



INVITATION TO BID
Glenforest Road Drainage Improvement Project

BID NUMBER
15-040

Pre-Bid Conference/Site Visit
JANUARY 6, 2015; 9:00 AM
City of Sandy Springs
7840 Roswell Road Suite 500
Sandy Springs, Georgia 30350

Bid Due Date
JANUARY 13, 2015; 2:00 PM
City of Sandy Springs Purchasing Office
7840 Roswell Road Suite 500
Sandy Springs, Georgia 30350

Questions must be directed in writing to:
City of Sandy Springs, Purchasing Agent, Lynn Taylor,
via e-mail to:

etaylor@sandyspringsga.gov

Deadline for questions from prospective contractors
is 5:00 p.m., January 7, 2015.

Questions received after this date and time may not be answered.

DEFINITIONS

SSPWD: Sandy Springs Public Works Department

GDOT: Georgia Department of Transportation

ENGINEER: The Sandy Springs Director of Public Works or a duly authorized representative.

ADA: Americans with Disabilities Act

EA: Each

GAL: Gallon

LF: Lineal Feet

LS: Lump Sum

SY: Square Yard

TN: Ton

MUTCD: *Manual on Uniform Traffic Control Devices*

OSHA: Occupational Safety and Health Administration

FHWA: Federal Highway Administration

AASHTO: American Association of State Highway and Transportation Officials

CONTRACT DOCUMENTS: Contract Agreement, General Conditions,
Special Provisions, Technical Specifications,
Drawings and Plans, Bidding Documents

CITY OF SANDY SPRINGS

Invitation to Bid #15-040

The City of Sandy Springs is accepting sealed bids from qualified firms, **meaning a Prequalified Contractor listed by the Georgia Department of Transportation, Office of Contract Administration**, for the **ITB #15-040 Glenforest Road Drainage Improvement Project**, for the **Public Works Department**. The contractor must self-perform tasks constituting a minimum of fifty-one percent (51%) of the value of the contract. Work will be done in accordance with Georgia Department of Transportation's (GDOT) Standard Drawings, Standard Specifications, and Pay Items Index as standards and specifications for the construction and completion of the work required, except as noted in Exhibit L. Plans for this project are available at LDI, <http://www.ldireprinting.com/locations.htm>, LDI Norcross, 3030 A Business Park Dr., Norcross, GA 30071, 770-263-1010 (P), 770-417-1147 (F).

All bidders must comply with all general and special requirements of the bid information and instructions enclosed herein. A Pre-Bid Conference will be held on **January 6, 2015; 9:00 AM** at the City of Sandy Springs City Hall Flying Pig Conference Room. **Deadline for questions from prospective contractors is 5:00 p.m., January 7, 2015.** Questions received after this date and time may not be answered.

Sealed bids will be received no later than **January 13, 2015; 2:00 PM** in the City of Sandy Springs Purchasing Office, 7840 Roswell Road, Bldg. 500, Sandy Springs, Georgia 30350 at which time bids will be opened and publicly read aloud. Bids received after the above time or in any other location other than the Purchasing Office **will not** be accepted.

Bids shall be presented in a sealed opaque envelope with the bid number and name **ITB #15-040 Glenforest Road Drainage Improvement Project** clearly marked on the outside of the envelope. The name of the company or firm submitting a bid should also be clearly marked on the outside of the envelope. One (1) original and three (3) copies should be submitted. An electronic copy (disk or thumb drive) should also be submitted. Bids will not be accepted verbally or by fax or email. Bid packages are available on the City of Sandy Springs website, purchasing page

<http://www.sandyspringsga.org/business/doing-business-with-the-city/bidding-opportunities>

and also may be downloaded from the DOAS website (www.doas.georgia.gov). All questions should be forwarded in writing to Lynn Taylor at etaylor@sandyspringsga.gov. Please refer to **ITB #15-040 Glenforest Road Drainage Improvement Project** when requesting information.

The City of Sandy Springs reserves the right to reject all bids and to waive technicalities and informalities, and to make award in the best interest of the City of Sandy Springs. The selected contractor must be able to start work within ten (10) calendar days after the "Notice to Proceed" is issued. The time of completion for the project is **ninety (90)** calendar days from the date of the "Notice to Proceed." Section 108.08 of the State of Georgia Department of Transportation *Standard Specifications Construction of Transportation Systems* (current edition) shall be applied.

BID FORM
(Bidder to sign and return)

**TO: PURCHASING MANAGER
CITY OF SANDY SPRINGS
SANDY SPRINGS, GEORGIA 30350**

Ladies and Gentlemen:

In compliance with your Invitation To Bid, the undersigned, hereinafter termed the Bidder, proposes to enter into a Contract with the City of Sandy Springs, Georgia, to provide the necessary machinery, tools, apparatus, other means of construction, and all materials and labor specified in the Contract Documents or as necessary to complete the Work in the manner therein specified within the time specified, as therein set forth, for:

ITB #15-040 Glenforest Road Drainage Improvement Project

The Bidder has carefully examined and fully understands the Contract, Specifications, and other documents hereto attached, has made a personal examination of the Site of the proposed Work, has satisfied himself as to the actual conditions and requirements of the Work, and hereby proposes and agrees that if his bid is accepted, he will contract with the City of Sandy Springs in full conformance with the Contract Documents.

Unless otherwise directed, all work performed shall be in accordance with the Georgia Department of Transportation *Standard Specifications, Construction of Transportation Systems* (current edition). All materials used in the process of completion of the work included in the Contract will be furnished from Georgia Department of Transportation certified suppliers only.

It is the intent of this Bid to include all items of construction and all Work called for in the Specifications, or otherwise a part of the Contract Documents.

In accordance with the foregoing, the undersigned proposes to furnish and construct the items listed in the attached Bid schedule for the unit prices stated.

The Bidder agrees that the cost of any work performed, materials furnished, services provided or expenses incurred, which are not specifically delineated in the Contract Documents but which are incidental to the scope, intent, and completion of the Contract, shall be deemed to have been included in the prices bid for the various items scheduled.

The Bidder further proposes and agrees hereby to promptly commence the Work with adequate forces and equipment within ten (10) calendar days from receipt of Notice to Proceed and to complete all Work within ninety (90) calendar days from the initial Notice to Proceed.

The Bidder will be required to sign a "Notice of Intent" (NOI) as the "operator" prior to beginning construction. The Bidder shall be responsible for installing and maintaining the "Best Management Practices" (BMP's) throughout the term of the project. Upon completion and prior to final payment the Bidder will be required to sign a "Notice of Termination (NOT) upon final approval by COSS.

Attached hereto is an executed Bid Bond (bond only: certified checks or other forms are not acceptable).
_____ in the amount of _____ Dollars (\$ Five Percent of Amount Bid).

If this bid shall be accepted by the City of Sandy Springs and the undersigned shall fail to execute a satisfactory contract in the form of said proposed Contract, and give satisfactory Performance and Payment Bonds, or furnish satisfactory proof of carriage of the insurance required within ten days from the date of Notice of Award of the Contract, then the City of Sandy Springs may, at its option, determine that the undersigned abandoned the Contract and there upon this bid shall be null and void, and the sum stipulated in the attached Bid Bond or certified check shall be forfeited to the City of Sandy Springs as liquidated damages.

Bidder acknowledges receipt of the following addenda:

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

Bidder further declares that the full name and resident address of Bidder's Principal is as follows:

Signed, sealed, and dated this _____ day of _____

Bidder _____
Company Name

Seal

Bidder Mailing Address:

: _____

: _____

By: _____

Title: _____

By: _____

Title: _____

BIDDING INSTRUCTIONS

The following items should be returned with the bid documents.

- City Bid Schedule and City Bid Form
- Bid Bond*
- Applicable Compliance Specifications Sheets
- Applicable Addenda Acknowledgement
- Affidavit Verifying Status for City Public Benefit Application*
- Contractor Affidavit under O.C.G.A. § 13-10-91(b)(1)*
- Qualifications Signature and Certification
- Corporate Certificate*
- List of Subcontractors*
- CD containing scanned copy of bid in PDF format

***These pages can be found in the Appendices' section of the Sample Contract.**

INSURANCE REQUIREMENTS

Within 10 days of Notice of Award, and at all times that this Contract is in force, the Contractor shall obtain, maintain and furnish the City Certificates of Insurance from licensed companies doing business in the State of Georgia with an A.M. Best Rating A-10 or higher and acceptable to the City covering:

1. Workers' Compensation & Employer's Liability Insurance. Workers' Compensation Insurance in compliance with the applicable Workers' Compensation Act(s) of the state(s) wherein the work is to be performed or where jurisdiction could apply in amounts required by statutes. Employer's Liability Insurance, with limits of liability of not less than \$1,000,000 per accident for bodily injury or disease.
2. Commercial General Liability Insurance, including contractual liability insurance, product and completed operations, personal and advertising injury, and any other type of liability for which this Contract applies with limits of liability of not less than \$1,000,000 each occurrence / \$2,000,000 policy aggregate for personal injury, bodily injury, and property damage. Commercial General Liability Insurance shall be written on an "occurrence" form.
3. Automobile Liability Insurance with limits of liability of not less than \$1,000,000 per accident for bodily injury and property damage if automobiles are to be used in the delivery of or in the completion of services and work or driven onto the City's property. Insurance shall include all owned, non-owned and hired vehicle liability.
4. Umbrella Insurance with limits of liability excess of Employer's Liability Insurance, Commercial General Liability Insurance and Automobile Liability Insurance in the amount of not less than \$3,000,000.
5. Contractors' Pollution Legal Liability and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) with limits not less than \$1,000,000 per occurrence or claim, and \$2,000,000 policy aggregate.
6. Professional (Errors and Omissions) Insurance- For Professional Services and for all Design/Build Projects with limits of liability of not less than \$3,000,000 per occurrence or claim / \$3,000,000 policy aggregate. Such policy shall also include coverage for losses arising from the breach of information security or cyber liability (including Errors & Omissions, Security and Privacy Liability and Media Liability), whether combined with the Professional Liability policy or placed as a separate policy, but carrying the same limits of liability. Such coverage shall insure damage, injury and loss caused by error, omission or negligent acts, including all prior acts without limitation, related to the professional services to be provided under this Contract. The policy shall be amended to include independent contractors providing professional services on behalf of or at the direction of the Contractor. The definition of Contractual Liability shall be amended to state that liability under a contract of professional services is covered. Further, coverage shall be afforded for fraudulent acts, misappropriation of trade secrets, internet professional services, computer attacks, personal injury, regulatory actions, wrongful acts, contractual liability, privacy policy, and insured versus insured. The Contractor shall ensure that coverage under this policy continues for a period of thirty-six (36) months after completion of services.

7. Fidelity Bond (Employee Dishonesty) in the sum of not less than \$50,000.

All such insurance shall remain in effect until final payment is made and the Project is accepted by the City. If the Contractor receives notice of non-renewal or material adverse change of any of the required coverages, the Contractor shall promptly advise the City in writing. Failure of the Contractor to promptly notify the City on non-renewal or material adverse change of any of the required coverages terminates the Agreement as of the date that the Contractor should have given notification to the City. The insurance policies shall contain or be endorsed to contain, the following provisions:

A provision that coverage afforded under such policies shall not expire, be canceled or altered without at least thirty (30) days prior written notice to the City.

Workers' Compensation and Employer's Liability and Property insurance policies shall contain a waiver of subrogation in favor of the City and the City's boards, officials, directors, officers, employees, representatives, agents, and volunteers.

Commercial General Liability, Automobile Liability Contractors' Pollution Legal Liability and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) insurance policies shall include an endorsement making the City and the City's boards, officials, directors, officers, employees, representatives, agents, and volunteers Additional Insureds under such policies.

A copy of these endorsements shall be provided to the City.

Certificates of Insurance showing that such coverage is in force shall be filed under this Contract by the Contractor to the City.

The obligations for the Contractor to procure and maintain insurance shall not be construed to waive or restrict other obligations and it is understood that insurance in no way limits liability of the Contractor whether or not same is covered by insurance.

Certificate Holder should read: The City of Sandy Springs, 7840 Roswell Road, Building-500, Sandy Springs, Georgia 30350.

BONDING REQUIREMENTS

Each bid must be accompanied with a BID BOND (bond only: certified checks or other forms are not acceptable) in an amount equal to five percent (5%) of the base bid, payable to the City of Sandy Springs. Said bid bond guarantees the bidder will enter into a contract to construct the project strictly within the terms and conditions stated in this bid and in the bidding and contract documents, should the construction contract be awarded.

The Successful Bidder shall be required to furnish a bond for the faithful performance on the contract and a bond to secure payment of all claims for materials furnished and/or labor performed in performance of the project, both in amounts equal to one hundred percent (100%) of the contract price.

The Successful Bidder shall also be required to furnish a Maintenance Bond, in the amount of one-third (1/3) of the contract price, guaranteeing the repair or replacement caused by defective workmanship or materials for a period of one (1) year from the completion of construction.

Bonds shall be issued by a corporate surety appearing on the Treasury Department's most current list (Circular 570 as amended) and be authorized to do business in the State of Georgia.

Date of Bond must not be prior to date of Contract. If Contractor is a Partnership, all partners shall execute Bond.

QUALIFICATIONS SIGNATURE AND CERTIFICATION
(Bidder to sign and return)

I certify that this offer is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a proposal for the same materials, supplies, equipment, or services and is in all respects fair and without collusion or fraud. I understand collusive bidding is a violation of State and Federal Law and can result in fines, prison sentences, and civil damage awards. I agree to abide by all conditions of the proposal and certify that I am authorized to sign this proposal for the proposer. I further certify that the provisions of the Official Code of Georgia Annotated, Sections 45-10-20 et. seq., have not been violated and will not be violated in any respect.

Authorized Signature _____ Date _____

Print/Type Name _____

Email Address _____

Print/Type Company Name Here _____



**SAMPLE
CONTRACT AGREEMENT**

For

GLENFOREST ROAD DRAINAGE IMPROVEMENT PROJECT
("Project")

Between

CITY OF SANDY SPRINGS, GEORGIA
("City")

and

("Contractor")

TABLE OF CONTENTS

ARTICLE I

THE CONTRACT AND THE CONTRACT DOCUMENTS

- 1.1 The Contract
- 1.2 The Contract Documents
- 1.3 Entire Agreement
- 1.4 Subletting, Assignment, or Transfer
- 1.5 No Privity with Others
- 1.6 Intent and Interpretation
- 1.7 Ownership of Contract Documents
- 1.8 Hierarchy of Contract Documents

ARTICLE II

THE WORK

- 2.1 Contractor Responsibility
- 2.2 “Work” Defined
- 2.3 Review of Work
- 2.4 Workday and Restrictions, Suspension and Interruption

ARTICLE III

CONTRACT TIME

- 3.1 Time and Liquidated Damages
- 3.2 Substantial Completion
- 3.3 Time is of the Essence

ARTICLE IV

CONTRACT PRICE

- 4.1 The Contract Price

ARTICLE V

PAYMENT OF THE CONTRACT PRICES

- 5.1 Bid Schedule
- 5.2 Payment Procedure
- 5.3 Withheld Payment
- 5.4 Substantial Completion
- 5.5 Completion and Final Payment

ARTICLE VI

THE CITY

- 6.1 City Responsibility
- 6.2 Right to Stop Work
- 6.3 City's Right to Carry Out Work

ARTICLE VII

THE CONTRACTOR

- 7.1 Duties with Respect to Documents
- 7.2 Manner of Performance
- 7.3 Supervision
- 7.4 Compliance
- 7.5 Warranty
- 7.6 Permits, Inspections, Fees and Licenses
- 7.7 Supervision
- 7.8 Schedules
- 7.9 Contract to be Maintained at Project Site
- 7.10 Shop Drawings, Product Data and Samples
- 7.11 Cleaning the Project Site and the Project
- 7.12 Access to Work
- 7.13 Indemnity
- 7.14 Means, Methods, Techniques, Sequences, Procedures and Safety
- 7.15 Separate Contracts
- 7.16 Maintenance of Contract Cost Records

ARTICLE VIII

CONTRACT ADMINISTRATION

- 8.1 Claims by the Contractor

ARTICLE IX

SUBCONTRACTORS

- 9.1 Definition
- 9.2 Award of Subcontracts

ARTICLE X

CHANGES IN THE WORK

- 10.1 Changes Permitted
- 10.2 Change Order Defined

- 10.3 Changes in the Contract Price
- 10.4 Effect of Executed Change Order
- 10.5 Notice to Surety; Consent

ARTICLE XI

UNCOVERING AND CORRECTING WORK

- 11.1 Uncovering Work
- 11.2 Correcting Work
- 11.3 City May Accept Defective or Nonconforming Work

ARTICLE XII

CONTRACT TERMINATION

- 12.1 Termination by the Contractor
- 12.2 Termination by the City

ARTICLE XIII

INSURANCE

- 13.1 Insurance Requirements

ARTICLE XIV

DISPUTES

- 14.1 Mediation

ARTICLE XV

INDEPENDENT CONTRACTOR

- 15.1 Relationship between Contractor and City

ARTICLE XVI

COVENANT AGAINST CONTINGENT FEES

- 16.1 Warranty by Contractor

ARTICLE XVII

MISCELLANEOUS

- 17.1 Governing Law
- 17.2 Successors and Assigns
- 17.3 Surety Bonds
- 17.4 Notices

EXHIBITS

EXHIBIT A SCOPE OF SERVICES

EXHIBIT B BID SCHEDULE

EXHIBIT C REQUIRED CONTRACT PROVISIONS - FEDERAL AID
CONSTRUCTION CONTRACT (Not required in this contract)

EXHIBIT D NOTICE TO CONTRACTORS - COMPLIANCE WITH
TITLE VI OF THE CIVIL RIGHTS ACT

EXHIBIT E STANDARD FEDERAL EQUAL OPPORTUNITY CONSTRUCTION
CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)
(43 CFR 14895)

EXHIBIT F CERTIFICATION OF SPONSOR DRUG-FREE WORKPLACE

EXHIBIT G DBE REQUIREMENTS

EXHIBIT H CONTRACTOR CERTIFICATION REGARDING DEBARMENT,
SUSPENSION, AND OTHER RESPONSIBILITY MATTERS AND
INSTRUCTIONS

EXHIBIT I LOWER TIER CERTIFICATION REGARDING DEBARMENT,
SUSPENSION, AND OTHER RESPONSIBILITY MATTERS AND
INSTRUCTIONS

EXHIBIT J CERTIFICATION OF CONTRACTOR GEORGIA SECURITY
AND IMMIGRATION COMPLIANCE ACT

EXHIBIT K INSURANCE REQUIREMENTS

EXHIBIT L SPECIAL PROVISIONS

EXHIBIT M NOTICE TO CONTRACTORS
COMPLIANCE WITH ELECTRICAL SAFETY PROVISIONS

APPENDICES

CONTRACT AGREEMENT

This Agreement is made by and between the City of Sandy Springs, a political subdivision of the State of Georgia (hereinafter referred to as the City) and Surfaces Group LLC, (hereinafter referred to as the Contractor) under seal for construction of the Glenforest Road Drainage Improvement Project (hereinafter referred to as the Project);

WHEREAS, the Contractor desires to enter into this Agreement for construction of the Project and has represented to the City that it is qualified (**meaning a Prequalified Prime Contractor listed by the Georgia Department of Transportation, Office of Contract Administration**) and experienced to provide such services necessary for construction of the Project (the City requires that the Contractor and to comply with all federal, state and local legal requirements imposed on the Project as the result of federal funding and the City has relied on such representation);

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, it is agreed by and between the Contractor and the City as follows:

ARTICLE I

THE CONTRACT AND THE CONTRACT DOCUMENTS

1.1 The Contract

1.1.1 The Contract between the City and the Contractor, of which this Agreement is a part, consists of the Contract Documents. It shall be effective on the date this Agreement is executed by the last party to execute it.

1.2 The Contract Documents

1.2.1 The Contract Documents consist of this Agreement, General Conditions, Special Provisions, the Technical Specifications, the Drawings and Plans, Bidding Documents, all Change Orders and Field Orders issued hereafter, the base bid made by the Contractor in response to the City's Invitation to Bid No. 15-040 (the "Bid"), and any other amendments hereto executed by the parties hereafter, together with the following (if any):

Documents not enumerated in this Paragraph 1.2 are not Contract Documents and do not form a part of this Contract.

1.3 Entire Agreement

1.3.1 The Contract Documents constitute the entire and exclusive agreement between the City and the Contractor with reference to the Project.

1.4 Subletting, Assignment, or Transfer

1.4.1 It is understood by the parties to this Agreement that the Work of the Contractor is considered personal by the City. The Contractor agrees not to assign, sublet, or transfer any or all of its interest in this Agreement without prior written approval of the City.

1.4.2 The City reserves the right to review all subcontracts prepared in connection with the Agreement, and the Contractor agrees that it shall submit to the City proposed subcontract documents together with Subcontractor cost estimates for the City's review and written concurrence in advance of their execution.

1.4.3 All subcontracts in the amount of \$10,000.00 or more shall include the provisions set forth in this Agreement.

1.5 No Privity with Others

1.5.1 Nothing contained in this Contract shall create, or be interpreted to create, privity or any other contractual agreement between the City and any person or entity other than the Contractor.

1.6 Intent and Interpretation

1.6.1 The intent of this Contract is to require complete, correct and timely execution of the Work. Any Work that may be required, implied or inferred by the Contract Documents, or any one or more of them, as necessary to produce the intended result shall be provided by the Contractor for the Contract Price, as hereinafter defined.

1.6.2 This Contract is intended to be an integral whole and shall be interpreted as internally consistent. What is required by any one Contract Document shall be considered as required by the Contract.

1.6.3 When a word, term or phrase is used in this Contract, it shall be interpreted or construed, first, as defined herein; second, if not defined, according to its generally accepted meaning in the construction industry; and third, if there is no generally accepted meaning in the construction industry, according to its common and customary usage.

1.6.4 The words include, includes, or including, as used in this Contract, shall be deemed to be followed by the phrase, without limitation.

1.6.5 The specification herein of any act, failure, refusal, omission, event, occurrence or condition as constituting a material breach of this Contract shall not imply that any other, non-specified act, failure, refusal, omission, event, occurrence or condition shall be deemed not to constitute a material breach of this Contract.

1.6.6 Words or terms used as nouns in this Contract shall be inclusive of their singular and plural forms, unless the context of their usage clearly requires a contrary meaning.

1.6.7 The Contractor shall have a continuing duty to read, carefully study and compare each of the Contract Documents, the shop drawings and the product data and shall give written notice to the City of any inconsistency, ambiguity, error or omission which the Contractor may discover with respect to these documents before proceeding with the affected Work. The issuance or the express or implied approval by the City of the Contract Documents, shop drawings or product data shall not relieve the Contractor of the continuing duties imposed hereby, nor shall any such approval be evidence of the Contractor's compliance with this Contract. **HOWEVER, THE CITY MAKES NO REPRESENTATION OR WARRANTY OF ANY NATURE WHATSOEVER TO THE CONTRACTOR CONCERNING THE DOCUMENTS FOR THE PROJECT, INCLUDING THE DRAWINGS AND SPECIFICATIONS FOR THE PROJECT.** By the execution hereof, the Contractor acknowledges and represents that it has received, reviewed and carefully examined such documents, has found them to be complete, accurate, adequate, consistent, coordinated and sufficient for construction, and that the Contractor has not, does not, and will not rely upon any representation or warranties by the City concerning such documents as no such representation or warranties have been or are hereby made.

1.6.8 Neither the organization of any of the Contract Documents into divisions, sections, paragraphs, articles, (or other categories), nor the organization or arrangement of the design, shall control the Contractor in dividing the Work or in establishing the extent or scope of the Work to be performed by Subcontractors.

1.7 Ownership of Contract Documents

1.7.1 The Contractor may be provided, have access to or become aware of the City's Confidential Information including the City's strategic plans, employee data, customer data and other technical and business information of the City (collectively referred to as the "Confidential Information"). The term Confidential Information includes the deliverables as well as all information generated by the Contractor that contains, references or is derived from the Confidential Information and the Services including, without limitation, the Contractor's summaries, analysis, extracts, working papers and notes relating to the Services and the Deliverables (referred to as the "Working Papers"). The Contractor agrees not to disclose the Confidential Information to third parties without the prior written approval of the City and not to make use of the Confidential Information other than as needed to perform the Services. The Contractor further agrees that it will only disclose the Confidential Information to its personnel on a need-to-know basis solely for the performance of the Services and will protect the Confidential Information with the same degree of care that the Contractor uses to protect its own confidential information, but no less than reasonable care or as the various laws may require or impose.

All Confidential Information as well as other documents, data and information provided to the Contractor by the City is and will remain the property of the City to the extent that it was the property of the City at the time it was provided to the Contractor.

All Confidential Information shall be returned to the City by the Contractor within five (5) business days of the completion of the Services under this Contract. The Contractor will keep no copies of the Confidential Information except that the Contractor may retain one copy of the Working Papers as required by law, regulation, professional standards or reasonable business practice. If requested by the City, an officer of the Contractor will certify in writing that, to the best of his/her knowledge, information and belief, all Confidential Information and all copies thereof (except for one copy of the Working Papers) have been delivered to the City or destroyed.

The Contract Documents, and each of them, shall remain the property of the City. The Contractor shall have the right to keep one record set of the Contract Documents upon completion of the Project; provided, however, that in no event shall Contractor use, or permit to be used, any or all of such Contract Documents on other projects without the City's prior written authorization.

1.8 Hierarchy of Contract Documents

1.8.1 In the event of any conflict, discrepancy, or inconsistency among any of the Contract Documents, the following hierarchy shall control: (a) as between figures given on drawings and the scaled measurements, the figures shall govern; (b) as between large scale drawings and small scale drawings, the large scale shall govern; (c) as between drawings and specifications, the requirements of the specifications shall govern; (d) as between the Contract Agreement and General and the specifications, the requirements of the Contract Agreement shall govern. As set forth hereinabove, any and all conflicts, discrepancies, or inconsistencies shall be immediately reported to the City in writing by the Contractor.

ARTICLE II

THE WORK

2.1 Contractor Responsibility

2.1.1 The Contractor shall perform all of the Work required, implied or reasonably inferable from, this Contract.

2.2 “Work” Defined

2.2.1 The term Work shall mean whatever is done by or required of the Contractor to perform and complete its duties under this Contract, including the following: construction of the whole or a designated part of the Project; furnishing of any required surety bonds and insurance; and the provision or furnishing of labor, supervision, services, materials, supplies, equipment, fixtures, appliances, facilities, tools, transportation, storage, power, permits and licenses required of the Contractor, fuel, heat, light, cooling and all other utilities as required by this Contract. The Work to be performed by the Contractor is generally described in Exhibit A, SCOPE OF SERVICES, attached hereto and incorporated herein.

2.3 Review of Work

2.3.1 Authorized representatives of the City, GDOT, and affected federal agencies may at all reasonable times review and inspect the activities and data collected under the terms of the Contract and any amendments thereto, including but not limited to, all reports, drawings, studies, specifications, estimates, maps, and computations, prepared by or for the City.

2.4 Workday and Restrictions, Suspension and Interruption

2.4.1 Normal workday for the Work shall be from 8:00 A.M. to 5:00 P.M. and the normal work week shall be Monday through Friday. The City will consider extended workdays or work weeks upon written request on a case-by-case basis. The City may restrict work hours in certain locations or at certain times of the day. No work will be allowed on national holidays (i.e., Memorial Day, July 4th, Labor Day, etc.). The City may order the Contractor in writing to suspend, delay or interrupt all or any part of the Work for such period of time as it may determine appropriate for the convenience of the City. The time for completion of the Work shall be extended by the number of days the Work is suspended. The City shall not be responsible for any claims, damages or costs stemming from any delay of the Project.

2.5 Work to be performed by the Prime Contract

2.5.1 Tasks constituting of at least fifty-one percent (51%) of the value of this contract must be performed directly by the prime contractor and shall not be sub-contracted to other firms.

2.5.2 The contractor shall identify which tasks shall be self-performed.

ARTICLE III

CONTRACT TIME

3.1 Time and Liquidated Damages

3.1.1 The Contractor shall not proceed to furnish such services and the City shall not become obligated to pay for same until a written authorization to proceed (“Notice to Proceed”) has been sent to the Contractor from the City. The Contractor shall commence the Work no later than ten (10) days after the effective date of the Notice to Proceed and shall achieve Substantial Completion of the Work, as hereinafter defined, no later than *ninety (90) Calendar Days*, in accordance with the Contract Documents. The number of calendar days from the date on which the Work is permitted to proceed, through the date set forth for Substantial Completion, shall constitute the Contract Time. The Work shall be carried on expeditiously, it being understood, however, that this Agreement may be extended or continued in force by the parties hereto in writing as provided herein.

3.1.2 The Contractor shall pay the City the sum of \$500.00 per day for each and every calendar day of unexcused delay in achieving Substantial Completion beyond the date set forth herein for Substantial Completion

of the Work. Any sums due and payable hereunder by the Contractor shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the City, estimated at or before the time of executing this Contract. When the City reasonably believes that Substantial Completion will be inexcusably delayed, the City shall be entitled, but not required, to withhold from any amounts otherwise due the Contractor an amount then believed by the City to be adequate to recover liquidated damages applicable to such delays. If and when the Contractor overcomes the delay in achieving Substantial Completion, or any part thereof, for which the City has withheld payment, the City shall promptly release to the Contractor those funds withheld, but no longer applicable, as liquidated damages.

3.2 Substantial Completion

3.2.1 Substantial Completion shall mean that stage in the progression of the Work when the City deems the Work is sufficiently complete in accordance with this Contract that the City can enjoy beneficial use and occupancy of the Work and can utilize the Work for its intended purpose. Partial use or occupancy of the Project shall not result in the Project being deemed substantially complete, and such partial use or occupancy shall not be evidence of Substantial Completion.

3.3 Time is of the Essence

3.3.1 All limitations of time set forth in the Contract Documents are of the essence of this Contract.

ARTICLE IV

CONTRACT PRICE

4.1 The Contract Price

4.1.1 The total contract amount for the Project (the "Contract Price") shall be as set forth in the bid schedule ("Bid Schedule") attached hereto as EXHIBIT B, BID SCHEDULE and incorporated herein. Payment to the Contractor pursuant to the Bid Schedule is full payment for the complete scope of services. The Contract Price shall not be modified except by Change Order as provided in this Contract.

ARTICLE V

PAYMENT OF THE CONTRACT PRICE

5.1 Bid Schedule

5.1.1 The Contractor shall invoice and be paid pursuant to the Bid Schedule contained in the Contract Documents.

5.2 Payment Procedure

5.2.1 The City shall pay the Contract Price to the Contractor as provided below.

5.2.2 Based upon the Contractor's invoices for payment submitted to the City, the City shall make progress payments to the Contractor on account of the Contract Price.

5.2.3 On or before the 5th day of each month after commencement of the Work, the Contractor shall submit an invoice for Work satisfactorily completed as evaluated by an inspector representing the City pursuant to the Bid Schedule. The invoice shall be in such form and manner, and with such supporting data and content, as the City may require. Therein, the Contractor may request payment for ninety percent (90%) of that portion of the

Contract Price properly allocable to Contract requirements properly provided, labor, materials and equipment properly incorporated into the Work plus ninety percent (90%) of that portion of the Contract Price properly allocable to materials or equipment properly stored on-site (or elsewhere if approved in advance in writing by the City) for subsequent incorporation into the Work, less the total amount of previous payments received from the City. Payment for stored materials and equipment shall be conditioned upon the Contractor's proof satisfactory to the City, that the City has title to such materials and equipment and shall include proof of required insurance. Such invoice shall be signed by the Contractor and shall constitute the Contractor's representation that the Work has progressed to the level for which payment is requested in accordance with the Schedule of Work, that the Work has been properly installed or performed in full accordance with this Contract, and that the Contractor knows of no reason why payment should not be made as requested. Thereafter, the City will review the invoice and may also review the Work at the Project Site or elsewhere to determine whether the quantity and quality of the Work is as represented in the invoice and is as required by this Contract. The City shall make partial payments on account of the Contract Price to the Contractor within thirty (30) days following receipt of each invoice. The amount of each partial payment shall be the amount approved for payment less such amounts, if any, otherwise owing by the Contractor to the City or which the City shall have the right to withhold as authorized by this Contract. The City shall not be precluded from the exercise of any of its rights as set forth in Paragraph 5.3 herein below; PROVIDED, HOWEVER, that when fifty (50) percent of the Contract value, including Change Orders and other additions to the Contract value, provided for by the Contract Documents is due, and the manner of completion of the Contract Work and its progress are reasonably satisfactory to the City, the City shall withhold no more retainage. At the discretion of the City, and with the approval of the Contractor, the retainage of any Subcontractor may be released separately as the Subcontractor completes its Work. If, however, after discontinuing the retention, the City determines that the Work is unsatisfactory or has fallen behind schedule, retention may be resumed at the previous level. If retention is resumed by the City, the Contractor and Subcontractors shall be entitled to resume withholding retainage accordingly. The rights of the City set forth herein to retainage are in addition to all of the other rights and remedies of the City set forth in this Agreement.

5.2.4 The Contractor warrants that upon submittal of an invoice, all Work for which payments have been received from the City shall be free and clear of liens, claims, security interest or other encumbrances in favor of the Contractor or any other person or entity whatsoever.

5.2.5 The Contractor shall promptly pay each Subcontractor out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which such Subcontractor is entitled. In the event the City becomes informed that the Contractor has not paid a Subcontractor as herein provided, the City shall have the right, but not the duty, to issue future checks in payment to the Contractor of amounts otherwise due hereunder naming the Contractor and such Subcontractor as joint payees. Such joint check procedure, if employed by the City, shall create no rights in favor of any person or entity beyond the right of the named payees to payment of the check and shall not be deemed to commit the City to repeat the procedure in the future.

5.2.6 No progress payment, nor any use or occupancy of the Project by the City, shall be interpreted to constitute an acceptance of any Work not in strict accordance with this Contract.

5.3 Withheld Payment

5.3.1 The City may decline to make payment, may withhold funds, and, if necessary, may demand the return of some or all of the amounts previously paid to the Contractor, to protect the City from loss because of:

- (a) defective Work not remedied by the Contractor or, in the opinion of the City, unlikely to be remedied by the Contractor;
- (b) claims of third parties against the City or the City's property;

- (c) failure by the Contractor to pay Subcontractors or others in a prompt and proper fashion;
- (d) evidence that the balance of the Work cannot be completed in accordance with the Contract for the unpaid balance of the Contract Price;
- (e) evidence that the Work will not be completed in the time required for substantial or final completion;
- (f) persistent failure to carry out the Work in accordance with the Contract;
- (g) damage to the City or a third party to whom the City is, or may be, liable.

In the event that the City makes written demand upon the Contractor for amounts previously paid by the City as contemplated in this Subparagraph 5.3.1, the Contractor shall promptly comply with such demand.

5.4 Substantial Completion

5.4.1 When the Contractor believes that the Work is substantially complete, the Contractor shall so notify the City. If the City deems the work is substantially complete, the City shall make a preliminary final inspection of the Project and shall submit to the Contractor a list of items to be completed or corrected (the "Punch List"). The Contractor shall complete all items on the Punch List within twenty-one (21) calendar days from the date of issuance of the Punch List by the City. If the Contractor is already in liquidated damages, as herein provided, prior to beginning the Punch List, then liquidated damages will be postponed for the twenty-one (21) calendar days. Once the twenty-one (21) calendar days expire, then liquidated damages will continue to accrue. In any case, once the twenty-one (21) calendar days expire after the Punch List is submitted to the Contractor, then liquidated damages will be assessed.

5.5 Completion and Final Payment

5.5.1 When all of the Work is finally complete and the Contractor is ready for a final inspection, the Contractor shall notify the City thereof in writing. Thereupon, the City will make final inspection of the Work and, if the Work is complete in full accordance with this Contract and this Contract has been fully performed, the Contractor is entitled to the remainder of the unpaid Contract Price as hereinafter provided in Subparagraph 5.5.3. Guarantees required by the Contract shall commence on the date of final completion of the Work.

5.5.1.1 If the Contractor fails to achieve final completion within the time fixed therefor by the City, the Contractor shall pay the City the sum of \$ 500.00 (as stipulated in GDOT Standard Specifications 108.08) per day for each and every calendar day of unexcused delay in achieving final completion beyond the date set forth herein for final completion of the Work. Any sums due and payable hereunder by the Contractor shall be payable, not as a penalty, but as liquidated damages representing an estimate of delay damages likely to be sustained by the City, estimated at or before the time of executing this Contract. When the City reasonably believes that final completion will be delayed without excuse, the City shall be entitled, but not required, to withhold from any amounts otherwise due the Contractor an amount then believed by the City to be adequate to recover liquidated damages applicable to such delays. If and when the Contractor overcomes the delay in achieving final completion, or any part thereof, for which the City has withheld payment, the City shall promptly release to the Contractor those funds withheld, but no longer applicable, as liquidated damages.

5.5.2 The Contractor shall not be entitled to final payment unless and until it submits to the City all documents required by the Contract, including, but not limited to, its affidavit that all payrolls, invoices for materials and equipment, and other liabilities connected with the Work for which the City, or the City's property might be responsible, have been fully paid or otherwise satisfied; releases and waivers of lien from all Subcontractors of the Contractor and of any and all other parties required by the City; consent of Surety, if any,

to final payment. If any third party fails or refuses to provide a release of claim or waiver of lien as required by the City, the Contractor shall furnish a bond satisfactory to the City to discharge any such lien or indemnify the City from liability.

5.5.3 Upon a determination by an inspector representing the City that the Work is complete in full accordance with this Contract, the City shall pay the Contractor an amount sufficient to increase total payments to the Contractor to one hundred percent (100%) of the Contract Price less two hundred percent (200%) of the reasonable cost as determined by the City for completing all incomplete Work, correcting and bringing into conformance all defective and nonconforming Work, and handling all unsettled claims.

