DAVIS & FLOYD

SINCE 1954

GreenvilleWater

"Project Manual" for

Greenville Water

June 2021

24" Augusta Road Water Main

D&F Job No.: 013841.01

GW CIP No. 187

PREPARED FOR:

Greenville Water

Nancy Barrett

407 West Broad Street

Greenville, SC 29601

(864) 241-6132

PREPARED BY:

Davis & Floyd, Inc.

164 Milestone Way, Suite 200

Greenville, SC 29615

(864) 527-9800

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 11138 JOHN EDWARDS REYNOLDS

6/1/2021

SOUTH CAROLINA DAVIS & FLOYD, INC. No. C00538 CERTIFICATE OF AUTHORIZATION

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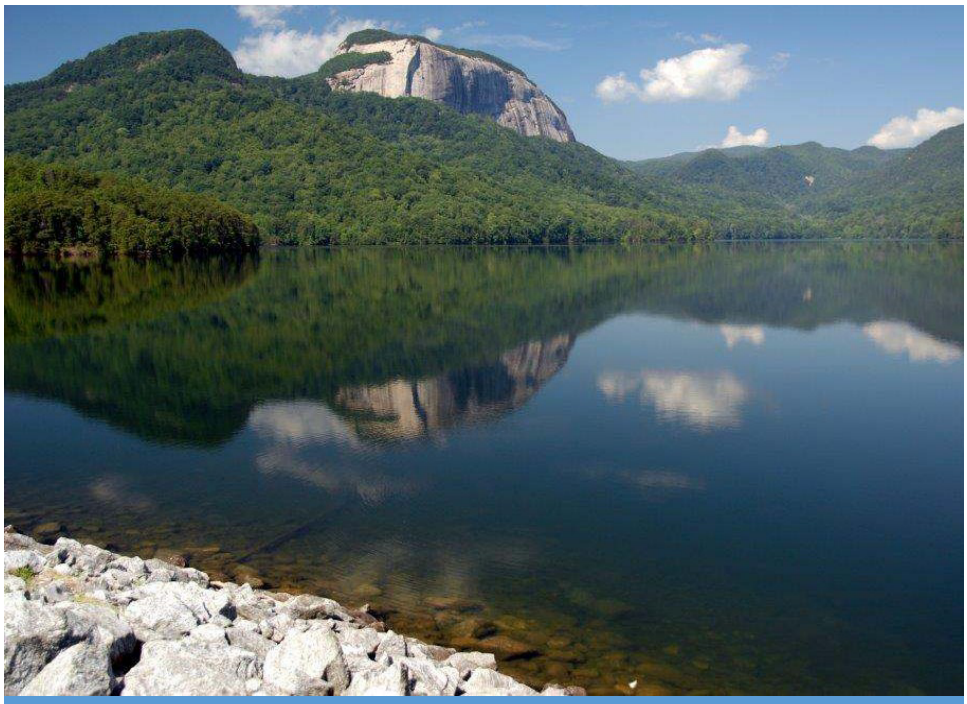
END OF SECTION

Greenville Water

INVITATION FOR BID



24" AUGUSTA ROAD WATER MAIN

BID DATE/TIME: 2:00 PM Tuesday, June 22nd, 2021

SEALED BIDS TO BE DELIVERED TO:
Greenville Water
407 West Broad Street
Greenville, South Carolina 29601
Attn: Nancy Barrett

INTRODUCTION AND BACKGROUND

Greenville Water (GW), voted “Best of the Best” by the American Water Works Association in 2011 for having the best tasting water in North America, has been providing exceptional water service for close to 100 years to the 500,000 current residents of the Upstate region of South Carolina, making it the largest water utility in the state.
GW is seeking competitive bids for upgrading existing water mains to provide additional capacity needed for the area around the Donaldson Center and Fork Shoals Road.

CONTRACTOR RESPONSIBILITIES (SCOPE OF WORK)

Contractor to install approximately:

- 8,260 linear feet (LF) of 24-inch ductile iron pipe (DIP) along Augusta Road (SC-25) from Bracken Road (SC-23-27) to Antioch Church Road (SC-23-331)
- 4,030 LF of 12-inch DIP along Perimeter Road (E0145) from Kitty Hawk Road (E-DC-105) to Access Road (S-23-331)
- 120 lf of 8-inch DIP along Milledge Road (E 144)
- 175 lf of 6-inch DIP along Mackenzie Drive (E00540)

Contractor to install valves, hydrants, air release valves, and other appurtenances as needed to complete the work as shown on the Plans and as defined by the Specifications.

Contractor to attend the Mandatory Pre-Bid Meeting which will be at Operations Center Conference Room, 517 W. Washington Street, Greenville, SC 29601, on **Thursday, June 10th** at **2:00 PM**. GW is not responsible for assumptions made by Contractor regarding site conditions.

INTENT

The purpose of this Invitation for Bid (“IFB”) is to:

Solicit responses from qualified contractors to perform the work stated in this IFB.

