 - 2. When final grade has been established, all bare soil, unless otherwise required by the Contract Documents, shall be seeded, fertilized and mulched in an effort to restore to a protected condition. Critical areas shall be sodded as approved or directed by the Architect.
 - 3. Specified permanent grassing shall be performed at the first appropriate moment following establishment of final grading in each section of the site.
- B. Where permanent vegetative cover (grassing) cannot be immediately established due to season or other circumstances, the Contractor shall provide temporary vegetative cover. The Contractor shall return to the site at the appropriate season to install permanent vegetation in areas that have received temporary vegetative cover, if not previously provided. If a permanent species was sown at the same time as the temporary species, the Contractor shall return to the site at the appropriate season to inspect the grassing, and if necessary, reseed those areas which are unsatisfactory.

3.05 EROSION CONTROL BLANKET

- A. Furnish and install erosion control blanket in coordination with permanent grassing on all disturbed areas.

- B. Follow manufacturer's recommendations and instructions relating to installation.

3.06 RIP RAP

- A. Rip rap shall be placed as shown on the Drawings and at all points where banks of streams or drainage ditches are disturbed by excavation, or at all points where natural vegetation is removed from banks of the streams or drainage ditches. Carefully compact backfill and place rip rap to prevent subsequent settlement and erosion. This requirement applies equally to construction along side a stream or drainage ditch as well as crossing a stream or drainage ditch.
- B. Preparation of Foundations: The ground surface upon which the rip rap is to be placed shall be brought in reasonable close conformity to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers.
- C. Placement of Filter Fabric: The surface to receive fabric shall be prepared to a relatively smooth condition free from obstructions, depressions and debris. The fabric shall be placed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3 inches of the centerline of the overlap. The fabric shall be placed so that the upstream strip overlaps the downstream strip. The fabric shall be placed loosely so as to give and therefore avoid stretching and tearing during placement of the stones. The stones shall be dropped no more than three feet during construction. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals or other contaminants. Any contaminated fabric or any fabric damaged during its installation or during placement of rip rap shall be removed and replaced with uncontaminated and undamaged fabric at no expense to the Owner.
- D. Placement of Rip Rap: The rip rap shall be placed on a 6-inch layer of soil, crushed stone or sand overlaying the filter fabric. This 6-inch layer shall be placed to maximize the contact between the soil beneath the filter fabric and the filter fabric. Rip rap shall be placed with its top elevation conforming with the finished grade or the natural slope of the stream bank and stream bottom.
 - 1. Stone Rip Rap: Stone rip rap shall be dumped into place to form a uniform surface and to the thickness specified on the Drawings. The thickness tolerance for the course shall be -6 inches and +12 inches. If the Drawings or the Bid do not specify a thickness, the course shall be placed to a thickness of not less than 18 inches.
 - 2. Grouted Rip Rap: Reference the Drawings for grouted rip rap which is required as a minimum at the outlet headwalls.

END OF SECTION 31 25 00

SECTION 32 12 00

FLEXIBLE PAVEMENT

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. The Work required under this Section includes all labor, material, equipment and services necessary for and reasonably incidental to the proper completion of bituminous pavements as indicated on the Drawings or herein specified.
- B. Related Work Specified Elsewhere:
 - 1. Division 31 Section “Grading” for sub-grade preparation.

1.02 QUALITY ASSURANCE

- A. Use only materials which are furnished by a bulk asphalt concrete producer regularly engaged in production of hot mix, job-laid asphalt concrete.
- B. Comply with applicable requirements of The Latest Edition Georgia Department of Transportation, Standard Specifications for Construction of Roads and Bridges and any supplemental standards and specifications thereto.
- C. Testing Agency: Testing and sampling shall be performed by an independent testing laboratory provided by Owner.
- D. All areas to receive pavement shall be proof-rolled in the presence of a representative of the Geotechnical Engineer immediately prior to the placement of base course. Refer to Geotechnical Report for information.
- E. Tests: The following tests are required:
 - 1. Graded Aggregate Base Course. Test one (1) sample of the compacted base course of the first 200 cubic yards of material or fraction thereof and for each additional 400 cubic yards or fraction thereof to determine that the density requirement herein specified is met.
 - 2. Bituminous Materials. Each shipment shall be covered by a manufacturer's certified analysis or certificate of compliance.
 - 3. Mineral Aggregates. One sample from each source for complete test of all requirements. Additional gradation tests at the rate of one test per each 1000 yards of material furnished.
 - 4. Asphaltic Concrete.
 - a. Job Mix Formula. One test prior to starting work for each type of mix to determine percentage of various aggregates to be used and amount of asphalt cement to be added. For projects with less than 1000 tons of each material, Contractor may use a mix formula which has been used or is being used on other projects. This information to be supplied by the Contractor.
 - b. Compaction Test. One Test for each 500 square yards of surface area shall be taken as directed by the Geotechnical Engineer.

1.03 SUBMITTALS

- A. General: Submittals shall be in accordance with Specification Section 01 33 00.
- B. Certificates: Provide certificates stating that materials supplied comply with Specifications. Certificates shall be signed by the asphalt producer and the Contractor.
- C. Mix Design: Submit Mix Design for each course to Architect for acceptance.

- D. Sampling Pavements and Mixtures:
 - 1. Remove suitably sized samples, as required by the Architect for the determination of thickness and density of the completed pavements. Use cores drilled from the base and surface courses to test the density of the pavement by either ASTM D 1188 or ASTM D 2726 whichever is applicable. Use the same cores used to test the density to measure the thickness of the pavement. Make up any deficiency in base thickness with the surface mixture when the surface course is applied. Furnish all tools and labor for cutting samples and replacing the pavement to the satisfaction of the Architect.

1.04 JOB CONDITIONS

- A. Weather Limitations.
 - 1. Apply bituminous prime and tack coats only when the ambient temperature in the shade has been at least 40 degrees F. for two hours and rising.
 - 2. Do not conduct paving operations when surface is wet, frozen or contains excess of moisture which would prevent uniform distribution and required penetration.
 - 3. Construct asphaltic courses only when atmospheric temperature in the shade is above 35 degrees F, when the underlying base is dry and when weather is not rainy.
 - 4. Place base course when air temperature is above 35 degrees F and rising. No base course shall be placed on a frozen or muddy subgrade.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Graded Aggregate Base Course: Grade aggregate base course shall be of uniform quality throughout and shall meet the requirements of Section 815.2.01 of the Georgia Department of Transportation Standard Specifications.
- B. Binder Course: Binder course shall be uniform quality throughout and shall conform to the requirements of Section 828.2.03, 19mm Superpave GP 1 or 2, of the Georgia Department of Transportation Standard Specifications.
- C. Surface Course: Surface course shall be of uniform quality throughout and shall conform to the requirements of Section 828.2.03, 9.5 mm Superpave TP 2 GP2, of the Georgia Department of Transportation Standard Specifications.
- D. Tack coat shall conform to the requirements of Section 413 of Georgia Department of Transportation Standard Specifications.
- E. Refer to Drawings and construction details for thickness of pavement layers.