The City shall make final payment of all sums due the Contractor within thirty (30) days of final completion of the Project as determined by an inspector representing the City.

5.5.4 Acceptance of final payment shall constitute a waiver of all claims against the City by the Contractor except for those claims previously made in writing against the City by the Contractor, pending at the time of final payment, and identified in writing by the Contractor as unsettled at the time of its request for final payment.

ARTICLE VI

THE CITY

6.1 City Responsibility

6.1.1 Excluding permits and fees normally the responsibility of the Contractor, the City shall obtain all approvals, easements, and the like required for construction and shall pay for necessary assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

6.2 Right to Stop Work

6.2.1 If the Contractor persistently fails or refuses to perform the Work in accordance with this Contract, the City may order the Contractor to stop the Work, or any described portion thereof, until the cause for stoppage has been corrected no longer exists, or the City orders that Work be resumed. In such event, the Contractor shall immediately obey such order.

6.3 City's Right to Carry Out Work

6.3.1 If the City determines to order the Contractor to stop the Work under the provisions of Paragraph 6.2, the City shall provide notice to the Contractor and the Contractor's surety under the performance bond that they have seven (7) days to provide adequate assurance to the City that the cause of such stoppage will be eliminated or corrected and provide the City with a plan to remedy the cause of such Work stoppage. If the Contractor and the surety fail within seven (7) days of such Work stoppage to provide such assurance, then the City may, without prejudice to any other rights or remedies the City may have against the Contractor, proceed to carry out the remedies necessary to eliminate or correct the cause of such Work stoppage. Upon proceeding to perform or cause to be performed any corrective actions, the City shall provide notice to the Contractor and the surety of action being taken by the City. In such a situation, an appropriate Change Order shall be issued deducting from the Contract Price the cost of correcting the subject deficiencies. If the unpaid portion of the Contract Price is insufficient to cover the amount due the City, the Contractor and the surety shall be responsible for paying the difference to the City.

ARTICLE VII

THE CONTRACTOR

7.1 Duties with Respect to Documents

7.1.1 The Contractor is again reminded of its continuing duty set forth in Subparagraph 1.6.7. The Contractor shall perform no part of the Work at any time without adequate Contract Documents or, as appropriate, approved shop drawings, product data or samples for such portion of the Work. If the Contractor performs any of the Work knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the City, the Contractor shall bear responsibility for such performance and shall bear the cost of correction.

7.2 Manner of Performance

7.2.1 The Contractor shall perform the Work strictly in accordance with this Contract.

7.3 Supervision

7.3.1 The Contractor shall supervise and direct the Work using the Contractor's best skill, effort and attention. The Contractor shall be responsible to the City for any and all acts or omissions of the Contractor, its employees and others engaged in the Work on behalf of the Contractor.

7.4 Compliance

7.4.1 The Contractor's performance of the Work shall comply with all federal and state legal requirements imposed on GDOT including specifically, but not limited to, the provisions governing GDOT's authority to contract, Sections 32-2-60 through 32-2-77 of the Official Code of Georgia Annotated; GDOT's Rules and Regulations Governing the Prequalification of Prospective Bidders, Chapter 672-5; and GDOT's Standard Specifications, Construction of Transportation Systems (current edition), and Special Provisions modifying them, except as noted in the General Conditions to the Contract including in the Contract Documents. The Contractor shall require all subcontracts for construction of the Project to incorporate the requirements of this Subparagraph.

7.4.2 The Contractor shall comply with the provisions of Federal Form-1273, attached hereto as EXHIBIT C, REQUIRED CONTRACT PROVISIONS – FEDERAL AID CONSTRUCTION CONTRACTS, and incorporated herein. The Contractor further agrees to require compliance with and physical incorporation of the provisions of Federal Form-1273 into all subcontracts for construction of the Project.

7.4.3 The Contractor shall comply with and shall require its Subcontractors to comply with the regulations for compliance with Title VI of the Civil Rights Act of 1964, as amended, and 23 CFR 200, as stated in EXHIBIT D, NOTICE TO CONTRACTORS - COMPLIANCE WITH TITLE VI OF THE CIVIL RIGHTS ACT OF 1964, attached hereto and incorporated herein.

7.4.4 The Contractor shall comply with the provisions of Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246) (43 CFR 14895) and shall physically include the provisions of Executive Order 11246 in each subcontract in excess of \$10,000. A copy of Executive Order 11246 (43 CFR 14895) is attached to this Agreement as EXHIBIT E, STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246) (43 CFR 14895), and incorporated herein.

7.4.5 The Contractor shall certify that the provisions of Section 50-24-1 through 50-24-6 of the Official Code of Georgia Annotated relating to the "Drug-Free Workplace Act" have been complied with in full, in the form attached hereto as EXHIBIT F, CERTIFICATION OF SPONSOR - DRUG-FREE WORKPLACE, and

incorporated herein.

7.4.6 The Contractor shall subcontract a minimum of N/A percent (N/A%) of the total amount of Project funds to Disadvantaged Business Enterprise (“DBE”), as defined and provided for under the Federal Rules and Regulations 49 CFR 23 and 26, and as outlined in EXHIBIT G, DBE REQUIREMENTS, attached hereto and incorporated herein.

7.4.7 The Contractor shall comply with and shall require its Subcontractors to comply with all applicable requirements of the American with Disabilities Act of 1990 (“ADA”), 42 U.S.C. 12101, et seq. and 49 U.S.C. 322; Section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. 791, and regulations and amendments thereto.

7.4.8 The Contractor shall provide to the City in the form attached hereto as EXHIBIT H, CONTRACTOR CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS, a certification regarding debarment, suspension, ineligibility and voluntary exclusion in compliance with Executive Order 12549 and 49 CFR 29, according to instructions attached to the certification form. As a part of the Exhibit H certification, the Contractor agrees to include the clause titled “Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transaction,” as provided by GDOT without modification, in all lower tier covered transactions and in all solicitations for lower tier transactions, and shall cause the lower tier participant or Subcontractor to submit the certification attached hereto as EXHIBIT I, LOWER TIER CONTRACTOR CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS, according to the instructions attached to the certification form.

7.4.9 The Contractor shall comply with and shall require its Subcontractors to comply with all applicable requirements of the Davis-Bacon Act of 1931, 40 U.S.C. 276(a), as prescribed by 23 U.S.C. 113 for federal aid highway projects, except roadways classified as local roads or rural minor collectors. **Note: Davis-Bacon Wage Rates not required for this contract.**

7.4.10 The Contractor shall comply with and shall require its Subcontractors to comply with Section 25-9-1, et seq. of the Georgia Code Annotated, “Georgia Utility Facility Protection Act”, CALL BEFORE YOU DIG 1-800-282-7411.

7.4.11 The Contractor shall comply with and shall cause its Subcontractors to comply with the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330), as supplemented by Department of Labor Regulations (29 CFR Part 5).

7.4.12 The Contractor shall comply with and shall cause its Subcontractors to comply with the Copeland “Anti-Kickback” Act (18 U.S.C. 874), as supplemented in Department of Labor Regulations (29 CFR, Part 3).

7.4.13 The Contractor shall execute a certification and shall cause all Subcontractors to execute a certification in the form of EXHIBIT J, CERTIFICATION OF CONTRACTOR – GEORGIA SECURITY AND IMMIGRATION COMPLIANCE ACT, attached hereto and incorporated herein. Pursuant to the certification, Contractor agrees to comply with all applicable requirements of the Georgia Security and Immigration Compliance Act of 2006 as codified in O.C.G.A. Sections 13-10-90 and 13-10-91 and regulated in Chapter 300-10-1 of the Rules and Regulations of the State of Georgia, “Public Employers, Their Contractors and Subcontractors Required to Verify New Employee Work Eligibility Through a Federal Work Authorization Program,” accessed at <http://www.dol.state.ga.us>.

7.4.14 The Contractor acknowledges and agrees that the failure to complete appropriate certifications or the submission of a false certification as required herein shall result in the termination of this Agreement as provided in Article XII herein.

7.5 Warranty

7.5.1 The Contractor warrants to the City that all labor furnished to progress the Work under this Contract will be competent to perform the tasks undertaken, that the product of such labor will yield only first-class results, that materials and equipment furnished will be of good quality and new unless otherwise permitted by this Contract, and that the Work will be of good quality, free from faults and defects and in strict conformance with this Contract. All Work not conforming to these requirements may be considered defective. Unless otherwise specified in this Contract, acceptance shall be final and conclusive except for latent defects, fraud, gross mistakes amounting to fraud, or the City's rights under any warranty or guarantee. The Contractor shall remedy all defects in the Work and pay for damage to the Work and/or to other City property resulting from defective Work, which shall appear within a minimum period of one (1) year from the date of acceptance of the Work under this Contract, unless a longer period is specified. The one (1) year warranty period shall begin after any repairs are performed, if needed.

7.6 Permits, Inspections, Fees and Licenses

Except as otherwise provided herein, the Contractor shall obtain and pay for all permits, inspections, fees and licenses necessary and ordinary for the Work. The Contractor shall comply with all lawful requirements applicable to the Work and shall give and maintain any and all notices required by applicable law, ordinance, or regulation pertaining to the Work.

7.7 Supervision

7.7.1 The Contractor shall employ and maintain at the Project Site only competent supervisory personnel. Absent written instruction from the Contractor to the contrary, the superintendent shall be deemed the Contractor's authorized representative at the Project Site and shall be authorized to receive and accept any and all communications from the City.

7.8 Schedules

7.8.1 The Contractor shall submit to the City on a weekly basis a Schedule of Work to be performed for the next two (2) weeks. The Schedule of Work must be delivered to the City each Thursday no later than 12:00 noon. The Contractor's Schedule of Work shall be prepared in such form, with such detail, and supported by such data as the City may require. The City reserves the right to prohibit Work on any section of the Project not included in the weekly Schedule of Work. The Schedule of Work must accurately represent the intended Work and cannot be vague or broad, such as listing all Work in the Contract. The violation of this provision by the Contractor shall constitute a material breach of this Contract. **THE PARTIES SPECIFICALLY AGREE THAT ANY FLOAT CONTAINED IN THE SCHEDULES SHALL BELONG TO THE PROJECT AND IN NO EVENT SHALL THE CONTRACTOR MAKE CLAIM FOR ANY ALLEGED DELAY, ACCELERATION, OR EARLY COMPLETION SO LONG AS THE PROJECT IS COMPLETED WITHIN THE CONTRACT TIME.** Strict compliance with the requirements of this Paragraph is a condition precedent for payment to the Contractor, and failure by the Contractor to strictly comply with said requirements shall constitute a material breach of this Contract.

7.9 Contract to be maintained at Project Site

The Contractor shall continuously maintain at the Project Site, for the benefit of the City, one record copy of this Contract marked to record on a current basis changes, selections and modifications made during construction. Additionally, the Contractor shall maintain at the Project Site for the City the approved shop drawings, product data, samples and other similar required submittals. Upon final completion of the Work, all of these record documents shall be delivered to the City.

7.10 Shop Drawings, Product Data and Samples

7.10.1 Shop drawings, product data, samples and other submittals from the Contractor do not constitute Contract Documents. Their purpose is merely to demonstrate the manner in which the Contractor intends to implement the Work in conformance with information received from the Contract Documents.

7.10.2 The Contractor shall not perform any portion of the Work requiring submittal and review of shop drawings, product data or samples unless and until such submittal shall have been approved by the City. Approval by the City, however, shall not be evidence that Work installed pursuant thereto conforms with the requirements of this Contract.

7.11 Cleaning the Project Site and the Project

7.11.1 The Contractor shall keep the Project Site reasonably clean during performance of the Work. Upon final completion of the Work, the Contractor shall clean the Project Site and the Project and remove all waste, together with all of the Contractor's property from the Project Site.

7.12 Access to Work

7.12.1 Access to the Work shall be given to the City, GDOT and any affected federal agency requiring access to the Work at all times from commencement of the Work through final completion. The Contractor shall take whatever steps necessary to provide access when requested.

7.13 Indemnity

7.13.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the City and GDOT, their boards, officials, directors, officers, employees, representatives, agents, and volunteers from and against all liability, claims, damages, losses and expenses, including attorneys' fees, arising out of or resulting from performance of the Work, provided that such liability, claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such liability, claim, damage, loss or expense is caused in part by a party indemnified hereunder.

7.13.2 In claims against any person or entity indemnified under this Paragraph 7.13 by an employee of the Contractor, a Subcontractor, any one directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Paragraph 7.13 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

7.13.3 The Contractor shall ensure that the provisions of this Paragraph 7.13 are included in all contracts and subcontracts for the performance of Work under this Agreement.

7.14 Means, Methods, Techniques, Sequences, Procedures and Safety

7.14.1 The Contractor is fully responsible for, and shall have control over, all construction means, methods, techniques, sequences, procedures and safety, and shall coordinate all portions of the Work required by the Contract Documents. The Contractor shall confine its apparatus, material and the operations of its workers to limits/requirements indicated by law, ordinances, permits, codes and any restrictions of the City, and shall not unreasonably encumber the premises with its materials or supplies.

The Contractor shall adequately protect its own property from damage, will protect the City's property from damage or loss, and will take all necessary precautions during the progress of the work to protect all persons and the property of others from injury or damage. The Contractor shall take all precautions for the safety of employees, and shall comply with all applicable provisions of Federal, State and local safety laws, building codes and any restrictions of the City to prevent accidents or injury to persons on, about, or adjacent to the premises where work is being performed.

The Contractor shall erect and properly maintain at all times as required by the conditions, service and work, all necessary safeguards for the protection of its employees, the Contractor's employees, and the public, and shall post signs warning against potential hazards.

7.15 Separate Contracts

7.15.1 The City reserves the right to perform work on the premises with its own forces or by the use of other contractors. In such event, the Contractor shall fully cooperate with the City and such other contractors and shall coordinate, schedule and manage its work so as not to hinder, delay or otherwise interfere with the separate work of the City or other contractors.

7.16 Maintenance of Contract Cost Records

7.16.1 The Contractor shall maintain all books, documents, papers, accounting records, and other evidence pertaining to costs incurred on the Project and used in support of its Bid and shall make such material available at all reasonable times during the period of the Contract, and for three (3) years from the date of final payment under the Contract, for inspection by GDOT and any reviewing agencies, and copies thereof shall be furnished upon request. The Contractor agrees that the provisions of this Subparagraph shall be included in any agreement it may make with any Subcontractor, assignee, or transferee.

ARTICLE VIII

CONTRACT ADMINISTRATION

8.1 Claims by the Contractor

8.1.1 All Contractor claims shall be initiated by written notice and claim to the City. Such written notice and claim must be furnished within seven (7) days after occurrence of the event, or the first appearance of the condition, giving rise to the claim.

8.1.2 Pending final resolution of any claim of the Contractor, the Contractor shall diligently proceed with performance of this Contract and the City shall continue to make payments to the Contractor in accordance with this Contract. The resolution of any claim under this Paragraph 8.1 shall be reflected by a Change Order executed by the City and the Contractor.

8.1.3 **Claims for Concealed and Unknown Conditions** -- Should concealed and unknown conditions encountered in the performance of the Work (a) below the surface of the ground or (b) in an existing structure be at variance with the conditions indicated by this Contract, or should unknown conditions of an unusual nature differing materially from those ordinarily encountered in the area and generally recognized as inherent in Work of the character provided for in this Contract, be encountered, the Contract Price shall be equitably adjusted by Change Order upon the written notice and claim by either party made within seven (7) days after the first observance of the condition. As a condition precedent to the City having any liability to the Contractor for concealed or unknown conditions, the Contractor must give the City written notice of, and an opportunity to observe, the condition prior to disturbing it. The failure by the Contractor to make the written notice and claim as provided in this Subparagraph shall constitute a waiver by the Contractor of any claim arising out of or relating

to such concealed or unknown condition.

8.1.4 Claims for Additional Costs -- If the Contractor wishes to make a claim for an increase in the Contract Price, as a condition precedent to any liability of the City therefor, the Contractor shall give the City written notice of such claim within seven (7) days after the occurrence of the event, or the first appearance of the condition, giving rise to such claim. Such notice shall be given by the Contractor before proceeding to execute any additional or changed Work. The failure by the Contractor to give such notice prior to executing the Work shall constitute a waiver of any claim for additional compensation.

8.1.4.1 In connection with any claim by the Contractor against the City for completion in excess of the Contract Price, any liability of the City shall be strictly limited to direct costs incurred by the Contractor and shall in no event include indirect costs or consequential damages of the Contractor. The City shall not be liable to the Contractor for claims of third parties, including Subcontractors, unless and until liability of the Contractor has been established therefor in a court of competent jurisdiction.

8.1.5 Claims for Additional Time -- If the Contractor is delayed in progressing any task which at the time of the delay is then critical or which during the delay becomes critical, as the sole result of any act or neglect to act by the City or someone acting in the City's behalf, or by changes ordered in the Work, unusual delay in transportation, unusually adverse weather conditions not reasonably anticipatable, fire or any causes beyond the Contractor's control, then the date for achieving Substantial Completion of the Work shall be extended upon the written notice and claim of the Contractor to the City, for such reasonable time as the City may determine. Any notice and claim for an extension of time by the Contractor shall be made not more than seven (7) days after the occurrence of the event or the first appearance of the condition giving rise to the claim and shall set forth in detail the Contractor's basis for requiring additional time in which to complete the Project. In the event the delay to the Contractor is a continuing one, only one notice and claim for additional time shall be necessary. If the Contractor fails to make such claim as required in this Subparagraph, any claim for an extension of time shall be waived.

8.1.6 Extension of Contract Time for Unusually Adverse Weather Conditions not Reasonably Anticipated

8.1.6.1 Pursuant to the provisions of Subparagraph 8.1.5 of the Contract Agreement, the Contract Time may be extended upon written notice and claim of the Contractor to the City as set forth in such Subparagraph and as further set forth herein. It is, however, expressly agreed that the time for completion as stated in the Contract Documents includes due allowance for calendar days on which work cannot be performed out-of-doors.

Furthermore, in addition to the notice requirements set forth in the aforesaid Subparagraph 8.1.5, the Contractor agrees that it shall provide written notice to the City on the day of any adverse weather not anticipated and for which a request for a time extension has been, or will be, made. Said notice shall state with particularity a description of the adverse weather as well as a description of the nature and extent of any delay caused by such weather. Receipt of this notice by the City is a condition precedent to the submission of any claim for an extension of time as provided by Subparagraph 8.1.5. Furthermore, as required by Subparagraph 8.1.5, the Contractor shall submit a written claim for extension of time within seven (7) days after the occurrence of the adverse weather and such claim shall be supported by such documentation including, but not limited to, official weather reports, as the City may require. To the extent that any of the terms and conditions set forth in this paragraph are in conflict with any of the terms and conditions of Subparagraph 8.1.5 as identified herein, the terms and conditions of this paragraph shall govern and control.

ARTICLE IX
SUBCONTRACTORS

9.1 Definition

9.1.1 A Subcontractor is an entity which has a direct contract with the Contractor to perform a portion of the Work.

9.2 Award of Subcontracts

9.2.1 Upon execution of the Contract, the Contractor shall furnish the City, in writing, the names of persons or entities proposed by the Contractor to act as a Subcontractor on the Project. The City shall promptly reply to the Contractor, in writing, stating any objections the City may have to such proposed Subcontractor. The Contractor shall not enter into a Subcontract with a proposed Subcontractor with reference to whom the City has made timely objection. The Contractor shall not be required to subcontract with any party to whom the Contractor has objection.

9.2.2 All subcontracts shall afford the Contractor rights against the Subcontractor which correspond to those rights afforded to the City against the Contractor herein, including those rights afforded to the City by Subparagraph 12.2.1 below.

9.2.3 All subcontracts shall comply with the requirements of Paragraph 7.4 above.

ARTICLE X

CHANGES IN THE WORK

10.1 Changes Permitted

10.1.1 Changes in the Work within the general scope of this Contract, consisting of additions, deletions, revisions, or any combination thereof, may be ordered without invalidating this Contract, by Change Order or by Field Order.

10.1.2 Changes in the Work shall be performed under applicable provisions of this Contract and the Contractor shall proceed promptly with such changes.

10.2 Change Order Defined

10.2.1 Change Order shall mean a written order to the Contractor executed by the City, issued after execution of this Contract, authorizing and directing a change in the Work or an adjustment in the Contract Price or the Contract Time, or any combination thereof. The Contract Price and the Contract Time may be changed only by Change Order.

10.3 Changes in the Contract Price

10.3.1 Any change in the Contract Price resulting from a Change Order shall be determined as follows by mutual agreement between the City and the Contractor as evidenced by (1) the change in the Contract Price being set forth in the Change Order, (2) such change in the Contract Price, together with any conditions or requirements related thereto, being initialed by both parties and (3) the Contractor's execution of the Change Order.

10.3.2 If unit prices are provided in the Contract, and if the quantities contemplated are so changed in a proposed Change Order that application of such unit prices to the quantities of Work proposed will cause substantial inequity to the City or to the Contractor, the applicable unit prices shall be equitably adjusted.

10.4 Effect of Executed Change Order

10.4.1 The execution of a Change Order by the Contractor shall constitute conclusive evidence of the Contractor's agreement to the ordered changes in the Work, this Contract as thus amended, the Contract Price and the Contract Time. The Contractor, by executing the Change Order, waives and forever releases any claim against the City for additional time or compensation for matters relating to or arising out of or resulting from the Work included within or affected by the executed Change Order.

10.5 Notice to Surety; Consent

10.5.1 The Contractor shall notify and obtain the consent and approval of the Contractor's surety with reference to all Change Orders if such notice, consent or approval are required by the Contractor's surety or by law. The Contractor's execution of the Change Order shall constitute the Contractor's warranty to the City that the surety has been notified of and consents to, such Change Order and the surety shall be conclusively deemed to have been notified of such Change Order and to have expressly consented thereto.

ARTICLE XI

UNCOVERING AND CORRECTING WORK

11.1 Uncovering Work

11.1.1 If any of the Work is covered contrary to the City's request or to any provisions of this Contract, it shall, if required by the City, be uncovered for the City's inspection and shall be properly replaced at the Contractor's expense without change in the Contract Time.

11.1.2 If any of the Work is covered in a manner not inconsistent with Subparagraph 11.1.1 above, it shall, if required by the City, be uncovered for the City's inspection. If such Work strictly conforms with the provisions of this Contract, costs of uncovering and proper replacement shall by Change Order be charged to the City. If such Work does not strictly conform with the provisions of this Contract, the Contractor shall pay the costs of uncovering and proper replacement.

11.2 Correcting Work

11.2.1 The Contractor shall immediately proceed to correct Work rejected by the City as defective or failing to conform to this Contract. The Contractor shall pay all costs and expenses associated with correcting such rejected Work, including any additional testing and inspections, and reimbursement to the City for services and expenses made necessary thereby, if any.

11.2.2 If within one (1) year after Substantial Completion of the Work any of the Work is found to be defective or not in accordance with this Contract, the Contractor shall correct it promptly upon receipt of written notice from the City. This obligation shall survive final payment by the City and termination of this Contract. With respect to Work first performed and completed after Substantial Completion, this one (1) year obligation to specifically correct defective and nonconforming Work shall be extended by the period of time which elapses between Substantial Completion and final completion of the subject Work.

11.2.3 Nothing contained in this Paragraph 11.2 shall establish any period of limitation with respect to other obligations which the Contractor has under this Contract. Establishment of the one (1) year time period in Subparagraph 11.2.2 relates only to the duty of the Contractor to specifically correct the Work.

11.3 City May Accept Defective or Nonconforming Work

11.3.1 If the City chooses to accept defective or nonconforming Work, the City may do so. In such event, the Contract Price shall be reduced by the greater of (a) the reasonable cost of removing and correcting the

defective or nonconforming Work, and (b) the difference between the fair market value of the Project as constructed and the fair market value of the Project had it not been constructed in such a manner as to include defective or nonconforming Work. If the remaining portion of the unpaid Contract Price, if any, is insufficient to compensate the City for its acceptance of defective or nonconforming Work, the Contractor shall, upon written demand from the City, pay the City such remaining compensation for accepting defective or nonconforming Work.

ARTICLE XII

CONTRACT TERMINATION

12.1 Termination by the Contractor

12.1.1 If the Work is stopped for a period of ninety (90) days by an order of any court or other public authority, or as a result of an act of the government, through no fault of the Contractor or any person or entity working directly or indirectly for the Contractor, the Contractor may, upon ten (10) days' written notice to the City, terminate performance under this Contract and recover from the City payment for the actual reasonable expenditures of the Contractor (as limited in Subparagraph 10.3.2 above) for all Work executed and for materials, equipment, tools, construction equipment and machinery actually purchased or rented solely for the Work, less any salvage value of any such items.

12.1.2 If the City shall persistently or repeatedly fail to perform any material obligation to the Contractor for a period of fifteen (15) days after receiving written notice from the Contractor of its intent to terminate hereunder, the Contractor may terminate performance under this Contract by written notice to the City. In such event, the Contractor shall be entitled to recover from the City as though the City had terminated the Contractor's performance under this Contract for convenience pursuant to Subparagraph 12.2.1 hereunder.

12.2 Termination by the City

12.2.1 For Convenience

12.2.1.1 The City may for any reason whatsoever terminate performance under this Contract by the Contractor for convenience. The City shall give written notice of such termination to the Contractor specifying when termination becomes effective.

12.2.1.2 The Contractor shall incur no further obligations in connection with the Work and the Contractor shall stop Work when such termination becomes effective. The Contractor shall also terminate outstanding orders and subcontracts. The Contractor shall settle the liabilities and claims arising out of the termination of subcontracts and orders. The City may direct the Contractor to assign the Contractor's right, title and interest under terminated orders or subcontracts to the City or its designee.

12.2.1.3 The Contractor shall transfer title and deliver to the City such completed or partially completed Work and materials, equipment, parts, fixtures, information and Contract rights as the Contractor has.

12.2.1.4

- (a) The Contractor shall submit a termination claim to the City specifying the amounts due because of the termination for convenience together with costs, pricing or other data required by the City. If the Contractor fails to file a termination claim within one (1) year from the effective date of termination, the City shall pay the Contractor an amount derived in accordance with subparagraph (c) below.

- (b) The City and the Contractor may agree to the compensation, if any, due to the Contractor hereunder.
- (c) Absent agreement to the amount due to the Contractor, the City shall pay the Contractor the following amounts:
 - (i) Contract prices for labor, materials, equipment and other services accepted under this Contract;
 - (ii) Reasonable costs incurred in preparing to perform and in performing the terminated portion of the Work, and in terminating the Contractor's performance, plus a fair and reasonable allowance for overhead and profit thereon (such profit shall not include anticipated profit or consequential damages); provided however, that if it appears that the Contractor would have not profited or would have sustained a loss if the entire Contract would have been completed, no profit shall be allowed or included and the amount of compensation shall be reduced to reflect the anticipated rate of loss, if any;
 - (iii) Reasonable costs of settling and paying claims arising out of the termination of subcontracts or orders pursuant to Subparagraph 12.2.1.2 of this Paragraph. These costs shall not include amounts paid in accordance with other provisions hereof.

The total sum to be paid the Contractor under this Subparagraph 12.2.1 shall not exceed the total Contract Price, as properly adjusted, reduced by the amount of payments otherwise made, and shall in no event include duplication of payment.

12.2.2 For Cause

12.2.2.1 If the Contractor persistently or repeatedly refuses or fails to prosecute the Work in a timely manner, supply enough properly skilled workers, supervisory personnel or proper equipment or materials, or if it fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a material provision of this Contract, then the City may by written notice to the Contractor and the surety, without prejudice to any other right or remedy, terminate the employment of the Contractor and take possession of the Project Site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may proceed to carry out the remedies necessary to finish the Work by whatever methods it may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the Work is finished.

12.2.2.2 If the unpaid balance of the Contract Price exceeds the cost of finishing the Work, including compensation for additional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the City. This obligation for payment shall survive the termination of the Contract.

12.2.2.3 In the event the employment of the Contractor is terminated by the City for cause pursuant to Subparagraph 12.2.2 and it is subsequently determined by a Court of competent jurisdiction that such termination was without cause, such termination shall thereupon be deemed a termination for convenience under Subparagraph 12.2.1 and the provisions of Subparagraph 12.2.1 shall apply.

ARTICLE XIII

INSURANCE

13.1 Insurance Requirements

13.1.1 Prior to beginning Work on the Project, the Contractor shall procure and maintain for the duration of this Contract, and for one (1) years thereafter, at its sole cost and expense such insurance as will fully protect it and the City and the City's boards, officials, directors, officers, employees, representatives, agents, and volunteers from incidents, accidents and claims for personal injury, bodily injury, and property damage which may arise from or in connection with the performance of the work and for the Contractor's professional liability (errors and omissions) under this Contract, whether such services and work are performed by the Contractor, its agents, representatives, employees, or by any subcontractor or any tier directly employed or retained by either. The following is the minimum insurance and limits that the Contractor must maintain. If the Contractor maintains higher limits than the minimums shown below, the City requires and shall be entitled to coverage for the higher limits maintained by the Contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City.

All of the insurance herein specified shall be written on a form acceptable to the City and shall be A.M. Best Company rated A X or greater. See EXHIBIT K, INSURANCE REQUIREMENTS attached hereto and incorporated herein.

13.1.2 All such insurance shall remain in effect until final payment is made and the Project is accepted by the City. If the Contractor receives notice of non-renewal or material adverse change of any of the required coverages, the Contractor shall promptly advise the City in writing. Failure of the Contractor to promptly notify the City on non-renewal or material adverse change of any of the required coverages terminates the Agreement as of the date that the Contractor should have given notification to the City. The insurance policies shall contain or be endorsed to contain, the following provisions:

- (a) A provision that coverage afforded under such policies shall not expire, be canceled or altered without at least thirty (30) days prior written notice to the City.
- (b) Workers' Compensation and Employer's Liability and Property insurance policies shall contain a waiver of subrogation in favor of the City and the City's boards, officials, directors, officers, employees, representatives, agents, and volunteers.
- (c) Commercial General Liability, Automobile Liability Contractors' Pollution Legal Liability and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) insurance policies shall include an endorsement making the City and the City's boards, officials, directors, officers, employees, representatives, agents, and volunteers Additional Insureds under such policies.

A copy of these endorsements shall be provided to the City.

Certificates of Insurance showing that such coverage is in force shall be filed under this Contract by the Contractor to the City.

The obligations for the Contractor to procure and maintain insurance shall not be construed to waive or restrict other obligations and it is understood that insurance in no way limits liability of the Contractor whether or not same is covered by insurance.

13.1.3 If the City has any objections to the coverage afforded by or provisions of the insurance required to be purchased and maintained by the Contractor, the City will notify the Contractor thereof within twenty (20) days of the date of delivery of such certificates to the City.

13.1.4 The Contractor shall provide to the City such additional information in respect of insurance provided by it as the City may reasonably request. The right of the City to review and comment on certificates of insurance

is not intended to relieve the Contractor of his responsibility to provide insurance coverage as specified nor to relieve the Contractor of his liability for any claims which might arise.

13.1.5 The Contractor agrees to require its Subcontractors to obtain insurance complying with the requirements the requirements of the Contract Documents.

ARTICLE XIV

DISPUTES

No civil action with respect to any dispute, claim or controversy arising out of or relating to this Contract may be commenced without first giving fourteen (14) calendar days written notice to Sandy Springs of the claim and the intent to initiate a civil action.

ARTICLE XV

INDEPENDENT CONTRACTOR

15.1 Relationship between Contractor and City

15.1.1 The Contractor shall perform the services under this Agreement as an independent contractor and nothing contained herein shall be construed to be inconsistent with such relationship or status. Nothing in this Agreement shall be interpreted or construed to constitute the Contractor or any of its agents or employees to be the agent, employee or representative of the City. Inasmuch as the City and the Contractor are contractors independent of one another, neither has the authority to bind the other to any third person or otherwise to act in any way as the representative of the other, unless otherwise expressly agreed to in writing signed by both parties hereto. The Contractor agrees not to represent itself as the City's agent for any purpose to any party or to allow any employee or agent of the Contractor to do so, without specific prior written authorization from the City, and then only for the limited purpose stated in such authorization.

15.1.2 The Contractor shall assume full liability for any contracts or agreements that the Contractor enters into on behalf of the City without the express knowledge and prior written authorization of the City.

ARTICLE XVI

COVENANT AGAINST CONTINGENT FEES

16.1 Warranty by Contractor

16.1.1 Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this Agreement upon an agreement or understanding for any fee, commission, percentage, brokerage or contingent fee, gift or other consideration, excepting bona fide employees maintained by Contractor for the purpose of securing business and that Contractor has not received any non-City fee related to this Agreement without the prior written consent of the City.

16.1.2 For breach or violation of this warranty, the City shall have the right to annul this Agreement without liability or at its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of any such fee, commission, percentage, brokerage or contingent fee, gift or other consideration.

ARTICLE XVII

MISCELLANEOUS

17.1 Governing Law

17.1.1 The Contract shall be administered and interpreted under the laws of the State of Georgia. Jurisdiction of litigation arising from this Agreement shall be in Georgia. If any part of this Agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void insofar as it is in conflict with said laws, but the remainder of this Agreement shall be in full force and effect.

Whenever reference is made in the Agreement to standards or codes in accordance with which work is to be performed, the edition or revision of the standards or codes current on the effective date of this Agreement shall apply, unless otherwise expressly stated.

17.2 Successors and Assigns

17.2.1 The City and Contractor bind themselves, their successors, assigns and legal representatives to the other party hereto and to successors, assigns and legal representatives of such other party in respect to covenants, agreements and obligations contained in this Contract. The Contractor shall not assign this Contract without written consent of the City.

17.3 Surety Bonds

17.3.1 The Contractor shall furnish separate performance and payment bonds to the City. Each bond shall set forth a penal sum in an amount not less than the Contract Price. Each bond furnished by the Contractor shall incorporate by reference the terms of this Contract as fully as though they were set forth verbatim in such bonds. In the event the Contract Price is adjusted by Change Order executed by the Contractor, the penal sum of both the performance bond and the payment bond shall be deemed increased by like amount. The performance and payment bonds furnished by the Contractor shall be in form suitable to the City and shall be executed by a surety, or sureties, reasonably suitable to the City. Bonds shall be issued by a corporate surety appearing on the Treasury Department’s most current list (Circular 570, as amended) and be authorized to do business in the State of Georgia. The date of the bond must not be prior to the date of the Agreement. If the Contractor is a partnership, all partners shall execute the bond.

It is mutually agreed by the parties hereto that if at any time after execution of this Agreement and the surety bonds for its faithful performance, the City shall deem the surety or sureties upon such bonds to be unsatisfactory, or if for any reason such bonds cease to be adequate to cover the performance of the Work, the Contractor shall, at its expense, within five (5) days after receipt of notice from the City 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 City. In such event, no further payment to the Contractor shall be deemed due under this Agreement until such new or additional security for the faithful performance of the Work shall be furnished in manner and form satisfactory to the City.

17.4 Notices

If to the City:

John McDonough, City Manager
7840 Roswell Road, Building 500
Sandy Springs, Georgia 30350

With copies to:

Wendell Willard, City Attorney
7840 Roswell Rd. Suite 330
Sandy Springs, Georgia 30350

If to Contractor:

Contractor Contact, Title
Address

With copies to:

City, State Zip

IN WITNESS WHEREOF, the parties hereto, acting through their duly authorized agents, have signed and sealed this Agreement.

CITY OF SANDY SPRINGS, GEORGIA

By: _____
John McDonough, City Manager

Date of Execution

ATTEST:

By: _____
City Clerk

(SEAL)

Approved as to Form:

By: _____
Assistant City Attorney

CONTRACTOR

Date of Execution

By: _____
Name:

(Typed or printed name)

Title

ATTEST:

By: _____
Secretary for Corporation

(SEAL)

Witness

Executed in originals of four (4).

**EXHIBIT A
TO CONTRACT AGREEMENT**

SCOPE OF SERVICES

Glenforest Road Drainage Improvement Project

This project includes the construction of four proposed drainage structures and approximately 224 LF of proposed storm drain at the intersection of Glenforest Road and Brookgreen Road in Sandy Springs, Georgia. The project also includes modification of sanitary sewer profiles to avoid conflict with the new culvert under Glenforest Road. Please refer to construction plans titled “Glenforest Road Drainage Improvement Project” by Columbia Engineering dated July 30, 2014 for more detailed information on the scope.

The Contractor shall provide the necessary machinery, tools, apparatus, other means of construction, and all materials and labor specified in the Contract Documents or as necessary to complete the City of Sandy Springs Glenforest Road Drainage Improvement Project as per the plans.

Unless otherwise directed, all work performed shall be in accordance with the Georgia Department of Transportation Standard Specifications, Construction of Transportation Systems (current edition). All materials used in the process of completion of the work included in the Contract will be furnished from Georgia Department of Transportation certified suppliers only.

There is no City furnished equipment to be installed by the Contractor.