Enter into an agreement between GW and selected Contractor based on the results from this solicitation.

Greenville Water

TIMELINE

SCHEDULE OF EVENTS

The table below contains the intended Schedule of Events for this solicitation.

Event	Time EDT	Date
1. IFB issuance	**5:00 PM**	**6/3/2021**
2. Pre-Bid Meeting/ Requests for information due	**2:00 PM**	**6/10/2021**
3. Respond to questions/inquiries	**2:00 PM**	**6/15/2021**
4. Bids due	**2:00 PM**	**6/22/2021**
5. Notice of Award	N/A	**6/29/2021**
6. Anticipated contract start date	N/A	**No later than 7/13/2021**
7. Anticipated construction completion date	N/A	**12/10/2021**

ADMINISTRATION

TECHNICAL CONTACT (ENGINEER)

Questions concerning the plans or technical requirements may be directed to:

Name John E. Reynolds, P.E.
Title Senior Project Manager
Phone (843) 519-1050 Ext. 5103
Email jreynold@davisfloyd.com

PROJECT MANAGER

Questions for the Owner may be directed to:

Name Nancy Barrett, P.E.
Title Engineer
Phone (864) 241-6132
Email nbarrett@greenvillewater.com

Guidelines have been established for the purpose of clarification to assure full understanding of the requirements of the solicitation and to ensure a fair and equitable evaluation process for all contractors.

INFORMATION AND INSTRUCTIONS

There is no expressed or implied obligation for GW to reimburse responding Contractors for any expenses incurred in preparing bids in response to this request.

Questions and inquiries pertaining to this solicitation shall be in writing and sent via email to the appropriate contact(s) listed in the section titled Administration. Questions submitted by close of business on **Thursday, June 10th** will be accumulated. Responses will be shared with all who intend to bid on **Tuesday, June 15th**.

When submitting questions, include a contact name, email address, telephone number and specifically reference the section of the IFB in question.

GW reserves the right to reject any or all bids submitted; to waive any immaterial technicalities and to accept the proposal deemed to be the best value.

The terms and conditions (the provisions) that shall govern any resulting agreement between GW and the best value Contractor are contained in this IFB.

Under the South Carolina Freedom of Information Act (Section 11-35-410), “documents submitted in response or with regard to any solicitation or other request, the person submitting the documents shall comply with instructions provided in the solicitation for marking information exempt from public disclosure. Information not marked as required by the applicable instructions may be disclosed to the public.” To prevent improper disclosure, Respondents must conspicuously identify (mark and/or denote as **TRADE SECRET**, **CONFIDENTIAL** or **PROTECTED**) those portions of their bids that qualify for protection, otherwise all information not so noted and identified shall be subject to disclosure by the Buyer as public information.

RESPONSE SUBMITTAL

Submission of a bid indicates acceptance by the Contractor to the terms and conditions contained in this IFB, unless clearly and specifically noted in the submitted quotation and confirmed in the agreement between GW and the selected Contractor.

GW must receive bids no later than **Tuesday, June 22nd** at **2:00 PM**. Bids received after such time will be returned unopened.

Emailed bids will not be accepted.

To be considered, one (1) clearly marked and sealed bid with the title of this IFB must be delivered by one of three methods listed below by the previously mentioned date.

METHOD	SHIP-TO ADDRESS
Shipping carrier (UPS, FedEx, etc.)	Nancy Barrett Greenville Water 407 West Broad Street Greenville, SC 29601
Courier/hand-delivered	Nancy Barrett Greenville Water 407 West Broad Street Greenville, SC 29601
Mailed via United States Postal Service (Overnight Priority Mail Express®):	Nancy Barrett Greenville Water PO Box 687 Greenville, SC 29602

Bids received after the closing date and time will not be considered.

LATE SUBMITTALS AND MODIFICATIONS

GW is not responsible for delays that may result from the Contractor's choice of submission methods.

Likewise, GW is not responsible for, and will not open, any bids that are received on or after the date and time stated above.

GW reserves the right, where it may serve GW's best interest, to request additional information or clarifications from responding Contractors or to allow corrections of error or omissions.

Greenville Water

DETAILED RESPONSE REQUIREMENTS

The below requirements are mandatory. Contractors must accept and commit requirements described to be considered for award.

BID ITEMS

Bids shall be in the form of a fixed unit price and submitted on the Bid Form (Attachment 1).

Contractor shall provide an extended price for each item listed in accordance with Specifications.

NARRATIVE OF WORK

Contractor shall submit a short narrative description of how the proposed work covered by the Bid Items above will be accomplished.

WORK SCHEDULE

Contractor shall submit a work schedule for the project.

IDEMNIFICATION AND INSURANCE

Contractors agrees to carry liability and workmen's compensation insurance, satisfactory to GW, and hold harmless and indemnify GW against all liability, loss and damage arising out of any injuries to persons and property caused by Firm, their sub-contractors, employees, or agents.