PART 3 – EXECUTION

3.01 INSTALLATION/APPLICATION/PERFORMANCE

- A. Construct all pavements in a workmanlike manner at the location and to the lines and levels shown on the Drawings and place pavement in a manner to insure uniform surfaces free from defects.
 - 1. Shaping and compacting graded aggregate rock base course. Spread the materials uniformly over the subgrade in layers whose depth does not exceed that which the equipment on the Project is capable of compacting to the required density.
 - a. Accomplish the preliminary compaction by rolling with tamping or grid type rollers. Accomplish the final compaction by rolling with multiple wheel pneumatic rollers and a tandem or three-wheel roller. Continue rolling until the base course material is compacted throughout the full depth, to at least 95 percent of the density at optimum

- moisture based on the weight per cubic foot of the material passing the No. 4 sieve, as determined by ASTM D 1557.
- b. The use of vibratory compactor in lieu of rolling equipment will be permitted, provided the compaction requirements can be met and a satisfactory surface can be obtained.
 - c. Continue blading, rolling and tamping until the surface is smooth and free from waves and inequalities. Add water before and after the final rolling as directed by Architect's engineer.
 - d. To facilitate the obtaining of a smooth satisfactory surface, the use of a small application of crushed rock screenings (material passing the 1/2 inch sieve), may be permitted.
 - e. The surface shall not show any deviations in excess of 3/8 inch when tested with a 10 foot straightedge applied parallel with and at right angles to the centerline of the surfaced area.
2. Shaping and compacting asphalt base course. Accomplish mixing and placing in accordance with the best practices and conform to ASTM D 995. Mixing time shall not exceed 60 seconds. Lay the mixture only upon a surface which is dry. Make sure that the surface is clean and free of any loose or foreign matter at the time of placing the mixture. Do not place the bituminous mixtures when the weather is rainy or the atmospheric temperature is below 40 degrees F., unless otherwise directed by the Engineer. Mixes with temperatures below 250 degrees F. will be rejected. Place the base course in one or more lifts. The minimum lift thickness shall be at least two times the maximum particle size.
- a. Place the mixture with an acceptable bituminous spreader in strips having a width of ten (10) feet and do not roll the 6 inch strip adjacent to the area on which additional material is to be laid until such additional material is placed, except when the work is to be discontinued. After the first strip has been placed and rolled, place the second strip and succeeding strips and extend rolling to include the 6 inches of the first strip not previously rolled. Place the succeeding strips while the unrolled 6 inch section of the adjoining is hot and in a readily compactable condition.
 - b. Perform the compaction by the use of three-wheel rollers, tandem rollers, vibratory rollers and pneumatic-tired rollers.
 - c. Begin rolling of the mixture as soon after placing as the mixture will bear the roller without undue displacement. Delays in rolling freshly spread mixture will not be tolerated. Start rolling longitudinally at the extreme sides of the lanes and proceed toward the center of the pavement, overlapping on successive trips by at least one-half of the width of the rear wheel of the roller.
 - d. In all places not accessible to the rollers, compact the mixture thoroughly with hot hand tampers. Hand tampers shall weigh not less than twenty-five (25) pounds and shall have a tamping face of not more than fifty (50) square inches. Skin patching of an area that has been finish rolled will not be permitted. Remove any mixture that becomes mixed with foreign material or in any way defective and replace it with fresh mixture, and compact it to the density of the surrounding area. The roller shall pass over the unprotected edge of the course only when the laying of the course is to be discontinued for such length of time as to permit the mixture to become cold. Continue rolling of the base course until all roller marks are eliminated, and a density has been obtained of at least 94 percent of the density of a laboratory specimen of the same mixture subjected to 50 blows of a standard Marshall on each side of specimen.
3. Tack Coat:
- a. Apply tack coat to asphalt base course immediately prior to spreading surface course materials.
 - b. Quantity. Apply from 0.05 to 0.15 gallons per square yard of surface to be covered as directed by the Architect's engineer. Emulsified asphalt shall be diluted with an equal part of water.
 - c. Application. Apply tack coat by means of a bituminous distributor so that a uniform distribution is obtained at all points. Apply tack coat on each layer of the base course and allow to cure before placing the succeeding course. Apply tack coat only as

- much pavement as can be covered with asphalt aggregate mixture in the same day.
4. Asphaltic Concrete Surface Course:
 - a. The asphaltic concrete surface course shall consist of plant or hot-mix asphaltic concrete to be placed on previously prepared surfaces. It shall be placed in one or more courses and of the thickness as shown on the Drawings.
 - b. Weather Limitations. Place the asphaltic concrete only when the primed or tack coated base course is dry, when the weather is not rainy and when the atmospheric temperature is above 40 degrees F.
 - c. Mixing and Placing. Accomplish in accordance with the best practices and ASTM D 995. Place the mixture with an acceptable bituminous spreader in strips having a minimum width of 10 feet, and do not roll the 6 inch strip adjacent to the area on which additional material is to be laid until such additional material is placed, except, when the work is to be discontinued. After the first strip has been placed and rolled, place the second strip and succeeding strips and extend rolling to include the 6 inches of the first strip not previously rolled. Place the succeeding strips while the unrolled 6 inch section of the adjoining strip is hot and in a readily compactable condition.
 - d. Compaction of Mixture. Perform compaction by the three-wheel rollers and tandem rollers. Begin rolling of the mixture as soon after placing as the mixture will bear the rolling without undue displacement. Make tests for conformity with the specified crown, grade and smoothness immediately after initial compression. Before continuing the rolling, correct any variations by removing or adding materials. Continue rolling until all roller marks are eliminated and density has been obtained of at least 96 percent of the density of a laboratory specimen of the same mixture subjected to 50 blows of a standard Marshall on each side of the specimen. During rolling, moisten the wheels of the rollers to prevent adhesion of the mixture to the wheels but an excess of water will not be permitted. In all places not accessible to the roller, compact the mixture thoroughly with hot hand tampers. Hand tampers shall weigh not less than 25 pounds and shall have a tamping face of not more than 50 square inches.
 - e. Joints. Make sure that all joints present the same texture, density and smoothness as other sections of the course.
 - f. Smoothness. The finished surface shall not vary more than 1/8 inch when tested with a 10 foot straightedge applied both parallel with and at right angles to the centerline of the paved area.
 - g. No bird baths deeper than 1/8" will be allowed, positive drainage is required throughout.

3.02 CLEANING AND PROTECTION

- A. Cleaning. After completion of paving operations, clean surfaces of excess or spilled asphalt materials to the satisfaction of the Architect.
- B. Protection:
 1. Concrete curb and gutter or concrete crosswalks shall be protected from tack-coat overspray and asphalt track marks for the period necessary for the asphalt concrete pavement to cool and harden or until a time designated by the Architect.
 2. After final rolling, do not permit vehicular traffic on asphalt concrete pavement until it has cooled and hardened, and in no case sooner than 24 hours.
 3. Provide barricades and warning devices as required to protect pavement and the general public.
 4. Cover openings of structures in the area of paving until permanent coverings are placed.