**EXHIBIT B
TO CONTRACT AGREEMENT
BID SCHEDULE**

DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST
MOBILIZATION (GDOT 151)	1	LS		
TRAFFIC CONTROL (GDOT 150)	1	LS		
GRADING COMPLETE (CLEAR, GRUB, REMOVE EXIST DRAIN STRUCTURES & PIPE, SHOULDER, FINE GRADING, REMOVE GUARD RAIL) (GDOT 210)	1	LS		
GRASSING, COMPLETE	1	LS		
SILT FENCE TYPE C, COMPLETE (Sd1)	520	LF		
INLET SEDIMENT TRAP (Sd2-F or P)	1	EACH		
SLOPE STABILIZATION (Ss)	215	SY		
24" RCP (H0-10)	60	LF		
48" RCP (H0-10)	170	LF		
TIE IN PIPE	1	EACH		
INVERT INSTALLATION	4	EACH		
SAN SEWER PIPE, 8 IN, DUCTILE IRON	110	LF		
CONCRETE HEADWALL	12	CY		
CLASSIFIED STONE (INCLUDING GAB)	120	TN		
MATCH EXISTING ASPHALT	1	LS		
CATCH BASIN, GROUP 1 (GADOT 1033/1034)	1	EACH		
SANITARY SEWER MANHOLE	3	EACH		
COMPLETE PRECAST MANHOLE, TYPE 1 (GADOT 1011A)	1	EACH		
6" X 24" X 12" HIGH BACK CURB & GUTTER	154	LF		
WATER MAIN, 8 IN, DIP (INCL FITTINGS, TESTING, DIS)	30	LF		
GATE VALVE, 8 IN	1	EA		
CONSTRUCT AND REMOVE ROCK FILTER DAM	1	EACH		
6" PUMP FOR FLOW CONTROL	250	HRS		
CONCRETE SPILLWAYS/DITCH AND TOP	1	LS		
RIP RAP BASIN TYPE III	33	SY		

ADJUST WATER VALVE TO GRADE	1	EACH		
FLOWABLE FILL	6	CY		
DEBRIS REMOVAL	5	EACH		
TOTAL OF BID LINE ITEMS				
UTILITY CONTINGENCY			25,000.00	25,000.00
TOTAL COST				

TOTAL BID PRICE: _____

TOTAL BID PRICE IN WORDS: _____

Total bid price shall include all costs. Compensation not to exceed negotiated compensation for services rendered to and accepted by the City of Sandy Springs.

BID PRICE CERTIFICATION

In compliance with the attached Specification, the undersigned offers and agrees that if this Bid is accepted, by the City Council within one hundred and twenty (120) days of the date of Bid opening, that he will furnish any or all of the Items upon which Prices are quoted, at the Price set opposite each Item, delivered to the designated point(s) within the time specified in the Bid Schedule.

COMPANY _____

ADDRESS _____

AUTHORIZED SIGNATURE _____

EMAIL ADDRESS _____

PRINT / TYPE NAME _____

**EXHIBIT C
TO CONTRACT AGREEMENT**

**REQUIRED CONTRACT PROVISIONS
FEDERAL AID CONSTRUCTION CONTRACTS
Not Applicable for this Contract.**

**EXHIBIT D
TO CONTRACT AGREEMENT**

**NOTICE TO CONTRACTORS
COMPLIANCE WITH TITLE VI OF THE CIVIL RIGHTS ACT OF 1964**

During the performance of this Contract, the Contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "Contractor"), agrees as follows:

1. Compliance with Regulations: The Contractor will comply with the Regulations of the Department of Transportation relative to nondiscrimination in Federally-assisted programs of the Department of Transportation (Title 49, Code of Federal Regulations, Part 21, hereinafter referred to as the "Regulations"), which are herein incorporated by reference and made a part of the Contract.
2. Nondiscrimination: The Contractor, with regard to the work performed by it afterward and prior to completion of the contract work, will not discriminate on the ground of race, color, sex, or national origin in the selection and retention of subcontracts including procurements of materials and leases of equipment. The Contractor will not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when contract covers a program set forth in Appendix B of the Regulations. In addition, the Contractor will not participate either directly or indirectly in discrimination prohibited by 23 CFR 710.405 (b).
3. Solicitations for subcontracts, including procurements of materials and equipment: In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this Contract and the Regulations relative to nondiscrimination on the ground of race, color, national origin or sex.
4. Information and Reports: The Contractor will provide all information and reports required by the Regulations, or orders and instructions issued pursuant thereto, and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
5. Sanctions for Noncompliance: In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Contract, the Department of Transportation shall impose such Contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:
 - (a) withholding of payments to the Contractors under the Contract until the Contractor complies, and/or
 - (b) Cancellation, termination or suspension of the Contract, in whole or in part.

6. Incorporation of Provisions: The Contractor will include the provisions of paragraph (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, orders or instruction issued pursuant thereto. The Contractor will take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as result of such direction, the Contractor may request the State to enter into such litigation to protect the interests of the State, and, in addition, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.

**EXHIBIT E
TO CONTRACT AGREEMENT**

**STANDARD FEDERAL EQUAL OPPORTUNITY
CONSTRUCTION CONTRACT SPECIFICATIONS
(EXECUTIVE ORDER 11246) (43 CFR 14895)
Not Applicable for this Contract.**

**EXHIBIT F
TO CONTRACT AGREEMENT**

**CERTIFICATION OF SPONSOR
DRUG-FREE WORKPLACE
(Bidder to sign and return)**

I hereby certify that I am a principal and duly authorized representative of _____, (“Contractor”), whose address is _____, _____, _____, and I further certify that:

- (1) The provisions of Section 50-24-1 through 50-24-6 of the Official Code of Georgia Annotated, relating to the “Drug-Free Workplace Act” have been complied with in full; and
- (2) A drug-free workplace will be provided for Contractor’s employees during the performance of the Agreement; and
- (3) Each Subcontractor hired by Contractor shall be required to ensure that the subcontractor’s employees are provided a drug-free workplace. Contractor shall secure from that subcontractor the following written certification: “As part of the subcontracting agreement with Contractor, _____ certifies to Contractor that a drug-free workplace will be provided for the Subcontractor’s employees during the performance of this Agreement pursuant to paragraph (7) of subsection (b) of the Official Code of Georgia Annotated, Section 50-24-3”; and
- (4) The undersigned will not engage in unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana during the performance of the Agreement.

CONTRACTOR:

Date: _____

Signature: _____

Title: _____

**EXHIBIT G
TO CONTRACT AGREEMENT**

**DBE REQUIREMENTS
Not Applicable to this project.**

**EXHIBIT H
TO CONTRACT AGREEMENT**

**CONTRACTOR
CERTIFICATION REGARDING DEBARMENT, SUSPENSION,
AND OTHER RESPONSIBILITY MATTERS
AND INSTRUCTIONS
Not Applicable for this Contract**

**EXHIBIT I
TO CONTRACT AGREEMENT**

**LOWER TIER
CERTIFICATION REGARDING DEBARMENT, SUSPENSION,
AND OTHER RESPONSIBILITY MATTERS
AND INSTRUCTIONS**

Not Applicable for this Contract.

**EXHIBIT J
TO CONTRACT AGREEMENT**

**CERTIFICATION OF CONTRACTOR
GEORGIA SECURITY AND IMMIGRATION COMPLIANCE ACT**

I hereby certify that I am a principal and duly authorized representative of _____, (“Contractor”), whose address is _____, _____.

Contractor hereby agrees to comply with all applicable provisions and requirements of the Georgia Security and Immigration Compliance Act of 2006 (the “Act”), as codified in O.C.G.A. Sections 13-10-90 and 13-10-91 and regulated in Chapter 300-10-1 of the Rules and Regulations of the State of Georgia, "Public Employers, Their Contractors and Subcontractors Required to Verify New Employee Work Eligibility Through a Federal Work Authorization Program," accessed at <http://www.dol.state.ga.us>, as further set forth below.

Contractor agrees to verify the work eligibility of all of newly hired employees through the U.S. Department of Homeland Security’s *Employment Eligibility Verification (EEV) / Basic Pilot Program*, accessed through the Internet at <https://www.vis-dhs.com/EmployerRegistration>, in accordance with the provisions and timeline found in O.C.G.A. 13-10-91 and Rule 300-10-1-.02 of the Rules and Regulations of the State of Georgia. As of July 1, 2007, the verification requirement applies to contractors and subcontractors with five-hundred (500) or more employees.

Contractor understands that the contractor and subcontractor requirements of the Act apply to contracts for, or in connection with, the physical performance of services within the State of Georgia.

Contractor understands that the following contract compliance dates set forth in the Act apply to the Contract Agreement, pursuant to O.C.G.A. 13-10-91:

On or after July 1, 2007, to public employers, contractors, or subcontractors of 500 or more employees;

On or after July 1, 2008, to public employers, contractors, or subcontractors of 100 or more employees; and

On or after July 1, 2009, to all other public employers, their contractors, and subcontractors.

To document the date on which the Act is applicable to Contractor, and to document Contractor’s compliance with the Act, the undersigned agrees to initial one of the three (3) lines below indicating the employee number category applicable to Contractor, and to submit the indicated affidavit with the Contract Agreement if the Contractor has 500 or more employees.

Contractor has:

- _____ 500 or more employees [Contractor must register with the *Employment/Eligibility Verification/Basic Pilot Program* and begin work eligibility verification on July 1, 2007];
- _____ 100-499 employees [Contractor must register with the *Employment Eligibility Verification/Basic Pilot Program* and begin work eligibility verification by July 1, 2008]; or
- _____ 99 or fewer employees [Contractor must begin work eligibility verification by July 1, 2009].

Contractor further agrees to require O.C.G.A. Sections 13-10-90 and 13-10-91 compliance in all written agreements with any subcontractor employed by Contractor to provide services connected with the Contract Agreement, as required pursuant to O.C.G.A. 13-10-91.

Contractor agrees to obtain from any subcontractor that is employed by Contractor to provide services connected with the Contract Agreement, the subcontractor's indication of the employee number category applicable to the subcontractor.

Contractor agrees to secure from any subcontractor engaged to perform services under this Contract an executed "Subcontractor Affidavit," as required pursuant to O.C.G.A. 13-10-91 and Rule 300-10-1-.08 of the Rules and Regulations of the State of Georgia, which rule can be accessed at <http://www.dol.state.ga.us>.

Contractor agrees to maintain all records of the subcontractor's compliance with O.C.G.A. Sections 13-10-90 and 13-10-91 and Chapter 300-10-1 of the Rules and Regulations of the State of Georgia.

CONTRACTOR:

Date: _____

Signature: _____

Title: _____

EXHIBIT K

TO CONTRACT AGREEMENT

INSURANCE REQUIREMENTS

Within 10 days of Notice of Award, and at all times that this Contract is in force, the Contractor shall obtain, maintain and furnish the City Certificates of Insurance from licensed companies doing business in the State of Georgia with an A.M. Best Rating A-10 or higher and acceptable to the City covering:

1. Workers' Compensation & Employer's Liability Insurance. Workers' Compensation Insurance in compliance with the applicable Workers' Compensation Act(s) of the state(s) wherein the work is to be performed or where jurisdiction could apply in amounts required by statutes. Employer's Liability Insurance, with limits of liability of not less than \$1,000,000 per accident for bodily injury or disease.
2. Commercial General Liability Insurance, including contractual liability insurance, product and completed operations, personal and advertising injury, and any other type of liability for which this Contract applies with limits of liability of not less than \$1,000,000 each occurrence / \$2,000,000 policy aggregate for personal injury, bodily injury, and property damage. Commercial General Liability Insurance shall be written on an "occurrence" form.
3. Automobile Liability Insurance with limits of liability of not less than \$1,000,000 per accident for bodily injury and property damage if automobiles are to be used in the delivery of or in the completion of services and work or driven onto the City's property. Insurance shall include all owned, non-owned and hired vehicle liability.
4. Umbrella Insurance with limits of liability excess of Employer's Liability Insurance, Commercial General Liability Insurance and Automobile Liability Insurance in the amount of not less than \$3,000,000.
5. Contractors' Pollution Legal Liability and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) with limits not less than \$1,000,000 per occurrence or claim, and \$2,000,000 policy aggregate.
6. Professional (Errors and Omissions) Insurance- For Professional Services and for all Design/Build Projects with limits of liability of not less than \$3,000,000 per occurrence or claim / \$3,000,000 policy aggregate. Such policy shall also include coverage for losses arising from the breach of information security or cyber liability (including Errors & Omissions, Security and Privacy Liability and Media Liability), whether combined with the Professional Liability policy or placed as a separate policy, but carrying the same limits of liability. Such coverage shall insure damage, injury and loss caused by error, omission or negligent acts, including all prior acts without limitation, related to the professional services to be provided under this Contract. The policy shall be amended to include independent contractors providing professional services on behalf of or at the direction of the Contractor. The definition of Contractual Liability shall be amended to state that liability under a contract of professional services is covered. Further, coverage shall be afforded for fraudulent acts, misappropriation of trade secrets, internet professional services, computer attacks, personal injury, regulatory actions, wrongful acts, contractual liability, privacy policy, and insured versus insured. The Contractor shall ensure that coverage under this policy continues for a period of thirty-six (36) months after completion of services.
7. Fidelity Bond (Employee Dishonesty) in the sum of not less than \$50,000.

All such insurance shall remain in effect until final payment is made and the Project is accepted by the City. If the Contractor receives notice of non-renewal or material adverse change of any of the required coverages, the Contractor shall promptly advise the City in writing. Failure of the Contractor to promptly notify the City on non-renewal or material adverse change of any of the required coverages terminates the Agreement as of the date that the Contractor should have given notification to the City. The insurance policies shall contain or be endorsed to contain, the following provisions:

- (d) A provision that coverage afforded under such policies shall not expire, be canceled or altered without at least thirty (30) days prior written notice to the City.

- (e) Workers' Compensation and Employer's Liability and Property insurance policies shall contain a waiver of subrogation in favor of the City and the City's boards, officials, directors, officers, employees, representatives, agents, and volunteers.
- (f) Commercial General Liability, Automobile Liability Contractors' Pollution Legal Liability and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) insurance policies shall include an endorsement making the City and the City's boards, officials, directors, officers, employees, representatives, agents, and volunteers Additional Insureds under such policies.

A copy of these endorsements shall be provided to the City.

Certificates of Insurance showing that such coverage is in force shall be filed under this Contract by the Contractor to the City.

The obligations for the Contractor to procure and maintain insurance shall not be construed to waive or restrict other obligations and it is understood that insurance in no way limits liability of the Contractor whether or not same is covered by insurance.

Certificate Holder should read: The City of Sandy Springs, 7840 Roswell Road, Building-500, Sandy Springs, Georgia 30350.

EXHIBIT L
SPECIAL PROVISIONS

GLENFOREST ROAD DRAINAGE IMPROVEMENT PROJECT TECHNICAL SPECIFICATIONS

Contents

General

Section 151 – Mobilization

Section 157 – Survey Aids

Erosion Control

Section 160 – Reclamation of Material Pits and Waste Areas

Section 163 – Miscellaneous Erosion Control Items

Section 171 – Temporary Silt Fence

Earthwork

Section 204 – Channel Excavation

Section 207 – Excavation and Backfill for Minor Structures

Section 210 – Grading Complete

Miscellaneous Items

Section 522 – Shoring

Drainage

Section 550 – Storm Drain Pipe, Pipe–Arch Culverts, and Side Drain Pipe

Section 551 – Pipe Protection in Earth Walls

Miscellaneous Items

Section 603 – Rip Rap

Section 608 – Brick Masonry

Section 610 – Removal of Miscellaneous Roadway Items

Section 611 – Relaying, Reconstructing, or Adjusting to Grade of Miscellaneous Roadway Structures

Section 643 - Fence

Section 668 – Miscellaneous Drainage Structures

Section 700 – Grassing

Materials

Section 805 – Rip Rap and Curbing Stone

Section 806 – Aggregate for Drainage

Section 812 – Backfill Materials

Section 834 – Masonry Materials

Section 843 – Concrete Pipe

Section 866 – Precast Concrete Catch Basin, Drop Inlet, and Manhole Units

Section 890 – Seed and Sod

Storm System Rehabilitation

Section 950 – Flow Control

Section 951 – Relining (Cured-in-Place) Storm Drainage Systems

Section 952 – Storm Line Cleaning

Section 953 – Storm Line Television Inspection

Note: All references to General Provisions 101 through 150 in these specifications shall be deferred to the **General Requirements** of this project manual.

Section 151—Mobilization

151.1 General Description

Mobilization, when listed as a pay item in the Proposal, includes preparatory work and operations, including but not limited to, moving personnel, equipment, supplies, and incidentals to the Project site. Mobilization also includes all other work and operations that shall be performed or costs incurred before beginning work on the various Items on the Project site.

151.1.01 Definitions

See General Conditions

151.1.02 Related References

A. Standard Specifications

See General Conditions

B. Referenced Documents

See General Conditions

151.1.03 Submittals

See General Conditions

151.2 Materials

See General Conditions

151.2.01 Delivery, Storage, and Handling

See General Conditions

151.3 Construction Requirements

See General Conditions

151.3.01 Personnel

See General Conditions

151.3.02 Equipment

See General Conditions

151.3.03 Preparation

See General Conditions

151.3.04 Fabrication

See General Conditions

151.3.05 Construction

See General Conditions

151.3.06 Quality Acceptance

See General Conditions

151.3.07 Contractor Warranty and Maintenance

See General Conditions

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Section 157—Survey Aids

157.1 General Description

This work includes constructing, maintaining, and removing (when specified by the Engineer) survey aids required at the locations shown on the Plans or modified Plans, or at locations designated by the Engineer. Survey aids may be required when line and distance control for excavation, embankment, and/or bridges require triangulation.

This work also includes disposing of survey aids, unless the Engineer directs to leave the aids in place.

157.1.01 Definitions

See General Conditions

157.1.02 Related References

A. Standard Specifications

See General Conditions

B. Referenced Documents

TT-E543

TT-529A

157.1.03 Submittals

See General Conditions

157.2 Materials

Comply with the following survey aid requirements:

A. General

The materials used to construct these expendable items do not require pre-inspection or sampling and testing. Replace, repair, or strengthen defective, worn, deteriorated, corroded, or unsatisfactory materials according to [Subsection 157.3.07, "Contractor Warranty and Maintenance."](#)

B. Timber and Piles

Timber and piles may be untreated; however all piles shall be peeled. Timber may be of any commercial grade and species.

For triangulation stations, ensure that the center pile for the instrument mounting has a minimum diameter of 1 ft (300 mm) at a distance of 4 ft (1.2 m) from the butt. The minimum diameter of other piles in the station shall be 10 in (250 mm).

Use piles for survey targets that conform to the requirements of the Specifications. The butt diameter for timber walkway piles shall be at least 8 in (200 mm). Use piles that will maintain safe walkways for the duration of the Project.

C. Plywood

Use marine-type plywood for survey targets that is 0.75 in (19 mm) thick. Paint the plywood with coats that meet the requirements of the Federal Specification noted:

Apply an undercoat to all surfaces and edges (TT-E543); second and third coats—apply to all surfaces and edges (TT-E529A, color number 27875); fourth and fifth coats—apply to colored areas (TT-529A, color number 21105).

D. Sheet Metal Caps

Use galvanized sheet metal caps for pile heads, galvanized large-headed roofing nails to attach the caps, and galvanized cable to wrap the pile clusters.

E. Other Hardware for Connections

Use bolts, nuts, washers, etc. of any commercial grade. They do not need to be galvanized.

157.2.01 Delivery, Storage, and Handling

157.3 Construction Requirements

157.3.01 Personnel

See General Conditions

157.3.02 Equipment

See General Conditions

157.3.03 Preparation

See General Conditions

157.3.04 Fabrication

See General Conditions

157.3.05 Construction

A. Location of Base Lines, Triangulation Stations, and Survey Targets

Possible locations of base lines, triangulation stations, and survey targets are shown on the Plans. Timber walkways are included as a bid item, but their locations may not be shown on the Plans. Actual and final locations of survey aids are based upon Contractors' own procedures and equipment methods.

The Contractor and the Engineer must agree on the most effective means to control the line and distance during construction. At the Preconstruction Conference, discuss with the Subcontractors the plan of operation for reaching this consensus.

After the conference, the Plans will be modified to show the locations of base lines and the number and locations of triangulation stations and survey targets. Timber walkway locations may not be shown on the modified Plans. After receiving the modified plans, make survey aids construction the first operation, including the installation of timber walkways if needed to provide access.

B. Location of Survey Points

After the Contractor constructs survey aids, the Engineer places instrument mountings and performs field checks and office calculations necessary to provide the location of the survey points.

Even though electronic data methods are used to calculate the point locations, the Engineer may not be able to designate survey point locations immediately. Time Charges will not be suspended during this period.

C. Clearing and Grubbing

The Engineer must be satisfied with the method and the location of all clearing and grubbing necessary for survey aid construction as a part of this work. Dispose of removed materials as directed by the Engineer.

D. Framing

Perform all framing and construct survey aids according to the Plan details, unless the Engineer permits alternate details.

E. Triangulation Stations

Drive pile clusters into the underlying firm material to provide instrument mountings. Ensure that these mountings are steady enough to use during wind and wave conditions.

F. Survey Targets

Drive the piling into the firm material to provide and maintain accuracy of the targets under weather and construction conditions specific to the Project area.

G. Timber Walkways

Drive piling deep enough to provide stability under weather and construction conditions specific to the Project area.

Walkways may be required to provide access to triangulation stations, to provide access to boats located at the edge of marsh or swamp areas at low water or low tide periods, or for other purposes as designated on the Plans or by the Engineer.

Alternate designs will be considered if they have equal strength, width, and safety.

H. Height Control

Regardless of elevations stated or implied on the Plans or in the Contract, the Engineer can determine how high to construct the survey aids.

Construct items above the extreme high-tide mark. The Engineer may require triangulation stations used initially for roadway item control to be built higher. These higher stations may be used in bridge control that may be in the initial or subsequent Contracts.

Constructing railing ladders and other vertical means of access are considered incidental to constructing survey aids.

157.3.06 Quality Acceptance

See General Conditions

157.3.07 Contractor Warranty and Maintenance

Maintain the survey aids as follows:

- A. Promptly replace, repair, or strengthen defective, unduly worn, corroded, deteriorated, or otherwise unsatisfactory material at the Engineer's request. Such maintenance is incidental to survey aid construction.
- B. Maintain survey aids to the Engineer's satisfaction to ensure that they are safe, have longevity, and perform accurately.
- C. If a survey aid will be used to control the work under another Contract:
 - 1. Do not remove that aid.
 - 2. Before moving off the Project or before relinquishing maintenance to another Contractor, perform the maintenance required to leave the aid in serviceable use for the future Work. The Engineer must approve of the maintenance. The additional maintenance is considered incidental to survey aid construction.

The subsequent Contractor's maintenance period will conclude when the survey aids no longer are needed for the duration of the Contract. The subsequent Contractor shall maintain the survey aids to the Engineer's satisfaction needed for Work, as provided in [Subsection 105.05, "Cooperation by Contractor"](#) as incidental to the work.

When the aids no longer are needed the Engineer will advise the responsible Contractor. The Contractor who used the aids last shall remove and dispose of the material to the Engineer's satisfaction. Removal and disposal is incidental to the work.

Section 160—Reclamation of Material Pits and Waste Areas

160.1 General Description

This work includes reclaiming material pits and waste areas by vegetative planting and applies to areas outside of the right-of-way.

The vegetative requirements of this section apply when the Contractor obtains material from a source or wastes material on an area other than within the Right of Way. These requirements apply regardless of how the source or area is obtained.

Exceptions to the vegetative requirements of this section include:

- A material source where the Engineer determines not to drain water that accumulates after the material is removed. Only the slopes above water will be planted.
- An area composed of rock or other materials that the Engineer determines are not satisfactory for permanent vegetative cover.
- An area that has been exempted in writing by the Georgia Surface Mined Land Use Board.
- An area where the owner or Contractor, (whichever is designated as the Operator) secures a license from the Surface Mined Land Use Board for surface mining. The Operator will be responsible only to the Surface Mined Land Use Board for reclamation of the affected area.

160.1.01 Definitions

See General Conditions

160.1.02 Related References

A. Standard Specifications

[Section 700—Grassing](#)

[Section 702—Vine, Shrub and Tree Planting](#)

[Section 890—Seed and Sod](#)

B. Referenced Documents

See General Conditions

160.1.03 Submittals

The Engineer must:

- Approve the planting type if the Contractor furnishes a material pit or waste area that requires vegetation under the provisions of this Specification.
- Approve all modified mixtures before planting begins.

The property owner may change the plant material types specified in the Plans to a type not shown in the Planting Table in [Subsection 160.2, “Planting Table”](#), below. If a change is made, the mixture shall cost approximately the same and shall produce an equal amount of protective covering as the mixture contained in this Specification.

160.2 Materials

Materials shall conform to the requirements of [Sections 700](#) and [702](#) as applicable.

If the Plans or the Proposal do not specify the vegetation type to be planted on State-optioned areas, the Engineer will select the type to be used on each area from the Planting Table.

The State is divided into planting zones as shown on the Planting Zones Map in [Sections 700](#). Consult the Planting Table when planting and follow these points:

Section 160—Reclamation of Material Pits and Waste Areas

- Do not use giant bermuda seed (cynodon species) including NK-37.
- Do not use Italian rye grass seed—perennial or annual.
- Apply the entire combination of seeds specified for each group in the amounts specified. If the property owner does not make a specific choice, use planting groups A, B, C, G, H, or N-1.
- Increase all seed quantities 50 percent on slopes that are too steep for soil preparation and cannot be dug at least 6 in (150 mm) deep.
- Air dry sericea lespedeza seed hay and ensure that it contains mature seed.

Planting Table

	Planting Groups	Species	Rates per Acre/Hectare	Planting Zones			
				lbs. (kg) (except as noted)	Zone 1	Zone 2	Zone 3
Spring Planting	A	Weeping Love Grass	4 (4.5)	3/1-7/15	2/15-7/ 15	2/15-7/ 15	2/1-7/ 15
		Interstate Lespedeza (HS)*	50 (56)	3/1-7/15	2/15-7/ 15	2/15-7/ 15	2/1-7/ 15
	A-1	Interstate Lespedeza (HS)*	60 (67)	3/1-7/15	2/15-7/ 15	2/15-7/ 15	2/1-7/ 15
	B	Tall Fescue	30 (33.5)	3/1-5/1	2/15-5/1		
		Interstate Lespedeza (HS)*	50 (56)	3/1-5/1	2/15-5/1		
	C	Hulled Common Bermuda	10 (11)	3/1 -7/1	2/15-7/1	2/15-7/1	2/1-7/1
		Pensacola Bahia	50 (56)	3/1 -7/1	2/15-7/1	2/15-7/1	2/1-7/1
	D	Hulled Common Bermuda	15 (17)				
		Korean Lespedeza	25 (28)	3/1-3/15	2/15-6/1	2/15-6/ 15	2/1-7/ 15
	D-1	Hulled Common Bermuda	15 (17)				
		Unhulled Common Bermuda	5 (5.5)	3/1-6/1	2/15-6/ 15	2/15-7/1	2/1-7/ 15
		Korean Lespedeza	25 (28)				
	E	Tall Fescue	20 (22.5)				
		White Dutch Clover	6 (6.5)	2/1-4/1	2/1-4/1	1/1-3/1	1/1-3/1
		Korean Lespedeza	20 (22.5)				
	F	Tall Fescue	30 (33.5)				
		Korean Lespedeza	20 (22.5)	2/1-4/1	2/1-4/1	1/1-3/1	1/1-3/1
	F-1	Tall Fescue	50 (56)				
		Korean Lespedeza	20 (22.5)	2/1-6/1	2/1-5/1	1/1-4/1	
	F-2	Tall Fescue	60 (67)	2/1-4/1	2/1-4/1	1/1-3/1	
Summer	G	Hulled Common Bermuda	10 (11)	7/1-9/1	7/1-9/1	7/1-9/1	7/1-9/1

Section 160—Reclamation of Material Pits and Waste Areas

	Planting Groups	Species	Rates per Acre/Hectare	Planting Zones			
				Zone 1	Zone 2	Zone 3	Zone 4
			lbs. (kg) (except as noted)				
Planting							
		Pensacola Bahia	50 (56)				
	H	Weeping Love Grass	4 (4.5)	7/1-9/1	7/1-9/1	7/1-9/1	7/1-9/1
		Interstate Lespedeza (HS)	50(56)				
	I	Hulled Common Ber muda	15 (17)	7/1-9/1	7/1-9/1	7/1-9/1	7/1-9/1
		Pensacola Bahia	20 (22.5)				
		Korean Lespedeza	20 (22.5)				
		Reseeding Crimson Clover	30 (33.5)				
	J	Weeping Love Grass	4 (4.5)	7/1-9/1	7/1-9/1	7/1-9/1	7/1-9/1
		Korean Lespedeza	20 (22.5)				
		Reseeding Crimson Clover	20 (22.5)				
	K	Hulled Common Bermuda	5 (5.5)	7/1-9/1	7/1-9/1	7/1-9/1	7/1-9/1
		Pensacola Bahia	20 (22.5)				
		Reseeding Crimson Clover	20 (22.5)				
	L	Tall Fescue	20 (22.5)	7/1-9/1	7/1-9/1	7/1-9/1	7/1-9/1
		Pensacola Bahia	20 (22.5)				
		Korean Lespedeza	20 (22.5)				
		Reseeding Crimson Clover	30 (33.5)				
	M	Weeping Love Grass	5 (5.5)	7/1-9/1	7/1-9/1	7/1-9/1	7/1-9/1
		Tall Fescue	20 (22.5)				
		Korean Lespedeza	20(22.5)				
		Reseeding Crimson Clover	20 (22.5)				
Fall Planting	N	Tall Fescue	30 (33.5)				
		Interstate Lespedeza (HS)*	50 (56)	8/1-11/1	8/15-11/ 1		
	N-1	Tall Fescue	30 (33.5)				
		Interstate Lespedeza (Unscarified)	75 (84)	8/1-3/1	8/15-2/ 15	9/1-2/15	9/15-2/ 1
	O	Tall Fescue	50 (56)	8/1-10/ 15	8/15-11/ 1		
	O-1	Tall Fescue	60 (67)	8/1-10/ 15	8/15-11/ 1	9/1-11/ 15	
	P	Tall Fescue	20 (22.5)				

Section 160—Reclamation of Material Pits and Waste Areas

	Planting Groups	Species	Rates per Acre/Hectare	Planting Zones			
				Zone 1	Zone 2	Zone 3	Zone 4
			lbs. (kg) (except as noted)				
		Pensacola Bahia	40 (45)	8/1-10/ 15	8/15-11/ 1	9/1-11/ 15	10/1-12/1
	P-1	Tall Fescue	20 (22.5)				
		Pensacola Bahia	60 (67)	8/1-10/ 15	8/15-11/ 1	9/1-11/ 15	10/1-12/1
	Q	Tall Fescue	40 (45)				
		Korean Lespedeza	20 (22.5)	9/1-11/1	9/15-11/ 15	10/1-12/ 1	10/15-12/15
	Q-1	Tall Fescue	50 (56)				
		Korean Lespedeza	20 (22.5)	8/1-10/ 15	8/15-11/ 1	9/1-11/ 15	
	Q-2	Reseeding Crimson Clover	50 (56)	8/15-11/ 1	8/15-11/ 15	9/1-12/ 15	9/15-12/15
Special Planting	R	Unhulled Common Bermuda	8 (9)				
		Sericea Lespedeza Seed Hay	3 tons (6.7 Mg)	10/1-3/ 15	10/1-3/1		
	S	Pine Seedlings, Native to Georgia @ 6' x 8' (1.8 m x 2.4 m) spacing	900 (2224) seedlings	10/15-3/ 15	10/15-3/ 15	11/1-3/1	11/1-3/ 1
	T	Costal Bermuda Sprigs	Omit Over seeding		3/1-9/1	2/15-9/ 15	1/15-12/1
*(HS) = Hulled and Scarified Note: Sericea Lespedeza or Serala Lespedeza may be substituted for Interstate Lespedeza							

160.2.01 Delivery, Storage, and Handling

If the sprigs are stockpiled, cover the sprigs and keep them moist.

160.3 Construction Requirements

160.3.01 Personnel

See General Conditions

160.3.02 Equipment

Equipment shall conform to the requirements of [Section 700](#) and [Section 702](#) as applicable.

160.3.03 Preparation

Seed or sprig areas that are subject to erosion. If the Engineer feels the borrow pit or waste area will be subject to erosion, grass and mulch areas that require pine seedlings before planting the seedlings.

160.3.04 Fabrication

See General Conditions

160.3.05 Construction

Comply with the construction methods in [Section 700](#) for this work with the following exceptions:

A. Prepare the Ground

1. Complete the excavation.
2. Have the Engineer examine the slopes to ensure that planting is not done on areas composed of rock or other materials that the Engineer determines unsatisfactory for permanent vegetation.
3. Plow areas that are to be planted to a depth of 6 in (150 mm) unless the areas are exempted in this Specification or in [Section 700](#).

B. Apply Lime and Fertilizer

1. Spread agricultural lime uniformly at the rate shown on the Plans or determined by the Engineer.
2. Apply fertilizer grade 4-12-12, 6-12-12, or 5-10-15 uniformly at approximately 1,200 lbs/acre (1350 kg/ha).
3. Mix the lime and fertilizer into the top 2 in (50 mm) of soil, including the areas to be planted with pine seedlings.
4. Hydroseed slopes steeper than 2 to 1 as defined in [Subsection 700.3.05.F, "Hydroseeding."](#) The mixing may be eliminated.

C. Seed

Sow seeds at the rates specified in the [Subsection 160.2, "Planting Table"](#).

D. Mulch

1. Use any mulch type listed in [Subsection 700.3.05.G, "Mulching."](#)
2. Mulch all seeded and sprigged areas.

E. Plant Pine Seedlings

1. Use a dibble or other approved planter to dig holes for the pine seedlings after seeding or sprigging and mulching.
2. Set the plants slightly deeper than they were planted in the nursery. When hand planting, compact the bottom of the hole before setting the plants.

F. Apply Nitrogen

1. Apply nitrogen according to [Subsection 700.3.05.I, "Application of Nitrogen."](#)
2. Do not apply nitrogen directly over the seedlings.

G. Harvest Sprigs

1. Observe sprigging seasonal limitations. See [Subsection 160.2, "Planting Table"](#).
2. Inspect harvesting sites. Ensure inspection is according to [Subsection 890.2.02.C, "Acceptance."](#)
3. Harvest sprigs as follows:
 - a. Harvest the sprigs using a sod cutter, turning plow, or other approved equipment so that at least 3 in (75 mm) of the root system is lifted intact.
 - b. Immediately load the harvested sprigs and cover them with wet burlap or canvas to prevent weather damage.
 - c. Transport the sprigs to where they will be immediately planted or stockpiled.
 - d. Plant sprigs within 48 hours after they are harvested. Never allow sprigs to dry out or freeze.

Section 160—Reclamation of Material Pits and Waste Areas

H. Apply Sprigs

Apply sprigs using either the broadcast or row method. However, do not perform broadcast sprigging on steep slopes or narrow areas where results will not be satisfactory.

During sprigging, ensure that the soil moisture content is at least the optimum for soil sprigging.

1. Broadcast Sprigging

Perform broadcast sprigging as follows:

- a. Apply the sprigs mechanically or by hand in a uniform layer over the prepared surface placing at least 4 viable sprigs to each square foot (43 viable sprigs to each square meter).
- b. Place the sprigs 2 to 3 in (50 to 75 mm) deep by disc harrowing or by other satisfactory means.

2. Row Sprigging

Perform row sprigging as follows:

- a. Open furrows spaced at least 1 ft (300 mm) apart to at least 4 in (100 mm) deep.
- b. Immediately place the sprigs in the furrows by hand or by planting machines and overlap them in the furrows.
- c. Do not expose sprigs more than 15 minutes before filling in the furrows.

I. Restore Line and Grade, and Roll

After the sprigging is done, do the following:

1. Return the impaired sections back to the line and grade as established by the Engineer.
2. Roll the area at right angles to the direction of the slope incline.

J. Mulch Sprigged Areas

Mulch sprigged areas within the construction limits according to [Subsection 700.3.05.G, "Mulching."](#)

1. Mulch with Binder

When applying mulch with binder, apply immediately after the overseeding and rolling are complete.

2. Mixed-in-Place Mulch

When applying mixed-in-place mulch, apply immediately after sprigging.

160.3.06 Quality Acceptance

Before Final Acceptance, each planted area shall meet the requirements for satisfactory growth and development as defined in [Subsection 160.5.01.A, "Plant Establishment."](#) Except as otherwise specified in this Specification, all seeding shall conform to [Section 700](#), and pine seedling planting shall conform to [Section 702](#).

160.3.07 Contractor Warranty and Maintenance

See General Conditions

Section 163—Miscellaneous Erosion Control Items

163.1 General Description

This work includes constructing and removing:

- Silt control gates
- Temporary erosion control slope drains shown on the Plans or as directed
- Sediment basins
- Baled straw erosion checks
- Other temporary erosion control structures shown on the Plans or directed by the Engineer

This work also includes applying temporary mulch and temporary grass.

163.1.01 Definitions

Retrofit Device—A temporary sediment filter placed in front of an existing or proposed detention pond being used as a temporary sediment basin during the construction of the Project

163.1.02 Related References

A. Standard Specifications

[Section 109—Measurement and Payment](#)

[Section 161—Control of Soil Erosion and Sedimentation](#)

[Section 171—Temporary Silt Fence](#)

[Section 500—Concrete Structures](#)

[Section 603—Rip Rap](#)

[Section 700—Grassing](#)

[Section 715—Bituminous Treated Roving](#)

[Section 822—Emulsified Asphalt](#)

[Section 860—Lumber and Timber](#)

[Section 863—Preservative Treatment of Timber Products](#)

[Section 890—Seed and Sod](#)

[Section 893—Miscellaneous Planting Materials](#)

B. Referenced Documents

AASHTO M252

AASHTO M294

163.1.03 Submittals

Provide written documentation to the Engineer as to the average weight of the bales of mulch.

163.2 Materials

Provide materials shown on the Plans, such as pipe, spillways, wood baffles, and other accessories including an anti-seep collar, when necessary. The materials shall remain the Contractor's property after removal, unless otherwise shown on the Plans.

Section 163—Miscellaneous Erosion Control Items

Materials may be new or used; however, the Engineer shall approve previously used materials before use.