A Certificate of Insurance shall be provided demonstrating the following coverage:

a) Comprehensive General Liability with minimum limit of $1,000,000 combined single limit for bodily injury and property damage, per occurrence. Minimum $2,000,000 aggregate.

b) Comprehensive Automobile Liability with minimum limit of $1,000,000 combined single limit.

c) Workers Compensation with minimum of statutory requirements.

d) Employers' Liability with minimum of $500,000 each employee, $500,000 each accident and $500,000 policy limit.

e) In the event, any insurance policy expires before the end of the term of the contract, the Firm must provide within ten (10) business days of expiration, evidence of new or renewal policies.

PAYMENT TERMS

The payment terms: Net 30.

Greenville Water

EVALUATION OF RESPONSES

GW reserves the right to reject any or all bids; to waive any informality or irregularity not affected by law; to evaluate, in its absolute discretion, the responses submitted; to award the contract according to the low bid received.

FIRM SELECTION

Before award, GW reserves the right to seek clarifications or request additional information deemed necessary to properly evaluate submissions from all responding Contractors deemed eligible for contract award. Failure to provide requested information may result in rejection of proposal.

Upon selection of a contractor, GW intends to enter into an agreement using its standard General Services Agreement (Attachment No. 2) which shall be used to secure these services.

NOTIFICATION

GW shall issue a Notice of Award, if any, to the successful responding Contractor; however, no agreement shall be formed between selected Contractor and GW until the Service Agreement is signed by both parties.

An announcement will be sent in writing to all Contractors. Results will not be given over the phone.

ATTACHMENTS

Attachment No. 1: Bid Form
Attachment No. 2: Standard General Service Agreement
Attachment No. 3: Plans and Specifications (By Davis & Floyd, Inc.)
Attachment No. 4: Permits

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Attachment 1: Bid Form

Item No.	Description	Unit	Estimated Quantity	Unit Price	Extended Price
1.	Mobilization (Maximum = 3% of Total Bid Price)	LS	1	$	$
2.	6" DIP Water Main	LF	175	$	$
3.	8" DIP Water Main	LF	118	$	$
4.	12" DIP Water Main	LF	3,943	$	$
5.	12" DIP Water Main with RJ Bore & Jack in 20" Steel Encasement	LF	86	$	$
6.	24" DIP Water Main	LF	7,905	$	$
7.	24" DIP Water Main with RJ Bore & Jack in 36" Steel Encasement	LF	357	$	$
8.	Rock Excavation (Maximum = $150.00 per CY)	CY	100	$	$
9.	Connections to Existing System				
a.	24" at Bracken Rd & Augusta Rd	LS	1	$	$
b.	24" at Augusta Rd & Antioch Church Rd	LS	1	$	$
c.	12" on Perimeter Rd	LS	1	$	$
d.	12" at Perimeter Rd & Kitty Hawk Rd	LS	1	$	$
e.	8" at Perimeter Rd & Milledge Rd	LS	1	$	$
f.	6" at Mackenzie Dr & Jennings Dr	LS	1	$	$
10.	Ductile Iron Fittings	LB	14,495	$	$
11.	6" Gate Valve w/ Joint Restraint in Valve Box	EA	1	$	$
12.	8" Gate Valve w/ Joint Restraint in Valve Box	EA	1	$	$
13.	12" Gate Valve w/ Joint Restraint in Valve Box	EA	1	$	$
14.	24" Butterfly Valve w/ Joint Restraint in Utility Vault	EA	3	$	$
15.	12" Pipe Concrete Arch Encasement	EA	2	$	$
16.	24" Pipe Concrete Arch Encasement	EA	4	$	$
17.	Air Release Valve Assembly	EA	5	$	$
18.	Blow Off Valve Assembly	EA	3	$	$
19.	Fire Hydrant Assembly Installed on 12" Water Main	EA	3	$	$
20.	Fire Hydrant Assembly Installed on 24" Water Main	EA	2	$	$

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21.	Cut & Replace SCDOT Asphalt Roadway	LF	130	$	$
22.	Cut & Replace County Asphalt Roadway	LF	215	$	$
23.	Mill 2" & Resurface SCDOT Asphalt Roadway	SY	200	$	$
24.	Cut & Replace Asphalt Driveway	LF	316	$	$
25.	Mill 1.5" Asphalt Driveway	SF	307	$	$
26.	Resurface Asphalt Driveway	SF	979	$	$
27.	Cut & Replace Concrete Driveway	LF	45	$	$
28.	Cut & Replace Concrete Curb & Gutter	LF	80	$	$
29.	Seeding & Grassing	LS	1	$	$
30.	Sediment & Erosion Control	LS	1	$	$
31.	Traffic Control	LS	1	$	$
32.	As-Built Survey & Plans	LS	1	$	$

Base Bid Subtotal $ _____

Adder Items

Item No.	Description	Unit	Estimated Quantity	Unit Price	Extended Price
33.	36" Steel Encasement Bore & Drill Through Rock	LF	357	$	$
34.	20" Steel Encasement Bore & Drill Through Rock	LF	86	$	$