END OF SECTION 32 12 00

SECTION 32 12 10
CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. General.
 - 1. The Work required under this Section includes all labor, material, equipment and services necessary for and reasonably incidental to the proper completion of all pavements as shown on the Drawings or herein specified.
- B. Related Work Specified Elsewhere.
 - 1. Refer to all Sections in Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.
 - 2. Subgrade preparation is specified in Section 31 23 00, EARTHWORK.
 - 3. Concrete is specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.

1.02 QUALITY ASSURANCE

- A. **Concrete paving subcontractor shall be able to demonstrate successful past experience with commercial concrete paving projects.**
- B. Mill tests and/or manufacturer's certification of compliance with Specifications will be required for all joint material and sealing compound, membrane waterproofing and miscellaneous materials when requested by the Architect.
- C. Concrete design mix is to be submitted to the Architect for review prior to pavement.
- D. A concrete pavement pre-construction meeting with the Owner and Architect is required prior to placing any concrete pavement.

1.03 JOB CONDITIONS

- A. Placing Temperature.
 - 1. Warm Weather. Concrete placement will not be permitted when, in the opinion of the Architect, the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper finishing and curing of the concrete in accordance with the requirements of this Section.
 - 2. Cold weather. In addition to other requirements, in cold weather, heat, protect and prepare the subgrade so as to produce a satisfactory subgrade entirely free from frost when the concrete is deposited. Do not place concrete when the ambient temperature is below 35 degrees F. (2 degrees C.), nor when the concrete without special protection is likely to be subject to freezing temperature before final set has occurred.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete shall have a strength as indicated on the Drawings.
- B. Expansion joint filler shall be nonextruding and resilient bituminous type and conform to requirements of AASHTO M 213 or as otherwise indicated on the Drawings.

- C. Joint sealer shall be of the hot poured type and shall consist of a resilient and adhesive plastic. The material shall be in accordance with ASTM D 1190.
- D. Curing Materials: Membrane curing compound shall be water soluble emulsion type linseed oil base compound and conform to the requirements for Type 2 compound as specified in ASTM C-309, except that requirements for the sag test and the drying time shall not apply. Where surfaces are to receive waterproofing, painting or any other surface treatment, use a compound which will have no deleterious effect to the application thereof.
- E. Dowels shall conform to ASTM A 615, and shall be either grade 40 or 60 steel.
- F. Expansion tubes shall be metal dowel caps or tubes manufactured from 32 gage sheet metal, shall be indented to provide a limiting stop for the dowel bar and shall provide unobstructed expansion space of not less than 1 inch (25 mm) to permit movement of the dowel bar. They shall be of proper size to fit the specified bars tightly and the closed end shall be watertight.
- G. Oil protective solution shall consist of one part boiled linseed oil thinned with one part turpentine, naphtha, kerosene or mineral spirits.
- H. Traffic paint shall be nonreflective paint conforming to GADOT Section 652 of the standard specifications or as otherwise shown on the Drawings.
- I. All pavement markings within public rights-of-way shall be GADOT approved thermoplastic.
- J. If not otherwise covered on the plans or in these specifications, all concrete pavement is to comply with GADOT Section 430 – Portland Cement Concrete Pavement. In the event of a discrepancy in requirements, the more stringent requirement shall reign.

PART 3 - EXECUTION

3.01 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

- A. Concrete.
 - 1. Forms.
 - a. General. Use metal forms unless otherwise specifically authorized by the Architect, except that on curves having a radius of 150 feet (50 m) or less, wood forms may be used. All forms shall be reviewed by the Architect.
 - b. Form Setting. The subgrade under the forms shall be compact and cut true to grade so that the forms will be firmly in contact with it for their entire length. Correct imperfections and variations of the grade in a manner satisfactory to the Architect. There shall be no settlement or springing of forms under the finishing machine. Connect each form section tightly by locked joints, free from play or movement in any direction. Check conformity to the alignment and grade elevation shown on the Drawings and make necessary corrections immediately prior to placing the concrete.
 - c. Coating. Oil forms each time they are used.
 - d. Removal. Keep forms in place at least 12 hours after concrete has been placed against them or for a longer period if so directed by the Architect. Do not use crowbars or other heavy tools against green concrete when removing the forms. Clean forms well before reoiling and reuse.
 - 2. Finishing.
 - a. General. Employ the machine method of finishing except that on odd widths or shapes, on curbs or on areas of 1000 square yards (1000 square meters) or less, hand methods will be permitted. Maintain all finishing equipment and tools clean,

free from hardened concrete or grout.

- (1) When a mechanical finishing machine is used. Strike off the concrete at such a height that after consolidation and final finishing, it shall be at the exact elevation as shown on the plans. Carry a depth of at least 2 inches (50 mm) of concrete in front of the strike-off screed for the full width of the slab whenever the screed is being used to strike off the pavement. The finishing machine shall be provided with a screed which will consolidate the concrete by pressure. The concrete shall, through the use of this machine, be brought to a true and even surface, free from rock pockets, with the fewest possible number of passages of the machine. Keep hand-finishing tools available for use in case the finishing machine breaks down.
 - (2) When hand finishing is permitted, strike off the concrete and consolidate by a vibrating screed to the exact elevation as shown on the plans. When the forward motion of the vibrating screed is stopped, shut off the vibrator. Do not allow it to idle.
- b. Longitudinal Floating--Machine. After the concrete has been struck off and consolidated, it shall be further smoothed by means of a mechanical longitudinal float of a suitable design. In order to allow enough time for consolidation of the concrete, it may be necessary for the float to lag the finishing operation by as much as one hour. The float machine shall be of such a design that the float is operated transversely across the pavement with its longitudinal axis approximately parallel to the centerline and successive passes lapped at least one-half the length of the float.
 - c. Longitudinal Floating--Hand. When hand finishing is permitted, operate the longitudinal float from foot bridges spanning the pavement and the float shall be worked with a wiping motion, parallel to the pavement centerline and passing from one side of the pavement to the other. Movement ahead along the centerline of the pavement shall be in successive advances of not more than one-half the length of the float. The float shall be not less than 12 feet (3.65 m) long and 6 inches (150 mm) wide and shall be properly stiffened and provided with handles at each end.
 - d. Scraping. After the passage of the longitudinal float, scrape the pavement with a straightedge from 6 to 10 feet (2.0 to 3.0 m) long, equipped with a handle to permit it to be operated from the edge of the pavement. Operate the straightedge so that any excess water, laitance and inert material are removed from the surface of the pavement.
 - e. Straightedging. After the longitudinal floating has been completed and any excess water removed, but while the concrete is still plastic, test the slab surface for trueness with a 10 foot (3.0 m) straightedge swung from handles 3 feet (1.0 m) longer than one-half the width of the slab. Place the straightedge on the surface of the pavement parallel to the centerline and at not more than 5 foot (1.52 m) intervals transversely. After each test move the straight edge forward one-half its length and repeat the operation.
 - (1) When irregularities are discovered, correct them by adding or removing concrete, float all disturbed places with a wood or metal float not less than 3 feet (1.0 m) long and not less than 6 inches (150 mm) wide, and again straightedge. Avoid depressions on the pavement surface in which water will stand.
 - f. Belting shall follow the straight edging when most of the water sheen has disappeared and just before the concrete becomes non-plastic. Belt the surface with a two-ply canvas belt not less than 6 inches (150 mm) wide and at least 3 feet (1.0 m) longer than the width of the slab, or with an acceptable wooden belt. Use hand belts that have suitable handles to permit controlled uniform manipulation. Operate the belt with short strokes transverse to the road centerline while advancing parallel to the centerline.
 - g. Burlap drag shall follow belting and the drag shall have at least 3 feet (1.0 m) in contact with the pavement and be 4 feet (1.2 m) longer than the width of the slab