Materials shall meet the requirements of the following Specifications:

Material	Section
Mulch	893.2.02
Temporary Silt Fence	171
Concrete Aprons and Footings shall be Class A	500
Rip Rap	603
Temporary Grass	700
Bituminous Treated Roving	715
Lumber and Timber	860.2.01
Preservative Treatment of Timber Products	863.1
Corrugated Polyethylene Temporary Slope Drain Pipe	AASHTO M252 or M294

Additional requirements:

- Use 40d nails.
- To tack the lining material to earth flumes, use grade RS-2h or SS-1h asphaltic material that meets the requirements of [Section 822](#).
- Use rectangular, standard size baled straw in mechanically produced bales.

163.2.01 Delivery, Storage, and Handling

See General Conditions

163.3 Construction Requirements

163.3.01 Personnel

See General Conditions

163.3.02 Equipment

See General Conditions

163.3.03 Preparation

See General Conditions

163.3.04 Fabrication

See General Conditions

163.3.05 Construction

A. Silt Control Gates

If silt control gates are required or are directed by the Engineer, follow these guidelines to construct them:

1. Clear and grade only that portion of the roadway within the affected drainage area where the drainage structure will be constructed.
2. Construct the drainage structure and backfill.
3. Install the silt control gate at the inlet of the structure. Use the type indicated on the Plans.

Section 163—Miscellaneous Erosion Control Items

4. Vary the height of the gate as required or as shown on the Plans.
5. Finish grading the roadway in the affected drainage area. Grass and mulch slopes and ditches that will not be paved. Construct the ditch paving required in the affected area.
6. Keep the gate in place until the work in the affected drainage area is complete and the erodible earth is stabilized.
7. Remove the silt gate assembly by sawing off the wood posts flush with the concrete apron. Leave the concrete apron between the gate and the structure inlet in place. The gate shall remain the property of the Contractor.

B. Temporary Slope Drains

If temporary slope drains are required, conduct the roadway grading operation according to [Section 161](#) and follow these guidelines:

1. Place temporary pipe slope drains with inlets and velocity dissipaters (straw bales, silt fence, or aprons) according to the Plans.
2. Securely anchor the inlet into the slope to provide a watertight connection to the earth berm. Ensure that all connections in the pipe are leak proof.
3. Place the temporary slope drains as shown on the Uniform Code System for Erosion and Sediment Control Sheet for temporary items or as directed by the Engineer. Keep the slope drains in place until the permanent grass has grown enough to control erosion.
4. Remove the slope drains and grass the disturbed area with permanent grass. However, the temporary slope drains may remain in place to help establish permanent grass if approved by the Engineer.

C. Sediment Basins

Construct sediment basins according to the Plans at the required location, or as modified by the Engineer.

1. Construct the unit complete as shown, including:
 - Grading
 - Drainage
 - Rip rap
 - Spillways
 - Anti-seep collar
 - Temporary mulching and grassing on external slopes
 - Accessories to complete the basin
2. When the sediment basin is no longer needed, remove and dispose of the remaining sediment.
3. Remove the sediment basin. Grade to drain and restore the area to blend with the adjacent landscape.
4. Mulch and permanently grass the disturbed areas according to [Section 700](#).

D. Baled Straw Erosion Checks

Construct baled straw erosion checks according to the Plan details. Substitute temporary silt fence Type B as specified in [Section 171](#) for baled straw erosion checks at the Engineer's direction or the Contractor's option.

E. Other Temporary Structures

When special conditions occur during the design stage, the Plans may show other temporary structures for erosion control with required materials and construction methods.

F. Temporary Grass

Use a quick growing species of temporary grass such as rye grass, millet, or a cereal grass suitable to the area and season.

Section 163—Miscellaneous Erosion Control Items

Use temporary grass in the following situations:

- To control erosion where permanent grassing cannot be planted. The Engineer will direct the planting.
- To protect an area for longer than temporary mulch is expected to last (60 calendar days).

Plant temporary grass as follows:

1. Use seeds that conform to [Subsection 890.2.01, "Seed."](#) Perform seeding according to [Section 700](#); except use the minimum ground preparation required to provide a seed bed if further grading is required.
2. Prepare areas that require no further grading according to [Subsection 700.3.05.A, "Ground Preparation."](#) Omit the lime unless the area will be planted with permanent grass without further grading. In this case, apply the lime according to [Section 700](#).
3. Apply mixed grade fertilizer at 400 lbs/acre (450 kg/ha). Omit the nitrogen. Mulch temporary grass according to [Section 700](#).
4. Before planting permanent grass, thoroughly plow and prepare areas where temporary grass has been planted according to [Subsection 700.3.05.A, "Ground Preparation."](#)

G. Temporary Mulch

When stage construction or other conditions prevent completing a roadway section continuously, apply temporary mulch to control erosion for 60 calendar days or less.

Use temporary mulch on erodible areas on or off the Right of Way, including borrow pits, temporary haul roads, or waste areas. Apply mulch as follows:

1. Plant temporary grass on areas stabilized only with temporary mulch. Mulch the area again after 60 calendar days.
2. Uniformly spread the mulch over the designated areas from 2 in to 4 in (50 mm to 100 mm) thick.
3. After spreading the mulch, walk in the mulch by using a tracked vehicle (preferred method), empty sheep foot roller, light discing, or other means that preserves the finished cross section of the prepared areas. The Engineer will approve of the method.
4. Place temporary mulch on slopes as steep as 2:1 by using a tracked vehicle to imbed the mulch into the slope. Where specified, bituminously treat temporary mulch according to [Subsection 700.3.05.G.1, "Mulch with Binder."](#)
5. When grassing operations begin, leave the mulch in place and plow the mulch into the soil during seed bed preparation. The mulch will become beneficial plant food for the newly planted grass.
6. Place mulch to protect the newly planted grass. This mulch is required in addition to the mulch specified in step 5.

H. Miscellaneous Erosion Control Not Shown on the Plans

When conditions develop during construction that were unforeseen in the design stage, the Engineer may direct the Contractor to construct temporary devices such as but not limited to:

- Bulkheads
- Wooden ditch checks
- Sump holes
- Half round pipe for use as ditch liners
- U-V resistant plastic sheets to cover critical cut slopes

The Engineer and the Contractor will determine the placement to ensure erosion control in the affected area.

I. Diversion Channels

When constructing a culvert or other drainage structure in a live stream requires diverting a stream, construct a diversion channel. Protect the bottom and sides of the channel with plastic sheeting, rip rap (either stone or sandbag), geotextile

Section 163—Miscellaneous Erosion Control Items

fabric, or other materials approved by the Engineer. Cement may be omitted in sandbag rip rap used to line diversion channels.

J. Temporary Ditch Checks

Temporary ditch checks shall be constructed and placed according to Plan details. Temporary ditch checks may be constructed of stone plain rip rap according to [Section 603](#) or of sand bags as in [Section 603](#) without Portland cement.

Place plastic filter fabric on ditch section before placing rip rap.

Temporary ditch checks shall be cleaned of sediment when 1/2 the height of the temporary ditch check has been reached. They remain in place until the permanent ditch protection is in place or being installed and the removal is approved by the Engineer.

These ditch checks may remain in place to aid in establishing permanent grass in vegetated waterways, if approved by the Engineer.

K. Construction Exits

Locate construction exits at any point where vehicles will be leaving the project onto a public roadway. Install construction exits at the locations shown in the plans and in accordance with plan details.

L. Retrofit

Add the retrofit device to the permanent outlet structure as shown on the Plan details.

When all land disturbing activities that would contribute sediment-laden runoff to the basin are complete, clean the basin of sediment and stabilize the basin area with vegetation.

When the basin is stabilized, remove the retrofit device from the permanent outlet structure of the detention pond.

M. Inlet Sediment Trap

Inlet sediment traps consist of a temporary device placed around a storm drain inlet to trap sediment. An excavated area adjacent to the sediment trap will provide additional sediment storage.

Inlet sediment traps may be constructed of Type C silt fence, plastic frame and filter, hay bales, baffle box, or other filtering materials approved by the Engineer.

Construct inlet sediment traps according to the appropriate specification for the material selected for the trap.

Place inlet sediment traps as shown on the Plans or as directed by the Engineer.

163.3.06 Quality Acceptance

See General Conditions

163.3.07 Contractor Warranty and Maintenance

See General Conditions

Section 171—Silt Fence

171.1 General Description

This work includes furnishing, installing, and removing a water permeable filter fabric fence to remove suspended particles from drainage water.

171.1.01 Definitions

See General Conditions

171.1.02 Related References

A. Standard Specifications

[Section 163—Miscellaneous Erosion Control Items](#)

[Section 700—Grassing](#)

[Section 862—Wood Posts and Bracing](#)

[Section 881—Fabrics](#)

[Section 894—Fencing](#)

B. Referenced Documents

ASTM D 3786

ASTM D 4355

ASTM D 4632

ASTM D 4751

[GDT 87](#)

[QPL 36](#)

171.1.03 Submittals

See General Conditions

171.2 Materials

Materials shall meet the requirements of the following Specifications:

Material	Section
Filter Fabrics	881
Fencing	894
Wood Posts and Bracing	862

Conditions during Project construction will affect the quantity of the silt fence to be installed.

The Engineer may increase, decrease, or eliminate the quantity at his or her direction. Variations in quantity are not changes in details of construction or in the character of the work.

For Type A, B, and C fences, use fabric as specified in [Subsection 881.2.07, “Silt Fence Filter Fabric.”](#)

171.2.01 Delivery, Storage, and Handling

During shipment and storage, wrap the fabric in a heavy-duty covering that will protect the cloth from sunlight, mud, dust, dirt, and debris. Do not expose the fabric to temperatures greater than 140 °F (60 °C).

Section 171—Silt Fence

When installed, the Engineer will reject the fabric if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

171.3 Construction Requirements

171.3.01 Personnel

See General Conditions

171.3.02 Equipment

See General Conditions

171.3.03 Preparation

See General Conditions

171.3.04 Fabrication

See General Conditions

171.3.05 Construction

Install the silt fence according to this Specification, as shown on the Plans, or as directed by the Engineer.

A. Install Silt Fence

1. Install silt fence by either of the following methods:
 - a. **Excavated Trench Method**

Excavate a trench 4 to 6 in (100 to 150 mm) deep using equipment such as a trenching machine or motor grader. If equipment cannot be operated on the site, excavate the trench by hand.
 - b. **Soil Slicing Method**

Create a mechanical slice in the soil 8 to 12 in (200 to 300 mm) deep to receive the silt fence. Ensure that the width of the slice is not more than 3 in (75 mm). Mechanically insert the silt fence fabric into the slice in a simultaneous operation with the slicing that ensures consistent depth and placement.
2. Install the first post at the center of the low point (if applicable). Space the remaining posts a maximum of 6 ft (1.8 m) apart for Types A and B fence and 4 ft (1.2 m) apart for Type C fence.
3. Bury the posts at least 18 in (450 mm) into the ground. If this depth cannot be attained, secure the posts enough to prevent the fence from overturning from sediment loading.
4. Attach the filter fabric to the post using wire, cord, staples, nails, pockets, or other acceptable means.
 - a. **Staples and Nails (Wood Posts):** Evenly space staples or nails with at least five per post for Type A fence and four per post for Type B fence.
 - b. **Pockets:** If using pockets, and they are not closed at the top, attach the fabric to a wood post using at least one additional staple or nail, or to a steel post using wire.

Ensure that the additional attachment is within the top 6 in (150 mm) of the fabric.
 - c. Install the filter fabric so that 6 to 8 in (150 to 200 mm) of fabric is left at the bottom to be buried. Provide a minimum overlap of 18 in (450 mm) at all splice joints.
 - d. For Type C fences, attach the filter fabric to the top of a woven wire support fence at the midpoint between posts.
5. Install the fabric in the trench so that 4 to 6 in (100 to 150 mm) of fabric is against the side of the trench with 2 to 4 in (50 to 100 mm) of fabric across the bottom in the upstream direction.

Section 171—Silt Fence

6. Backfill and compact the trench to ensure that flow cannot pass under the barrier. When the slice method is used, compact the soil disturbed by the slice on the upstream side of the silt fence first, and then compact the downstream side.

B. Remove the Silt Fence

1. Keep the silt fence in place unless the Engineer directs. A removed silt fence may be used at other locations if the Engineer approves of its condition.
2. After removing the silt fence, return the area to a pleasing appearance. Seed and mulch the area according to [Section 700](#).
3. When installing a silt fence across a waterway that produces significant runoff, place a settling basin in front of the fence to handle the sediment load, if required. Construct a suitable sump hole or storage area according to [Section 163](#).

171.3.06 Quality Acceptance

Approved silt fence is listed in [QPL 36](#). Approved fabrics must consistently exceed the minimum requirements of this Specification as verified by the Office of Materials and Research. The Office of Materials and Research will remove fabric that fails to meet the minimum requirements of this specification from the QPL until the products' acceptability has been reestablished to the Department's satisfaction.

At the time of installation, the Engineer will reject the fabric if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

171.3.07 Contractor Warranty and Maintenance

Maintain the silt fence until the Project is accepted or until the fence is removed. Also, remove and dispose of the silt accumulations at the silt fence.

Remove and replace any deteriorated filter fabric that reduces the effectiveness of the silt fence.

Repair or replace any undermined silt fence at no additional cost to the Department.

Section 204—Channel Excavation

204.1 General Description

This work includes excavating and properly disposing of material encountered when changing, cleaning, or widening waterway channels. Excavation for inlet ditches, outlet ditches, tail ditches, and take-off, intercepting, side, or berm ditches will not be classified as channel excavation. This work is included in [Section 205](#)

204.1.01 Definitions

General Provisions 101 through 150.

204.1.02 Related References

A. Standard Specifications

[Section 205—Roadway Excavation](#)

B. Related Documents

General Provisions 101 through 150.

204.1.03 Submittals

General Provisions 101 through 150.

204.2 Materials

General Provisions 101 through 150.

204.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

204.3 Construction Requirements

204.3.01 Personnel

General Provisions 101 through 150.

204.3.02 Equipment

General Provisions 101 through 150.

204.3.03 Preparation

General Provisions 101 through 150.

204.3.04 Fabrication

General Provisions 101 through 150.

204.3.05 Construction

Excavate channel to the lines, grades, typical sections, and details shown on the Plans or established by the Engineer.

Coordinate the work with grading, constructing drainage structures, and performing other work on the project.

1. Maintain the channel to ensure continued adequate drainage until Final Acceptance of the Project.
2. Use suitable excavated material as defined in the Plans, or permitted by the Engineer, when constructing roadway embankments.
3. Waste and deposit all surplus excavated material as follows:
 - a. Do not deposit material from channel excavation within 3ft (1 m) of the channel edge.
 - b. Do not deposit excavated material within jurisdictional wetlands, either on or off the Right-of-Way.

Section 204—Channel Excavation

- c. The Engineer may permit surplus material to be wasted in flushing out slopes if ditch lines, slope stability, and other features are not impaired. Do not leave material in unsightly piles. Spread it in uniform layers, neatly leveled and shaped. Leave adequate openings in spoil banks to allow adjacent land surfaces to drain.
- d. Apply provisions pertaining to soil erosion and stream pollution to this work.

204.3.06 Quality Acceptance

General Provisions 101 through 150.

204.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

204.4 Measurement

Channel excavation, authorized and accepted by the Engineer, is measured in its original position by the method of average end areas.

204.4.01 Limits

General Provisions 101 through 150.

204.5 Payment

The Department will pay for the quantity of channel excavation as measured above at the Contract Unit Price per cubic yard (meter). Payment will not be made for excavation beyond the authorized typical sections, grades, or lengths established by the Engineer.

Payment will be made under:

Item No. 204	Channel excavation	Per cubic yard (meter)
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204.5.01 Adjustments

General Provisions 101 through 150.

Section 207—Excavation and Backfill for Minor Structures

207.1 General Description

This work includes excavating, backfilling, or disposing of materials required to install a bridge culvert, box culvert, pipe, arch culvert, headwall and retaining wall according to the Specifications, the Plans, and the Engineer.

207.1.01 Definitions

General Provisions 101 through 150.

207.1.02 Related References

A. Standard Specifications

[Section 104—Scope of Work](#)

[Section 109—Measurement and Payment](#)

[Section 205—Roadway Excavation](#)

[Section 206—Borrow Excavation](#)

[Section 208—Embankments](#)

[Section 810—Roadway Materials](#)

[Section 812—Backfill Materials](#)

B. Referenced Documents

[GDT 7](#)

207.1.03 Submittals

General Provisions 101 through 150.

207.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Foundation Backfill Material—Type I	Subsection 812.2.01
Foundation Backfill Material—Type II	Subsection 812.2.02
Imperfect Trench Backfill Material—Type III	Subsection 812.2.03

207.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

207.3 Construction Requirements

207.3.01 Personnel

General Provisions 101 through 150.

207.3.02 Equipment

General Provisions 101 through 150.

207.3.03 Preparation

General Provisions 101 through 150.

Section 207—Excavation and Backfill for Minor Structures

207.3.04 Fabrication

General Provisions 101 through 150.

207.3.05 Construction

A. Locations and Elevations

The Engineer will determine final locations and elevations of the structure. The locations and elevations shown on the Plans are approximate.

B. Excavation

The Engineer will determine the minimum requirements for length and depth of excavation for each structure. Assume the responsibility for the cost of installing necessary sheeting and bracing.

When excavating, follow these requirements:

- Excavate through rock or boulder formations to at least 1 ft (300 mm) below the bottom of the structure, except for where the entire concrete or masonry structure rests on solid rock.
- Backfill with Type I or Type II material to the proper subgrade elevation.
- As the embankment is constructed, excavate and place pipe on the new embankment. Pipe may be placed incrementally on steep gradients.
- Cut surfaces at structure trenches to prevent damage to the adjacent pavement when existing paved areas will be retained.
- Saw pavements deep enough to cause the edges to break in straight lines.
- Ensure that the width, depth, and vertical walls of an excavated imperfect trench conform to Plan details and dimensions within 2 in (50 mm).
- Dispose of surplus and unsuitable materials as directed by the Engineer.
- Consider excavated material as unclassified excavation according to [Section 205](#), except that the Department will not pay for excavation for minor structures.
- Include the cost of fulfilling these requirements in the price bid for the pipe.

C. Backfill

Obtain backfill materials that meet the Specifications from sources approved by the Engineer.

1. Foundation Backfill Materials, Types I and II

Use the following materials as shown on the Plans or as directed by the Engineer:

- a. Use Type I material in dry structure trenches and Type II material in wet trenches.
- b. Use Type I material as a finishing course for Type II material when permitted by the Engineer.
- c. Backfill excavations beyond the specified limits with the same type of material required for the adjacent area; however, the Department will not measure excess backfill material for payment.
- d. Place Type I and Type II backfill material in layers of no more than 6 in (150 mm) loose.
- e. Compact each layer as follows:
 - 1) Type I Backfill Material: Compact to 95 percent of the theoretical dry density determined by [GDT 7](#).
 - 2) Type II Backfill Material: Compact to a satisfactory uniform density as directed by the Engineer.

2. Imperfect Trench Backfill Material, Type III

Place this material as loose uncompacted backfill over pipe structures as shown on the Plans where imperfect trench backfill is specified.

3. Normal Backfill

Section 207—Excavation and Backfill for Minor Structures

Ensure that normal backfill material meets the requirements of [Subsection 810.2.01](#), Class I or II. Place and compact according to [Section 208](#) except as follows:

- a. Do not place rock more than 4 inches (100 mm) in diameter within 2 ft (600 mm) of any drainage structure.
- b. For backfill behind retaining walls, use a pervious material that meets the requirements of Case I or Case II as follows:
 - 1) Case I. Case I refers to backfills for retaining walls that support roadbeds and parking areas.
Ensure that the backfill conforms to [Section 208](#). Do not place rock more than 4 in (100 mm) in diameter within 2 ft (600 mm) of the retaining wall or finished surface.
 - 2) Case II. Case II refers to backfills for retaining walls that do not support roadbeds or parking areas.
Ensure that the backfill conforms to the requirements of Case I above, except compact the backfill to the density of the adjacent soil.

D. Pavement Replaced

Replace pavement removed at structure trenches in kind where adjacent pavements will be retained. An equal or better material may be used when approved by the Engineer.

Backfill and maintain a smooth riding surface until repaving is complete.

207.3.06 Quality Acceptance

General Provisions 101 through 150.

207.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

207.4 Measurement

A. Excavation

The following considerations are not measured for payment:

- Excavation for minor structures, including undercut for backfill materials as shown on the Plans
- Excavation for an imperfect trench which is required at locations specified in the Plans but which is not measured for payment
- Removal of water
- Removal of material from any area required to be reexcavated
- Excavation and backfill of temporary drainage ditches

B. Extra Depth Excavation

The following extra depth excavations are not measured for payment:

1. Extra depth excavation because of Contractor negligence
2. Extra depth excavation (required by the Engineer) below the original Plan elevation of the bottom of the footing or the flow line of a culvert pipe that does not exceed 3 ft (1 m)

If the Engineer relocates the structure or orders the elevation of the bottom of the footing or the flow line of the pipe to be lowered or undercut more than 3 ft (1 m), the Contractor will be compensated for the extra depth excavated below the 3 ft (1 m) limit according to [Subsection 104.04](#) and [Subsection 109.05](#).

Calculate the width of extra depth excavation using the diameter of the pipe or the width of the footing plus 2 ft (600 mm).

The length of extra depth excavation is equal to the length of that portion of the structure that is lowered more than 3 ft (1 m) below Plan elevation.

Section 207—Excavation and Backfill for Minor Structures

C. Backfill Materials Types I, II, and III

1. Types I and II

These materials (in place and accepted) are measured in cubic yards (meters) compacted.

Lateral measurements are confined to an area bounded by vertical planes lying not more than 1 ft (300 mm) outside of and parallel to the limits of the structure.

Length and depth measurements are confined to the dimensions of compacted material in place as specified by the Engineer. Materials placed outside the above limitations are not measured for payment.

2. Type III

The Department measures Type III material (complete, in place, and accepted) in cubic yards (meters).

Lateral measurements of Type III material are confined to an area bounded by vertical planes lying directly above the outside walls of the structure.

Longitudinal measurements are confined to the length of treatment installed as specified. Measurements of depth are the dimensions shown on the Plans or as directed.

D. Normal Backfill

This Item is not measured separately, but is included in the measurement of the Items of excavation from which normal backfill materials are obtained.

207.4.01 Limits

General Provisions 101 through 150.

207.5 Payment

A. Excavation for Minor Structures

This Item will not be paid for separately except as provided in [Subsection 207.4.B](#).

B. Sheeting and Bracing

Sheeting and bracing will not be paid for separately unless these materials are left in place at the written direction of the Engineer. In this case, the Contractor will be paid at invoice cost plus 10 percent.

C. Backfill Materials

Backfill material Type I, (measured as shown in [Subsection 207.4.C.1](#)) will be paid for according to [Section 205](#) or [Section 206](#).

The Department will pay for Types II and III separately at the Contract Unit Price per cubic yard (meter). This payment is full compensation for furnishing the materials from sources inside or outside the right-of-way, loading, unloading, hauling, handling, placing, and compacting the material.

D. Normal Backfill

This Item will not be paid for directly but will be paid at the Unit Price for the applicable excavation item from which the normal backfill materials are obtained.

Payment will be made under:

Item No. 207	Foundation backfill material, type II	Per cubic yard (meter)
Item No. 207	Imperfect trench backfill material, type III	Per cubic yard (meter)

207.5.01 Adjustments

General Provisions 101 through 150.

Section 210—Grading Complete

210.1 General Description

This work includes:

- Excavating of all materials including ditches, undesirable material (including removal and replacement), and borrow (if required)
- Hauling
- Forming embankments
- Constructing shoulders and subgrades
- Finishing, dressing, and disposing of undesirable or surplus material
- Clearing and grubbing according to [Section 201](#) and [Section 202](#) unless these items are established as Pay Items in the Contract
- Removing and disposing of miscellaneous roadway items, including but not limited to curbs, drainage structures, and pavements (unless established as separate contract items)

Ensure that the completed grading work conforms to the horizontal and vertical alignment and typical cross- sections shown on the Plans or as directed by the Engineer.

210.1.01 Definitions

See [General Conditions](#)

210.1.02 Related References

A. Standard Specifications

[Section 109—Measurement and Payment](#)

[Section 201—Clearing and Grubbing Right-of-Way](#)

[Section 202—Random Clearing and Grubbing](#)

[Section 204—Channel Excavation](#)

[Section 205—Roadway Excavation](#)

[Section 206—Borrow Excavation](#)

[Section 207—Excavation and Backfill for Minor Structures](#)

[Section 208—Embankments](#)

[Section 209—Subgrade Construction](#)

B. Referenced Documents

See [General Conditions](#)

210.1.03 Submittals

See [General Conditions](#)

210.2 Materials

Use materials required for grading construction that conform to the requirements of [Section 204](#), [Section 205](#), [Section 206](#), [Section 207](#), [Section 208](#), and [Section 209](#).

Section 210—Grading Complete

210.2.01 Delivery, Storage, and Handling

See General Conditions

210.3 Construction Requirements

210.3.01 Personnel

See General Conditions

210.3.02 Equipment

Use equipment approved by the Engineer that will not damage base, pavement, or other appurtenances to be retained.

210.3.03 Preparation

Before placing base material, finish the subgrade according to [Subsection 209.3.05.E](#).

210.3.04 Fabrication

See General Conditions

210.3.05 Construction

Perform The Work according to the appropriate portions of [Section 201](#), [Section 202](#), [Section 204](#), [Section 205](#), [Section 206](#), [Section 207](#), [Section 208](#), and [Section 209](#) of the Specifications. Measurement and payment shall be according to the provisions of this Section. See [Subsection 210.4](#) and [Subsection 210.5](#), below.

210.3.06 Quality Acceptance

When the Engineer determines that the existing material in areas where fills are to be placed is undesirable, the Engineer may require the Contractor to remove the undesirable material and replace it with suitable material.

- Compact the replacement materials according to the applicable portions of [Section 208](#).
- In cut areas, where the material below the template line is undesirable for subgrade or shoulders, undercut it to a depth established by the Engineer and replace it with suitable material.
- Compact the replacement materials as specified herein.

210.3.07 Contractor Warranty and Maintenance

See General Conditions

Section 522—Shoring

522.1 General Description

This work consists of furnishing, placing, maintaining, and removing all materials and equipment required for shoring as shown on the Plans and as described in other Special Provisions. It also includes all incidentals and additional work related to shoring.

522.1.01 Definitions

See General Conditions

522.1.02 Related References

A. Related Specifications

See General Conditions

B. Referenced Documents

See General Conditions
General Provisions 101

522.1.03 Submittals

A. Drawings

The Engineer may require the Contractor to submit drawings of the proposed shoring for review. If this is required, the Contractor shall not start work until the Engineer completes the review. The review will not relieve the Contractor of responsibility for the adequate and safe performance of the shoring.

522.2 Materials

Use materials that meet the requirements of the Plans and Specifications.

The Contractor retains ownership of all shoring materials.

522.2.01 Delivery, Storage, and Handling

See General Conditions

522.3 Construction Requirements

522.3.01 Personnel

See General Conditions

522.3.02 Equipment

See General Conditions

522.3.03 Preparation

See General Conditions

522.3.04 Fabrication

See General Conditions

522.3.05 Construction

A. Shoring Design

Ensure that shoring is structurally adequate to withstand forces including the following:

- Forces and pressures resulting from excavation
- Forces and pressures of surcharge loads from adjacent structures, roadbeds, tracks, slopes, and equipment

Section 522—Shoring

B. Work Standards

Ensure this work conforms to the Sequence of Construction outlined on the Plans and in the Special Provisions.

522.3.06 Quality Acceptance

See General Conditions

522.3.07 Contractor Warranty and Maintenance

See General Conditions

Section 550—Storm Drain Pipe, Pipe-Arch Culverts, and Side Drain Pipe

550.1 General Description

This work includes furnishing and installing the following:

- Storm drain pipe
- Pipe-arch culverts
- Side drain pipe flared end sections
- Tapered pipe inlets

Install structures according to the Specifications and the details shown on the Plans, or as directed by the Engineer.

550.1.01 Definitions

See General Conditions

550.1.02 Related References

A. Standard Specifications

[Section 205—Roadway Excavation](#)

[Section 207—Excavation and Backfill for Minor Structures](#)

[Section 208—Embankments](#)

[Section 645—Repair of Galvanized Coatings](#)

[Section 834—Masonry Materials](#)

[Section 840—Corrugated Aluminum Alloy Pipe](#)

[Section 841—Iron Pipe](#)

[Section 843—Concrete Pipe](#)

[Section 844—Steel Pipe](#)

[Section 845—Smooth Lined Corrugated Polyethylene \(PE\) Culvert Pipe](#)

[Section 846—Polyvinyl chloride \(PVC\) Profile Wall Drain Pipe](#)

[Section 847—Miscellaneous Pipe](#)

[Section 848—Pipe Appurtenances](#)

B. Referenced Documents

See General Conditions

550.1.03 Submittals

See General Conditions

550.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Backfill Materials	207
Reinforced Concrete Pipe	843.2.01

Section 550—Storm Drain Pipe, Pipe-Arch Culverts, and Side Drain Pipe

Material	Section
Nonreinforced Concrete Pipe	843.2.02
Mortar And Grout	834.2.03
Bituminous Plastic Cement	848.2.05
Rubber Type Gasket Joints (Concrete Pipe)	848.2.01
Preformed Plastic Gaskets	848.2.06
Corrugated Steel Pipe	844.2.01
Bituminous Coated Corrugated Steel Pipe	844.2.02
Corrugated Aluminum Alloy Pipe	840.2.01
Bituminous Coated Corrugated Aluminum Pipe	840.2.03
Aluminized Type 2 Corrugated Steel Pipe	844.2.06
Ductile Iron Pipe, Fittings and Joints	841
Precoated, Galvanized Steel Culverts	844.2.05
Smooth Lined Corrugated Polyethylene Pipe	845.2.01
Poly vinyl chloride (PVC) Profile Wall Drain Pipe	846
Miscellaneous Pipe	847

Use any of the following types of pipe:

- Reinforced concrete
- Nonreinforced concrete
- Corrugated steel or Aluminum
- Smooth-lined corrugated polyethylene
- Ductile iron
- Poly Vinyl Chloride (PVC) Profile Wall Drain Pipe

Use the type of pipe designated on the Plans, or acceptable alternate types when applicable.

550.2.01 Delivery, Storage, and Handling

See General Conditions

550.3 Construction Requirements

550.3.01 Personnel

See General Conditions

550.3.02 Equipment

See General Conditions

550.3.03 Preparation

Before installing pipe and pipe-arches, shape the foundation material as shown on the Plans.

Prepare structure excavations and foundation according to [Section 207](#). Except, do not use Class II B3 or II B4 soils as backfill for smooth-lined corrugated polyethylene pipe or polyvinyl chloride (PVC) profile wall drain pipe.

550.3.04 Fabrication

See General Conditions

550.3.05 Construction

A. Drainage

Provide necessary temporary drainage. Periodically remove any debris or silt that constricts the pipe flow to maintain drainage throughout the life of the Contract.

B. Damage

Before allowing traffic over a culvert, protect the structure by providing sufficient depth and width of compacted backfill. Repair damage or displacement from traffic or erosion that occurs after installing and backfilling at no additional cost to the Department.

C. Installation

1. Concrete Pipe

Lay flat-bottom and circular sections in a prepared trench with the socket ends pointing upstream. To join sections, use any of the following joint types:

- Mortar
- Bituminous plastic cement
- Rubber-type gasket
- O-ringed gasket
- Preformed plastic gasket

If using mortar and bituminous plastic cement joints:

- a. Fill the annular space with the joint material and wipe the inside of each joint smooth.
- b. Construct mortar joints in the same manner, but thoroughly wet the annular space before filling it with joint material.
- c. After the initial set, protect the outside mortar from air and sun with thoroughly wet earth or burlap cover. Install rubber-type, O-ring, and preformed plastic gasket joints according to the manufacturer's recommendations.

2. Ductile Iron Pipe

Lay pipe sections in a prepared trench, with bells pointing upstream. Construct joints according to [Subsection 841.2.02.A](#).

3. Corrugated Aluminum or Steel Pipe and Pipe-Arches

Lay pipe sections in a prepared trench, with outside laps of circumferential joints pointing upstream and longitudinal joints at the sides. Join the sections with coupling bands, fastened by two or more bolts. Keep no more than 2 in (50 mm) of space between adjoining sections.

Before backfilling the structure:

- a. Repair exposed base metal in metal coating according to [Section 645](#).
- b. Recoat exposed base metal in bituminous coating with asphalt.

4. Smooth-Lined Corrugated Polyethylene Pipe

Install smooth-lined corrugated polyethylene pipe according to ASTM D 2321. Use fitting and couplings that comply with the joint performance criteria of AASHTO Standard Specifications for Highway Bridges, Division II. Ensure that all joints are "soiltight" as stated in the AASHTO bridge specifications.

5. Specials (Wyes, Tees, and Bends)

Section 550—Storm Drain Pipe, Pipe-Arch Culverts, and Side Drain Pipe

Install wyes, tees, and bends as shown on the Plans or as directed.

6. Tapered Pipe Inlets

Locate and install tapered pipe inlet end sections as shown on the Plans or as directed.

7. Elongation

Elongate metal pipe as shown on the Plans. Order the elongation of the vertical axis of the pipe to be done in the shop.

Have the manufacturer ship metal pipe with wire ties in the pipe ends. Remove wire-ties immediately after completing the fill.

8. Flared End Sections

Use flared end sections on the inlet, outlet, or on both ends of storm drain pipe, according to Plan details.

9. Polyvinyl Chloride (PV) Profile Wall Drain Pipe

Install polyvinyl chloride (PVC) profile wall pipe according to ASTM D 2321. Use fittings and couplings that comply with the joint performance criteria of AASHTO Standard Specifications for Highway Bridges, Division II. Ensure that all joints are “soiltight” as stated in the AASHTO bridge specifications.

550.3.06 Quality Acceptance

Clean pipes and pipe-arch culverts before final acceptance of the Work.

The Department may conduct video surveillance on storm drain (cross drain and longitudinal drain) installations after all activities are complete that may damage the pipe, but before the placement of the base and paving when applicable. If video surveillance shows problems such as pipe deformation, cracking, or joint separation, the Contractor shall repair or replace these pipes at no cost to the Department.

Use a nine-point mandrel to test a minimum of 25% of the installed length of smooth-lined corrugated polyethylene or PVC profile wall drain pipe for deformation (pieces will be selected by the Engineer). Use a mandrel that has an effective diameter equal to 95% of the base inside diameter. Provide the Engineer with a proving ring to verify the mandrel size. Mandrel testing shall not be paid for separately.

Ensure that smooth-lined corrugated polyethylene or PVC profile wall drain pipe installations have a maximum of 5% deflection when checked after completing all construction activities that may damage the pipe, but before placing the base and paving when applicable. If mandrel testing reveals problems, the Engineer may require that up to 100% of the storm drain installations be checked for deformation. Remove and replace pipe with over 5% deflection at no cost to the Department.

550.3.07 Contractor Warranty and Maintenance

See General Conditions

Section 551—Pile Protection in Earth Walls

551.1 General Description

This work includes protecting bridge end bent piles located in the stabilized backfill of earth retaining walls.

551.1.01 Definitions

See General Conditions

551.1.02 Related References

A. Standard Specifications

[Section 535—Painting Structures](#)

[Section 801—Fine Aggregate](#)

[Section 806—Aggregate for Drainage](#)

B. Referenced Documents

ASTM A 123/A 123M

ASTM B 512

ASTM D 92

ASTM D 95

ASTM D 992

ASTM D 1241

ASTM D 1743

ASTM D 1621

ASTM D 1622

APHA 426 D

551.1.03 Submittals

See General Conditions

551.2 Materials

A. Cans

Place cans of smooth or corrugated steel pipe over piling. Use cans thick enough to prevent buckling while placing and compacting earth-stabilized embankment. Coat both inside and outside of the cans with either of the following:

Material	Section
2P Coating	535.3.03.D
Galvanizing	ASTM A 123/A 123M

B. Backfilling Cans

Use aggregate for the backfilling of cans according to Section 801 or Section 806.

C. Corrosion Inhibitor (Grease)

Use grease that conforms to the following requirements.

Section 551—Pile Protection in Earth Walls

Drop point 350 °F (175 °C) minimum		ASTM D 1241
Flash point 350 °F (175 °C) minimum		ASTM D 92
Water content 0.1% maximum		ASTM D 95
Rust test		ASTM D 1743
Water soluble ions	Chlorides, 10 PPM maximum	ASTM B 512
	Nitrates, 10 PPM maximum	ASTM D 992
	Sulfides, 10 PPM maximum	APHA 426 D

D. Polyurethane Foam

Use foam approved for commercial use in Georgia that meets the following requirements:

Minimum density 1.5 lbs/ft ³ (24 kg/m ³)	ASTM D 1622
Compressive strength perpendicular 16 psi (110 kPa) @ 6 percent	ASTM D 1621

E. Polypropylene Fluted Sheets

Use “plastic cardboard” ultra-violet stabilized sheets that are at least 48 in (1.2 m) long. Score or grease sheets to fold around piling and into H-pile web. When adding sections, use at least a 3 in. (75 mm) (shingle style) overlap.

F. Duct Tape

Use duct tape to patch and secure plastic cardboard and polyurethane. Keep duct tape from grease or pile. Use duct tape in sandy backfill to seal overlaps and prevent sand infiltration.

551.2.01 Delivery, Storage, and Handling

See General Conditions

551.3 Construction Requirements

551.3.01 Personnel

See General Conditions

551.3.02 Equipment

See General Conditions

551.3.03 Preparation

See General Conditions

551.3.04 Fabrication

See General Conditions

551.3.05 Construction

When the Plans require, protect end bent piles from negative skin friction by using one of the following methods.