Adder Items Subtotal $ _____

Total Bid Price $ _____

_____

Total Bid Price in Words

Greenville Water

Attachment 2: Standard General Services Agreement

AGREEMENT BETWEEN OWNER AND CONTRACTOR

This Agreement (the "Contract" or "Agreement") is entered into as of the ___th day of _____ 2021 and is by and between the Commissioners of Public Works of the City of Greenville, d/b/a Greenville Water ("GW" or "Owner") and **CONTRACTOR** (Contractor). Each may hereinafter be referred to as "Owner" and "Contractor."
In consideration of the mutual promises made herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Owner and Contractor hereby agree as follows:

ARTICLE 1 - THE WORK

1.01 Work

A. Work includes all labor, materials, equipment, services, and documentation necessary to perform the Project defined herein: **24" Augusta Road Water Main**. The Work may include related services such as testing, start-up, and commissioning, as required by the Contract Documents.

B. The Contractor shall complete all Work as specified or indicated in the Contract Documents.

The Project is generally described as follows:

1. **Install approximately 8,260 LF of 24-inch DIP along Augusta Road (SC-25) from Bracken Road (SC-23-27) to Antioch Church Road (SC-23-331).**
2. **Install approximately 4,030 LF of 12-inch DIP along Perimeter Road (E0145) from Kitty Hawk Road (E-DC-105) to Access Road (S-23-331).**

ARTICLE 2 - CONTRACT DOCUMENTS

2.01 Intent of Contract Documents

A. It is the intent of the Contract Documents to describe a functionally complete project. The Contract Documents do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct surface preparation and application of selected products are to be provided by the Contractor and coordinated with the Engineer. This Contract supersedes prior negotiations, representations, and agreements, whether written or oral. The Contract Documents are complementary; what is required by one part of the Contract Documents is as binding as if required by other parts of the Contract Documents.

B. During the performance of the Work and until final payment, Contractor and Owner shall submit all matters in question concerning the requirements of the Contract Documents, or relating to the acceptability of the Work under the Contract Documents to the Project Manager. The Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

C. The Engineer will render a written clarification, interpretation, or decision on the issue submitted, or initiate a modification to the Contract Documents.

D. Contractor, and its subcontractors and suppliers, shall not have or acquire any title to or ownership rights to any of the Drawings, Specifications, or other documents (including copies or electronic media editions) prepared by Engineer or Owner's consultants.

2.02 Contract Documents Defined

A. The Contract Documents consist of the following documents:

1. This Contract
2. Performance bond
3. Payment bond
4. Exhibits to this Contract (enumerated as follows):

a. Exhibit 1 –Project Manual
b. Exhibit 2 –Project Drawings
c. The Contract Change Order (Form PURF008) may be issued on or after the Effective Date of the Contract to manage changes in Work.

ARTICLE 3 - PROJECT MANAGER & ENGINEER

3.01 Project Manager

A. The Project Manager for this Project is:
Nancy Barrett, P.E. – Greenville Water, Engineer II
864.241.6132
nbarrett@greenvillewater.com

3.02 Engineer

A. The Engineer for this Project is:
John E. Reynolds, P.E. – Davis & Floyd, Inc., Senior Project Manager
843.519.1050 Ext. 5103 (Direct)
864.527.9800 (Greenville Office)
jreynold@davisfloyd.com

ARTICLE 4 - CONTRACT TIMES

4.01 Contract Times

A. The Work will be substantially completed within **150** days after the Notice to Proceed.

4.02 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence in the performance of the Contract, and that Owner will incur damages if Contractor does not complete the Work according to the requirements of Paragraph 4.01. Because such damages for delay would be difficult and costly to determine, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner **$500** for each day that expires after the Contract Time for substantial completion.

4.03 Delays in Contractor's Progress

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times as its sole remedy. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor or their subcontractors or suppliers.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times as its sole remedy.

D. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor or Contractor's subcontractors or suppliers.

E. Contractor will be allowed delays for weather conditions, based on the concurrence of Contractor and Owner or Engineer, for two circumstances:

   a. Isolated inclement weather, wherein the project Site is determined to be unworkable for days of precipitation and days following for short times between otherwise good weather.

   b. Sustained inclement weather, wherein the project Site is determined to be unworkable for a sustained period of time, such as the winter months, with only an occasional working day within the sustained unworkable conditions.

F. If Contractor believes either condition applies, a request shall be made to Engineer or Owner for a Site meeting and a joint determination of the Site conditions and approval of the delay. Engineer will catalog these approved delays and will incorporate them into a Change Order for signature of Owner and Contractor.

4.04 Progress Schedules

A. Contractor shall develop a progress schedule and submit to the Engineer for review and comment before starting Work at the Sites. The Contractor shall modify the schedule in accordance with the comments provided by the Engineer.

B. The Contractor shall update and submit the progress schedule to the Engineer biweekly if the baseline schedule milestones are not met.