- under construction. Keep it clean and saturated while in use. It shall be laid on the surface of the pavement and dragged forward in the direction in which the pavement is being laid.
- h. Edging. After final finishing is completed, but before the concrete has taken its initial set, finish the edges of the slab carefully with an edger of the radius shown on the plans.
 - i. Final Surface Texture. The final surface of the concrete pavement shall have a uniform gritty texture free from excessive harshness and true to the grades and cross-section shown on the plans. The Architect may require changes in the final finishing procedure of belting, or burlap drag as required to produce the desired final surface texture.
 - j. Concrete Integral Curb. Concrete shall be placed monolithically with the concrete for the pavement slab by the use of finish machine screeds, vibrating screeds or compaction templates provided with notches at the ends to allow sufficient concrete to be deposited for the curbs at the same time it is being deposited for the slab. Integral curb shall receive the same surface treatment as the concrete pavement slab.
3. Curing.
- a. General. Cover and protect all concrete from moisture evaporation, rapid temperature change and from rain, flowing water and mechanical injury during a period of at least 72 hours immediately following the finishing and edging of the pavement. The use of a covering material which contains or becomes contaminated with sugar in any forms, tannic acid or any other substance considered detrimental to Portland cement will not be permitted. The initial curing medium shall be effective and applied so as to prevent checking, cracking and the appearance of dry spots in the surface of the concrete. Protect the sides of concrete slabs exposed by the removal of forms immediately to provide continuance of curing and prevent injury of the concrete edges and the underlying subgrade. When it is expected, during the progress of the work before all concrete has attained final set, that the temperature may fall below 35 degrees F., maintain a sufficient supply of straw, hay or other suitable material on hand on the Project Site to cover the concrete and to adequately protect its surface and edges against freezing until it is at least 10 days old.
 - b. Membrane Curing Compound. Use no compounds until they have been reviewed by the Architect.
 - (1) Application. Agitate the curing compounds thoroughly during use and spray uniformly in a single coat by acceptable spraying equipment on all concrete surfaces at a rate recommended by manufacturer and based on moisture retention tests. Make the application immediately following the final finishing operation.
 - c. Protection of Treated Surfaces. Keep concrete surfaces, to which membrane compounds have been applied, free from all foot and vehicular traffic and all other sources of abrasion for a minimum period of 72 hours.
 - d. Combination Curing. After joints have been cut and forms removed, mats used for curing may be removed and a membrane curing compound applied to protect the concrete during the balance of the curing period.
 - e. Surface Test. After the concrete curing period, Test the surface of pavements again with a straightedge or device which shall be operated in such manner as to reveal any irregularities. Remove any portion of the pavement which shows a variation or departure greater than 1/8 inch (3 mm) from the testing edge of a 10 foot (3.0 m) straightedge and replace or correct it as directed by the Architect. No area of pavement removed and replaced and no adjacent slab or portion of a slab which remains in the pavement abutting the replacement slab shall have length or width less than 10 feet (3.0 m).
4. Joints.
- a. General. Place and finish joints for pavements as shown on the Drawings or as

directed by the Architect and/or Engineer. Tool and round all joints and edges. Joints shall be perpendicular to the finished grade of the concrete and when tested with a straightedge placed at right angles across the joint, make sure the surfaces of adjacent slabs do not vary from the straightedge by more than 1/8 inch (3 mm). All transverse, expansion, and contraction joints shall be straight and continuous to edge of concrete. Do not stagger joints in abutting pavement unless otherwise shown on the drawings.

- b. Contraction Joints. Form transverse and longitudinal contraction joints by sawing grooves in the top portion of the freshly placed concrete or by use of preformed joint strip of the type shown on the Drawings. Edge the contraction joints on both sides. Saw joints after the concrete is hardened. Complete sawing joints within 6 hours after the concrete has been placed. If templates are used for forming curbs, open the joints caused by the templates with a double-edger while the concrete is still soft. If no template is used, extend the contraction joint through the curb to a minimum depth of 8 inches (200 mm).
 - c. Construction Joints. Install longitudinal construction joints and transverse joints at points where the placing of concrete is discontinued a sufficient time for the concrete to start hardening. At the close of a day's work or when pouring of concrete is stopped, install a transverse butt type construction joint with dowels if the joint occurs at the location of a contraction joint. Use keyed joints with tie bars if the joint occurs at any other location. Joints between construction lanes shall be of the keyed construction joint type. Edge all construction joints with a tool which will make a groove of sufficient width and depth to receive and effectively retain joint sealing material.
 - d. Expansion joints. Form expansion joints by means of joint filler material. Devices used for installing the joints shall be adequate to hold the joint in proper position and to protect the filler from damage during concreting operations and shall be removable without final detriment to the concrete. Fit adjacent sections of filler tightly together and hold in line to insure continuity and to prevent any concrete from entering the expansion space. Cut out immediately any concrete which has flowed into a gap between an expansion joint strip and the edge forms of the concrete, after the forms have been removed. Form expansion joints against all buildings, structures and features which project through, into or against the concrete. The filler shall form a complete uniform separation between the structure and concrete and the top edge of the filler shall be 1 inch (25 mm) below the pavement surface.
 - e. Joint Sealer. Fill all pavement joints with joint sealing material immediately following the curing period or as soon thereafter as weather conditions permit. Clean the joints thoroughly and fill the joints to 1/8 inch (3.17 mm) below the surface of the concrete. Remove all excess sealing material from the concrete. Make sure the joints are dry and the atmospheric temperature is above 50 degrees F. (10 degrees C.) at the time of application of the joint sealing materials.
5. Patching. After removal of forms, fill all damaged or honeycombed areas with mortar, one part cement to two parts sand. No patching will be allowed on the surface.
 6. Protection. Protect the pavements against all damage prior to final acceptance of the work by the Owner. Exclude traffic from the pavements by erecting and maintaining barricades and signs until the concrete is at least 14 days old or for a longer period if so directed by the Architect.
 7. Pavement Painting. Pavement painting shall be 4 inch (100 mm) stripes painted in the pattern indicated on the Drawings. Apply two coats of traffic paint. Apply the first coat not less than 28 days after the placing of the pavement. Immediately before applying the paint, clean the pavement surface of all dust, dirt and other objectionable materials. Apply the paint by spray or other acceptable means. Apply the paint so that uniform distribution of the area to be covered is obtained. Provide masking so that paint is contained within the area to be painted. The color of the paint shall be white or yellow as directed by the Architect.

3.02 FIELD QUALITY CONTROL

A. Workmanship.

1. Construct all pavements in a workmanlike manner at the location and to the lines and levels shown on the Drawings. Form and place pavement in a manner to insure uniform surfaces free from defects.