A. Method A

After driving the end bent piles and before installing the earth reinforcing elements:

1. Place a cylindrical can over each pile to prevent the earth wall backfill material from contacting the pile.
Use a can large enough in diameter to give a 1 in (25 mm) minimum clearance from the pile to the inside of the can.

Section 551—Pile Protection in Earth Walls

2. Place a spacer between the pile and the can to prevent the can from contacting the pile during wall backfilling. Extend the cans from the bottom of the earth-stabilized backfill to the bottom of the bridge end bent cap.
3. After positioning the cans, seal them at the top while backfilling to keep rubbish or aggregate out of the can. Keep the cans sealed until fill settlement time has expired.
4. When the wall backfill has reached the bottom of the cap and fill settlement time has expired, fill the cans with aggregate.

B. Method B

Cover the piles with the following amounts of corrosion-inhibiting grease as follows:

- Steel piling = 1/16 in (2 mm) minimum
 - Concrete piling = 1/4 in (6 mm) minimum
1. Apply grease only after driving the piles. Treat only the pile portion that will be in contact with the wall backfill.
 2. In addition to the grease, install a urethane or polypropylene sleeve to protect the grease coating from the backfill.
 3. Use spray-on or preformed sleeves. Replace portions of the sleeve damaged or removed by construction activities during backfill.

551.3.06 Quality Acceptance

See General Conditions

551.3.07 Contractor Warranty and Maintenance

See General Conditions

Section 603—Rip Rap

603.1 General Description

This work includes placing protective coverings of sand-cement bag rip rap or stone rip rap.

When required, this work includes placing crushed stone filter material or plastic filter fabric beneath stone rip rap on:

- Fill slopes
- Cut slopes
- End rolls
- Shoulders
- Ditches
- Stream banks
- Channel banks
- Other locations

603.1.01 Definitions

General Provisions 101 through 150.

603.1.02 Related References

A. Standard Specifications

[Section 800—Coarse Aggregate](#)

[Section 801—Fine Aggregate](#)

[Section 805—Rip Rap and Curbing Stone](#)

[Section 815—Graded Aggregate](#)

[Section 830—Portland Cement](#)

[Section 832—Curing Agents](#)

[Section 880—Water](#)

[Section 881—Fabrics](#)

B. Referenced Documents

AASHTO T 134

[QPL 28](#)

603.1.03 Submittals

General Provisions 101 through 150.

603.2 Materials

Ensure that the materials meet the requirements of the following Specifications:

Material	Specification
Portland cement	830.2.01
Rip Rap (Stone)	805.2.01

Section 603—Rip Rap

Material	Specification
Membrane Curing Compound	832.2.03
Stone Filter Blanket	815.2.01 or 800.2.01 (Size No. 467*)
Fine Aggregate for Sand Cement Rip Rap	801.2.03
Water	880.2.01
Woven Plastic Filter Fabric	881.2.05
*Except that up to 10% is allowed to pass the No. 4 (4.75 mm) sieve.	

A. Bags for Sand-Cement Bag Rip Rap

Use cotton, burlap, or fiber reinforced paper bags that can contain the sand-cement mixture without leaking during handling and placing. Do not use bags that previously held sugar or other material that will adversely affect the sand-cement mixture.

Ensure that the capacity is at least 0.75 ft³ (0.02 m³) but not greater than 2 ft³ (0.5 m³).

B. Stone Dumped Rip Rap

Stone dumped rip rap is designated on the Plans as Type 1 or Type 3 as defined in [Subsection 805.2.01](#).

603.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

603.3 Construction Requirements

603.3.01 Personnel

General Provisions 101 through 150.

603.3.02 Equipment

General Provisions 101 through 150.

603.3.03 Preparation

General Provisions 101 through 150.

603.3.04 Fabrication

General Provisions 101 through 150.

603.3.05 Construction

Construct this Work according to the following requirements:

A. Preparing the Foundations

Prepare the ground surface where the rip rap will be placed to conform with the correct lines and grades before beginning the placement.

1. When filling depressions, compact the new material with hand or mechanical tampers.
Dispose of excess material by spreading it neatly within the right-of-way as an incidental part of the work.
2. Unless otherwise shown or provided below, begin placing the rip rap in a toe ditch constructed in original ground around the toe of the fill or the cut slope.

Section 603—Rip Rap

Ensure that the toe ditch is 2 ft (600 mm) deep in original ground and the side next to the fill or cut has the same slope.

3. After placing the rip rap, backfill the toe ditch and spread the excess dirt neatly within the right-of-way as an incidental part of the work.
4. When beginning rip rap in water or below normal water level, substitute an apron of rip rap for the toe ditch. Ensure that the width and thickness of this apron is as shown on the Plans or determined by the Engineer.

B. Placing Stone Rip Rap

Place rip rap to the limits shown on the Plans or as directed by the Engineer. Place and classify rip rap as follows:

1. Stone Plain Rip Rap

Dump and handle stone plain rip rap into place to form a compact layer to the design thickness.

Ensure that the thickness tolerance for the course is plus 12 in (300 mm) with no under-tolerance. If the Plans do not show a thickness, place stone rip rap to at least 12 in (300 mm) thick, but no greater than 2 ft (600 mm) thick.

2. Stone Dumped Rip Rap

Dump stone dumped rip rap into place to form a uniform surface as thick as specified in the Plans.

- a. Ensure that the thickness tolerance for the course is minus 6 in (150 mm) and plus 12 in (300 mm). If the Plans or Proposal do not specify a thickness, place the course to at least 2 ft (600 mm) thick.
- b. Recycled concrete that meets the requirements of [Subsection 805.2.01](#) may be used instead of stone when shown on the Plans or approved by the Engineer.

Use recycled concrete only when materials do not contain steel after processing.

NOTE: Do not use recycled concrete in aesthetically sensitive areas.

3. Stone Grouted Rip Rap

Place stone grouted rip rap according to specifications for stone plain rip rap and these guidelines:

- a. Prevent earth from filling the spaces between the stones.
- b. After placing the stone, fill the spaces between them with 1:3 grout composed of Portland cement and sand mixed thoroughly with enough water to make a thick, creamy consistency.
- c. Place the grout beginning at the toe. Finish it by sweeping with a stiff bristle broom.
- d. After grouting, cover the rip rap and keep it wet for 5 days, or cover and keep wet for 24 hours and then coat with white pigmented membrane curing compound.

C. Placing Filter

Place woven plastic filter fabric under all rip rap. Follow these requirements for placing the filter fabric:

1. Prepare the surface to receive the fabric until it is smooth and free from obstructions, depressions, and debris.
2. Place the fabric with the long dimension running up the slope. Minimize the number of overlaps.
3. Place the strips to provide a width of at least 1 ft (300 mm) of overlap for each joint.
4. Anchor the filter fabric in place with securing pins of the type recommended by the fabric manufacturer. Place the pins on or within 3 in (75 mm) of the centerline of the overlap.
5. Place the fabric so that the upstream strip will overlap the downstream strip.
6. Loosely place the fabric to prevent stretching and tearing during stone placement.
Do not drop the stones more than 3 ft (1 m) during construction.
7. Always protect the fabric during construction from clogging due to clay, silts, chemicals, or other contaminants.

Section 603—Rip Rap

8. Remove contaminated fabric or fabric damaged during installation or rip rap placement. Replace with uncontaminated or undamaged fabric at no expense to the Department.

D. Placing Sand-Cement Bag Rip Rap

Place rip rap to the limits shown on the Plans or as directed by the Engineer.

1. Proportioning Materials

Mix sand and Portland cement at the maximum ratio of 5:1 by weight.

- a. Obtain a minimum compressive strength of 500 psi (3 MPa) in 7 days.
- b. For sand-cement bag rip rap, use enough water to make up the optimum moisture content of the aggregate and cement as determined by AASHTO T 134.
- c. When sand-cement rip rap is to be prebagged, mix the sand cement dry. After placing each course, wet the bags until the bags are wet enough for proper cement hydration.

2. Placement

Before placing sand-cement bag rip rap, fill the bags full, but allow room to tie the bags.

- a. Place the bagged rip rap by hand with the tied ends facing the same direction. Produce close, broken joints.
- b. Place header courses when directed by the Engineer or required by the Plans.
- c. After placing the bags, ram or pack them against one another to produce the required thickness and form a consolidated mass.
- d. Do not allow the top of each bag to vary more than 3 in (75 mm) above or below the required plane.

E. Placing Stone Blanket Protection

Ensure that the stone blanket protection meets the materials Specifications for stone filter blanket as specified in [Subsection 603.2](#), “Materials,” except stone size No. 357 will be allowed instead of size No. 467.

Place stone blanket protection to the limits shown on the Plans, or as directed by the Engineer.

Uniformly place this material to the thickness shown on the Plans and to a thickness tolerance of 0.5 in (\pm 15 mm).

Do not use stone blanket protection on slopes steeper than two horizontal to one vertical or in areas highly susceptible to erosion. Do not use plastic filter fabrics with stone blanket protection.

603.3.06 Quality Acceptance

General Provisions 101 through 150.

603.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

603.4 Measurement

This work is measured for payment in square yards (meters) of accepted material of the specified thickness. Area measurements are made parallel to the surface on which the material is placed. Plastic filter fabric will be measured as the area of rip rap placed and accepted. No separate measurement will be made for fabric overlap joints, seams, or vertical sections at toe of slopes. No separate measurement is made for grout or cushioning sand.

Plan dimensions are figured by the use of filled bags 12 by 18 by 6 in. (300 by 450 by 150 mm) thick.

When filled bags are less than Plan dimensions or are of varying lengths or width, Plan square yards (meters) will be used to determine pay quantities, if overall dimensions are equal to or greater than those shown on the Plans.

603.4.01 Limits

General Provisions 101 through 150.

Section 603—Rip Rap

603.5 Payment

This work will be paid for at the Contract Price per square yard (meter) of material complete in place.

Payment will be made under:

Item No. 603	Stone plain rip rap ___ in (mm) thick	Per square yard (meter)
Item No. 603	Stone dumped rip rap (<u>type</u>) ___ in (mm) thick	Per square yard (meter)
Item No. 603	Stone grouted rip rap (<u>thick</u>)	Per square yard (meter)
Item No. 603	Filter blanket	Per square yard (meter)
Item No. 603	Sand-cement bag rip rap, ___ in (mm) thick	Per square yard (meter)
Item No. 603	Stone blanket protection, ___ in (mm)	Per square yard (meter)
Item No. 603	Plastic filter fabric	Per square yard (meter)

603.5.01 Adjustments

General Provisions 101 through 150.

Section 608—Brick Masonry

608.1 General Description

This work includes laying brick in mortar.

608.1.01 Definitions

See General Conditions

608.1.02 Related References

A. Standard Specifications

[Section 207—Excavation and Backfill for Minor Structures](#)

[Section 834—Masonry Materials](#)

B. Referenced Documents

See General Conditions
General Provisions 101

608.1.03 Submittals

See General Conditions

608.2 Materials

Ensure that the materials meet the requirements of the following Specifications:

Brick for Masonry	834
Mortar and Grout	834

608.2.01 Delivery, Storage, and Handling

See General Conditions

608.3 Construction Requirements

608.3.01 Personnel

See General Conditions

608.3.02 Equipment

See General Conditions
General Provisions 101

608.3.03 Preparation

See General Conditions
General Provisions 101

608.3.04 Fabrication

See General Conditions

608.3.05 Construction

A. Brick Selection

Select brick for exposed surfaces, corners, etc. from brick approved as to color and uniformity.

B. Laying Brick

Follow these guidelines when laying brick:

1. Saturate the brick with water before laying it.

Section 608—Brick Masonry

2. Lay the brick using the shove-joint method to bond it thoroughly into the mortar.
3. Arrange headers and stretchers to bond the mass thoroughly.
4. For straight masonry walls using stretcher courses, ensure that at least 1 course in 7 is a header course.
5. Finish joints properly as the Work progresses. Create joints at least 0.25 in (5 mm) but no more than 0.5 in (15 mm) thick.

NOTE: Do not use spalls or bats except to shape around irregular openings or to use at corners.

6. Lay brick evenly and neatly.

C. Observing Weather Limitations

Do not lay brick in freezing weather or when the bricks contain frost, except with permission from the Engineer and when required.

In hot and dry weather, protect the masonry and keep it wet for at least 48 hours after laying the brick.

D. Backfilling

Do not place backfill against the masonry until it is at least 7 days old. During cold weather, the restricted period may be longer as directed.

608.3.06 Quality Acceptance

All brick masonry shall present an even, uniform, neat, and workmanlike appearance.

608.3.07 Contractor Warranty and Maintenance

See General Conditions

Section 610—Removal of Miscellaneous Roadway Items

610.1 General Description

This work includes removing, salvaging, or disposing of items listed in the Proposal as Pay Items to be removed, and backfilling the excavations made during removal.

Remove structures not separately listed as Pay Items in the Contract as specified in [Sections 201](#), [202](#), or [205](#).

610.1.01 Definitions

See General Conditions

610.1.02 Related References

A. Standard Specifications

[Section 201—Clearing and Grubbing Right-of-Way](#)

[Section 202—Random Clearing and Grubbing](#)

[Section 205—Roadway Excavation](#)

[Section 208—Embankments](#)

[Section 540—Removal of Existing Bridge](#)

[Section 611—Relaying, Reconstructing, or Adjusting to Grade of Miscellaneous Roadway Structures](#)

B. Referenced Documents

See General Conditions

610.1.03 Submittals

See General Conditions

610.2 Materials

610.2.01 Delivery, Storage, and Handling

A. Materials Retained by the Department

Unless removed under [Sections 201](#), [202](#), or [205](#), or unless otherwise provided for in the Plans or Proposal, carefully remove materials with a salvage value.

1. Neatly stack or stockpile the materials along the right-of-way near the removal point and above high water.
2. Store highway signs standing on edge and protected from the elements.
3. Replace materials damaged, defaced, or destroyed by removing them carelessly at no cost to the Department.
4. Notify the Engineer when the materials have been stockpiled and are ready to be transported.
5. Keep materials secure and replace (at the Contractor's expense) materials lost, stolen, or missing within a maximum of 10 days after the Engineer has been notified that the materials are ready to be transported.

B. Materials Reused in the Work

Maintain structures, portions of structures, and other materials to be salvaged and reused in reconstruction work.

Assume responsibility for the material until Project Final Acceptance.

Repair or replace materials lost or stolen before reuse at the Contractor's expense.

Spread suitable surplus excavation material on the slopes of the roadway embankments. Otherwise, dispose of the waste materials off the right-of-way at the Contractor's expense.

Section 610—Removal of Miscellaneous Roadway Items

C. Bridge Components

Dispose of bridge components according to [Section 540](#). Replace or repair at the Contractor's expense structures, portions of structures, or materials to be salvaged, retained, or used in the reconstructed work but that were carelessly damaged or destroyed by the Contractor.

610.3 Construction Requirements

610.3.01 Personnel

See General Conditions

610.3.02 Equipment

See General Conditions

610.3.03 Preparation

If removing a structure may endanger a new construction, finish that part of the work before beginning the new construction.

610.3.04 Fabrication

See General Conditions

610.3.05 Construction

A. Protection of Remaining Structures

Do not use explosives, equipment, or devices that may endanger structures, facilities, or other property to remain in place. If parts of structures are to remain in place, protect them from damage during construction. Protect and preserve the salvage value of materials to be salvaged.

B. Extent of Removal

Separate and remove existing structures, with their attached parts and connections, as shown on the Plans or designated to be removed.

1. When a part of an existing structure is to remain in place, ensure that the part to be removed extends to a construction joint or is cut off to the lines shown on the Plans, leaving reasonably smooth faces.
Remove walls and other masonry construction to the bottoms of the foundations unless otherwise specified.
2. Remove walls and their foundations within the roadbed area to an elevation at least 3 ft (900 mm) below the top of the finished subgrade, unless otherwise specified.
3. See [Subsection 201.3.05.C.1.c, "Abandoned Obstructions,"](#) for guidelines for rigid surfaces.

C. Railway Tracks

Removing railway tracks includes removing rails, ties, switches, towers, concrete structures, sign posts, and other related railway structures. Leave ballast in place, unless otherwise specified.

D. Inlets, Catch Basins, Manholes, and Culverts

1. Remove gratings, traps, and other metal castings of inlets, catch basins, and manholes without damaging them. Reuse them on new structures or salvage them, whichever the Engineer directs.
2. Remove old culverts down to the ground level or to the adjacent water level, unless otherwise shown on Plans.
3. Remove the bottom slabs of inlets, catch basins, manholes, and culverts. If the Engineer permits them to remain in place, break them up so that water will readily pass through them.

E. Removing Pipe

Uncover the pipe to remove it without damage. Exercise care in removing the pipe. Replace pipe sections damaged by negligence at the Contractor's expense.

Section 610—Removal of Miscellaneous Roadway Items

After removing the pipe, clean it and neatly stack it at points directed by the Engineer along the line of the work. Unless otherwise specified, the pipe is the property of the Department.

F. Septic Tanks

When encountering septic tanks, completely remove the contents of each tank.

1. Remove and dispose of the tank's contents as required by the State Department of Health and local health authorities.
2. Before backfilling the remaining portion of the septic tank, drill holes in the bottom of the tank or break it up as the Engineer directs, to permit drainage.

G. Backfilling

Backfill trenches and other excavations dug for removing miscellaneous structures.

1. Use approved materials in the backfill.
2. Compact the backfill in layers no more than 6 in (150 mm) thick and with the proper moisture content. Use pneumatic tampers or other approved equipment.
3. Under the roadway, ensure that the degree of compaction conforms to [Section 208](#).
Elsewhere, compact the backfill equal to the soil surrounding it.

H. Structures to Remain

Preserve unharmed the miscellaneous structures, including fences, buildings, pipe lines, pole lines, water and sewer lines, and other improvements that owners or the Department will retain or that others will remove.

I. Culverts to be Extended

Where concrete culverts are to be extended, remove a minimum amount of concrete in parapets, wing walls, and wing wall footings to clear the new construction. Make the joint or connection as shown on the Plans or as directed by the Engineer.

J. Fences

When removing fences, do not allow livestock to escape. If fences are to be reset according to [Section 611](#), protect the spelter coating of fence fabric, steel fence posts, and braces.

The Engineer will require that reusable posts removed be clean and free of concrete. If desired, furnish new posts instead of cleaning the old ones at no additional cost to the Department.

K. Raised Edge Curb

Remove raised edge curb to a reasonably true line at the elevation of normal finished pavement.

If the average of the plus and minus deviations approximate the original normal edge of pavement, a tolerance of approximately 1 in (25 mm) above or below this elevation will be accepted.

Do not shatter pavement that will be retained.

L. Highway Signs

Remove the entire sign from the supports, and remove the supports from the concrete foundation.

M. Lighting Standards and Appurtenances

Disassemble the lighting standard, and separate each component part including the transformer base. Cut the underground duct before removing these items.

Section 610—Removal of Miscellaneous Roadway Items

610.3.06 Quality Acceptance

See General Conditions

610.3.07 Contractor Warranty and Maintenance

See General Conditions

Section 611—Relaying, Reconstructing, or Adjusting to Grade of Miscellaneous Roadway Structures

611.1 General Description

This work includes relaying, reconstructing, resetting, adjusting to grade, capping minor structures, resetting guard rail, or adjusting other miscellaneous roadway structures as specified in the Proposal or on the Plans.

611.1.01 Definitions

See General Conditions
General Provisions 101

611.1.02 Related References

A. Standard Specifications

[Section 610—Removal of Miscellaneous Roadway Items](#)

[Section 641—Guard Rail](#)

[Section 668—Miscellaneous Drainage Structures](#)

[Section 854—Castings and Forgings](#)

B. Referenced Documents

See General Conditions

611.1.03 Submittals

See General Conditions

611.2 Materials

Most materials for the work in this Specification are salvaged from the removal of existing structures. The Engineer will determine the suitability of the salvaged material for use.

Use other materials to complete the structure, such as mortar, sand-cement grout, sand for sand cushion, bituminous filler, brick, and other materials that meet the requirements of the applicable Specifications for such materials for use in new structures of the same character and type.

611.2.01 Delivery, Storage, and Handling

See General Conditions
General Provisions 107

611.3 Construction Requirements

611.3.01 Personnel

See General Conditions

611.3.02 Equipment

See General Conditions
General Provisions 101

611.3.03 Preparation

See General Conditions

611.3.04 Fabrication

See General Conditions

611.3.05 Construction

A. Miscellaneous Roadway Items

Follow these procedures to construct miscellaneous roadway items:

1. Remove existing structures to be rebuilt according to [Section 610](#).
2. Clean the material salvaged for use in the rebuilt structure and stockpile it in convenient places. Protect it from damage until it is used.
3. Dispose of the portions of structures not suitable for reuse as provided in [Section 610](#). Replace them with suitable new material.
4. Relay or rebuild the structures according to the Specifications for new structures of the same type.
5. Adjust to the required grade miscellaneous structures specified in the Proposal or on the Plans by raising or lowering the upper portion of the fixture, including sleeve extensions, adjustable manhole rings, gaskets, mastic, mortar, masonry, and other material.
6. Furnish materials such as mortar, sand-cement grout, sand cushion, bituminous filler, brick, castings, and other materials to excavate, trench, prepare earth foundation, backfill, and other work necessary to complete the Item.

B. Capping an Existing Structure

When capping an existing structure requires removing adjacent existing pavement, sidewalk, curb, gutter, or other improvement not otherwise affected by the work, follow these guidelines:

1. Remove the improvements to expose only the portion of the structure to be modified.
2. Replace the removed improvements to the Engineer's satisfaction without additional compensation.
3. Remove enough existing masonry to lower the top elevation to a point not less than the thickness of the cap plus 3 ft (1 m) below subgrade elevation, unless otherwise indicated.
4. Cap the remaining portion of the structure with a fitted reinforced concrete cover constructed to the general details shown on the Plans.

Grates, rings, plates, covers, hoods, or other castings or fittings removed while capping and not re-used become the property of the Department unless otherwise indicated on the Plans.

C. Resetting Guard Rail

When resetting the guard rail is specified in the Proposal:

1. Reset guard rail removed according to [Section 610](#) where the Plan indicates and to the required post spacing.
2. Furnish materials, including additional hardware, offset blocks, and posts.
3. Replace posts that do not conform to the Plans.
4. Follow the applicable provisions of [Section 641](#).

D. Raising Manholes

When raising manholes:

1. Adjustments may be made by using adjustable extension rings that do not require removing the existing manhole frame.
2. Ensure that the extension device locks to the existing frame and permits height and diameter adjustment. The adjustable extension ring to be used shall have the Engineer's prior approval.
3. Choose an extension ring compatible with the existing casting and cover. Ensure that the adjustment range conforms to the finished pavement surface.
 - a. Use an adjustable extension ring made of materials that meet the requirements of [Subsection 854.2.01](#) or are manufactured from ASTM A 36/A 36M steel and approved by the Office of Materials and Research.

Section 611—Relaying, Reconstructing, or Adjusting to Grade of Miscellaneous Roadway Structures

- b. Ensure that the extension ring and cover are machine ground to reduce contact irregularity. Ensure that the grates are rattleproof.
- c. Obtain the Engineer's approval for the type of adjustable extension ring used.

E. Replacing Fences

Replace fences removed under [Section 610](#) in kind, using the removed materials as far as possible. Unless the Plans provide for new fence at the particular location, include new materials required in the Bid Price for resetting fence.

611.3.06 Quality Acceptance

See General Conditions

611.3.07 Contractor Warranty and Maintenance

See General Conditions

unit shown in Proposal Item No. 611

Reconstruct

Section 643—Fence

643.1 General Description

This work includes constructing fence and gates according to these Specifications where shown on the Plans or designated by the Engineer. Ensure that this work conforms with the lines and grades shown on the Plans. The fence types covered by these Specifications are:

- Chain-link
- Woven wire
- Barbed wire
- Field fence
- Barrier fence

643.1.01 Definitions

General Provisions 101 through 150.

643.1.02 Related References

A. Standard Specifications

[Section 500—Concrete Structures](#)

[Section 645—Repair of Galvanized Coatings](#)

[Section 862—Wood Posts and Bracing](#)

[Section 863—Preservative Treatment of Timber Products](#)

[Section 894—Fencing](#)

B. Referenced Documents

General Provisions 101 through 150.

643.1.03 Submittals

Furnish the Engineer, in duplicate, a materials certification for temporary barrier fence physical properties according to [Section 106](#) of the Specifications.

643.2 Materials

Ensure that materials conform to the following Specifications:

Material	Section
Concrete (Class A or B)	500
Wood Fence Posts and Bracing	862.2.01
Metal Caps	862.2.01.A.5.
Preservative Treatment	863.2.01
Chain Link Fence (Fabric, Posts, Gates, and Accessories)	894.2.01
Woven Wire Fence (Fabric, Gates, and Posts)	894.2.02
Barbed Wire (including Posts)	894.2.03
Ground Rods and Connections	894.2.04
Field Fence	894.2.05

A. Chain-Link Fence

Use the fencing material shown in [Subsection 894.2.01](#). Ensure that posts, fabric, wire, appurtenances, and gates when required, are the same or matching type for each Project, unless otherwise directed.

Section 643—Fence

B. Woven-Wire or Barbed-Wire Fences

Use wood or steel post types as shown on the Plans. Ensure that each Project fence and post is the same type and shape, unless otherwise specified.

C. Temporary Barrier Fence

1. Use barrier fence fabricated from high-density polyethylene or polypropylene containing U.V. stabilizers
2. Ensure the barrier fence meets the following:
 - a) Is free of manufacturing flaws
 - b) Meets the following physical properties

Maximum Mesh Opening Size	1 ¾" (45 mm) x 2 1/8 " (54 mm)
Roll Width	4 ft. (1.2 m)
Color	International Orange
Maximum Porosity	80%
Minimum Yield Strength (MD)	750 lb/ft (11 kN/m)

643.2.01 Delivery, Storage, and Handling

Do not store barbed-wire, woven-wire fence fabric, steel posts, hardware, and other materials on the ground. Place them in floored buildings, on platforms, or on wooden timbers or poles. Ensure that the floors, platforms, or props are high enough to prevent the wire and steel posts from touching ground or surface water.

Wire or steel posts that are damaged from improper storage between fabrication and final erection will be rejected.

643.3 Construction Requirements

643.3.01 Personnel

General Provisions 101 through 150.

643.3.02 Equipment

General Provisions 101 through 150.

643.3.03 Preparation

General Provisions 101 through 150.

643.3.04 Fabrication

General Provisions 101 through 150.

643.3.05 Construction

Construct fence (except for field fence) within the right-of-way line. Do not allow the permanent installation to encroach on adjacent property.

A. General Fencing Requirements

Follow these general requirements when placing the fence:

1. Construct the fence to follow the contour of the ground. Place the bottom of the fence fabric at least 1 in (25 mm) from the ground surface, but no more than 6 in. (150 mm).
2. Clear the fence line a maximum of 8 ft (2.4 m) wide and grade where necessary to provide a neat appearance.
3. When the ground profile in low areas changes abruptly, use longer posts to maintain the ground clearance. Stretch multiple strands of barbed wire on the posts with 6 in (150 mm) or less vertical clearances between strands of barbed wire.
4. Connect the existing cross fences to new fencing, except for obviously unserviceable fences.
5. Place corner or end posts, whichever is appropriate, at the junction with existing fences and fasten the wires in the new and existing fences to the posts.

Section 643—Fence

6. Install corner or pull posts for new fencing without placing tension on existing fence posts. At structures, fasten new fencing to end posts to permit livestock to pass through or under the structure freely, unless otherwise directed or shown on the Plans.

B. Posts and Appurtenances

Follow these steps to install posts and appurtenances:

1. Place and install the posts as shown on the Plans. If the soil is Class I, II, III, or V, drive “C” and 2-3/8 in (60 mm) tube-type line posts for all fence types at least 3 ft (900 mm) deep instead of using concrete encasement.
2. Encase in concrete line posts installed in marshy or swampy areas (Class IV soils). Install posts in rock according to this subsection.
3. Encase the corner, end, and pull posts in concrete as shown on the Plans.
4. Replace posts damaged by driving. When posts are set in concrete, fill the entire hole around the post with Class A or B concrete.
5. Hand mix concrete for batches of 1/2 yd³ (0.5 m³) or less. Firmly brace the posts and hold them in place until the concrete has set.
6. Ensure that the distance between the end, pull, and corner or angle post assemblies does not exceed the following:

For chain-link fence, straight line	500 ft (150 m)
For chain-link fence, curved line	250 ft *(75 m)
For woven-wire fabric	330 ft (100 m)
Field fence	330 ft (100 m)

7. On end, pull, and corner or angle post assemblies for woven-wire fence, add additional approach posts for greater stability when necessary or as directed by the Engineer.
8. Set posts placed on concrete walls, slabs, or solid rock in round holes 6 in (150 mm) deep or as indicated on the Plans.
9. Fill the space around the post with molten lead or a cement filler approved by the laboratory.
10. Repair the posts after cutting or drilling. Repair galvanized steel posts according to [Section 645](#). Repair other metal posts according to the manufacturer’s recommendations.
11. Treat timber posts and braces with a preservative coating of the type specified in [Subsection 863.2.01](#).

C. Fence Erection

Install fence fabric or barbed wire when posts are set and braced, except when posts are set in concrete footings.

When posts are set in concrete footings, delay installing the fabric or wire to allow the concrete to cure at least 5 days. When barbed wire fence is required, install three strands unless otherwise indicated on the Plans.

D. Gates

Ensure that the gate assemblies are the length, height, and type designated on the Plans. Install the gate to provide a 180-degree swing.

Weld the gate frames into units. Properly coat them after welding according to [Section 894](#).

Stretch fabric that matches the fence fabric taut over the gate frame. Provide gate assemblies with a positive-type locking device, padlock, and keys.

E. Electrical Ground

Wherever a power line carrying more than 600 volts passes over the fence, install a ground rod.

1. Install the ground rod at the nearest point directly below the point of crossing.
2. Where possible, drive the rod into the ground for a full 8 ft (2.4 m) of penetration.
 - a. In rocky soil, drive the rod slanted to provide 18 in (450 mm) of cover at the tip.
 - b. In solid rock, install two ground rods at the nearest post on each side of the power line crossing where soil conditions will permit.
3. Use clamps to attach a length of No. 6 AWG bare copper, 7-strand wire between the fence and the ground rod.

Section 643—Fence

F. Trespassing on Private Property

To trespass on private property outside the right-of-way or easements provided on the Plans, obtain permission from the property owner for the intrusion.

Use field fence for replacing fence outside the right-of-way or for providing temporary fence at locations shown on the Plans or directed by the Engineer. Field fence is considered permanent unless it is specified as temporary.

G. Maintaining Livestock

Construct the fence to prevent livestock from escaping. Schedule fence removal and new fence installation to provide continuous security of the livestock. If security is not maintained and animals or property are damaged or lost, compensate the owner or make repairs at no cost to the Department. Replace or repair damaged existing fences.

H. Temporary Barrier Fence

Install the barrier fence according to the manufacturer's instruction. Use suitable strength metal, wood, or composite posts. Ensure the posts are long enough to be embedded to a depth that will provide stability to the fence have sufficient rigidity to hold the fence in a vertical position.

The maximum post spacing is 10 ft (3 m). Attach the fence to the posts with nails, staples, or wire ties spaced every 6 in. (150 mm) along the posts. Do not allow the method of attachment to create a safety hazard.

At the completion of the project, or as directed by the Engineer, remove all barrier fence including posts and incidentals.

643.3.06 Quality Acceptance

Repair rusted wire or posts before Final Acceptance, or remove and replace with new material at the Contractor's expense. Do not replace the fence if rusting occurs as a result of ponding water after the fence is erected.

643.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

643.4 Measurement

Fence will be measured by the linear foot (meter) along the bottom of the fence, from the outside of end posts for each continuous run of fence. Measurement for payment includes posts, post assemblies, pull, corner, and gate posts, and gates unless gates are a separate Pay Item.

When gates are paid for separately they will be measured as complete Units of the type and size specified and installed.

Temporary barrier fence will be measured by the linear foot (meter) along the bottom of the fence outside of end posts for each continuous run of fence.

643.4.01 Limits

General Provisions 101 through 150.

643.5 Payment

The accepted quantities of fence, measured as indicated above, will be paid for at the Contract Unit Price per linear foot (meter) of the specified type and height of fence. Payment includes gates unless the gates are paid for separately.

The accepted quantity of gates, when listed as a separate Pay Item, will be paid for at the Contract Unit Price for each type and size of gate specified, complete in place, including posts and hardware, locks, keys, and other incidentals shown on the Plans.

Payment includes clearing and grubbing, grading, excavating, backfilling, disposing of surplus materials, and furnishing materials and incidentals such as molten lead or cement filler on concrete walls, slabs, or solid rock to complete the work.

When field fencing is temporary, payment includes removal. Materials salvaged from temporary field fence remain the Contractor's property.

The accepted quantities of temporary barrier fence measured as indicated above will be paid for at the Contract unit price per linear foot (meter) of fence. Payment to complete the item includes all necessary clearing, installation of fence including hardware and other incidentals, and removal of the fence. The barrier fence, posts, and all incidentals become the property of the Contractor upon removal.

Section 643—Fence

Payment will be made under:

Item No. 643	Field fence, woven wire	Per linear foot (meter)
Item No. 643	Field fence, barbed wire (strand)	Per linear foot (meter)
Item No. 643	Field fence, special design	Per linear foot (meter)
Item No. 643	Chain-link fence (type___), (height___) in (mm), wire gauge___	Per linear foot (meter)
Item No. 643	Chain-link fence (type___), (height___) in (mm), wire gauge___, with extension arms and barbed wire	Per linear foot (meter)
Item No. 643	Woven-wire fence	Per linear foot (meter)
Item No. 643	Barbed-wire fence (strand)	Per linear foot (meter)
Item No. 643	Gate (fence type,___) (size___)	Per each
Item No. 643	Barrier fence, height,___ ft (m)	Per linear foot (meter)

643.5.01 Adjustments

General Provisions 101 through 150.

Section 668—Miscellaneous Drainage Structures

668.1 General Description

This work includes constructing catch basins, drop inlets, manholes, junction boxes, spring boxes, drain inlets, special inlets with safety grates, and vertical tee sections.

Construct according to these Specifications and the lines and grades shown on the Plans, or as established by the Engineer.

668.1.01 Definitions

See General Conditions through 150.

668.1.02 Related References

A. Standard Specifications

[Section 207—Excavation and Backfill for Minor Structures](#)

[Section 500—Concrete Structures](#)

[Section 607—Rubble Masonry](#)

[Section 608—Brick Masonry](#)

[Section 801—Fine Aggregate](#)

[Section 830—Portland Cement](#)

[Section 834—Masonry Materials](#)

[Section 843—Concrete Pipe](#)

[Section 853—Reinforcement and Tensioning Steel](#)

[Section 854—Castings and Forgings](#)

[Section 866—Precast Concrete Catch Basin, Drop Inlet, and Manhole Units](#)

B. Referenced Documents

See General Conditions

668.1.03 Submittals

See General Conditions through 150.

668.2 Materials

The structures in this section may be constructed of brick, cast-in-place concrete, or pre-cast concrete, unless the Plans or Proposal specifies a specific type of construction.

Use rubble masonry only when specified on the Plans. Ensure that materials meet the following specifications:

Material	Section
Class "A" or "B" Concrete	500
Sand for Bedding Material	801.2.01
Fine Aggregate for Mortar	801.2.02
Portland Cement	830.2.01
Brick	834
Masonry Stone	834
Mortar and Grout	834
Nonreinforced Concrete Pipe	843
Steel Bars for Reinforcement	853.2.01

Section 668—Miscellaneous Drainage Structures

Material	Section
Gray Iron Castings	854.2.01
Precast Reinforced Concrete Catch Basin, Drop Inlet, and Manhole Units	866

Ensure that the materials for fabricating special inlets and their safety grates are according to Plan details.

Construct the following manholes and drainage structures from pre-cast or cast-in-place concrete:

- Structures within the backfill limits of mechanically stabilized embankment retaining walls
- Structures within 5 ft (1.5 m) of the wall foundation's front.

668.2.01 Delivery, Storage, and Handling

See General Conditions

668.3 Construction Requirements

668.3.01 Personnel

See General Conditions through 150.

668.3.02 Equipment

See General Conditions

668.3.03 Preparation

See General Conditions through 150.

668.3.04 Fabrication

See General Conditions

668.3.05 Construction

A. Excavation and Backfill

Excavate and prepare foundations for the structures included in this section; place pipe through the structures according to [Section 207](#).

B. Concrete

Concrete units may be either poured-in-place or precast. Construct units as follows:

1. Poured-in-Place Units

The throat or other nonreinforced portions of catch basins may be Class B concrete. Use Class A concrete for the top slab. Construct units according to [Section 500](#).

2. Pre-Cast Reinforced Concrete Units

Construct pre-cast reinforced concrete units as follows:

a. Holes for Pipe

Cast each unit with the number and dimensions of pipe holes necessary to incorporate the unit into the drainage system according to Plan details.

Installation conditions may require additional pipe for which no holes have been cast. If so, make the holes and repair or replace, to the Engineer's satisfaction, pipe damaged during the process.

b. Pipe Connections

Use mortar or Class A concrete to connect pipe to units.

c. Installation of Pre-cast Concrete

1) Pre-cast Reinforced Units: Set these units to within 1/2 in (\pm 13 mm) of grade on a bed of compacted sand 2 in to 3 in (50 mm to 75 mm) thick.

2) Sectional Precast Reinforced Units: When using these units to build-up extra-depth catch basins or drop inlets, fill the joints between sections with mortar and wipe smooth.

Section 668—Miscellaneous Drainage Structures

C. Brick Masonry

Construct brick masonry structures according to [Section 608](#).

D. Mortar Rubble Masonry

Construct rubble masonry structures according to [Section 607](#).

E. Castings

Hold frame castings securely in place to proper line and grade. Make castings an integral part of the complete structure. After completion, ensure that castings subject to traffic use are firm and stable under traffic.