CONTRACT PRICE

4.05 Payment

A. Owner shall pay Contractor in accordance with the Contract Documents unit prices for each unit of Work completed. The total value of the agreement will be: $ **DOLLARS**. (See Attachment 1 – Bid Form)

Payment will be made in an amount equal to the total of all extended prices for actual Work completed. The extended price is determined by multiplying the unit price times the actual quantity of that Work item completed. Actual quantities installed will be determined by the Engineer.

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ARTICLE 5 - BONDS AND INSURANCE

5.01 Bonds

A. Before starting Work, Contractor shall furnish a performance bond and a payment bond from surety companies that are duly licensed or authorized to issue bonds in the required amounts in the jurisdiction in which the Project is located. Each bond shall be in an amount equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until the completion of the correction period specified in Paragraph 6.12 but, in any case, not less than one year after the date when final payment becomes due.

5.02 Insurance

A. Before starting Work, Contractor shall furnish evidence of insurance from companies that are duly licensed or authorized in the jurisdiction in which the Project is located with a minimum AM Best rating of A-VII or better. Contractor shall provide coverage for not less than the following:

A Certificate of Insurance shall be provided demonstrating the following coverage: a) Comprehensive General Liability with minimum limit of $1,000,000 combined single limit for bodily injury and property damage, per occurrence. Minimum $2,000,000 aggregate. b) Comprehensive Automobile Liability with minimum limit of $1,000,000 combined single limit. c) Workers Compensation with minimum of statutory requirements. d) Employer's Liability with minimum of $500,000 each employee, $500,000 each accident and $500,000 policy limit. e) In the event any insurance policy expires before the end of the term of the contract, the Contractor must provide within ten (10) business days of expiration, evidence of new or renewal policies.

B. All insurance policies required to be purchased and maintained will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least ten (10) days prior written notice has been given to the insured and additional insured.

C. Automobile liability insurance provided by Contractor shall provide coverage against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

D. Contractor's commercial general liability policy shall be written on a 1996 or later ISO commercial general liability occurrence form and include the following coverages and endorsements:

1. Products and completed operations coverage maintained for three (3) years after final payment;
2. Blanket contractual liability coverage to the extent permitted by law;
3. Broad form property damage coverage; and
4. Severability of interest; underground, explosion, and collapse coverage; personal injury coverage.

E. The Contractor's commercial general liability and automobile liability, umbrella or excess, and pollution liability policies shall include and list Owner and Engineer and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each as additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis.

1. Additional insured endorsements will include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.

2. Contractor shall provide ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent for design professional additional insureds.

F. Umbrella or excess liability insurance shall be written over the underlying employer's liability, commercial general liability, and automobile liability insurance. Subject to industry-standard exclusions, the coverage afforded shall be procured on a "follow the form" basis as to each of the underlying policies. Contractor may demonstrate to Owner that Contractor has met the combined limits of insurance (underlying policy plus applicable umbrella) specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policies and an umbrella or excess liability policy.

G. The Contractor shall provide property insurance covering physical loss or damage during construction to structures, materials, fixtures, and equipment, including those materials, fixtures, or equipment in storage or transit.

H. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 14.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 Supervision and Superintendence

A. Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, safety, and procedures of construction.

B. Contractor shall assign a competent resident superintendent who is to be present at all times during the execution of the Work. This resident superintendent shall not be replaced without written notice to and approval by the Owner and Engineer except under extraordinary circumstances.

C. Contractor shall at all times maintain good discipline and order at the Sites.

D. Except as otherwise required for the safety or protection of persons or the Work or property at the Sites or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Sites may be performed from dawn to dusk, Sunday through Saturday.

6.02 Other Work at the Sites

A. In addition to and apart from the Work of the Contractor, other work may occur at or adjacent to the Sites. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Sites.

6.03 Services, Materials, and Equipment

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be new, of good quality and shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable supplier, except as otherwise may be provided in the Contract Documents.

6.04 Subcontractors and Suppliers

A. Contractor may retain subcontractors and suppliers for the performance of parts of the Work. Such subcontractors and suppliers must be acceptable to Owner.

6.05 Quality Management

A. Contractor is fully responsible for managing the quality of Work to ensure Work is completed in accordance with the Contract Documents.

6.06 Licenses, Fees and Permits

A. Contractor shall pay all license fees and royalties and assume all costs incident to performing the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others.

B. Contractor shall obtain and pay for all construction permits and licenses unless otherwise provided in the Contract Documents.

6.07 Laws and Regulations; Taxes

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

B. Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages if Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations.

C. Contractor shall pay all applicable sales, consumer, use, and other similar taxes Contractor is required to pay in accordance with Laws and Regulations.

6.08 Record Documents

A. Contractor shall maintain one (1) printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved shop drawings in a safe place at the Site. Contractor shall annotate them to show changes made during construction. Contractor shall deliver these record documents to Engineer upon completion of the Work.