END OF SECTION 32 12 00

SECTION 32 16 00

COMBINATION CURB AND GUTTER

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. This Section covers the construction of combination curb and gutter when not integral with the pavement slab.
- B. Related Work Specified Elsewhere:
 - 1. Refer to all Sections in Division 0, CONTRACT REQUIREMENTS, and Division 1, GENERAL REQUIREMENTS.
 - 2. Subgrade preparation is specified in Section 31 23 00, EARTHWORK.
 - 3. Concrete is specified in Section 03 30 00, CAST-IN-PLACE CONCRETE.

1.02 QUALITY ASSURANCE

- A. Source Quality Control.
 - 1. Mill tests and/or manufacturer's certification of compliance with the Specifications will be required for all materials when requested by the Architect.
- B. Georgia Department of Transportation Standards for Roads and Bridges, Latest Edition.

1.03 JOB CONDITIONS

- A. Environmental Requirements:
 - 1. Placing Temperature.
 - a. Warm Weather. Concrete placement will not be permitted when, in the opinion of the Architect, the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper finishing and curing of the concrete in accordance with the requirements of these Specifications.
 - b. Cold Weather. In addition to other requirements, in cold weather, heat, protect and prepare the subgrade to produce a satisfactory subgrade entirely free from frost when the concrete is deposited. Concrete shall not be placed when the ambient temperature is below 35 degrees F. (2 degrees C.), nor when the concrete without special protection is likely to be subject to freezing temperature before final set has occurred.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete. Use class A with minimum compressive strength at 28 days of 3,000 psi. Concrete curb and gutter within public rights-of-way shall be GADOT approved.
- B. Expansion Joint Filler. Preformed non-extruding bituminous-treated fiberboard conforming to ASTM D 1751.
- C. Joint Sealer. Hot poured type consisting of a resilient and adhesive plastic. The material shall be in accordance with ASTM D 1190.

- D. Curing Materials: Membrane curing compound shall be water soluble emulsion type linseed oil base compound and conform to the requirements for Type 2 compound as specified in ASTM C 309, except that requirements for the sag test and the drying time shall not apply.

PART 3 - EXECUTION

3.01 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

- A. Concrete.
1. General. Use metal forms unless otherwise specifically authorized by the Architect, except that on curves having a radius of 150 feet or less, wood forms may be used. All forms shall be reviewed by the Architect.
 - a. Form Setting. The subgrade under the forms shall be compact and cut true to grade, so that the forms will be firmly in contact with it for their entire length. Correct imperfections and variations of the grade in a manner satisfactory to the Architect. Join each form section tightly by locked joints, free from play or movement in any direction. Check conformity to the alignment and grade elevation indicated on the Drawings and make necessary corrections prior to placing the concrete.
 - b. Coating. Oil forms each time they are used.
 - c. Removal. Keep forms in place at least 12 hours after concrete has been placed against them or for a longer period if so directed by the Architect. Do not use crowbars or other heavy tools against green concrete in removing the forms. Clean forms well before re-oiling and reuse.
 2. Finishing. Test the subgrade for elevation and density in advance of placing concrete. Correct any discrepancies in accordance with the requirements for subgrade preparation.
 - a. Tamp and space the concrete so as to produce a dense concrete in which the mortar has been worked to the surface. Strike off the concrete to the required cross section and smooth the upper face of the gutter slab and the front face and top of the curb with a wood float. Use an edging tool on all exposed corners. When completed, the surface of the curb and gutter shall be straight and true, and shall conform to the shape and dimensions indicated on the plans and shall have a first-class float finish of sandy or gritty texture.
 3. Joints.
 - a. General. Provide contraction and expansion joints in all curb and gutters. Place and finish joints as indicated on the Drawings or as directed by the Architect. Make sure all joints are perpendicular to the finished grade.
 - b. Contraction Joint. Place contraction joints so that monolithic sections shall be in 8 foot sections. Separate each section by a 1/8 inch thick steel template. Remove templates as soon as practicable after the concrete has been struck off, and set sufficiently to preserve the shape of the joint.
 - c. Expansion Joint. Form expansion joints by a preformed filler material cut and shaped to the cross section of the curb and gutter. Provide expansion joints at the ends of all return radii. Expansion joints shall be provided 1/2 inch in width at intervals not exceeding 40 feet.
 - d. Sealing. Fill the joints with sealing material, specified herein, as indicated on the Drawings or as directed by the Architect. Make sure that the joints are cleaned, dried and poured as soon after the end of the curing period as weather conditions permit. Perform the work in a neat workmanlike manner without spilling and remove all excess material.
 4. Patching. After removal of forms, fill all damaged and honeycombed areas with mortar, one part cement to two parts sand. No patching is allowed on the surface.
 5. Curing.
 - a. General. Cover and protect all concrete fully from moisture evaporation, rapid temperature change and from rain, flowing water, and mechanical injury during a

period of at least 72 hours immediately following the finishing. The use of a covering material which contains, or becomes contaminated with sugar in any form, tannic acid, or any other substance considered detrimental to portland cement, will not be permitted. The initial curing medium shall be effective and applied so as to prevent checking, cracking, and the appearance of dry spots in the surface of the concrete. Protect the sides of concrete slabs exposed by the removal of forms immediately to provide continuance of curing and prevent injury of the curb and gutter edges and the underlying subgrade. When it is expected during the progress of the work, and before all concrete has attained final set, that the temperature may fall below 35 degrees F. (2 degrees C.), a sufficient supply of straw, hay or other material suitable in the opinion of the Architect must be maintained on hand on the Project Site, to cover the concrete and to adequately protect its surface and edges against freezing until it is at least 10 days old.

b. Membrane Curing Compound. No compound shall be used until it has been reviewed by the Architect.

(1) Application. Agitate curing compounds thoroughly during use, and spray uniformly, in a single coat, by approved spraying equipment, on all concrete surfaces, at a rate recommended by the manufacturer and based on moisture retention tests. Application will be made immediately following the final finishing operation.

6. Protection:

a. Protection of Treated Surfaces. Keep concrete surfaces to which membrane compounds have been applied free from all foot and vehicular traffic and all other sources of abrasion for a minimum period of 72 hours.

b. Protection. Protect the curb and gutter against all damage prior to final acceptance of the work by the Owner. Exclude the traffic from the pavement by erecting and maintaining barricades and signs until the concrete is at least 14 days old, or for a longer period if so directed by the Architect.

3.02 FIELD QUALITY CONTROL

A. Workmanship.

1. Construct all curbs in workmanlike manner at the location and to the lines and levels indicated on the Drawings.

B. Curbs damaged during construction shall be replaced in sections at no cost to Owner.

END OF SECTION 32 16 00

SECTION 32 31 00
FENCES AND GATES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

- A. This Section covers fencing at locations and alignments shown on the Drawings complete.
- B. Related Work Specified Elsewhere: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this Section.