F. Maintenance

Thoroughly clean fallen masonry, silt, debris, and other foreign matter from structures.

G. Safety Grates

Fabricate safety grates according to Plan details.

H. Sanitary Sewer Manholes

Ensure that sanitary and combination sanitary and storm sewer manholes conform to the following requirements and the related Specifications.

1. Form Invert Channels

Shape invert channels to the lines and grades shown on the Plans, or as established by the Engineer. Ensure that channel surfaces are smooth.

Form invert channels by one of the following methods:

- Directly form the invert channel in the concrete base of the manhole.
- Construct the invert channel of brick and mortar.
- Lay half-round tile in the concrete base of the manhole.
- Lay round sewer pipe through the manhole and cut out the top half of the pipe after the concrete base has set. Do not use this method if the Plans provide for an offset drop in the invert.

2. Plaster Outside Walls

Plaster outside walls as follows:

- a. Saturate the outside wall of each brick manhole with water.
- b. Plaster the wall smooth with a mortar coat at least 1/2 in (13 mm) thick. Manufacture the mortar according to [Section 834](#) with the following exceptions:
 - Manufacture the mortar with one part cement to two parts mortar sand.
 - Do not add hydrated lime.

3. Connections to Manholes

Complete manhole connections to the Engineer's satisfaction and as follows:

- a. Carefully connect existing sewer lines to new manholes to prevent infiltration of foreign substances.
- b. Construct manholes in or adjacent to existing sewer lines according to [Section 660](#) to maintain continuous sewage flow in existing lines.

668.3.06 Quality Acceptance

See General Conditions

668.3.07 Contractor Warranty and Maintenance

See General Conditions

Section 700—Grassing

700.1 General Description

This work includes preparing the ground, furnishing, planting, seeding, fertilizing, sodding, and mulching disturbed areas within the Right-of-Way limits and easement areas adjacent to the right-of-way as shown on the Plans except as designated by the Engineer.

700.1.01 Definitions

General Provisions 101 through 150.

700.1.02 Related References

A. Standard Specifications

[Section 160—Reclamation of Material Pits and Waste Areas](#)

[Section 163—Miscellaneous Erosion Control Items](#)

[Section 718—Wood Fiber](#)

[Section 822—Emulsified Asphalt](#)

[Section 882—Lime](#)

[Section 890—Seed and Sod](#)

[Section 891—Fertilizers](#)

[Section 893—Miscellaneous Planting Materials](#)

B. Referenced Documents

[QPL 33](#)

700.1.03 Submittals

General Provisions 101 through 150.

700.2 Materials

Use materials that meet the requirements of the following Specifications:

Material	Section
Wood Fiber Mulch	718.2
Emulsified Asphalt	822
Agricultural Lime	882.2.01
Seed	890.2.01
Sod	890.2.02
Fertilizer	891.2.01
Plant Topsoil	893.2.01
Mulch	893.2.02
Inoculants	893.2.04
Tackifiers	QPL 33

A. Seeds

Whenever seeds are specified by their common names, use the strains indicated by their botanical names.

B. Water

Obtain the water for grassing from an approved source. Use water free of harmful chemicals, acids, alkalies, and other substances that may harm plant growth or emit odors. Do not use salt or brackish water.

C. Asphalt

Secure the mulch with asphalt made of a homogenous emulsification of a refined petroleum. Ensure that the asphalt can be sprayed on with or without diluting with water.

Use suitable asphalt free of petroleum solvents or other diluting agents that may harm plant growth. Use asphalt according to [Section 822](#). Do not use asphalt that separates after freezing or from any other cause.

D. Fertilizer Mixed Grade

Select fertilizer mixed grade such as 10-10-10, 6-12-12, 5-10-15, or other analysis within the following limits:

- Nitrogen 5 to 10 percent
- Phosphorus 10 to 15 percent
- Potassium 10 to 15 percent

If using mixed grade fertilizer for hydroseeding, ensure that it has the following analysis:

- Nitrogen 5 to 19 percent
- Phosphorus 10 to 19 percent
- Potassium 10 to 19 percent

E. Mulch

Use straw or hay mulch according to [Subsection 700.3.05.G](#).

Use wood fiber mulch in hydroseeding according to [Subsection 700.3.05.F.1](#).

700.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

700.3 Construction Requirements

700.3.01 Personnel

General Provisions 101 through 150.

700.3.02 Equipment

Use grassing equipment able to produce the required results.

Never allow the grading (height of cut) to exceed the grassing equipment's operating range.

A. Blower Equipment

When using blower equipment to apply bituminous treated mulch in a single operation, place two or more jets or spray nozzles at or near the end of the discharge spout to eject a uniform coat of mulch.

B. Mulch Material Equipment

Use mulching equipment that uniformly cuts the specified materials into the soil to the required control depth.

C. Rollers

Use at least 12 in (300 mm) diameter rollers with corrugated or notched surfaces. Do not use smooth surface rollers.

D. Hydroseeding Equipment

For hydroseeding equipment, see [Subsection 700.3.05.F](#).

700.3.03 Preparation

General Provisions 101 through 150.

700.3.04 Fabrication

General Provisions 101 through 150.



700.3.05 Construction

Follow the planting zones, planting dates, types of seed, seed mixtures, and application rates described throughout this Section.

In general:

- Obtain the Engineer's approval before changing the ground cover type.
- Do not use annual rye grass seeds with permanent grassing.
- Follow the planting zones indicated on the [Georgia State Planting Zone Map](#), below.
- Sod may be installed throughout the year, weather permitting.
- For permanent grassing, apply the combined amounts of all seeds for each time period within each planting zone and roadway location listed in the [Seeding Table](#), below. Do not exceed the amounts of specified seed.

Planting Zone Map

SEEDING TABLE

		Pounds (kg) Of Seed Per Acre (hectare)									REQUIRED PERMANENT PLANTING
		Rye Grass, Millet, Cereal Grass (Oats)	Common Bermuda Grass (Hulled)	Common Bermuda Grass (Unhulled)	Tall Fescue	Weeping Love Grass	White Or Crimson Clover	Crown Vetch	Scarified Interstate Lespedeza	Unscarified Interstate Lespedeza	
Planting Zones	Planting Dates										
1	March 1 – May 15		10 (11)	10 (11)	50 (56)						Common Bermuda Grass
1	May 1 – July 31		10 (11)	10 (11)							
1	August 1 – February 28	15 (17)									
1	November 15 – January 31						6 (7)				
2,3,4	February 15 – August 31		10 (11)	10 (11)							
2,3,4	September 1 – February 14	15 (17)									Common Bermuda Grass
2,3,4	November 15 – January 31						6 (7)				

Plant these combinations on back slopes, fill slopes and areas which will not be subject to frequent mowing											
1,2	March 1 – July 31					4 (5)			50 (56)		Interstate Lespedeza Of Crown Vetch
1,2	August 1 – February 28				30 (34)			15 (17)		75 (84)	
3,4	February 15 – August 31					4 (5)			50 (56)		Interstate Lespedeza
3,4	September 1 – February 14	50 (56)								75 (84)	

A. Ground Preparation

Prepare the ground by plowing under any temporary grass areas and preparing the soil as follows:

1. Slopes 3:1 or Flatter

On slopes 3:1 or flatter, plow shoulders and embankment slopes to between 4 in and 6 in (100 mm and 150 mm) deep.

Plow front and back slopes in cuts to no less than 6 in (150 mm) deep. After plowing, thoroughly disk the area until pulverized to the plowed depth.

2. Slopes Steeper Than 3:1

Serrate slopes steeper than 3:1 according to Plan details when required.

On embankment slopes and cut slopes not requiring serration (sufficient as determined by the Engineer), prepare the ground to develop an adequate seed bed using any of the following methods as directed by the Engineer:

- Plow to a depth whatever depth is practicable.
- Use a spiked chain.
- Walk with a cleated track dozer.
- Scarify.

Disking cut slopes and fill slopes is not required.

3. All Slopes

- a. Obstructions
Remove boulders, stumps, large roots, large clods, and other objects that interfere with grassing or may slide into the ditch.
- b. Topsoil
Spread topsoil stockpiled during grading evenly over cut and fill slopes after preparing the ground.
Push topsoil from the top over serrated slopes. Do not operate equipment on the face of completed serrated cuts.

B. Grassing Adjacent to Existing Lawns

When grassing areas adjacent to residential or commercial lawns, the Engineer shall change the plant material to match the type of grass growing on the adjacent lawn. The Contract Unit Price will not be modified for this substitution.

If the Engineer believes bituminous treated mulch would harm other portions of the work, bituminous treated mulch may be substituted with 1,500 lbs/acre (1680 kg/ha) of wood fiber mulch with tackifier.

C. Temporary Grassing

Apply temporary grassing according to [Subsection 163.3.05.F](#) and the following:

- Determine lime requirements by a laboratory soil test.
- Add mulch only if the temporary grass does not provide adequate mulch to meet the requirements of [Subsection 700.3.05.G](#).

In March or April of the year following planting and as soon as the weather is suitable, replace all areas of temporary grass with permanent grass by plowing or overseeding using the no-till method. If the no-till method is used, ensure that temporary grass is less than 3 inches in height (this may be achieved by mowing). Additional mulch will be required only if the temporary grass does not provide adequate mulch to meet the requirements of [Subsection 700.3.05.G](#), “[Mulching](#).”

Temporary grass, when required, will be paid for according to [Section 163](#).

D. Applying Agricultural Lime and Fertilizer Mixed Grade

Apply and mix lime and fertilizer as follows:

1. Agricultural Lime
Uniformly spread agricultural lime on the ground at the approximate rate determined by the laboratory soil test.
2. Fertilizer Mixed Grade
Uniformly spread the fertilizer selected according to [Subsection 700.2.D](#) over the ground at approximately 1,200 lbs/acre (1350 kg/ha).
If using a higher analysis fertilizer with hydroseeding, apply it at the same rate per acre (hectare) as the standard fertilizer.
3. Mixing
Before proceeding, uniformly work the lime and fertilizer into the top 4 in (100 mm) of soil using harrows, rotary tillers, or other equipment acceptable to the Engineer.
On cut slopes steeper than 3:1, other than serrated slopes, reduce the mixing depth to the maximum practical depth as determined by the Engineer.
Omit mixing on serrated slopes.

E. Seeding

Following is a list of both common names and botanical names for approved seed types. Whenever seeds are specified by the common names, the strains indicated by their botanical name apply.

Common Name	Botanical Name
Annual Ryegrass	Lolium multiflorum
*Bermuda Grass, Common Hulled and Unhulled	Cynodon dactylon
**Crimson Clover	Trifolium incarnatum Var. Reseeding
**Lespedeza Virgata	Lespedeza Ambro Virgata
**Lespedeza Sericea	Lespedeza cuneta, Var. Sericea

Common Name	Botanical Name
**Lespedeza Serala	Lespedeza cuneta, Var. Serala
**Lespedeza Interstate	Lespedeza cuneta, Var. Interstate
**Lespedeza Korean	Lespedeza stipulacea Maxim
Pensacola Bahiagrass	Paspalum notatum, var. Pensacola
Tall Fescue	Festuca arundinacea
Weeping Love Grass	Eragrostis curvula
**White Dutch Clover	Trifolium repens
**Crown Vetch	Coronilla Varia
*Do not use Giant Bermuda Seed (Cynodon species) including NK-37.	
**Requires inoculation.	

Prepare seed and sow as follows:

1. Inoculation of Seed

Inoculate each kind of leguminous seed separately with the appropriate commercial culture according to the manufacturer's instructions for the culture.

When hydroseeding, double the inoculation rate.

Protect inoculated seed from the sun and plant it the same day it is inoculated.

2. Sowing

Weather permitting, sow seed within 24 hours after preparing the seed bed and applying the fertilizer and lime, or sow seed within 24 hours after applying mixed-in-place mulch.

Sow seed uniformly at the rates specified in the [Seeding Table](#). Use approved mechanical seed drills, rotary hand seeders, hydraulic equipment, or other equipment to uniformly apply the seed. Do not distribute by hand.

To distribute the seeds evenly sow seed types separately, except for similarly sized and weighted seeds. They may be mixed and sown together.

3. Rolling

Roll seeded areas before applying mulch, except on steep slopes where rollers cannot operate satisfactorily. On slopes inaccessible to compaction equipment, cover the seeds by dragging spiked chains over them or by using other methods.

Do not sow during windy weather, when the prepared surface is crusted, or when the ground is frozen, wet, or otherwise nontillable.

4. Overseeding

Temporary grass areas that were prepared in accordance with [Subsection 700.3.05.A](#), shall be overseeded using the no-till method. The no-till method is defined by planting permanent grass seeds using a drill-type seeder over existing temporary grass without plowing or tilling soil and in accordance with [Subsection 700.3.05.C](#). This method shall be shown on the Plans or directed by the Engineer before being implemented.

F. Hydroseeding

Hydroseeding may be used on any grassing area. Under this method, spread the seed, fertilizer, and wood fiber mulch in the form of a slurry. Seeds of all sizes may be mixed together. Inoculate the seeds at double the rate for seeds not being hydroseeded. Apply hydroseeding as follows:

1. Use wood fiber mulch as a metering agent and seed bed regardless of which mulching method is chosen. Apply wood fiber mulch at approximately 1,500 lbs/acre (560 kg/ha).
2. Prepare the ground for hydroseeding as for conventional seeding in [Subsection 700.3.05.A](#).
3. Use specially designed equipment to mix and apply the slurry uniformly over the entire seeding area.
4. Agitate the slurry mixture during application.
5. Discharge slurry within one hour after being combined in the hydroseeder. Do not hydroseed when winds prevent an even application.
6. Closely follow the equipment manufacturer's directions unless the Engineer modifies the application methods.

7. Mulch the entire hydroseeded area according to [Subsection 700.3.05.F.1](#), above, and [Subsection 700.3.05.G](#), below.

G. Mulching

Except as noted in [Subsection 700.3.05.B](#) and [Subsection 700.3.05.C](#), apply mulch immediately after seeding areas as follows:

Areas with permanent grass seed and covered with slope mats or blankets will not require mulch.

Evenly apply straw or hay mulch between 3/4 in and 1-1/2 in (20 mm and 40 mm) deep, according to the texture and moisture content of the mulch material.

Mulch shall allow sunlight to penetrate and air to circulate as well as shade the ground, reduce erosion, and conserve soil moisture. If the type of mulch is not specified on the Plans or in the Proposal, use any of the following as specified.

1. Mulch with Binder

Apply mulch with binder regardless of whether using ground or hydroseeding equipment for seeding.

- a. Mulch uniformly applied manually or with special blower equipment designed for the purpose. When using a blower, thoroughly loosen baled material before feeding it into the machine so that it is uniformly coated with binder and broken up.
- b. After distributing the mulch initially, redistribute it to bare or inadequately covered areas in clumps dense enough to prevent new grass from emerging.
Do not apply mulch on windy days.
- c. Apply enough binder to the mulch to hold it in place. Immediately replace mulch that blows away.

When using a power blower to distribute the mulch, spray the binder onto the mulch as the mulch is ejected from the machine. If distributing the mulch by hand, immediately apply the binder uniformly over the mulched areas.

Use one of the following binders:

- Emulsified asphalt, SS-1h or SS-1 ([Section 822](#)) : The public, adjacent property, bridges, pavements, curbs, sidewalks, and other existing structures shall be protected from discoloration by the asphalt. Correct discoloration damage at no expense to the Department.
- Tackifier: Use a tackifier listed in the Laboratory Qualified Products Manual may be used at the manufacturer's recommended rates.

2. Mixed-in-Place Mulch

Apply mixed-in-place mulch on flat areas or slopes 3:1 or less and treat as follows:

- a. Immediately work the mulch into the soil with appropriate equipment to produce a loose soil and mulch mixture 3 in to 3.5 in (75 mm to 90 mm) deep.
- b. After mixing mulch and soil and restoring areas to line and grade, seed as specified in this Section.

3. Walked-in-Mulch

Apply walked-in-mulch on slopes ranging in steepness from 5:1 to 2:1 and treat as follows:

- a. Immediately walk it into the soil with a cleated track dozer. Make dozer passes vertically up and down the slope.
- b. Where walked-in-mulch is used, do not roll or cover the seeds as specified in [Subsection 700.3.05.E.3](#).

H. Sod

Furnish and install sod in all areas shown on the Plans or designated by the Engineer.

1. Kinds of Sod

Use only Common Bermudagrass (Cynodon dactylon) or one of the following Bermudagrass varieties:

Tifway 419
Tifway II
Tift 94
Tifton 10
Midlawn
Midiron
GN-1
Vamont

No dwarf Bermuda types shall be used. Sod shall be nursery-grown and be accompanied with a Georgia Department Of Agriculture Live Plant License Certificate or Stamp. Sod shall consist of live, dense, well-rooted material free of weeds and insects as described by the Georgia Live Plant Act.

2. Type And Size Of Sod:

Furnish either big roll or block sod. Ensure that big roll sod is a minimum of 21 inches wide by 52 feet long. Minimum dimensions for block sod are 12 inches wide by 22 inches long. Ensure all sod consists of a uniform soil thickness of not less than 1 inch.

3. Ground Preparation

Excavate the ground deep enough and prepare it according to [Subsection 700.3.05.A](#) to allow placing of sod. Spread soil, meeting the requirements of [Subsection 893.2.01](#), on prepared area to a depth of 4 inches.

4. Application Of Lime And Fertilizer

Apply lime and fertilizer according to [Subsection 700.3.05.D](#) within 24 hours prior to installing sod.

5. Weather Limitation

Do not place sod on frozen ground or where snow may hinder establishment.

6. Install Sod

Install Sod as follows:

- Place sod by hand or by mechanical means so that joints are tightly abutted with no overlaps or gaps. Use soil to fill cracks between sod pieces, but do not smother the grass.
- Stake sod placed in ditches or slopes steeper than 2:1 or any other areas where sod slipping can occur.
- Use wood stakes that are at least 8 in (200 mm) in length and not more than 1 in (25 mm) wide.
- Drive the stakes flush with the top of the sod. Use a minimum of 8 stakes per square yard (meter) to hold sod in place.
- Once sod is placed and staked as necessary, tamp or roll it using adequate equipment to provide good contact with soil.
- Use caution to prevent tearing or displacement of sod during this process. Leave the finished surface of sodded areas smooth and uniform.

7. Watering Sod

After the sod has been placed and rolled or tamped, water it to promote satisfactory growth. Additional watering will be needed in the absence of rainfall and during the hot dry summer months. Water may be applied by Hydro Seeder, Water Truck or by other means approved by the Engineer.

8. Dormant Sod

Dormant Bermuda grass sod can be installed. However, assume responsibility for all sod through establishment and until final acceptance.

9. Establishment

Sod will be inspected by the Engineer at the end of the first spring after installation and at the time of Final Inspection. Replace any sod that is not live and growing. Any cost for replacing any unacceptable sod will be at the Contractor's expense.

I. Application of Nitrogen

Apply nitrogen at approximately 50 lbs/acre (56 kg/ha) when specified by the Engineer after plants have grown to 2 in (50 mm) high.

One application is mandatory and must be applied before Final Acceptance.

Apply nitrogen with mechanical hand spreaders or other approved spreaders capable of uniformly covering the grassed areas. Do not apply nitrogen on windy days or when the foliage is damp.

Do not apply nitrogen between October 15 and March 15 except in Zone 4.

700.3.06 Quality Acceptance

The Engineer may require replanting of an area that shows unsatisfactory growth for any reason at any time.

Except as otherwise specified or permitted by the Engineer, prepare replanting areas according to the Specifications as if they were the initial planting areas. Use a soil test or the Engineer's guidance to determine the fertilizer type and application rate, then furnish and apply the fertilizer.

700.3.07 Contractor Warranty and Maintenance

A. Plant Establishment

Before Final Acceptance, provide plant establishment of the specified vegetation as follows:

1. Plant Establishment

Preserve, protect, water, reseed or replant, and perform other work as necessary to keep the grassed areas in satisfactory condition.

2. Watering

Water the areas during this period as necessary to promote maximum growth.

3. Mowing

Mow seeded areas of medians, shoulders, and front slopes at least every 6 months. Avoid damaging desirable vegetation.

In addition, mow as necessary to prevent tall grass from obstructing signs, delineation, traffic movements, sight distance, or otherwise becoming a hazard to motorists.

Do not mow lespedezas or tall fescue until after the plants have gone to seed.

B. Additional Fertilizer Mixed Grade

Apply fertilizer at approximately 600 lbs/acre (675 kg/ha) each spring after initial plant establishment. Continue annual applications until Final Acceptance. This additional fertilizer will be measured and paid for at the Contract Unit Price for fertilizer mixed grade.

C. Growth and Coverage

Provide satisfactory growth and coverage, ensuring that vegetation growth is satisfactory with no bare spots larger than 1 ft² (0.1 m²). Bare spots shall comprise no more than 1 percent of any given area. An exception is given for seed not expected to have germinated and shown growth at that time.

D. Permissible Modifications

When all Items of the work are ready for Final Acceptance except for newly planted repaired areas or other areas with insufficient grass, the Contractor may fill the eroded areas or treat bare areas with sod obtained, placed, and handled according to [Subsection 700.3.05.H](#).

Carefully maintain the line and grade established for shoulders, front slopes, medians, and other critical areas.

Sod as described above will not be paid for separately, but will be an acceptable substitute for the satisfactory growth and coverage required under this Specification. These areas treated with sod are measured for payment under the Item for which the sod is substituted.

700.4 Measurement

A. Permanent Grassing

Permanent Grassing will be measured for payment by the pound of seed.

B. Mulches

Mulches, including wood fiber mulch, furnished by the Contractor for permanent grassing are not measured for separate payment.

C. Quantity of Sod

Sod is measured for payment by the number of square yards (meters) , surface measure, completed and accepted.

D. Water

Water furnished and applied to promote a satisfactory growth is not measured for payment.

E. Quantity of Lime and Fertilizer Mixed Grade

Lime and fertilizer are measured by the ton (megagram).

F. Quantity of Nitrogen Used for Permanent Grassing

Nitrogen is measured in pounds (kilograms) based on the weight of fertilizer used and its nitrogen content.

G. Replanting and Plant Establishments

No measurement for payment is made for any materials or work required under [Subsection 700.3.06](#) and [Subsection 700.3.07](#).

H. Temporary Grass

Temporary grass is measured for payment by the pound (kilogram) of seed according to [Section 163](#).

700.4.01 Limits

General Provisions 101 through 150.

700.5 Payment

As grassing and planting progress, the Contractor will receive full measurement and payment on regular monthly estimates provided the work complies with the Specifications.

A. Permanent Grassing

Permanent grassing will be paid for at the Contract Price per pound (kilogram) of seed, complete and in place. Payment is full compensation for preparing the ground, seeding, mulching, and providing plant establishment.

B. Fertilizer Mixed Grade

Fertilizer mixed grade will be paid for at the Contract Price per ton (megagram). Payment is full compensation for furnishing and applying the material.

C. Lime

Lime will be paid for at the Contract Price per ton (megagram). Payment is full compensation for furnishing and applying the material.

D. Nitrogen

Nitrogen will be paid for at the Contract Price per pound (kilogram) of nitrogen content. Payment is full compensation for furnishing and applying the material.

E. Sod

Sod will be paid by the square yard (meter) in accordance with the following schedule of payments. Payment is full compensation for ground preparation, including addition of topsoil, furnishing and installing live sod, and for Plant Establishment.

1. 70% of the Contract Price per square yard will be paid at the satisfactory completion of the installation.
2. 20% of the Contract Price will be paid upon satisfactory review of sod which is healthy, weed free and viable at the inspection made at the end of the first spring after installation..
3. 10% of the contract price will be paid upon satisfactory review of sod that is healthy, weed free and viable at the Final Acceptance.

F. Temporary Grass

Temporary Grass will be paid for under [Section 163](#).

Payment will be made under:

Item No. 700	Permanent grassing	Per pound (kilogram)
Item No. 700	Agricultural lime	Per ton (megagram)
Item No. 700	Fertilizer mixed grade	Per ton (megagram)
Item No. 700	Fertilizer nitrogen content	Per pound (kilogram)
Item No. 700	Sod	Per square yard (meter)

700.5.01 Adjustments

General Provisions 101 through 150.

Section 805—Rip Rap and Curbing Stone

805.1 General Description

This section includes the requirements for rip rap and curbing stone. Construction and material will be covered under the Special Provisions.

805.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO T 96

AASHTO T 104

ASTM C 295

[GDT 64](#)

805.2 Materials

805.2.01 Rip Rap

A. Requirements

1. Aggregate Quality

All rip rap stone shall be made of sound, durable rock pieces that meet these requirements:

Aggregate Quality	Maximum Percent
Abrasion loss "B" grading	65
Soundness loss	15
Flat and slabby pieces (length five times more than the average thickness)	5
Weathered and/or decomposed pieces and shale	5

2. Gradation for Stone-Dumped rip rap Type 1 and Type 3:

Severe Drainage Conditions or Moderate Wave Action (Type 1)*		
Size By Volume	Approx. Weight	Percent Smaller Than
4.2 ft ³ (0.12 m ³)	700 lbs (320 kg)	100%
1.8 ft ³ (0.05 m ³)	300 lbs (135 kg)	50% - 90%
0.8 ft ³ (0.02 m ³)	125 lbs (55 kg)	20% - 65%
*Between 0% and 15% of the Type 1 rip rap shall pass a 4 in (100 mm) square opening sieve.		

General Use Normal Drainage Conditions (Type 3)*		
Size By Volume	Approx. Weight	Percent Smaller Than
1.0 ft ³ (0.03 m ³)	165 lbs (75 kg)	100%
0.1 ft ³ (0.003 m ³)	15 lbs (7 kg)	10% - 65%
*Between 0% and 15% of the Type 3 rip rap shall pass a 2 in (50 mm) square opening sieve.		

3. Stone for Plain Rip Rap

The stones shall be clean and free of rock dust and fines.

- a. Process the stone so that the largest pieces have a volume of 2 ft³ (0.06 m³) or less.

Section 805—Rip Rap and Curbing Stone

- b. Ten percent or less of the total rip rap weight can consist of spalls that pass a 5 in (125 mm) sieve.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Percent wear	AASHTO T 96
Petrographic analysis	ASTM C 295
Soundness (magnesium sulfate)	AASHTO T 104

D. Materials Warranty

General Provisions 101 through 150.

805.2.02 Curbing Stone

A. Requirements

1. Type 1:

Provide Type 1 curb that meets these requirements:

- a. Curb thickness and height as shown on the Plans
- b. Cut in lengths of not less than 5 ft (1.5 m) nor more than 10 ft (3 m)
- c. Tops dressed to an even, smooth surface for the full length
- d. Have straight, even edges
- e. Top sloped ¼ in (6 mm) from back to front
- f. Have squared ends to permit joints to be constructed not more than ½ in (13 mm) wide for the full depth of the curb.
- g. Backface hand dressed at least 4 in (100 mm) below that part of the back that will be exposed
- h. Front face hand dressed to a depth of 1 in (25 mm) below the indicated elevation of the base course, pavement or gutter
- i. Have ends of circular curb sections cut along radial lines to permit joints to be constructed not more than ½ in (13 mm) wide
- j. Circular curb conforms accurately to the required radius
- k. Dressed surfaces do not contain projections or depressions more than 3/8 in (10 mm) from the plane surface of the curb

2. Type 2:

Provide Type 2 curb that meets these requirements:

- a. Dimensions shall be 5 in (125 mm) thick, 17 in (425 mm) deep, and 5 ft (1.5 m) long, unless otherwise specified.
- b. Front face to have a top margin draught with a smooth face 10 in (250 mm) deep
- c. Have a smooth face (Note: A quarry face may be considered a smooth face if free from holes and all bumps exceeding allowed tolerances are pointed level)
- d. Tops of curbs present even, smooth faces for the full length
- e. Have squared joints that when abutted with adjacent sections, present no crack or joint exceeding ½ in (13 mm) in width
- f. Have ends of circular curb sections cut along radial lines to permit joints to be constructed not more than ½ in (13 mm) wide
- g. Circular curb conforms accurately to the required radius

Section 805—Rip Rap and Curbing Stone

h. The allowable tolerances for Type 2 Curb dimensions are as follows:

Measurement Item	Dimension & Tolerance
Thickness	5 ¼ in (131 mm) +/- ¼ in (6mm)
Depth	17 in (425 mm) +/- 1 in (25 mm)
Top Surface	¼ in (6 mm) in 5 ft (1.5 m)
Side Surface	½ in (13 mm) in 5 ft (1.5 m)

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test for Percent Wear according to AASHTO T 96

D. Materials Warranty

General Provisions 101 through 150.

Section 806—Aggregate for Drainage

806.1 General Description

This section includes the requirements for aggregate used for drainage.

806.1.01 Related References

A. Standard Specifications

[Section 800 – Coarse Aggregate](#)

B. Referenced Documents

AASHTO T 11

AASHTO T 27

[GDT 4](#)

806.2 Materials

806.2.01 Coarse Aggregate for Underdrains

A. Requirements

Use Class A or B coarse aggregate graded for size No. 89 in [Table 800.1](#)

B. Fabrication

See General Conditions

C. Acceptance

Test the aggregate as follows:

Test	Method
Sieve analysis	AASHTO T 27

D. Materials Warranty

See General Conditions

806.2.02 Crushed Stone Drainage Material

A. Requirements

Use Class A or B coarse aggregate that is graded as follows:

Sieve Size	Percent by Weight
Passing 2 in (50 mm)	100
Passing 1-1/2 in (37.5 mm)	95-100
Passing No. 10 (2 mm)	10-35
Passing No. 100 (150 µm)	0-10

Section 806—Aggregate for Drainage

B. Fabrication

See General Conditions

Section 806—Aggregate for Drainage

C. Acceptance

Test the crushed stone as follows:

Test	Method
Sieve analysis	AASHTO T 27

D. Materials Warranty

See General Conditions

806.2.03 Drainage Blanket

A. Requirements

Use Class A or B coarse aggregate that is graded as follows:

Sieve Size	Percent by Weight
Passing No. 10 (2 mm)	75-100
Passing No. 40 (425 µm)	25-50
Passing No. 60 (250 µm)	0-25
Passing No. 200 (75 µm)	0-8
Percent clay	0-5

B. Fabrication

See General Conditions

C. Acceptance

Test the aggregate as follows:

Test	Method
Sieve analysis	AASHTO T 11 and AASHTO T 27
Percent clay (8 minute elutriation test)	GDT 4

D. Material Warranty

See General Conditions

Section 812—Backfill Materials

812.1 General Description

This section includes the requirements for four types of material used as backfill: foundation backfill, Types I and II, imperfect trench backfill, Type III, and mechanically stabilized wall backfill.

812.1.01 Related References

A. Standard Specifications

[Section 810—Roadway Materials](#)

B. Referenced Documents

AASHTO T 27

[GDT 4](#)

[GDT 6](#)

[GDT 7](#)

[GDT 67](#)

812.2 Materials

812.2.01 Foundation Backfill, Type I

A. Requirements

1. Use natural or artificial mixtures of materials consisting of hard, durable particles of sand or stone, mixed with silt, clay and/or humus material for Type I backfill.
2. Have the final blend of material meet the requirements of Class I or II soils in [Subsection 810.2.01](#).

B. Fabrication

See General Conditions

C. Acceptance

Test as follows:

Test	Method
Soil gradation	GDT 4
Volume change	GDT 6
Maximum density	GDT 7 or GDT 67

D. Materials Warranty

See General Conditions

812.2.02 Foundation Backfill, Type II

A. Requirements

1. Type

Use material that meets the requirements of [Section 800](#), Class A or B aggregate. Crushed concrete may be used provided it meets the requirements of [Section 800](#) that are applicable to Group 2 Aggregates.

Section 812—Backfill Materials

Do not use backfill aggregate containing soil or decomposed rock.

2. Gradation

Use material that meets the following gradation requirements:

Sieve Size	% Passing by Weight
1-1/2 in (37.5 mm)	100
1 in (25 mm)	80-100
No. 8 (2.36 mm)	0-5

B. Fabrication

See General Conditions

C. Acceptance

Test as follows:

Test	Method
Sieve analysis	AASHTO T 27

D. Materials Warranty

See General Conditions

812.2.03 Imperfect Trench Backfill, Type III

A. Requirements

1. Type

Use material made from either of the following for Type III backfill:

- A natural soil with a density of less than 95 lb/ft³ (1520 kg/m³) when tested with [GDT 7](#)
- An artificial mixture of soil and organic material, such as hay, leaves, or straw

B. Fabrication

See General Conditions

C. Acceptance

The laboratory will:

Test the soil density with [GDT 7](#).

1. Review the mixture and the percentages of each material, and approve a mixture suitable for the Project.

D. Materials Warranty

See General Conditions

812.2.04 Mechanically Stabilized Embankment Backfill

A. Requirements

Use material comprised of crushed stone, natural sand, or a blend of crushed stone and natural sand free of soils, organic or any other deleterious substances that meet the following additional requirements:

Section 812—Backfill Materials

1. Crushed Stone

Use a material manufactured from Class A or B stone free of soil overburden and having a soundness loss of not more than 15 percent.

2. Natural Sand

Use material that consists of strong, hard, durable particles, is non-plastic, and has a durability index of at least 70.

3. Gradation

Sieve Size	% Passing by Weight
4 in (100 mm)	100
2 in (50 mm)	80 -100
No. 10 (2 mm)	20 - 90*
No 200 (75 μm)	0 - 12
* Natural Sand may be 20 - 100	

4. Chemical

Ensure the material meets the following chemical requirements:

Test Method	Requirement
pH	6.0 – 9.5
Resistivity	>3000 ohms/cm
Chlorides	<100 ppm
Sulfates	<200 ppm
Note: These chemical requirements are not applicable to MSE walls stabilized with an approved extensible reinforcement.	

5. Maximum Dry Density

Use backfill material with a maximum dry density equal to or greater than the design unit weight shown on the plans. If no maximum dry density of the backfill material is shown, use a weight of 125 lb/ft³ (2000 kg/m³).

B. Fabrication

See General Conditions General Provisions 101 through 150.

C. Acceptance

Test the material as follows:

Test Method	Requirement
Percent Wear	AASHTO T96 ("A" Grading)
Sieve Analysis	AASHTO T 27

Section 812—Backfill Materials

Material Passing No. 200 (75 μ m) Sieve	AASHTO T 11
Durability Index	GDT 75
Maximum Dry Density	GDT 7 or GDT 24a , GDT 24b
Soundness (Magnesium Sulfate)	AASHTO T 104

D. Materials Warranty

See General Conditions

Section 834—Masonry Materials

834.1 General Description

This section includes the requirements for masonry materials, including brick; clay or shale brick; masonry stone; and mortar and grout.

834.1.01 Related References

A. Standard Specifications

[Section 801—Fine Aggregate](#)

[Section 830—Portland Cement](#)

B. Referenced Documents

AASHTO M 91

AASHTO M 240

AASHTO T 96

AASHTO T 104

ASTM C 5

ASTM C 55

ASTM C 109 (ASTM C 109M)

834.2 Materials

834.2.01 Brick

A. Requirements

1. Use bricks of the following sizes for masonry catch basins, inlets, and manholes. Use other sizes only if approved by the Office of Materials and Research.
 - 8 x 3½ x 2¼ in (190 x 90 x 57 mm)
 - 7½ x 3½ x 3½ in (178 x 90 x 90 mm)
 - 11½ x 3½ x 3½ in (273 x 90 x 90 mm)
2. Use bricks that are relatively straight, sound, and uniform in quality.
3. Clay or Shale Brick: Use clay or shale bricks that meet the requirements of AASHTO M 91.
Ensure that the maximum absorption of any individual clay or shale brick is less than 16 percent when submersed in cold water for 24 hours.
Use only clay bricks that give a clear ringing sound when struck together.
4. Concrete Brick: Use concrete bricks that meet the requirements of ASTM C 55.

B. Fabrication

See General Conditions

C. Acceptance

See General Conditions

D. Materials Warranty

See General Conditions

834.2.02 Masonry Stone

A. Requirements

1. Type: Use stone for rubble masonry that is sound, durable, and does not contain segregations, seams, cracks, pyrite intrusions, or other structural defects or imperfections that affect weather resistance.

a. Do not use stone with rounded, worn, or weathered surfaces. Exposed faces cannot show scars caused by quarrying. Weathered stone will be rejected.

Ensure that the stone has no more than 65 percent wear and no more than 15 percent loss after the magnesium sulfate soundness test.

Use stone that can be wrought truly to lines and surfaces (curved or plain).

Ensure that each stone is at least 6 in (150 mm) thick and 1 ft (300 mm) wide, except for fill stones used in wall interiors.

B. Fabrication

See General Conditions

C. Acceptance

Test as follows:

Test	Method
Percent Wear	AASHTO T 96
Soundness	AASHTO T 104

D. Materials Warranty

See General Conditions

834.2.03 Mortar and Grout

A. Requirements

1. Use mortar and grout that consists of fresh mixtures of one part Portland or masonry cement and three parts mortar sand and water.

You may add hydrated lime when using Portland cement in amounts not exceeding 10 percent of the weight of cement.

a. Cement: Use Portland cement that meets the requirements of [Subsection 830.2.01](#) or masonry cement that meets the requirements of ASTM C 91.

Mortar Sand: Use mortar sand that meets the requirements of [Subsection 801.2.02](#).

Mixing: Mix dry in a mixer or in a clean, tight box, until a uniform mixture is produced. Then add enough water to produce the desired consistency.

Do not use mortar and grout that has been mixed for more than 45 minutes.

Retempering of mortar is not permitted.

B. Fabrication

See General Conditions

C. Acceptance

See General Conditions
General Provisions 101 through 150.

D. Materials Warranty

See General Conditions

Section 843—Concrete Pipe

843.1 General Description

This section includes the requirements for reinforced concrete pipe, nonreinforced concrete pipe, and concrete underdrain pipe.