6.09 Safety and Protection

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work.

B. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

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

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

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

C. All damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by Contractor, or anyone for whose acts the Contractor may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Contract Documents or to the acts or omissions of Owner or Engineer and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor).

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

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

6.10 Shop Drawings, Samples, and Other Submittals

A. Contractor shall review and coordinate the shop drawing and samples with the requirements of the Work and the Contract Documents and shall verify all related field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers and similar information.

B. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contactor approves the submittal.

C. With each submittal, Contractor shall give Engineer specific written notice, in a communication separate from the submittal, of any variations that the shop drawing or sample may have from the requirements of the Contract Documents.

D. Engineer will provide timely review of shop drawings and samples.

E. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs.

F. Engineer's review and approval of a separate item does not indicate approval of the assembly in which the item functions.

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

H. Shop drawings are not Contract Documents.

6.11 Warranties and Guarantees

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

6.12 Correction Period

A. If within one (1) year after the date of substantial completion, any Work found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly and without cost to Owner, correct such defective Work.

6.13 Indemnification

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any subcontractor, any supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts they may be liable.

ARTICLE 7 - OWNER'S RESPONSIBILITIES

7.01 Owner's Responsibilities

A. Except as otherwise provided in the Contract Documents, Owner shall issue all communications to Contractor through Engineer.

B. Owner shall make payments to Contractor as provided in this Contract.

C. Owner shall provide Site and easements required to complete the Project.

D. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, unless stated elsewhere in the Contract Documents, Owner shall have sole authority and responsibility for such coordination.

E. The Owner shall be responsible for performing inspections and tests required by applicable codes.

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

G. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

H. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 8 - ENGINEER'S STATUS DURING CONSTRUCTION

8.01 Engineer's Status

A. Engineer will be Owner's representative during construction. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in this Contract.

B. Neither Engineer's authority or responsibility under this Article 8 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any subcontractor, any supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

C. Engineer will make visits to the Site at intervals appropriate to the various stages of the Work. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work.

D. Engineer has the authority to reject Work if Contractor fails to perform Work in accordance with the Contract Documents.

E. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work.

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

ARTICLE 9 - CHANGES IN THE WORK

9.01 Authority to Change the Work

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work.

9.02 Change Orders

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

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

2. Changes in the Work which are: (a) ordered by Owner or (b) agreed to by the parties or (c) resulting from the Engineer's decision, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other Engineer or technical matters; and

3. Changes in the Contract Price or Contract Times or other changes which embody the substance of any final binding results under Article 11.

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

ARTICLE 10 - DIFFERING SUBSURFACE OR PHYSICAL CONDITIONS

10.01 Differing Conditions Process

A. If Contractor believes that any subsurface or physical condition including but not limited to utilities or other underground facilities that are uncovered or revealed at the Site either differs materially from that shown or indicated in the Contract Documents or is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. After receipt of written notice, Engineer will promptly:

1. Review the subsurface or physical condition in question;

2. Determine necessity for Owner obtaining additional exploration or tests with respect to the condition;

3. Determine whether the condition falls within the differing site condition as stated herein;

4. Obtain any pertinent cost or schedule information from Contractor;

5. Prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and

6. Advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

ARTICLE 11 - CLAIMS AND DISPUTE RESOLUTION

11.01 Claims Process

A. The party submitting a claim shall deliver it directly to the other party to the Contract and the Engineer promptly (but in no event later than ten (10) days) after the start of the event giving rise thereto.

B. The party receiving a claim shall review it thoroughly, giving full consideration to its merits. The two (2) parties shall seek to resolve the claim through the exchange of information and direct negotiations. All actions taken on a claim shall be stated in writing and submitted to the other party.

C. If efforts to resolve a claim are not successful, the party receiving the claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the claim within forty-five (45) days, the claim is deemed denied.

D. If the dispute is not resolved to the satisfaction of the parties, Owner or Contractor shall give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction unless the Owner and Contractor both agree to an alternative dispute resolution process.

ARTICLE 12 - TESTS AND INSPECTIONS; CORRECTION OF DEFECTIVE WORK

12.01 Tests and Inspections

A. Owner and Engineer will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access.

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

C. If any Work that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense.

12.02 Defective Work

A. Contractor shall ensure that the Work is not defective.

B. Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. The Contractor shall promptly correct all such defective Work.

E. When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. If the Work is defective or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.

ARTICLE 13 - PAYMENTS TO CONTRACTOR

13.01 Progress Payments

A. The Contractor shall prepare a schedule of values that will serve as the basis for progress payments. The schedule of values will be in a form of application for payment acceptable to Engineer. The price breakdown submitted with the bid will be used.

13.02 Applications for Payments:

A. Contractor shall submit an application for payment in a form acceptable to the Engineer, no more frequently than monthly, to Engineer. Applications for payment will be prepared and signed by Contractor. Contractor shall provide supporting documentation required by the Contract Documents. Payment will be paid for Work completed as of the date of the application for payment.