1.02 QUALITY ASSURANCE

- A. Galvanizing:
 - 1. All tubular members shall comply with provisions of ASTM A 120, Schedule 40, for weight and coating.
- B. Coating. All tubular steel posts, gate frames, rails and braces shall be coated to a thickness of not less than 10 mils with polyvinylchloride. All other component parts shall be coated to match the color of the coated framework. All items shall be supplied by Allied Fence Division, Anchor Fence, Inc., Merchants Metal Co. or Semmerling Mfg. Corp.

1.03 SUBMITTALS

- A. General: Submittals shall be in accordance with Specification Section 01 33 00.
- B. Shop Drawings. Submit Shop Drawings, including details, showing fence height, size of posts, rails, braces, gates, footings and accessories.

PART 2 – PRODUCTS

2.01 VINYL COATED CHAIN LINK FENCE

- A. Fence Fabric. Fabric shall be PVC coated (7 mil) over galvanized 9 gage (core wire size, not finished wire size) steel wire with a 2" mesh. Fabric coating shall be of the thermally fused type as per ASTM F 668. Type 2B. Steel core wire shall have a tensile strength of 75,000 psi with 0.30 oz./sq. ft. zinc coating. Wire shall have a breakload strength of 1,290 lb. minimum. Selvage shall be knuckled at the bottom.
- B. Corner and Terminal Posts. Posts shall be constructed of schedule 40 steel pipe. Posts shall have an outside diameter of 2-3/8" (2.375"), a minimum wall thickness of .130 and a minimum weight per ft. of 3.117 lb. Posts shall have PVC-coated Finish. Finish shall be in accordance with ASTM F 1234. Apply supplemental color coating of 10-14 mils of thermally fused PVC in black.
- C. Line Posts. Posts shall be constructed of schedule 40 steel pipe. Posts shall have an outside diameter of 1-7/8" (1.875"), a minimum wall thickness of .120" and a minimum weight per ft. of 2.281 lb. Posts shall have a PVC-coated Finish as above.
- D. Top Rails and Braces. Top rails and braces shall be constructed of schedule 40 steel pipe. They shall have an outside diameter of 1-5/8" (1.625"), a minimum wall thickness of 0.111" and a minimum weight per ft. of 1.83 lb. They shall have PVC-coated Finish as above.

- E. Caps, Hardware, Miscellaneous. Post caps shall be of formed steel, cast malleable iron or aluminum alloy. Install one cap for each post where barbed wire supporting arms are not required. Top rail and brace ends shall be of formed steel, malleable iron or cast iron for the connection of rails and braces to terminal posts. Top rail sleeves shall be 6" and shall allow for expansion and contraction of top rails. Use 9 gage galvanized steel wire for the attachment of fabric to line posts. Double wrap 13 gage for rails and braces. Hog ring ties of 12-1/2 gage for attachment of fabric to tension wire. Tension bars shall be in one piece lengths equal to 2" less than full height of fabric with a minimum cross-section of 3/16" x 3/4". Install tension bars where chain link fabric meets terminal posts. 7 gage zinc coated tension wire with a tensile strength of 75,000 psi shall be installed at the bottom of the fence fabric. All parts shall have PVC-coated Finish (where applicable) as above.
- F. Concrete. Concrete for setting posts shall have minimum 28 day compressive strength of 3,000 psi.

2.02 EXECUTION

- A. Fence Framing. Install in accordance with ASTM F 567 and manufacturers instructions. Locate terminal posts at each fence termination. Space line posts at 10 feet on center. Concrete set all posts in holes bored with a diameter at least 4 times greater than the outside dimension of the post. Holes shall be 42" deep. Set post bottoms 36" below grade. Place concrete in a continuous pour, trowel finish the surface and slope to direct water away from posts. Install horizontal pipe brace at mid-height on each side of terminal posts. Install diagonal truss rods at these points, install braces and adjust truss rod. Install bottom tension wire before stretching fabric and attach to each post with ties or clips. Install the top rail in lengths of 21 feet. Connect top rail joints with sleeves for rigid connections with expansion/contraction. Install fabric on security side, and attach so that fabric remains in tension after pulling force is released. Leave approximately 2 inches between finished grade and bottom selvage. Attach fabric with wire ties and clips, to line posts at 15 inches on center, and to rails, braces, and tension wire at 24 inches center. To install tension bars, pull fabric taut, thread bar through fabric and attach to terminal posts with bands or clips spaced a maximum of 15 inches on center.
- B. Gates. Install gates plumb, level and secure for full opening without interference. Attach hardware by means which will prevent unauthorized removal. Adjust hardware for smooth operation.
- C. Accessories. Bend ends of tie wires to minimize hazard to persons and clothing. Install nuts on fasteners opposite the fabric side of the fence for added security. Install extension arms of posts and align perpendicular to the fence. Uniformly space parallel rows of barbed wire on the security side of the fence. Pull wire taut and attach in clips or slots of each extension.

END OF SECTION 32 31 00

SECTION 33 40 00

STORM SYSTEMS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions and other Division 1 Specifications Sections apply to this Section.

1.02 DESCRIPTION OF WORK

- A. This Section covers the complete installation of all storm systems.
 - 1. All storm systems shall be constructed to the locations shown on the Drawings.
 - 2. All Work shall be in conformance with the requirement of local codes and ordinances.
- B. Related Work Specified Elsewhere:
 - 1. Refer to Section 31 22 00, Grading.
 - 2. Refer to Section 31 25 00, Erosion and Sedimentation Control.
 - 3. Refer to Section 33 10 00, Water Utilities, for other exterior utilities.
 - 4. Refer to Section 03 30 00, Cast-In-Place Concrete, for concrete specifications.

1.03 QUALITY ASSURANCE

- A. Testing Agency: Samples and tests, as required, are to be made by an independent testing laboratory provided by the Owner.
- B. Allowable Tolerances: The allowable dimensional alignment for gravity sewers shall be:
 - 1. Minimum 1% slope, unless otherwise shown on the Drawings.

1.04 SUBMITTALS

- A. General: Submittals shall be in accordance with Specifications Section 01 33 00.
- B. Shop Drawings: Shop Drawings shall include:
 - 1. Storm sewer pipe and fittings.
 - 2. Manholes.
 - 3. Outlet control structure.
 - 4. Certificates: Provide manufacturer's certified analysis or certificate of compliance shall be furnished for all shipments of pipe, cast iron frames, grates and covers, valves and other miscellaneous material required under this Section of the Specifications.

1.05 JOB CONDITIONS

- A. Protection of Existing Utilities Structures:
 - 1. Have all utilities marked, verify horizontal and vertical locations. Call Utility Protection Center at 811. Protect the existing utilities shown on the Drawings or the locations of which are known prior to excavation, from damage during excavation and backfilling of trenches, and if damaged, repair them at no expense to the Owner. Any existing line or utility structure which is not shown on the Drawings or the location of which is not made known in sufficient

time to avoid damage, if inadvertently damaged, shall be repaired by the Contractor. In any event, make repairs under the supervision of the utility concerned.