843.1.01 Related References

A. Standard Specifications

[Section 800—Coarse Aggregate](#)

[Section 801—Fine Aggregate](#)

[Section 831—Admixtures](#)

[Section 880—Water](#)

B. Referenced Documents

AASHTO M 86(M 86M), Class II

AASHTO M 170 (M 170M)

AASHTO M 175 (M 175M) or AASHTO M 176 (M 176M)

[QPL 4](#)

[GDT 16](#)

843.2 Materials

843.2.01 Reinforced Concrete Pipe

A. Requirements

1. Type

Use reinforced concrete pipe that meets the requirements of AASHTO M 170 (M 170M), with the changes described in the following table. For a list of sources, see [QPL 4](#).

Material	Requirements	Other Modifications
Coarse aggregate	Subsection 800.2.01	Gradation requirements do not apply
Fine aggregate	Subsection 801.2.02	Gradation requirements do not apply
Fly ash	Subsection 831.2.03.A	None
Water	Subsection 880.2.01	None

NOTE: Before manufacture, you may request approval of modified designs that differ from the Specifications.

2. Certification

File a certificate with the Engineer stating that the concrete pipe manufactured for Department use meets the requirements of reinforcement steel specified in this Section.

A bonded legal authority of the manufacturing company shall endorse the requirements certification.

Submit a guarantee with the certificate stating that concrete pipe will be replaced, without cost to the purchaser, if the reinforcement steel does not meet these Specifications.

Section 843—Concrete Pipe

Ensure that the guarantee remains in effect as long as the manufacturer furnishes concrete pipe for Department use.

This guarantee does not limit the right of the Department to inspect and check the materials in manufactured concrete pipe prior to and during pipeline construction.

B. Fabrication

See General Conditions

C. Acceptance

The Department will test and inspect using [GDT 16](#).

D. Materials Warranty

See the Certification requirements under [Subsection 843.2.01.A.2](#).

843.2.02 Nonreinforced Concrete Pipe

A. Requirements

1. Type

Use nonreinforced concrete pipe to convey sewage, industrial waste, and storm water that meets the requirements of AASHTO M 86 (M 86M), Class II, with the following changes:

Material	Requirements	Other Modifications
Coarse aggregate	Subsection 800.2.01	Gradation requirements do not apply
Fine aggregate	Subsection 801.2.02	Gradation requirements do not apply
Fly ash	Subsection 831.2.03.A	None
Water	Subsection 880.2.01	None

B. Fabrication

See General Conditions

C. Acceptance

Test and inspect with [GDT 16](#).

D. Materials Warranty

See General Conditions

843.2.03 Concrete Underdrain Pipe

A. Requirements

1. Type

Use concrete underdrain pipe that meets the requirements of AASHTO M 175 (M 175M) or AASHTO M 176 (M 176M), with the following changes unless the Plans state otherwise:

Material	Requirements	Other Modifications
Coarse aggregate	Subsection 800.2.01	Gradation requirements do not apply
Fine aggregate*	Subsection 801.2.02	Gradation requirements do not apply
Fly ash	Subsection 831.2.03.A	None

Section 843—Concrete Pipe

Water	Subsection 880.2.01	None
*Use fine aggregate in standard strength, perforated, nonreinforced concrete underdrain pipe.		

B. Fabrication

See General Conditions

C. Acceptance

Test and inspect with [GDT 16](#).

D. Materials Warranty

See General Conditions

Section 866—Precast Concrete Catch Basin, Drop Inlet, and Manhole Units

866.1 General Description

This section includes the requirements for manufacturing the following to the dimensions shown on the Plans:

- Precast reinforced concrete catch basins
- Drop inlets
- Manhole units

866.1.01 Related References

A. Standard Specifications

[Section 500—Concrete Structures](#)

[Section 853—Reinforcement and Tensioning Steel](#)

B. Referenced Documents

AASHTO T 22

AASHTO T 24

[QPL 4](#)

[GDT 16](#)

866.2 Materials

The materials to be used shall meet the following requirements:

Material	Section
Concrete, Class AA-1, Vibrated, Air Entrained	500*
Reinforcement for Concrete	
Steel Bars	853.2.01
Steel Wire	853.2.06
Welded Steel Fabric	853.2.07
*Ensure that the concrete compressive strength is at least 4,000 psi (28 MPa). Do not use the gradation requirements.	

For a list of sources, see [QPL 4](#).

866.2.01 Precast Concrete Catch Basin, Drop Inlet, and Manhole Units

A. Requirements

1. Reinforcement

Follow the Plans, except as follows:

- Do not let reinforcement vary by more than 1/4 in (5 mm) from the position shown in the design, except at pipe connections.
 - Ensure the cover on the reinforcement is not less than that shown on the Plans.
- Ensure all precast concrete units are true to shape with smooth, dense, and uniform surfaces.

B. Fabrication

1. Casting

- a. Place the concrete in each unit without interruption.
- b. Consolidate the concrete with an approved vibrator and hand-tamping as necessary. Force the concrete into the corners of the forms to prevent stone pockets or cleavage planes.

2. Holes for Pipes

Make each hole about 4 in (100 mm) larger than the outside diameter of the appropriate pipe.

3. Curing:

Cure the units with one of the following methods until the minimum compressive strength has been achieved, or for 24 hours, whichever comes first.

a. Method 1

- 1) Place the units in a curing chamber, free from outside drafts, and cure them in a moist atmosphere not exceeding 160 °F (70 °C).
- 2) Use steam injection for the time and temperature needed to obtain proper curing.
- 3) Construct the curing chamber and place the units so that steam may fully circulate around the entire unit.

b. Method 2

- 1) Keep the units wet by covering the concrete not in contact with the forms with wet burlap or other suitable material.
- 2) Protect the units from freezing between when you place the concrete until curing is complete.

4. Removing the Forms

Leave the forms in place until you can remove them without damaging the unit.

5. Quality of Work

- a. Correct minor surface cavities or irregularities that do not impair the service value of the unit, that can be corrected with marring the surface by pointing with an approved mortar. Apply the mortar immediately after removing the forms.
- b. Minor defects will not be cause for rejection.

C. Acceptance

1. Testing Facilities

Ensure that the manufacturer to furnish facilities and assistance as required to let the Inspector sample and test quickly and efficiently.

NOTE: Check [OPL 4](#) for pre-approved manufacturers that supply material compliant with this Specification.

2. The Department will accept the units based on the results of compressive tests on concrete cylinders and on inspection during manufacture. The tests will determine the unit's conformance with the design and quality of work prescribed in these Specifications and on the Plans.

3. The Department will accept any unit that meets the test requirements, regardless of age.

4. Rejection

The Inspector will reject units if they fail to meet any requirements in this Specification, and for any of the following defects:

- Imperfect mixing and molding
- Honeycombed or open texture
- Exposure of the reinforcement that indicates the reinforcement is misplaced

Section 866—Precast Concrete Catch Basin, Drop Inlet, and Manhole Units

5. Marking

Ensure that each approved unit is marked with the name or trademark of the manufacturer and the date it was cast. The mark will be stenciled or otherwise placed so it is clearly legible at time of delivery.

- a. When approved by the Inspector, each unit will be stamped with the official mark of the Department or Certified Pipe Technician number (CPT).
- b. Accepted units or finished units will be rejected at any time if found to be defective.

6. Test as follows:

Test	Method
Compressive strength	AASHTO T 22 and AASHTO T 24

7. Compressive Strength Test

The Inspector shall do the following:

- a. Make compression tests on cylinders to satisfy the minimum strength requirements.
- b. Make at least three cylinders from each day’s pour and cure them in the same manner as the precast units.

D. Materials Warranty

1. Shipping

Do not ship or transport any unit to the installation site unless it bears the required markings, stated in [Subsection 866.2.01.C.5](#).

Section 890—Seed and Sod

890.1 General Description

This section includes the requirements for seed and sod.

890.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

General Provisions 101 through 150.

890.2 Materials

890.2.01 Seed

A. Requirements

1. Use seed that meets the requirements of the Georgia Seed Laws and Rules and Regulations.
2. The germination, purity, and maximum weeds specified in the Georgia Seed Laws for all seeds used by DOT are:

Germination and hard seed minimum	70%
Purity minimum	90%
Weed seeds maximum	2%
Noxious seeds maximum	300 seeds per lb (660 seeds per kg), subject to the limitations in Table 1

3. Seed Mixture

When seed mixtures are specified, each variety of seed shall be furnished separately and mixed after approval by the Engineer.

Table 1—Noxious Weed List

Name	Limitations
1. Field Bindweed (<i>Convolvulus arvensis</i>)	Prohibited
2. Cocklebur	Prohibited
3. Hedge Bindweed (<i>Convolvulus sepium</i>)	Prohibited
4. Nutgrass (<i>Cyperus Rotundus</i>)	Prohibited
5. Blessed Thistle (<i>Cnicus benedictus</i>)	9 per pound (20 per kg)
6. Wild Onion and/or Wild Garlic (<i>Allium</i> spp.)	27 per pound (60 per kg)
7. Sandbur (<i>Cenchrus pauciflorus</i>)	27 per pound (60 per kg)
8. Johnson Grass (<i>Sorghum halepense</i>)	100 per pound (220 per kg)
9. Wild Mustard and Turnips (<i>Brassica</i> spp.)	27 per pound (60 per kg)
10. Blue Weed (<i>Helianthus ciliaris</i>)	200 per pound (440 per kg)
11. Wild Radish (<i>Raphanus raphanistrum</i>)	27 per pound (60 per kg)

Section 890—Seed and Sod

12.	Dodders (<i>Cuscuta</i> spp.)	100 per pound (220 per kg)
13.	Canada Thistle (<i>Cirsium arvense</i>)	100 per pound (220 per kg)
14.	Quack Grass (<i>Agrophron repens</i>)	100 per pound (220 per kg)
15.	Russian Knapweed (<i>Centaurea Picris</i>)	100 per pound (220 per kg)
16.	Bermuda Grass (<i>Cynodon dactylon</i>)	300 per pound (660 per kg)
17.	Cheat or Ches (<i>Bromus secalinus</i> and/or <i>Bromus commutatus</i>)	300 per pound (660 per kg)
18.	Darnel (<i>Lolium temulentum</i>)	200 per pound (440 per kg)
19.	Cornockle (<i>Agrostemma githago</i>)	100 per pound (220 per kg)
20.	Horsenettle (<i>Solanum carolinense</i>)	200 per pound (440 per kg)
21.	Purple Nightshade (<i>Solanum elaeagnifolium</i>)	200 per pound (440 per kg)
22.	Buckhorn Plantain (<i>Plantago lanceolata</i>)	200 per pound (440 per kg)
23.	Docks (<i>Rumex</i> spp.)	100 per pound (220 per kg)
24.	Gian Foxtail	100 per pound (220 per kg)
25.	Sheep sorrel (<i>Rumex acetosells</i>)	200 per pound (440 per kg)
26.	Red Rice (<i>oryza sativa</i> variety)	300 per pound (660 per kg)
27.	Sorghum alnum	100 per pound (220 per kg)
	Sum Total Noxious Weeds	300 per pound (660 per kg)

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

1. Get approval from the Engineer before sowing seed.
2. Ensure each bag of seed is tagged with an analysis tag showing the results of a test made within 9 months of planting.
 - a. Collect and check the tags to ensure that they show a lot number, a test date within 9 months, and that the seed quality meets the requirements in [Table 1](#).
 - b. The Georgia Department of Agriculture and the laboratory will randomly sample seed.
3. Even though the Engineer approves the seed, you are still responsible to furnish and sow seed that meets these Specifications at the time of sowing.
4. If the Engineer requires, provide seed samples to the Engineer early enough before seeding to allow further testing before seeding.
5. You may increase the rate of seeding to obtain the minimum pure live seed content specified if a low percentage of germination causes the quality of the seed to fall below the minimum.

NOTE: You may increase the seeding rates if the noxious weed seed per square yard (meter) does not exceed the allowable quantity at the regular rate of seeding.

6. The Department will reject wet, moldy, or otherwise damaged seed.

D. Materials Warranty

General Provisions 101 through 150.

890.2.02 Sod

A. Requirements

1. Use living, growing sod of the designated species for block or big roll sod. This includes sod that is dormant during the cold or dry season and capable of renewing growth after the dormant period.
2. Obtain all sod from approved nurseries that have a Georgia Live Plant License.
3. Ensure that at least 75 percent of the plants in the sod are of the designated variety of grass.

B. Fabrication

1. Mow grass and weeds to a maximum height of 3 in (75 mm). Rake and remove the grass before cutting the sod.
2. Cut the sod into the following sizes:
 - Block sod—12 in (300 mm) by 22 in (550 mm)
 - Big roll sod—21 in (525 mm) by 52 ft (15.8 m)

Ensure that the sod has at least 1/2 in (15 mm) of soil adhering firmly to the roots.

3. Always exercise care to retain the soil on the roots of the sod during cutting, transporting, and planting. Do not dump the sod from vehicles.

C. Acceptance

The Department will accept the material based on the following:

1. Notify the Engineer to inspect the sod sources before it is harvested.
2. The Engineer will inspect the sod while it is being planted.
3. The Department will reject sod with weeds or other growth or foreign material that may be detrimental to the planting. Sod that is excessively dried out, exposed to heat, or not viable will also be rejected.

Do not assume that an approval of a source means that the material is accepted.

D. Materials Warranty

1. Transplant the sod within 72 hours from the time it is harvested.
2. Sod that is not transplanted within 24 hours shall be kept moist and protected from exposure to heat, direct sunlight, and freezing until it is transplanted. Do not exceed the 72-hour time limit for transplanting all of the harvested sod.
3. Cut and install sod only when the soil moisture conditions are favorable.

Section 950 – Flow Control

950.01 General

The Contractor shall furnish all labor, materials, equipment and supplies, and shall perform all work related to the diversion of water during construction. Flow diversion methods shall be subject to review by the Engineer prior to work commencing on each portion of the system.

950.02 Products

Not applicable

950.03 Execution

Stream Flow control:

- A. The Contractor shall submit flow control and bypassing arrangement plans to the Engineer for review and approval at least 48 hours prior to commencing work on each portion of the system. Flow control includes, but is not limited to coffer damming, stream diversion pumping, and all other labor, materials, tools, work and other incidentals as appropriate for the work performed. The plans must be specific and complete, and shall include, but not be limited to, the following details:
 - 1. Capacities of equipment.
 - 2. Road crossing details.
 - 3. Cofferdamming details.
 - 4. Pump discharge details.
 - 5. Size, length, material, and method of installation for suction and discharge piping.
 - 6. Method noise control for each pump and/or generator.
 - 7. Diversion pumping locations.
- B. The pump intake shall be installed in a manner that prevents ingestion of stream bed materials and debris into the pump. Diverted stream flows must be discharged on to a stable, non erodible material such as rip rap downstream of the work area.
- C. Stream flows shall be diverted to prevent interference with the work to be performed on that portion of the system.
- D. When pumping is required, the Contractor shall supply the necessary pumps, conduits, engines and other equipment to divert the flow as appropriate. The Contractor shall have backup equipment available should the primary system fail, and the pumping system shall be adequate in size to handle the peak stream flows.

- E. The Contractor shall also furnish the labor and supervision to set up, operate, and maintain the pumping/bypass system. The Contractor shall select pumping/bypass equipment that will not have excessive noise levels from a maximum of sixty decibels (60 db) at a distance of 50 feet (50').

Trench Dewatering:

- A. The Contractor shall furnish all materials and equipment and perform all incidental work required to install and maintain the drainage system proposed for handling groundwater or surface water encountered. The Contractor must alter his drainage methods if the trench bottom is unsatisfactory.
- B. The contractor shall provide pumping equipment and devices to properly remove and dispose of all water entering trench and excavation for structures. The grade shall be maintained acceptably dry until structures to be built therein are completed. All drainage shall be performed without damage to the trench, pavements, pipes or other utilities.
- C. Pipe and masonry shall not be laid in water or submerged within 24 hours after being placed. Water shall not flow over new masonry within four days after placement.
 - 1. In no event shall water rise to cause unbalanced pressure on structures until the concrete or mortar has set at least 24 hours. Prevent flotation of the pipe by promptly placing backfill.
 - 2. If underdrains are used for handling water, furnish and install pipe and crushed stone graded from coarse to fine, and furnish and install all pumps and equipment necessary to maintain the water level continuously at the required elevation. Pipe underdrains shall be laid with open joints and bedded in crushed stone for the full width of trench, to a depth of six (6) inches below the invert of underdrain.
 - 3. The invert of underdrain shall be 12" below the normal subgrade. Pipe underdrains shall have no permanent outlet and shall be sealed at the completion of the work. The length of continuous underdrain to be used shall be limited as conditions require. An impervious bulkhead of clay or concrete shall be constructed in the trench bottom between 100 ft. lengths of the underdrainage system to obstruct the free flow of groundwater after construction is completed. For all excavation below normal grade for the purpose of installing underdrains, the crushed stone and underdrain pipe shall be considered a part of the drainage work to be done under the pipe items. Continuously guard against the loss of earth through subbase or the underdrain. Should loss of either take place, alter the stone size to provide a satisfactory barrier or filter.
 - 4. Where other methods of handling water prove inadequate, furnish, install, operate, and remove proper well point facilities.

END OF SECTION

Section 951 – Relining (Cured in Place) Storm Drainage Systems

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Restoration of existing storm drainage systems by installation of a resin impregnated flexible felt tube into the existing storm drainage line utilizing a vertical inversion standpipe and hydrostatic head, pulled in place, or other approved method and curing by circulating hot water or other approved means to produce a hard, impermeable pipe.

1.2 REFERENCES

- A. Codes, Specifications, and Standards:
 - 1. Codes, specifications, and standards referred to by number or title shall form a part of this specification to the extent required by the references thereto. Latest revisions shall apply, unless otherwise shown or specified.
 - 2. All materials shall comply with the Georgia Department of Transportation “Standard Specifications, Construction of Transportation Systems”..
- B. American Society for Testing and Materials (ASTM) Standards:
 - D638 Test Method for Tensile Properties of Plastics.
 - D790 Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials.
 - D-2122 Determining Dimensions of Thermoplastic Pipe and Fittings.
 - D-2837 Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
 - F-1216-98 Rehabilitation of Existing Pipelines and Conduits by Inversion and Curing of a Resin-impregnated Tube.
 - F1743-96 Rehabilitation of existing pipelines and conduits by pulled-in-place installation of cured-in-place thermo setting resin pipe.

1.3 DEFINITIONS – NONE NOTED

1.4 RESPONSIBILITY FOR OVERFLOWS AND SPILLS

- A. It shall be the responsibility of the Contractor to schedule and perform his work to result in no overflows from the system. If flows are such that they interfere with the Contractor’s ability to perform work, the Contractor shall be responsible for scheduling his work during low flow periods or provide bypass pumping.
- B. Contractor will indemnify and hold harmless the Owner and the Engineer for any fines or third-party claims for personal or property damage arising out of an overflow that is fully or partially the responsibility of the Contractor. Should fines subsequently be imposed because of any overflow for which the Contractor is fully or partially responsible, the Contractor shall pay all such fines and all of the Owner’s legal, engineering, and administrative costs in defending such fines and claims associated with the overflow.

1.5 SUBMITTALS

- A. Submit the following:
 - 1. Manufacturer’s Certificate of Compliance certifying compliance with the applicable specifications and standards, a minimum of 300,000 linear feet of liner installed in U.S.
 - 2. Contractor’s individual certification of actual documented installations of proposed

material liner of 300,000 linear feet in the U.S. including references.

3. Certified copies of test reports of factory tests required by the applicable standards and this Section.
 4. Manufacturer's installation instructions and procedures.
 5. Contractor's procedures and materials for service renewal including time and duration of sewer service unavailability.
 6. Data, measurements, assumptions and calculations for sizing liners.
 7. Field measurements (diameter, depth, ovality) at upstream and downstream manholes for sewers 21 inches and greater.
 8. Sampling procedures and locations for obtaining representative samples of the finished liner.
 9. Lining manufacturer's certification that the surface preparation required for liner installation is in accordance with manufacturer's recommendations.
 10. Liner manufacturer's certification that the liner was installed in accordance with manufacturer's recommendations.
- B. A final certificate of compliance with this specification shall be provided by the manufacturer for all lining material furnished. Tests for compliance by an independent laboratory shall be made according to the applicable ASTM specification and the manufacturer's quality control program.
- C. Furnish an extended warranty for liner materials from the Contractor and liner manufacturer for a total of five (5) years from date of Final Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall be responsible for the delivery, storage, and handling of products. No products shall be shipped to the job site without the approval of the Owner's Representative.
- B. Keep products safe from damage. Promptly remove damaged products from the job site. Replace damaged products with undamaged products.

PART 2 PRODUCTS

2.1 GENERAL

- A. Take all necessary field measurements of the existing pipe (including diameter, ovality and length) prior to manufacturing liners.
- B. The minimum length shall be that deemed necessary by the Contractor to effectively span the distance from the inlet to the outlet of the respective manholes unless otherwise specified. The Contractor shall verify the lengths in the field before manufacturing.
- C. The liner thickness shall be sized for a minimum hydrostatic and earth load of 12.0 feet. The earth load and hydrostatic load shall be increased to the manhole depth for bury depths in excess of 12.0 feet unless otherwise noted as shown on the plans.
- D. Unless specified otherwise, the liner shall be structurally designed for a minimum service life of 50 years; fully deteriorated host pipe/direct bury condition; prism loading; soil loading of

120 pcf; factor of safety of 2.0; 2% ovality; maximum deflection of 5%; soil modulus of 1000 psi; lining enhancement factor of 7 maximum; H-20 live loading; 50% long-term modulus reduction factor; and hydrostatic load at 30% of depth to invert.

1. For corrugated steel pipe, use 5% ovality or the actual ovality measured in the field, whichever is greater.

E. The installed liner shall be furnished to the following minimum thickness:

Pipe Diameter (inch)	Depth of Pipe Invert (ft)	Cured-In-Place ASTM F1216 1 Min. Thickness (mm)
15-inch	0 to 12'	7.5
18-inch	0 to 12'	8.0
24-inch	0 to 12'	10.0
30-inch	0 to 12'	12.5
36-inch	0 to 12'	16.0
42-inch	0 to 12'	18.0
48-inch	0 to 12'	21.0
54-inch	0 to 12'	24.0
60-inch	0 to 12'	28.5
66-inch	0 to 12'	30.0
72-inch	0 to 12'	32.5
78-inch	0 to 12'	33.0
84-inch	0 to 12'	35.5
90-inch	0 to 12'	38.0
96-inch	0 to 12'	40.5

¹Based upon initial CIP modulus of 250,000 psi with 0.50 creep reduction factor.

- F. The Contractor shall submit the structural design of the liner for pipe 24-inches in diameter and larger, subject to review by the Owner.
1. Design may be based on material properties of the liner that exceed the minimum values specified in ASTM F1216. However, the initial flexural modulus used in structural design calculations shall not exceed 400,000 psi.
 2. All other design criteria, loads, and conditions shall remain as specified in this section.

GWINNETT OWNER DEPARTMENT OF PUBLIC UTILITIES RELINING STORM DRAINAGE SYSTEMS
 Item 3A
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2.2 CURED-IN-PLACE LINER

- A. All cured-in-place lining products shall comply with ASTM F-1216 or intent thereof as determined by the Owner. Minimum finished liner thickness 7.5mm.
- B. The flexible tube shall be fabricated to a size that when installed will neatly fit (minimum 99.75%) the internal circumference of the existing storm drainage pipe. Allowance shall be made for circumferential stretching during insertion so that the final cured product is snug against the wall of the host pipe.
- C. Unless otherwise specified, the Contractor shall furnish a general purpose, unsaturated, polyester or thermosetting vinyl ester resin and catalyst system compatible with the reconstruction inversion process that provides cured physical strengths specified herein.

PART 3 EXECUTION

A. PREPARATION

1. The following installation procedures shall be adhered to unless otherwise approved by the Owner's representative.
 - a. The Contractor shall carry out his operations in strict accordance with all OSHA, State, local, and manufacturer's safety requirements. Particular attention is drawn to those safety requirements involving entering confined spaces. Curing with pressurized steam creates additional safety concerns with regard to high temperatures, quick burn times, potential blow offs, etc. Contractors shall take additional precautions to insure the safety of everyone nearby curing mechanisms.
 - b. It shall be the responsibility of the Contractor to remove all internal debris and clean the existing storm line prior to installation of the liner. Cleaning and disposal of material shall be performed in conformance with Section 952.
 - c. Experienced personnel trained in locating breaks and obstacles by closed circuit television shall perform inspection of existing storm lines. The interior of the line shall be carefully inspected to determine the location of any conditions that may prevent proper installation of the liner pipe into the lines, and such conditions shall be noted so they can be corrected. A compact disc (CD) or digital video disc (DVD) and suitable log shall be kept for later reference by the Owner as specified in Section 952.
 - d. The Contractor shall clear the line of obstructions such as solids, dropped joints, or collapsed pipe that will prevent the insertion of the liner pipe. If inspection reveals an obstruction that cannot be removed by conventional cleaning equipment, the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction prior to lining. Pre-lining point repairs will be made at no additional cost to the Owner.
 - e. Do not install liner if ground water temperatures and/or ambient temperatures are excessive for the product installation procedures.
 - f. Prior to installation of the liner, the liner manufacturer's representative shall inspect and approve the surface preparation and provide certification that surface preparation is acceptable and meets the requirements for a proper liner installation.

- B. Where practicable, liners can be installed in continuous runs through manholes where there are two or more continuous sewer segments, especially to connect several short segments with a continuous lining.

3.2 INSTALLATION

A. General

1. Alternative methods of liner insertion, pressurization, and processing may be used for products and processes as approved by the Owner, and when the final liner product meets the intent of ASTM installation procedures as determined by the Owner. Installation shall be in accordance with manufacturer's recommendations, which shall be available for verification by the inspector.
2. Seal the area where the line enters or leaves each manhole. Finish the inside of the manhole with a quick set cement grout to raise the invert to the grade of the liner pipe.

Also, use this grout to dress up around the end of the liner. This space may be sealed with a mechanical seal, chemical seal, or combination of both. The Owner must approve the chosen method.

3. If the pipe liner fails to make a tight seal due to broken or misaligned pipe at the manhole wall or other reason, the Contractor shall apply a seal at that point. The Owner shall approve the seal.
4. The temperature of water discharged to the sewer system from processing liners shall not exceed 150°F maximum or the level allowed by State or local standards.
5. At all points where the liner pipe has been excavated and exposed (e.g., in access shafts, , etc.), prepare for the placement of a crushed stone backfill by removing all debris and creating a void below and around the pipe. The width of this void shall not exceed 4/3 of the liner's outside diameter plus 15". Use a minimum of 6" of 1/2" to 3/4" crushed stone to provide bedding for the liner. Then place a backfill of crushed stone to a height of 6" above the liner. Provide the rest of the backfill from 6" above the pipe to grade. Replace pavement removed or disturbed during excavation.

B. Cured-In-Place Liner

1. The Contractor shall designate a location where the reconstruction tube will be vacuum impregnated prior to installation. The Contractor shall allow the Owner to inspect the materials and "wet out" procedure. A catalyst system compatible with the resin and reconstruction tube shall be used. Sufficient excess resin will be provided to insure excretion into cracked pipe and or joints of the hot pipe after curing.
2. The wet out reconstruction tube shall be inserted through an existing manhole or other approved access by means of an inversion process, pulled in place process, or other approved method, and the application of a hydrostatic head, or equivalent pressure sufficient to fully extend it to the next designated manhole or termination point. The reconstruction tube shall be inserted into the vertical inversion standpipe with the impermeable plastic membrane side out. At the lower end of the inversion standpipe, the reconstruction tube shall be turned inside out and attached to the standpipe so that a leakproof seal is created. The inversion head will be adjusted to be of sufficient height to cause the impregnated tube to invert from manhole to manhole and hold the tube tight to the pipe wall, produce dimples at side connections and flared ends at the manholes. The use of a lubricant is recommended. Care shall be taken during the elevated curing temperature so as not to overstress the felt fiber.
3. After inversion is completed, the Contractor shall supply suitable heat source and recirculation equipment. The equipment shall be capable of delivering the heat source throughout the section uniformly to raise the temperature above the temperature required to affect a cure of the resin. This temperature shall be determined by the resin/catalyst system employed.
4. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing heat source. Another such gauge shall be placed between the impregnated reconstruction tube and the pipe invert at the remote manhole to determine the temperatures during cure. The resin manufacturer shall recommend temperature in the line during the cure period.
5. Initial cure shall be deemed to be completed when inspection of the exposed portions of cured pipe appear to be hard and sound and the remote temperature sensor indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer, as modified for the cured-in-place inversion process, during which time the recirculation of the heat source and cycling of

the heat exchanger to maintain the temperature continues.

6. The Contractor shall cool the hardened pipe to a temperature below 100° F before relieving the static head in the inversion standpipe. Cool-down may be accomplished by the introduction of cool water into the inversion standpipe to replace water being drained from a small hole made in the downstream end discharging to the sanitary sewer. Care shall be taken in the release of the static head so that a vacuum will not be developed that could damage the newly installed pipe. The contractor shall capture all water used to cure the liner and legally dispose of it in the Owner's sanitary sewer system (costs shall be incidental to the cost of the liner).

3.3 POST INSTALLATION

- A. Where liners of any type are installed in two or more continuous manhole segments, the liner invert through the intermediate manholes shall be left intact. Final finishing of the installation in those intermediate manholes shall require removal of the top of the exposed liner and neat trimming of the liner edge where it touches the lip of the manhole bench.
- B. Portions of any piece of liner material removed during installation shall be available for inspection and retention by the Owner.
- C. Each line segment lined shall be TV inspected as soon as practical after processing and installation to assure complete curing. Segments not fully conforming to these Specifications must be immediately brought to the Owner's attention with a proposed method of correction.

3.4 TESTING

- A. After completing lining, and manhole rehabilitation/replacement, every liner and manhole shall be TV inspected with a 360° integral lighthouse camera as soon as practical to verify proper installation. The rate of travel shall not exceed 30 feet per minute.. The footage meter count shall be clearly visible. Submit a color compact disc (CD) or digital videodisc (DVD) of the internal TV inspection and a log for each segment. Logs shall include date, line size, length, manhole numbers, project number, direction of camera travel, direction of flow, and any observed defects or comments.
- B. The Contractor shall have an independent testing lab analyze finished liner samples taken from manhole cutoffs, service coupons, etc.
 1. A minimum of 1 sample shall be taken of the first segment installed, or as directed by the Owner.
 2. A minimum of 2 samples shall be taken for each 2,500 LF of liner material installed or for each manufacturing lot, if less, or as directed by the Owner.
 3. A minimum of 6 samples per project shall be taken for each type of liner furnished, or as directed by the Owner.
 4. Tests in accordance with ASTM standards for Tensile Properties, Flexural Modulus and wall thickness shall be conducted.
 5. The Contractor shall determine sampling location and procedures to ensure representative samples are obtained from the finished liner, subject to approval by the Owner.
 6. The Contractor shall furnish removable sizing sleeves, when possible, to collect liner samples, which accurately replicate the host pipe diameter.

3.5 ACCEPTANCE

- A. It is the intent of these specifications that the completed liner with all appurtenances shall be essentially equivalent in final quality and appearance to new sewer installation.
- B. The finished liner shall be continuous over the entire segment between manholes and homogenous throughout.
- C. The finished liner shall be fully rounded and as free as commercially practicable from visible defects, including but not limited to damage, deflection, holes, delamination, ridges, cracks, uncured resin, foreign inclusions or other objectionable defects.
- D. There shall be no visible infiltration through the liner, around the liner at manhole connections, at lined service connections or in lined services. Contractor shall repair any visible leaks.
- E. Where a defect in the liner requires removal of a section of the liner, in the Owner's opinion, the Contractor shall make all repairs as required by the Owner and shall install a segmental liner, compatible with the original liner installed to accomplish a continuous finished liner. No separate payment will be made for such defect repair or for the post-repair segmental liner.

3.6 CLEAN-UP AND RESTORATION

- A. The Contractor shall not allow the site of the work to become littered with trash and waste material, but shall maintain the site in a neat and orderly condition throughout the construction period.
- B. On or before completion, the Contractor shall clean and remove from the site of the work all surplus and discarded materials, temporary structures, stumps and portions of trees, and debris

GWINNETT OWNER DEPARTMENT OF PUBLIC UTILITIES RELINING STORM DRAINAGE SYSTEMS

Item 3A

Printed: 01.06.2006

RELINING STORM DRAINAGE SYSTEMS SYSTEMS GWINNETT OWNER DEPARTMENT OF PUBLIC UTILITIES

Item 3A

Printed: 01.06.2006

of any kind. He shall leave the site of work in a neat and orderly condition, similar or equal to that prior to construction.

- C. All private and public property along or adjacent to the work disturbed by construction operations shall be restored to a condition similar or equal to that existing prior to construction.
- D. Before final acceptance by the Owner, the Contractor shall replace and/or restore any water, sewer, drain, and gas lines and appurtenances; electrical, telephone, telegraph conduits and wires, both underground and aboveground, and appurtenances; traffic signals, fire and police alarm systems and appurtenances; sidewalks, curbs, gutter, drainage ditches and pavements and all other public utility facilities and appurtenances along or adjacent to the work that may have been disturbed by construction operations.
- E. Conditions permitting, property cleanup and restoration shall begin and be prosecuted to completion on a timely basis as set forth herein.
- F. Disturbed grassed areas shall be seeded or sod placed as directed by the Owner. Site restoration shall be performed in accordance with the Contract Documents.

3.7 PROSECUTION OF WORK

- A. The Contractor shall note that not all storm line segments have been televised in their entirety due to obstructions blocking further entry, etc. These obstructions shall be cleared to allow TV viewing of the entire segment length before lining is commenced.

END OF SECTION

Section 952 – Storm Line Cleaning

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Storm line cleaning to remove foreign materials from the lines and restore the storm line to a minimum of 95% of the original carrying capacity, for clear viewing of the interior surfaces of the pipes during T.V. Inspection and/or proper seating of pipe lining, or as required for other specified rehabilitation.

1.2 REFERENCES

- A. Codes, Specifications, and Standards (NOT USED)
- B. Testing and Materials Standards (NOT USED)

1.3 DEFINITIONS (NOT USED)

1.4 RESPONSIBILITY FOR OVERFLOWS AND SPILLS

- A. It shall be the responsibility of the Contractor to schedule and perform his work to result in no overflows or spills from the system. If storm water flows are such that they interfere with the Contractor's ability to perform work, the Contractor shall be responsible for scheduling his work during low flow periods or provide bypass pumping.
- B. In the event of overflows caused by the Contractor's work activities, the Contractor shall immediately take appropriate action to contain and stop the overflow, clean up the spillage, disinfect the area affected by the spill, and notify Owner in a timely manner. The Contractor shall prepare his own written Standard Operating Procedure (SOP) for handling and reporting spills and shall provide a copy to the Owner.
- C. Contractor will indemnify and hold harmless the Owner for any fines or third-party claims for personal or property damage arising from a spill or overflow that is fully or partially the responsibility of the Contractor. Should fines subsequently be imposed, because of any overflow for which the Contractor is fully or partially responsible, the Contractor shall pay all such fines and all of the Owner's legal, engineering, and administrative costs in defending such fines and claims associated with the overflow.

PART 2 PRODUCTS

2.1 CLEANING EQUIPMENT

- A. The Contractor shall furnish all equipment, labor, materials, etc., necessary to satisfactorily clean the storm line(s).
- B. **Hydraulically Propelled Equipment:** The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to insure removal of grease. If sewer cleaning balls or other equipment, which cannot be collapsed, are used, special precautions to prevent flooding of the sewers and public or private property shall be taken.
- C. **High-Velocity Jet (Hydrocleaning) Equipment:** All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring

action from 15 to 45 degrees in all size lines designated to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring structure walls, floor, and produce at least 2000-psi pressure. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel.

- D. Mechanically Powered Equipment: Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat-treated steel. To insure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.
- E. The Contractor shall coordinate with the local water utility as required to obtain cleaning water and shall pay all costs required for temporary water connections at no additional cost to the Owner.

PART 3 – EXECUTION

3.1 CLEANING

- A. Cleaning Precautions: During storm line cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard the flow in the storm line are used, precautions shall be taken to insure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant.
- B. Storm Line Cleaning: The designated storm structure sections shall be cleaned using hydraulically propelled, high-velocity jet, or mechanically powered equipment. Selection of the equipment used shall be based on the conditions of lines at the time the work commences. The equipment and methods selected shall be satisfactory to the Owner's Representative. The equipment shall be capable of removing dirt, grease, rocks, sand, and other materials and obstructions from the sewer lines and manholes. If cleaning of an entire section cannot be successfully performed from one manhole, the equipment shall be set up on the other structure and cleaning again attempted. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire structure section, it will be assumed that a major blockage exists and the cleaning effort shall be repeated with other types of equipment.
- C. The term "clean" as used herein shall mean the complete removal of all garbage, dirt, gravel, rocks, roots, grease, settled sludge and all other solid or semi-solid materials from the storm lines and structures.
 - 1. Light Cleaning is defined as cleaning of a storm line that has an average depth of foreign material and debris equal to no more than 50% of the diameter of the pipe over the length of the structure to structure section. Rocks should be smaller than 3" in diameter.
 - 2. Heavy Cleaning is defined as cleaning of a storm line that has an average depth of foreign material and debris equal to more than 50% of the diameter of the pipe over the length of the structure to structure section. Rocks should be larger than 3" in diameter. If a storm line is encountered which requires heavy cleaning, the Contractor shall notify the Owner of the problem before commencing work.
- D. Conditions such as broken pipe and major blockages may prevent cleaning from being accomplished, especially where additional damage would result if cleaning were attempted, or continued. Should such conditions be encountered, the Contractor shall not be required to clean those specific pipe sections unless the Owner removes the apparent obstruction.