B. Beginning with the second application for payment, each application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior applications for payment. Owner may, in its discretion, require interim releases from Contractor and its subcontractors and suppliers.

13.03 Retainage

A. The Owner shall retain ten percent (10 %) of each progress payment until the Work is substantially complete.

13.04 Review of Applications

A. Within ten 10 days after receipt of each application for payment, the Engineer will either indicate in writing a recommendation for payment and present the application for payment to Owner or return the application for payment to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. The Contractor will make the necessary corrections and resubmit the application for payment.

B. Engineer will recommend reductions in payment (set-offs) which, in the opinion of the Engineer, are necessary to protect Owner from loss because the Work is defective and requires correction or replacement.

C. The Owner is entitled to impose set-offs against payment based on any claims that have been made against Owner on account of Contractor's conduct in the performance of the Work, incurred costs, losses, or damages on account of Contractor's conduct in the performance of the Work, or liquidated damages that have accrued as a result of Contractor's failure to complete the Work.

13.05 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven (7) days after the time of payment by Owner.

13.06 Substantial Completion

A. The Contractor shall notify Owner and Engineer in writing that the Work is substantially complete and request the Engineer issue a certificate of substantial completion when Contractor considers the Work ready for its intended use. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Engineer will inspect the Work with the Owner and Contractor to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor and Owner in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a certificate of substantial completion which shall fix the date of substantial completion and include a punch list of items to be completed or corrected before final payment.

13.07 Final Inspection

A. Upon written notice from Contractor that the entire Work is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

13.08 Final Payment

A. Contractor may make application for final payment after Contractor has satisfactorily completed all Work defined in the Contract, including providing all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents and other documents.

B. The final application for payment shall be accompanied (except as previously delivered) by:

1. All documentation called for in the Contract Documents;
2. Consent of the surety to final payment;
3. Satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any liens or other title defects, or will so pass upon final payment;
4. A list of all disputes that Contractor believes are unsettled; and
5. Complete and legally effective releases or waivers (satisfactory to Owner) of all lien rights arising out of the Work, and of liens filed in connection with the Work.

C. The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

13.09 Waiver of Claims

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted.

Greenville Water

ARTICLE 14 - SUSPENSION OF WORK AND TERMINATION

14.01 Owner May Suspend Work

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than sixty (60) consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension.

14.02 Owner May Terminate for Cause

A. Contractor's failure to perform the Work in accordance with the Contract Documents or other failure to comply with a material term of the Contract Documents will constitute a default by Contractor and justify termination for cause.

B. If Contractor defaults in its obligations, then after giving Contractor and any surety ten (10) days written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:

1. Declare Contractor to be in default, and give Contractor and any surety notice that the Contract is terminated; and

2. Enforce the rights available to Owner under any applicable performance bond.

C. Owner may not proceed with termination of the Contract if Contractor, within seven (7) days of receipt of notice of intent to terminate, begins to correct its failure to perform and proceeds diligently to cure such failure.

D. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

E. In the case of a termination for cause, if the cost to complete the Work, including related claims, costs, losses, and damages, exceeds the unpaid contract balance, Contractor shall pay the difference to Owner.

F. A termination for cause is later found to have been improper or unsupported shall be treated as a termination for convenience.

14.03 Owner May Terminate for Convenience

A. Upon seven (7) days written notice to Contractor, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for, without duplication of any items:

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

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

3. Other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

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

14.04 Contractor May Stop Work or Terminate

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than ninety (90) consecutive days by Owner or under an order of court or other public authority, or (2) Owner fails for thirty (30) days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven (7) days written notice to Owner, and provided Owner does not remedy such suspension or failure within that time, either stop the Work until payment is received, or terminate the Contract and recover payment from the Owner.

ARTICLE 15 - CONTRACTOR'S REPRESENTATIONS

15.01 Contractor Representations

A. Contractor makes the following representations when entering into this Contract:

1. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the
5. Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on:
    a. The cost, progress, and performance of the Work;
    b. The means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and
    c. Contractor's safety precautions and programs.
6. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
7. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
8. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
9. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
10. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Contract are premised upon performing and furnishing the Work required by the Contract Documents.

Greenville Water

ARTICLE 16 - MISCELLANEOUS

16.01 Cumulative Remedies

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

16.02 Limitation of Damages

A. Neither Owner, Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

B. The parties mutually waive their respective claims for consequential damages arising from or relating to this Contract.

16.03 No Waiver

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

16.04 Survival of Obligations

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

16.05 Contractor's Certifications

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract.

16.06 Controlling Law

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

IN WITNESS WHEREOF, Owner and Contractor each hereby execute this Agreement by its duly authorized representative. This Contract will be effective on _____ (which is the Effective Date of the Contract).