B. Removal of Utilities:

1. All utilities indicated to be removed or abandoned shall be removed or abandoned in accordance with the regulations and requirements of the governing utility or code authority.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Concrete. All cast-in-place concrete shall have 3,000 psi 28 days compressive strength, air entrained and shall conform to ASTM C 94 for ready mixed concrete.
- B. Mortar and Plaster. Mortar and plaster for masonry manholes shall consist of one part Portland cement and two parts fine sand. Lime may be added to the mortar in the amount of not more than 25 percent of the volume of cement.
- C. No. 57 stone for pipe bedding and trench backfill.

2.02 FABRICATION AND MANUFACTURE

A. Storm Sewer:

1. Pipe.

- a. Corrugated Metal Pipe (CMP) conforming to AASHTO standard M36. Refer to Drawings for more information.
- b. PVC pipe at connection to roof drain at building including cleanout. Refer to Drawings
- c. HDPE pipe for roof drain downstream from cleanout conforming to ASTM F2648. Refer to Drawings

1. Pipe Joints.

- a. Corrugated metal pipe joints shall be made with connecting bands conforming to AASHTO standard M36.
- b. PVC pipe joints shall be made with plain ends for solvent-cemented joints with socket-type fittings.
- c. HDPE pipe joints shall be made with single wall fittings.

- A. Reinforcing steel. Reinforcing steel to be deformed bars except where otherwise noted on plans and conform to ASTM A 615, Grade 40.
- B. Manhole and inlet steps. Where required, provide manholes and inlets with steps equal to M.A. Ind. Inc., #PS-1 or #PS-1-PF, not less than 10 inches in width built into and thoroughly anchored in the walls and spaced uniformly approximately 12 inches apart. Steps will not be required unless the depth from cover of manhole or inlet to invert of main sewer exceeds 4 feet.
- C. Manhole and cleanout frames and covers and inlet gratings. Provide cast iron conforming to ASTM A 48, Class 30. All castings to be true to pattern, in forms and dimensions, free from faults, sponginess, cracks, blowholes and other defects affecting their strength. Bearing surfaces between frames and covers to be machined, fitted together, and match-marked to prevent rocking.
- D. Precast reinforced concrete manhole sections shall conform to ASTM C 478.

PART 3 – EXECUTION

3.01 EXCAVATION

- A. General. Perform all excavation of every description and of whatever substances encountered, to the depths indicated on the Drawings. During excavation, deposit material suitable for backfill in an orderly manner a sufficient distance from the excavation banks to avoid overloading and to prevent slides or cave-ins. Waste material unsuitable for backfill as directed by the Geotechnical Engineer. Grade as necessary to prevent surface water from flowing into trenches or other excavations, and remove any water accumulating therein by pumping or by other acceptable method. Unless otherwise specified, all excavation shall be by open cut. Keep the banks of trenches and excavation for structures as nearly vertical as practicable and where required, properly sheet and brace. Fill any unauthorized excess excavation below the levels indicated for structures or pipe with sand, gravel or concrete.
- B. Trench Excavation. Excavate true to line to an elevation a minimum of 3' above the top of pipe to provide a clear space of not less than 6 inches nor more than 8 inches on either side of the pipe. Grade the bottom of the trenches accurately to provide uniform bearing and support for each section of the pipe on undisturbed soil at every point along its entire length, except for the portions of the pipe sections where it is necessary to excavate for the proper sealing of pipe joints. Bell holes and depressions for joints dug after the trench bottom has been graded, and in order that the pipe rest upon the prepared bottom for as nearly its full length as practicable, to be only of such length, depth and width as required for properly making the particular type of joint. Replace any material excavated beneath pipe entering and leaving manholes and inlets with concrete and extend such concrete fill to the center of pipe for a distance of at least 3 feet from face of manhole and inlet and terminate at a joint.
- C. Rock Excavation. Where rock is encountered, carry the excavation to a depth of at least 6 inches below the bottom of the pipe. No part of trench excavations shall be carried more than 12 inches below the bottom of the pipe. Backfill the trench with selected loose, moist earth and compact to provide proper bedding for the pipe. Ripplable weathered rock removal is part of the work and shall not be considered for additional payment.
- D. Unsuitable Material. Where the bottom of the trench is found to be unstable or to include ashes, cinders, all types of refuse, vegetable or other organic material, or large pieces or fragments of inorganic material, which in the judgment of the Geotechnical Engineer, should be removed, excavate and remove such unsuitable material to a minimum depth of 6 inches below the pipe. Backfill the trench with selected bedding material and compact to provide uniform and continuous bearing for the pipe. Dispose of the unsuitable material.
- E. Shoring Requirements. Perform all shoring and sheeting that is required to protect the excavation and to safeguard employees. Widen excavation to provide for space occupied by shoring and sheeting.

3.02 INSTALLATION/APPLICATION/PERFORMANCE/ERECTION

- A. Pipe:
 - 1. Laying Pipe. Shape the bottom of the trench by hand to give substantially uniform circumferential support to the lower fourth of each pipe. Where applicable, pipe laying shall proceed upgrade with the tongue or spigot ends pointing in the direction of the flow. Each pipe to be laid true to line and grade indicated on the Drawings and in such manner as to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line. As the work progresses, clean the interior of the sewer of all dirt and superfluous materials. Where cleaning after laying is difficult because of small pipe size, keep a suitable swab or drag in the pipe and pull forward past each joint immediately after the joining has

been completed. If the maximum width of the trench at the top of the pipe as specified is exceeded, install, such concrete cradling, pipe encasement or other bedding as may be required by the Geotechnical Engineer to support the added load of the backfill. Keep trenches for all sections of the sewer free from water until the pipe-jointing material has set and the trench backfilled. Do not lay pipe when the condition of the trench or the weather is unsuitable for such work. At times when the work is not in progress, keep open ends of pipes and fittings securely closed so that no trench water, earth or other substance will enter the pipe or fittings. When conditions are such that the pipe cannot be adequately supported on undisturbed earth or tamped backfill, encase the pipe in concrete or support it on a concrete cradle. Thermoplastic sewer pipes shall be installed in accordance with ASTM D 2321.

2. Pipe Joints:

a. Corrugated metal pipe or smooth interior corrugated metal pipe. Installation and joining or connecting shall be performed in accordance with the recommendations of the pipe manufacturer. Repair all materials on which the coating has been bruised or damaged during shipment or installation by the application of the same bituminous material used for shop coating the pipe or other suitable material.

b. PVC Pipe. Install in strict accordance with ASTM D 2321.

3. Connection to existing pipe. Make connections to existing pipe by the use of one of the joints described above where possible to do so. Where the end of the existing pipe is broken or a standard joint is otherwise impracticable, install a concrete collar to make the connection.

4. Connection to Existing Manholes. Make pipe connections to existing manholes in such a manner that the finished work will conform as nearly as practicable to the essential applicable requirements for new manholes, including all necessary concrete work, cutting and shaping.

5. Wye Branches. Install commercially manufactured wye branches where indicated on the plans. Cutting into the pipe for connections will not be permitted except in special cases reviewed by the Architect.

a. Pipe Plugs. Plug all open ends of wye branches with a manufactured stopper installed in accordance with provisions for jointing. Plug open ends of sewer pipe with a manufactured stopper or concrete masonry. Concrete masonry plugs shall have a minimum thickness of 4 inches. Install all plugs in such a manner that the open end of the pipe is permanently sealed but can be removed for future extensions without damaging the pipe.