- E. Whenever lines to be cleaned show evidence of being more than one-half filled with solids, bucket machines and/or rodding machines shall be utilized to remove the major portion of the material before hydraulic equipment or high velocity, hydro-cleaning equipment is brought into use for finishing the cleaning work.
 - 1. When bucket machines are used, the bucketing process shall be done in one line section at a time. A bucket of the proper size shall be placed into the downstream structure and pulled, in intervals, towards the upstream structure.
 - 2. The bucket shall be retrieved and emptied at varying intervals depending upon the amount of materials being removed. When a bucket is retrieved and it is completely full or overflowing with materials, then the length of travel into the line shall be reduced to ensure total removal of debris. This process shall be repeated until the bucket has been pulled through the entire line section. Upon completion of the bucketing or rodding operation, hydraulically propelled cleaning equipment or high velocity hydro-cleaning equipment shall be used to complete the cleaning work.
- F. Root Removal: Roots shall be removed from sections designated to be relined. Special attention shall be used during the cleaning operation to assure complete removal of roots from the joints. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners.
- G. Material Removal: All, dirt, sand, rocks, and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream structure of the section being cleaned. Passing material from structure section to structure section, which could cause line stoppages shall not be permitted.
- H. Disposal of Materials: All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of at a site approved by the Owner. All materials shall be removed from the site no less often than at the end of each workday. Under no circumstances will the Contractor be allowed to accumulate debris, etc., on the site of work beyond the stated time, except in totally enclosed containers and as approved by the Owner. Contractor shall be responsible for all disposal costs.
- I. Final Acceptance: Acceptance of storm line cleaning shall be made upon the successful completion of the television inspection and shall be to the satisfaction of the Owner. If TV inspection shows the cleaning to be unsatisfactory, the Contractor shall be required to reclean and reinspect the storm line until the cleaning is shown to be satisfactory. In areas where television inspection is not performed, the Owner may require the Contractor to pull a double squeegee (with each squeegee the same diameter as the pipe) through each manhole section as evidence of adequate cleaning.

3.2 CLEANING PRECAUTIONS

- A. Bucket machines or rodding machines shall be used very carefully because of their tendency to "hang-up" on or "wedge against" the pipe and break it. Only experienced and well-trained operators shall operate the machines(s).
- B. Whenever hydraulically propelled cleaning tools, or high velocity, hydro-cleaning equipment (which depends upon water pressure to provide their cleaning force) or any tools which retard the flow of water in the storm lines are used, precautions shall be take to ensure that the water pressure so created does not cause any damage or flooding to public or private property being served by the line section involved.
- C. Any damage to the storm lines caused by the Contractor's operations shall be repaired in a

manner approved by the Owner at the Contractor's expense. The Owner reserves the right to make said repairs itself and charge the Contractor accordingly.

- D. Damage due to flooding of any public or private property being served by any line section, which is over-filled by Contractor's cleaning operations, shall also be repaired or otherwise paid for by the Contractor.

3.3 DOCUMENTATION

- A. The Contractor shall keep records (in a log-type form) of the work accomplished in the cleaning of the storm lines. Two copies of the log, typed and bound, shall be furnished to the Owner documenting work completed with each pay request. The following information shall be required as a minimum:

1. Location (structure no. to structure no.) and type of surface cover.
2. Date and Time.
3. Length of storm line.
4. Condition and depth of structure.
5. Size and type of pipe.
6. Type and condition of structure.
7. Type of cleaning performed and various types of equipment used.
8. Meter readings (fire hydrant use).
9. Remarks as to type of materials removed, amount of materials removed, and number of hours spent to each structure section.

END OF SECTION

Section 953 – Storm Line Television Inspection

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General
- B. Digital Audio-Visual Recording
- C. Television Inspection Reports
- D. Storm.dat Specification
- E. General Guidelines for Inspection Reporting Using WRC Classifications and Sewer.dat
- F. Quality Control

1.2 REFERENCES

- A. Codes, Specifications, and Standards (NOT USED)
- B. Testing and Materials Standards (NOT USED)

1.3 DEFINITIONS

- A. Television Inspection: Operation necessary to complete a true-color audio-visual inspection for verification of existing internal storm line conditions. Contractor shall furnish all labor, materials, equipment, tools, and other incidental services for closed circuit television inspection.
- B. MPEG: MPEG (pronounced M-peg), which stands for Moving Pictures Expert Group, is the nickname given to a family of International Standards used for coding audio-visual information in a digital compressed format. For the purposes of this specification, MPEG shall be defined as an ISO-MPEG Level 1 standard (MPEG- 1) digital audio- visual coding having a resolution of 352 pixels (x) by 240 pixels (y) and an interlaced frame rate of 30 frames per second. All MPEG codings shall be named using .mpg as the file extension.
- C. CD-ROM: Compact Disk-Read Only Memory. For the purposes of this specification, CDROM shall be defined as a CD-R written or “burned” in accordance with the ISO-9660 Level 2 specifications.

1.4 RESPONSIBILITY FOR OVERFLOWS AND SPILLS

- A. It shall be the responsibility of the Contractor to schedule and perform his work to result in no overflows or spills from the system. If storm flows are such that they interfere with the Contractor's ability to perform work, the Contractor shall be responsible for scheduling his work during low flow periods or provide bypass pumping.
- B. In the event of overflows caused by the Contractor's work activities, the Contractor shall immediately take appropriate action to contain and stop the overflow, clean up the spillage, disinfect the area affected by the spill, and notify the Owner in a timely manner. The Contractor shall prepare his own written Standard Operating Procedure (SOP) for handling and reporting spills.
- C. Contractor will indemnify and hold harmless the Owner for any fines or third-party claims for personal or property damage arising from a spill or overflow that is fully or partially the responsibility of the Contractor. Should fines be imposed because of any overflow for which the Contractor is fully or partially responsible, the Contractor shall pay all such fines and all of

the Owner's legal, engineering, and administrative costs in defending such fines and claims associated with the overflow.

PART 2 EQUIPMENT

2.1 GENERAL

- A. The Contractor shall furnish the television inspection studio, television camera, audio-visual digital encoding equipment / software, and other necessary equipment, materials, electricity, labor, technicians, as needed to perform the television inspection.
- B. The television inspection equipment shall be capable of inspecting a minimum of 1,500 feet of sewer line, when entry into the sewer can be accessed from the upstream and downstream manhole. When entry is at one end only, the inspection equipment shall be capable of inspecting seven hundred and fifty (750) feet by a self-propelled unit. The inspection equipment shall be capable of clearly televising the interior of a 6-inch-diameter pipe and all larger sizes.
- C. The television equipment shall be transported in a stable condition through the sewer line under inspection. Throughout the inspection, the camera equipment shall be positioned with the camera directed along the longitudinal axis of the sewer. When the television equipment is towed by winch and bond through the sewer line, all winches shall be stable with either locking or ratcheting drums. All winches shall be inherently stable under loaded conditions. The bonds shall be steel or of an equally non-elastic material to ensure the smooth and steady progress of the camera equipment. The bonds shall be oriented in such a manner as to enable unhindered extension or retraction through the sewer conduit. All effort shall be made to prevent damage to the storm conduit during the television inspection. In the case where damage is caused by the Contractor, for any reason, such as would be caused by incorrect deployment of bonds or retrieval of lodged equipment, the cost of repair or remedy shall be borne by the Contractor.
- D. The television studio shall be large enough to accommodate four people for the purpose of viewing the television monitor while the inspection is in progress. The television studio shall be insulated against noise and extremes in temperature, and shall be provided with means of controlling external and internal sources of light in a manner capable of ensuring that the monitor screen display is in accordance with the requirements of these Specifications. The Owner or his representative shall have access to view the television screen at all times. The central control panel and television camera control shall be located in the mobile television studio. The television studio shall be mounted on a mobile vehicle (truck or trailer), which allows safe and orderly movement of the inspection equipment throughout the job site.
- E. The television camera used for the storm line inspection shall be one specifically designed and constructed for pipeline inspection. The camera shall be waterproof and shall be operative in any conditions that may be encountered in the inspection environment. The Contractor shall provide a color pan and tilt camera to facilitate the inspection of service laterals and sewer line and manhole defects. The television camera shall be capable of 360° rotational scan indicating any salient defects. The tilt arc must not be less than 225° unless otherwise approved by the Owner. The adjustment of focus and iris shall provide a minimum focal range of 3 inches in front of the camera's lens. The distance along the pipe in focus from the initial point of observation shall be a minimum of twice the vertical height of the pipe. The illumination must be such as to allow an even distribution of the light around the pipe perimeter without the loss of contrast, flare out of picture, or shadowing. The view seen by the television camera shall be transmitted to a monitor of not less than 11 inches in size. The television camera shall be capable of receiving and transmitting a picture having not less than a resolution of 352(x) by 240(y). The travel speed of the television inspection camera (through the pipe) shall be uniform and shall not exceed the maximum speed directed by the Owner of 6 inches per second under normal conditions.

- F. The Contractor shall test the television inspection equipment to verify the picture quality. The Marconi Regulation Chart No. 1 or the equipment manufacturer's recommendation shall be used to clearly differentiate between the following colors: white, yellow, cyan, green, magenta, red, blue and black.
- G. The television inspection equipment shall be of such quality as to enable the following to be achieved:
1. Color: With the monitor adjusted for correct saturation, the six colors plus black and white shall be clearly resolved with the primary and complementary colors in order of decreasing luminance.
 2. Linearity: The background grid shall show squares of equal size, without convergence/divergence over the whole of picture. The center circle shall appear round and have the correct height/width relationship ($\pm 5\%$).
 3. Resolution: The live picture must be displayed on a digital or analog monitor capable of providing a clear, stable image free of electrical interference with a minimum horizontal resolution not less than 352(x) by 240(y) lines.
 4. Color Consistency: To ensure that the camera shall provide similar results when used with its own illumination source, the lighting shall be fixed in intensity prior to commencing the survey. In order to ensure color consistency no variation in illumination shall take place during the inspection.
 5. The Owner may periodically check both the live and video picture color consistency against the color bar. Any differences will necessitate re-survey of the new length or lengths affected, at the Contractor's expense.
 6. The closed circuit television monitor display shall incorporate an automatically updated record in feet and tenths of a foot of the distance along the line from the cable calibration point to the center point of the camera or center point of the transducer, whichever unit is being used. The relative positions of the two center points should also be noted. The Contractor shall use a suitable metering device that enables the cable length to be accurately measured; this shall be accurate to $\pm 1\%$ or 6 inches whichever is greater. The Contractor shall demonstrate that the tolerance is being achieved by tape measurement between structures on the surface. This taped measurement must be included on each television inspection log both written and digital.
 7. If the Contractor fails to meet the required standard of accuracy, the Owner will instruct the Contractor to provide a new device to measure the footage. The Owner may at his discretion instruct the Contractor in writing, to re-survey those lengths of pipe first inspected with the original measuring device using the new measuring device.
 8. All audio-visual recordings and collected data made during the television inspection shall become the property of the Owner and shall be submitted to the Owner immediately upon completion of the television inspection.

PART 3 EXECUTION

3.1 GENERAL

- A. Television Inspection: The Contractor shall inspect pipelines with pan and tilt conventional television imagery as specified so as to record all relevant features and defects of the pipeline under inspection. Inspection of pipelines shall be carried out in a format approved by the Owner. Cleaning shall be performed in accordance with the Contract Documents. A skilled technician or supervisor shall control operation of television equipment.

- B. If television inspection of an entire section cannot be successfully performed from one manhole, a reverse setup shall be performed to obtain a complete television inspection.
- C. The Contractor shall provide a complete television inspection of both the upstream and downstream structures beginning at the top of each structure and panning down to inspect the entire structure.
- D. Whenever prevailing conditions allow, the camera head shall be positioned to reduce the risk of picture distortion. In circular lines, the camera lens shall be positioned centrally (i.e. in prime position) within the pipe. In non-circular lines, picture orientation shall be taken at midheight, unless otherwise agreed, and centered horizontally. In all instances the camera lens shall be directed along the longitudinal axis of the sewer when in prime position. A positioning tolerance of $\pm 10\%$ of the vertical sewer dimension shall be allowed when the camera is in prime position.
- E. All Television inspections shall be performed during low flow conditions. The Owner reserves right to refuse any television inspection that does not produce an effective survey of the sewer pipe because of high flow conditions or for any other reason. If the water level is greater than 25% of the pipe diameter, conventional television inspection shall not be attempted without prior approval from the Owner.

3.2 DIGITAL AUDIO VISUAL RECORDING

- A. Video Recording: Continuous digital video recordings of the inspection view as it appears on the television monitor shall be taken. It is intended that a digital video recording will be made of the complete television inspection of all the sewer lines constructed as part of this project. The recording shall also be used as a permanent record of defects. The recording shall be MPEG. The digital video encoding shall include both sound and video information that can be reproduced with a video image equal or very close to the quality of the original picture on the television monitor. The replay of the recorded video information, when reviewed by an ISOMPEG-1 compliant viewer, shall be free of electrical interference and shall produce a clear, stable image. The audio portion of the composite digital coding shall be sufficiently free of electrical interference and background noise to produce an oral report that is clear and completely and easily discernible.
- B. The audio portion of the inspection report shall include the location or identification of the section, the structure-to-structure direction of travel, and the distance traveled on the specific run encountered. The inspection camera equipment shall be continuously connected to the television inspection or monitoring equipment. The recording and monitoring equipment shall have the built-in capability to allow the Owner to instantly review both the audio and video quality of the recordings at all times during the television survey. Playback speed shall be continuously adjustable from one-third normal speed for slow-motion viewing to normal playback speed.
- C. Separate MPEG files shall be created for each storm line segment. In case of a reverse setup, such inspection shall be stored in a separate MPEG file. MPEG files shall be written to CDROM media for delivery to the Owner. Multiple MPEGs may exist on each CD-ROM. Each CD-ROM shall be labeled, at a minimum, with the following information: Owner, Project Name, Date CD created, CD Identification, Sewer Line Sections and Contractor Firm.
- D. MPEG files shall be named according to the following file specification:
 - 1. [STARTSTRUCTURENUMBER]_[ENDSTRUCTURENUMBER]_[MONTH][DAY][YEAR] .mpg
- E. The Owner, at its sole discretion, reserves right to refuse any MPEG, on the basis of poor

image quality, excessive bit rates, inconsistent frame rates or any other characteristics that may affect usability by the Owner.

- F. DVDs may be substituted for CD-ROMs when applicable.

3.3 TELEVISION INSPECTION REPORTS

- A. Television Inspection Report: The Contractor shall complete a television inspection report covering the television inspection work and the information acquired. Prior to beginning work, the Contractor shall submit a hardcopy of the television inspection report to the Owner for approval.
- B. The UK Water Industry Engineering and Operations Committee's publication:
1. Manual of Sewer Condition Classification, August 1993, Third Edition (ISBN 0-902156-89-6), herein after referred to, as Manual shall be used to describe all conditions, defects, and features of the sewer line being surveyed. The standard coding form on page 2 of this publication may be used, either manually or electronically and a hardcopy of this form or approved equivalent shall become part of the deliverables for Television Inspection. Data for all fields in the coding form shall be collected unless otherwise directed. The following exceptions shall be made regarding the use of the Manual of Sewer Condition Class Classification and the standard coding page:
 - a. U.S. Customary units (feet for all lengths, inches for all diameters) shall be
 - b. The data to populate the following field in the standard coding form shall be supplied to the Contractor by the Owner:
 - c. All fields in the sewer.dat containing text shall be left justified. Numeric fields (lengths, diameters, etc.) shall be right justified.
 - d. The decimal in Field 26 shall be omitted. Length of pipe joint spacing shall be expressed to the nearest foot.
 - e. The decimal in Field 27 shall be omitted. Total length of pipe shall be expressed to the nearest foot.
 - f. Field 29 shall be changed from "Video Cassette Number" to "CD-ROM ID". CD ROM's shall be labeled sequentially starting at 1.
 - g. Field 33 as described in the referenced publication on page 11 shall be replaced with the following:
 - 1) Field 33 — Pre-cleaning
 - 2) 1 character, code.
 - 3) State the type of cleaning that was carried out prior to the survey. Enter X for standard (normal) cleaning, enter M for Medium Cleaning, enter H for Heavy Cleaning, enter S for Specialty Cleaning, enter N if the line was not cleaned prior to survey.
 - h. In the details section, the fields for "Video No." shall be populated with the number of seconds into the current audio-visual coding. All audiovisual codings shall begin at zero seconds. There shall be such an entry for all lines in the details section.

- i. The list of necessary fields that are to be populated will be provided to the Contractor prior to Notice to Proceed.
- C. In addition to any paper documents, all television inspection reports shall be furnished in electronic format. Television inspection reports in electronic format shall be furnished in ASCII text in “sewer.dat” format as specified in subpart 3.4.
- D. ASCII Storm.dat Television inspection report files shall be named according to the following file specification:
 1. [STARTSTRUCTURENUMBER] [ENDSTRUCTURENUMBER] [MONTH] [DAY] [YEAR].dat
 2. Storm.dat files shall be delivered on the same physical CD-ROM with the associated MPEG files of the same sewer line segment.
- E. Video Data Display: At the start of each storm length being surveyed, the length of pipeline from zero up to the cable calibration point shall be recorded and reported in order to obtain a full record of the storm length. The length reading entered on to the data display at the cable calibration point must allow for the distance from the start of the survey to the cable calibration point such that the footage at the start of the survey is zero. In the case of surveying through a structure where a new header sheet is required, the distance shall be set at zero with the camera focused on the outgoing pipe entrance.
- F. Television Inspection Record: At the start of each structure length a data generator shall electronically generate and clearly display on the viewing monitor and video recording a record of data in alphanumeric form containing the following minimum information:
 1. Automatic update of the camera’s position, in feet, in the sewer line from adjusted zero
 2. Size and length of pipe
 3. Pipe material
 4. Upstream structure and downstream structure reference numbers
 5. Date of inspection
 6. Address, road name and/or location
 7. Direction of inspection (upstream or downstream)
 8. Starting time of the inspection
- G. Once the survey of the pipeline is under way, specific data shall be continuously displayed on the viewing monitor and video recording. The size and position of the data display shall be such as not to interfere with the main subject of the picture yet shall be easily readable when the recording is replayed. At minimum, the following data shall be displayed:
 1. Automatic update of the camera’s position, in feet, in the storm line from adjusted zero
 2. Pipe dimensions and type (8” clay, etc.)
 3. Upstream structure and downstream structure reference numbers
 4. Direction of inspection (upstream or downstream)
- H. Each storm length, i.e. the length of storm line between two consecutive structures, shall be

entered on a separate coding sheet, and hence, a separate storm.dat. Thus, where a Contractor elects to “pull through” a structure during a Television Inspection survey or “walk through” during a man entry survey he shall start a new coding sheet at the structure “pulled or walked through” and shall re-set the distance to zero on the coding sheet and related storm.dat.

3.4 SEWER.DAT DATA SPECIFICATION

- A. The file is to be in a standard ASCII text format (i.e. no control characters) therefore each line in the file should be terminated by an ASCII carriage return/linefeed combination--ASCII code 13 followed by ASCII code 10 (the default termination on most text generating programs).
- B. The maximum line length must not exceed 81 characters including the ASCII termination code, except for Line 1 where the contractor can have their own reference after the 80th character.
- C. There shall be no decimal points in any header field.
- D. Each header line must start with a three character identifier “OHn”, n being between 1 and 6.
- E. Each Detail line must start with a three character identifier “OD1”.
- F. Decimal points must be in Detail footage.
- G. The sewer.dat ASCII file shall have the following structure:

		Start Position	Number of Characters	Format (N=Number)
Line 1	“OH1”	1	3	
	Surveyed By (optional)	4	12	
	Contract No	16	8	
	Job Number			
	(start minisystem)	24	10	
	Catchment			
	(end minisystem)	34	10	
	Division	44	1	
	District	45	3	
	PLR (special condition)	48	11	
Line 2	“OH2”	1	3	
	Date (MM/DD/YY)	4	6	(NNNNNN)
	Time (HHMM)	10	4	(NNNN)
	Road Name	14	30	
	Place Name (city)	44	20	
Line 3	“OH3”	1	3	
	Start Structure	4	10	
	Start Depth	14	4	(NNNN)
	Start Cover	18	5	(NNNNN)
	Start Invert	23	5	(NNNNN)
	Finish Structure	28	10	
	Finish Depth	38	4	(NNNN)
	Finish Cover	42	5	(NNNNN)
Finish Invert	47	5	(NNNNN)	
Line 4	“OH4”	1	3	
	Use	4	1	
	Direction	5	1	
	Size 1	6	4	(NNNN)
	Size 2	10	4	(NNNN)

	Shape	14	1	
	Material	15	3	
	Lining	18	3	
	Pipe Length	21	3	
	Total Length (No Tenths)	24	4	(NNNN)
	Year Laid	28	4	
Line 5	"OH5"	1	3	
	CD ID 4 5			
	Video Recorder (CD label)	9	10	
	Comments	19	40	
Line 6	"OH6"	1	3	
	Purpose	4	1	
	Weather	5	1	
	Location	6	1	
	Location Details	7	1	
	Category Code (Z)	57	1	
	Pre-Cleaning	58	1	
	Details "OD1"	1	3	
	Video No (seconds into video)	4	4	(NNNN)
	Photo No.	8	4	(NNN)
	Distance	11	5	(NNN.N)
	CD	16	2	
	Code	18	4	
	Diameter	22	3	(NNN)
	Clock At	25	2	(NN)
	Clock To	27	2	(NN)
	Percentage%	29	2	(NN)
	Intrusion	31	2	(NN)
	Remarks	33	30	

3.5 GENERAL GUIDELINES FOR INSPECTION REPORTING USING WRC CLASSIFICATIONS AND STORM.DAT

A. HEADER INFORMATION

- Total Length between structures must be entered when the inspection successfully reaches the finish structure. It is fully understood that, in the case of an SA, the Total Footage is an estimate. If the Finish structure cannot be found then enter a sensible footage (nominally 300 feet as an example) and not the footage of the abandonment. If estimated, the text "Tot Len?" shall be entered in Comments.

Sewer Condition Codes (in alphabetical order)

Code	Definition
B	Broken pipe at... (OR from ...to...) o'clock
BR	Branch major
CC	Crack circumferential from ... to ... o'clock
CL	Crack longitudinal at ... o'clock
CM	Cracks multiple from ... to ... o'clock
CN	Connection at ... o'clock, diametermm
CNI	Connection at ... o'clock, diametermm, intrusion ...mm
CU	Camera under water
CX	Connection defective at ... o'clock, diameter ... mm
CXI	Connection defective at ... o'clock, diameter ... mm, intrusion ... mm
D	Deformed sewer ... %
DB	Displaced bricks at ... (OR from ... to ...) o'clock

DC	Dimension of sewer changes, new dimension ...mm
DE	Debris ... % cross-sectional area loss
DEG	Debris grease ... % cross-sectional area loss
DES	Debris silt ... % cross-sectional area loss
DI	Dropped invert, gap ... mm
EH(J)	Encrustation heavy from ... to ... o'clock % cross-sectional area loss (at joint)
EL(J)	Encrustation light from ... to ... o'clock (at joint)
EM(J)	Encrustation medium from ... to ... o'clock % cross-sectional area loss (at joint)
ESL	Scale light ... % cross-sectional area loss from ... to ... o'clock
ESH	Scale heavy from ... to ... o'clock %
ESM	Scale medium ... % cross-sectional area loss from ... to ... o'clock
FC	Fracture circumferential from ... to ... o'clock
FL	Fracture longitudinal at ... o'clock
FM	Fractures multiple from to ... o'clock
GO	General observation at this point
GP	General photograph number ... taken at this point
H	Hole in sewer at ... (OR from ... to ...) o'clock
ID(J)	Infiltration dripper at ... (OR from ... to ...) o'clock (at joint)
IG(J)	Infiltration gusher at ... (OR from ... to ...) o'clock (at joint)
IR(J)	Infiltration runner at ... (OR from ... to ...) o'clock (at joint)
IS(J)	Infiltration seep at ... (OR from ... to ...) o'clock (at joint)
JDL	Joint displaced large
JDM	Joint displaced medium
JN	Junction at ... o'clock, diameter ... mm
JX	Junction defective at ... o'clock, diameter ... mm
LC	Lining of sewer changes/starts/finishes at this point
LD	Line of sewer deviates down
LL	Line of sewer deviates left
LN	Lining defect at ... (OR from ... to ...) o'clock
LR	Line of sewer deviates right
LU	Line of sewer deviates up
MB	Missing bricks at ... (OR from ... to ...) o'clock
MC	Material of sewer changes at this point
MH	Manhole/node
MM	Mortar missing medium at ... (OR from ... to ... o'clock
MS	Mortar missing surface at ... (OR from ... to ...) o'clock
MT	Mortar missing total at ... (OR from ... to ...) o'clock
OB	Obstruction ...% height/diameter loss
OJL	Open joint large
OJM	Open joint medium
PC	Length of pipe forming sewer changes at this point, new length ...mm
RF(J)	Roots fine (at joint)
RM(J)	Roots mass ... % cross-sectional area loss (at joint)
RT(J)	Roots tap (at joint)
SA	Survey abandoned
SC	Shape of sewer changes at this point
SSL	Surface damage, spalling large at ... (OR from ... to ..) o'clock
SSM	Surface damage, spalling medium at ... (OR from ... to ...) o'clock
SSS	Surface damage, spalling slight at ... (OR from ... to ...) o'clock
SWL	Surface damage, wear large at ... (OR from ... to ...) o'clock
SWM	Surface damage, wear medium at ... (OR from ... to ...) o'clock
SWS	Surface damage, wear slight at ... (OR from ... to ..) o'clock
V	Vermin (rats and mice)
WL	Water level ... % height/diameter
X	Sewer collapsed ... % cross-sectional area loss

2. If a Buried or Uncharted structure is encountered then the Inspection report shall be finished with the MH / FH codes.
3. If the inspection is abandoned and then inspected from the other direction (reverse setup) then the current inspection must be finished using SA (plus a reason for the Survey being abandoned) and a new Header shall be started.
4. Each Survey Report must only contain one survey; hence, in the case of a Survey Abandonment or a buried or uncharted manhole being encountered, a new Header and Detail must be completed. In addition, a separate MPEG shall be created.

B. DETAILS INFORMATION

1. The first three lines of each set of survey details shall have the codes ST, MH, and WL respectively.
2. The Structure Number shall be entered in the Remarks MH code. Example:

V Digit	Dist	Code	Remarks
0030	0.0	ST	
0031	0.0	MH	1033-044B
0032	0.0	WL	10

3. The final detail line for each survey must end with a termination code, either SA or FH.

Example

0114	89.0	RMJ	
0114	89.0F1	JDS	
0114	89.0	SA	Due to Roots Mass
-----or-----			
0130	33.0	D	
0130	34.9	MH	1033-045
0131	34.9	FH	

4. When a defect or feature is encountered the camera shall be stopped just prior to the defect/feature so that it can be clearly seen.
5. The defect/feature must be recorded for a sufficient time to enable the Owner to assess the observation without recourse to using the “pause” facility
6. A video digit shall be entered against the defect/feature in the format of time elapsed into videotape.
7. If the defect spans for more than 3 feet or is repetitive over a number of joints (i.e. EU, Encrustation Light at Joint) then a Start Flag (S1 S2 etc, sequentially up to S9 then SA, SB through SZ can be used) can be entered against the code at the start footage. When the defect finishes the appropriate Finish Flag is inserted against the defect at the finish footage and the same Flag number is used to finish the defect off (S1 MUST finish with an F1 and so on). This aids the operator in reporting repeating defects without having to enter the code at every joint footage or every 3 feet. The defect that has the start flag against it can change its position (i.e. a FL or CL) but not its magnitude (i.e. you cannot start with a CL and finish with a FL. You must “close,” or finish, the defect with the appropriate Finish Flag and then start the new defect with an UNUSED (in the current inspection) Start Flag.
8. If the survey was abandoned (SA) then a reason for the abandonment shall be entered in

the Remarks column against the SA code. The description of the reason for the SA should contain the appropriate defect code that has caused the abandonment (i.e. If due to an intruding connection then the end of the report would read:

0102	342.8	CNI	04 11	02
0102	342.8	SA	10	DUE TO CNI

9. When it is difficult to determine the defect magnitude (an FL or CL, for instance) the worst code of the two, with its support information, shall be entered and a comment made in regards to the less severe classification.

Example				
0032	301.2	FL	11	POSS CL

10. All defects and features shall have the relevant support data (i.e. JN/CN shall have sizes and positions).

3.6 QUALITY CONTROL

- A. Quality Control: The Contractor shall operate a quality control system, to be approved by the Owner, which will effectively gauge the accuracy of all inspection reports produced by the operator.
- B. The Owner shall be entitled to audit the control system and be present when assessments are being computed. When requested by the Owner in writing, the Contractor shall forward to the Owner sufficient details and information for such audit assessment. Should any report fail to achieve a margin that the Owner deems satisfactory, the Owner shall require the Contractor, without any additional compensation, to re-code and re-submit any data or reports that the Owner deems necessary.

3.7 CLEANUP

- A. After the installation work has been completed and all testing acceptable, the Contractor shall cleanup the entire project area. The Contractor shall dispose of all excess material and debris not incorporated into the permanent installation. The work area shall be left in a condition equal to or better than prior condition. Disturbed grassed areas shall be seeded or sod placed as directed by the Owner.

END OF SECTION

**EXHIBIT M
TO CONTRACT AGREEMENT**

**NOTICE TO CONTRACTORS
COMPLIANCE WITH ELECTRICAL SAFETY PROVISIONS
(Bidder to sign and return)**

I hereby certify that I am a principal and duly authorized representative of _____, (“Contractor”), whose address is _____, _____, and I further certify that:

- (1) The provisions of Section 46-3-30 of the Official Code of Georgia Annotated, relating to the “High Voltage Safety Act” will be complied with in full; and
- (2) The provisions of OSHA 29CFR1910.333(c) relating to work near high voltage power lines; and
- (3) The provisions of Part 4 of the National Electrical Safety Code.
- (3) The Contractor shall be required to ensure that each subcontractor hired is in compliance with the provisions listed above.

CONTRACTOR:

Date: _____

Signature: _____
Title: _____

APPENDICES

1. AFFIDAVITS
 - Affidavit Verifying Status for City Public Benefit Application
 - Contractor Affidavit Under O.C.G.A. §13-10-91(b(1))
2. CORPORATE CERTIFICATE
3. BONDS
4. LIST OF SUBCONTRACTORS
5. CERTIFICATE OF QUALIFICATION GEORGIA DEPARTMENT OF TRANSPORTATION

**Affidavit Verifying Status
for City Public Benefit Application
(Bidder to sign and return)**

By executing this affidavit under oath, as an applicant for a City of Sandy Springs, Georgia Business License or Occupation Tax Certificate, Alcohol License, Taxi Permit, execution of contract or other public benefit as referenced in O.C.G.A. Section 50-36-1, I am stating the following with respect to my application for a City of Sandy Springs license/permit and/or contract for

[Name of natural person applying on behalf of individual, business, corporation, partnership, or other private entity]

1) _____ I am a United States citizen

OR

2) _____ I am a legal permanent resident 18 years of age or older or I am an otherwise qualified alien or non-immigrant under the Federal Immigration and Nationality Act 18 years of age or older and lawfully present in the United States.*

In making the above representation under oath, I understand that any person who knowingly and willfully makes a false, fictitious, or fraudulent statement or representation in an affidavit shall be guilty of a violation of Code Section 16-10-20 of the Official Code of Georgia.

Signature of Applicant: _____ Date: _____

Printed Name: _____

*Alien Registration number for non-citizens

****PLEASE INCLUDE A COPY OF YOUR PERMANENT RESIDENT CARD, EMPLOYMENT AUTHORIZATION, GREEN CARD, OR PASSPORT WITH A COPY OF YOUR DRIVER'S LICENSE IF YOU ARE A LEGAL PERMANENT RESIDENT (#2).**

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

Notary Public: _____

My Commission Expires: _____

*Note: O.C.G.A. § 50-36-1(e)(2) requires that aliens under the federal Immigration and Nationality Act, Title 8 U.S.C., as amended, provide their alien registration number. Because legal permanent residents are included in the federal definition of "alien", legal permanent residents must also provide their alien registration number. Qualified aliens that do not have an alien registration number may supply another identifying number below:

Contractor Affidavit under O.C.G.A. § 13-10-91(b)(1)
(Bidder to sign and return)

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of the City of Sandy Springs has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned contractor will continue to use the federal work authorization program throughout the contract period and the undersigned contractor will contract for the physical 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(b). Contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

Federal Work Authorization User Identification Number

Date of Authorization

Name of Contractor

Name of Project

Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____ 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 _____

NOTARY PUBLIC

My Commission Expires: _____

CORPORATE CERTIFICATE

I, _____, certify that I am the Secretary of the Corporation named as Contractor in the foregoing bid; that _____ who signed said bid in behalf of the Contractor, was then (title)_____ of said Corporation; that said bid was duly signed for and in behalf of said Corporation by authority of its Board of Directors, and is within the scope of its corporate powers; that said Corporation is organized under the laws of the State of ___Georgia_____.

This _____ day of _____, 2012.

(Seal)

(Signature)

BID BOND
(BID BOND TO BE RETURNED WITH BID)

KNOW ALL MEN BY THESE PRESENTS, THAT _____

(Name of Contractor)_____

(Address of Contractor) at

(Corporation, Partnership and 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 Sandy Springs Georgia

7840 Roswell Rd., Bldg.-500, Sandy Springs, Georgia 30350

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

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

GLENFOREST ROAD DRAINAGE IMPROVEMENT PROJECT

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 bid is accepted, the Principal shall within ten days after receipt of notification of the acceptance execute a Contract in accordance with the Bid and upon the terms, conditions, and prices set forth in the form and manner required by the City of Sandy Springs, Georgia, and execute a sufficient and satisfactory Performance Bond and Payment Bond payable to the City of Sandy Springs, Georgia, each in an amount of 100% of the total Contract Price, in form and with security satisfactory to said the City of Sandy Springs, 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 Sandy Springs, Georgia, upon demand, the amount hereof in good and lawful money of the United States of America, not as a

penalty, but as liquidated damages.

PROVIDED, FURTHER, that Principal and Surety agree and represent that this bond is executed pursuant, to and in accordance with the applicable provisions of the Official Code of Georgia Annotated, as Amended, including, but not limited to, O.C.G.A. § 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)

(Witness to Principal)

(Address)

(Surety)

ATTEST

BY: _____
(Attorney-in-Fact) and Resident Agent

(Attorney-in-Fact)

(Seal)

(Address)

(Witness as to Surety)

(Address)

(Principal)

BY: _____

(Address)

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

The City of Sandy Springs, Georgia
7840 Roswell Rd., Bldg.-500, Sandy Springs, Ga. 30350

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

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

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

GLENFOREST ROAD DRAINAGE IMPROVEMENT PROJECT

NOW THEREFORE, the conditions of this obligation are such that if the above bound 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 his 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 hereunder.

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.

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

ATTEST:

(Principal Secretary)

(Principal)

(SEAL)

BY: _____

(Witness to Principal)

(Address)

(Surety)

ATTEST BY:

Attorney-in-Fact) and Resident Agent

(Attorney-in-Fact)

(Seal)

(Address)

(Witness as to Surety)

(Address)

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

The City of Sandy Springs Georgia
7840 Roswell Rd., Bldg.-500, Sandy Springs, Georgia 30350

hereinafter referred to as Obligee; for the use and protection of all subcontractors and all persons supplying labor, services, skill, tools, machinery, materials and/or equipment in the prosecution of the work provided for in the contract herein after referred to in the full and just sum of _____ Dollars

(\$_____) in lawful money of the United States, for the payment of which sum well and truly to be made, the Principal and Surety bind themselves, their, and each of their heirs, executors, administrators, 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, dated _____ for:

GLENFOREST ROAD DRAINAGE IMPROVEMENT PROJECT

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall well, truly, and faithfully perform said Contract in accordance 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 there under 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 there under.

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 One Hundred and Twenty (120) 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.

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

ATTEST:

(Principal Secretary)

(SEAL)

(Witness to Principal)

(Address)

ATTEST

(Principal)

BY: _____

(Address)

(Surety)

BY: _____

(Attorney-in-Fact) and Resident Agent

(Attorney-in-Fact)

(Seal)

(Address)

(Witness as to Surety)

(Address)

MAINTENANCE BOND

CITY OF SANDY SPRINGS, GEORGIA

PROJECT NO: FULTON COUNTY, GEORGIA

BOND NO: _____

KNOW ALL MEN BY THESE PRESENTS

That we, _____ as Principal, and _____ as Surety, are held and firmly bound unto the CITY OF SANDY SPRINGS, GEORGIA, as Obligee in the sum of 1/3 of the contract bid for the payment of which said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into an agreement with the City of Sandy Springs for **GLENFOREST ROAD DRAINAGE IMPROVEMENT PROJECT** and said work has now been completed and the Obligee desires a maintenance bond guarantee said streets and improvements for a period of one (1) year beginning _____ and ending _____.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the Principal shall fully indemnify and save harmless the City of Sandy Springs from any and all loss, costs, expenses or damages, for any repairs or replacements required because of defective workmanship or materials in said construction, then this obligation shall be null and void; otherwise to be and remain in full force and effect as to any such claim arising within one (1) year from the completion of said construction as set forth in said agreement.

Signed, sealed and dated this _____ day of _____, 20 _____

Witness:

(Principal)

(Name of Surety. Company)

(Attorney-in-fact)

LIST OF SUBCONTRACTORS
(Bidder to complete and return)

I do _____, do not _____, propose to subcontract some of the work on this project. I propose to subcontract work to the following subcontractors:

Company Name: _____