B. Manholes:

1. General. Construct manholes of precast concrete with cast iron frames and covers, and in accordance with the Drawings. Precast reinforced concrete manholes shall conform to ASTM C 478. The invert channels shall be smooth and semicircular in shape conforming to the inside of the adjacent sewer section. Changes in direction of flow shall be made with a smooth curve of as large radius as the size of the manhole will permit. Make changes in size and grade of the channels gradually and evenly. The invert channels may be formed directly in the concrete of the manhole base, or shall be built up with brick and mortar or may be half tile laid in concrete, or may be constructed by laying full-section sewer pipe through the manhole and breaking out the top half after the surrounding concrete has hardened. The floor of the manhole outside the channels shall be smooth and shall slope toward the channels not less than 1 inch per foot nor more than 2 inches per foot. Any material excavated beneath pipe entering and leaving manholes and inlets shall be replaced with concrete. Such concrete fill shall extend to the center of pipe for a distance of at least 3 feet from face of manhole and inlet and shall terminate at a joint.

2. Jointing and Plastering. Fill mortar joints completely and make them smooth and free from surplus mortar on the inside of the manhole. Plaster brick manholes with half inch of mortar over the entire outside surface of walls. Lay brick radially with every sixth course laid as a stretcher course. When precast concrete manhole sections are used, set each section in a fresh bed of mortar to make a mortar joint with a minimum thickness of 1/8 inch. Point up all

- joints inside and out.
3. Frames and Covers. Set the cast iron manhole frame in a bed of mortar and carefully adjust to the elevations shown on the Drawings.
 4. Inspection manholes, branch connections and elbows on large diameter pipe shall be built to conform to details indicated on the Drawings.
- C. Inlets and Junction Boxes. Construct inlets and junction boxes of the materials and to the exact dimensions and grades shown on the Drawings. Finish surfaces smooth and true. Expansion joint filler shall be preformed bituminous treated fiberboard conforming to ASTM D 994, Type III.
- D. Headwalls. Construct headwalls of the materials and to the exact dimensions and grades shown on the Drawings.
- E. Rock Riprap. Place Riprap at the ends of pipe and in open ditches at the locations and to the lines and dimensions indicated on the Drawings. Place the riprap material on prepared areas by hand, to form a smooth surface. All pieces shall be in close contact and have a firm and even bearing on the soil and not wholly on the riprap material below. Fill the spaces between the larger stones with stones of suitable size so placed as to leave a surface capable of shedding water to the maximum degree practically obtainable.
- F. Backfill:
1. General. Do not backfill until all required inspections are made and tests are performed. Backfill with the excavated materials specified for backfilling, consisting of earth, loam, sandy clay, sand and gravel or other materials, free from large clods or earth or stones. Broken concrete shall not be used as backfill material. No backfilling shall take place in freezing weather, and no backfill shall be made with frozen material. Adjust the moisture content of the backfill material if required for proper compaction. Reopen any trenches improperly backfilled, or where settlement occurs, to the depth required for proper compaction, refill and compact to specified density. Compact all backfill for structures to the specified density.
 2. Around Pipe. Deposit suitable backfill material under the haunches of the pipe in 6 inch layers and thoroughly compact. Backfill to at least 90 percent of maximum density at optimum moisture content determined by ASTM D 698 until the pipe has a minimum cover of 2 feet. The moisture content of the soil at time of compaction shall be not more than 3 percent above or 3 percent below the optimum. Be careful not to disturb the pipe. Carry backfilling on simultaneously on both sides of the pipe to eliminate the possibility of lateral displacement.
 3. Remainder of Trench. Deposit the remainder of the suitable backfill material in layers not exceeding 12 inches in loose depth and thoroughly compact them to at least 95 percent of maximum density at optimum moisture content determined by ASTM D 698, except compact the top one foot of backfill below the paving base or subgrade in areas to be paved to at least 98 percent of maximum density at optimum moisture content determined by ASTM D 698. The moisture content of the soil at the time of compaction shall be not more than 4 percent above or 4 percent below the optimum.
 4. Crushed Rock Bedding. Where selected bedding material is required by the Drawings or by the Geotechnical Engineer during construction to replace unsuitable foundation material, crushed rock bedding shall be used. The bedding material shall consist of crushed rock mechanically or naturally combined with screenings from crusher operations or other finely divided mineral matter having similar physical properties. The composite material to be free from organic or other objectionable matter and to consist of angular, sound and durable fragments, reasonably uniform in density and quality, and reasonably free from thin and elongated pieces. The minimum depth between the bottom of the trench and the lowest point

- of pipe shall be 4 inches or one eighth of the outside diameter of pipe, whichever is greater.
5. The crushed rock shall be well graded with a maximum size of 2 inches. Not more than 20 percent by weight shall pass a No. 4 sieve and shall not contain more than 3 percent by weight of particles smaller than 20 micrometre grain size as determined by ASTM Standard D 422.
 6. Improved bedding where required by the Drawings shall consist of granular material (sand, crushed rock, etc.) or a concrete cradle as indicated by the Drawings. Granular material shall be free from organic or other objectionable material and shall conform to the grading requirements for either fine or coarse aggregate as set out in Section 03 30 00, Cast-In-Place Concrete. Concrete shall conform to requirements of Section 03 30 00, Cast-In-Place Concrete, except that the cement content may be reduced to 5 sacks per cubic yard (300 kg per cubic m) and may be either Type I or Type II.

3.03 FIELD QUALITY CONTROL

A. Testing and Inspection:

1. Storm Sewers:

- a. General: Inspect all storm sewer lines by checking each section between manholes for alignment. A full circle of light shall be seen by looking through the pipe at a light held at the opposite end of the Section of sewer line being inspected. The Contractor shall furnish materials for testing. Costs for tests shall be included in Contract Sum.
- b. Concrete and materials for concrete shall be tested in accordance with the requirements of Section 03 30 00, Cast-In-Place Concrete.
- c. Infiltration. Contractor shall coordinate with authority having jurisdiction for storm sewer leakage testing.

2. Backfill:

- a. Compaction Tests: Take compaction or in-place density tests as required by Geotechnical Engineer. Backfill not meeting the test requirements shall be removed, replaced, recompacted and retested for compaction at the expense of the Contractor. Findings of these tests shall be filed with the Architect in triplicate.

3.04 ADJUSTMENT AND CLEANING

A. Pavement Repair:

1. Where necessary to cut pavements, drives, sidewalks or other permanent surfaces, the cuts shall be made with neat lines at least 1 foot wider than the trench. Cut material shall be disposed of by the Contractor.
 - a. The surfaces that are cut shall be restored to a condition at least equivalent to the condition existing before the cut was made. The Contractor shall cooperate at all times to keep streets open for use and also shall cooperate to keep portions of driveways open for use.
 - b. Concrete for repair work shall be as specified in Section 03 30 00, Cast-In-Place Concrete. Concrete shall be finished to match surrounding surfaces as nearly as possible.
 - c. Asphalt for repair work shall be as indicated on Drawings for new work.

END OF SECTION 33 40 00