CONTRACTOR:	OWNER:
	The Commissioners of Public Work of the City of Greenville (d/b/a Greenville Water)
By:	By: David H. Bereskin
Title:	Title: Chief Executive Officer
License No. _____ (where applicable)	Address for giving notices:
	Greenville Water
	PO Box 687
	Greenville, SC 29602
Witness	Witness

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Greenville Water

Attachment 3: Specifications and Plans

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SECTION 01000

SPECIAL CONDITIONS

PART I. GENERAL

In the event there is a contradiction among the conditions of the project, the most stringent condition will apply.

1.1 LOCATION OF THE WORK

A. The site of the work is in the SCDOT Right-of-Way along Augusta Road and Perimeter Road in Greenville, South Carolina.

1.2 GENERAL DESCRIPTION OF THE WORK

A. Description

The work includes the construction of approximately the following work:

1. Installation of approximately 8,260 linear feet (lf) of 24-inch diameter ductile iron water main along Augusta Road (US Hwy. 25) from Donaldson Road (S-23-27)/Bracken Road (D-430) to Antioch Church Road (S-23-331)/Grove Reserve Parkway (D-378), approximately 4,030 lf of 12-inch diameter ductile iron water main along Perimeter Road (E-0145) from Kitty Hawk Road (E-DC-105) to connection with existing 12-inch water main, approximately 120 lf of 8-inch diameter ductile iron water main, approximately 175 lf of 6-inch diameter ductile iron water main, valves, hydrants, air release valves, and other appurtenances for improvements to Greenville Water's transmission and distribution system.

B. Disclaimer

This short description, however, shall not, in any way, be construed to limit the Contractor's obligation for compliance with the Contract Documents.

C. Unit and Lump-Sum Priced Items

1. The Bid Form has spaces for bidding several unit and lump-sum priced items. The prices submitted and subsequently paid shall constitute full compensation for all work required by the Contract Documents. The estimated quantities shown shall be considered as approximate only, and any item may be increased, decreased, or totally deleted should the Owner determine this to be in his best interest.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Specification sections referenced in the text of other specification sections are listed under the "Related Work Specified Elsewhere" subsection for each specification section.

B. The Greenville Water Construction Specifications for Water Mains and Figures included in this project manual shall govern the installation and material Specifications for the work under this project. The other sections listed are intended to supplement the Greenville Water Construction Specifications. Where there is a contradiction in the Specifications, the more stringent requirement shall govern.

1.4 TERMS

A. Owner's Representative

The Engineer shall be the Owner's representative during construction. Direct all communications through the Owner's Representative.

B. Not in Contract (NIC)

Materials and equipment indicated NIC are not in this contract and will be furnished and installed by the Owner or others.

C. Owner's Agent

For purposes of this contract, the Owner's Agent is Davis & Floyd, Inc.

1.5 PROCEDURES FOR COMMENCING THE WORK

A. Notice to Proceed

The Owner will issue the Notice to Proceed to the Contractor following execution of the Agreement and following approval of the certificate of insurance and the bonds.

B. The Contractor shall not begin any work on the project without first notifying the Owner and Engineer. The notice shall be in writing and shall be received by the Owner and Engineer at least seven (7) days prior to the beginning of work. Any work done without prior notice will not be accepted. Upon request, the Contractor shall meet with the Owner and Engineer prior to beginning the work to discuss and clarify all phases of the work.

C. The Contractor shall be solely responsible for the means, methods, and sequence of construction, for the safety of the workers and other persons on the construction site and of all materials and equipment to be incorporated in the work.

1.6 SUBCONTRACTS

The Contractor shall not award work in excess of 25% of the contract price without written approval of the Owner and/or Engineer.

1.7 MANNER OF CONDUCTING THE WORK

A. Daily Cleanup

Clean up work regularly and continuously maintain the project in a neat and orderly manner consistent with normal operation. Execute the work and furnish such temporary facilities as required to preclude interference with access within and between existing building areas and structures and to cause no possible interference with the operation of any essential service thereof.

B. Existing Utilities and Equipment

Do not operate or disturb the setting of valves, switches, or electrical equipment on the service lines to the building, and service within the building, except by proper previous arrangement with the Owner and in the presence of the Owner or his authorized representative.

C. Coordination

Coordinate demolition and installation of temporary and permanent utilities with the Owner. Schedule this work to prevent disruption of existing building operation and minimize delay of the work. Notify the Owner a minimum of two (2) weeks in advance of anticipated utility outages and schedule such work at the Owner's convenience.

D. Damage to Existing Facilities

Restore existing work, including concealed work not indicated or specified to be modified, and which is damaged or otherwise affected by the Contractor's operations, to a condition equal to that which existed before the work was commenced. Use workers skilled in reconstruction and alteration work where new construction adjoins, connects to, or abuts existing work. Join new work to existing work in such a manner as to make the joining as inconspicuous as possible. Obvious patching of damaged work will not be acceptable. At the completion, ensure that the buildings and grounds are in first-class condition within the intent of the Specifications, with new parts well joined to the old as required, all connections completed, and facilities in full working condition.

1.8 SUBMITTALS

A. Section 01300 - Submittals

1.9 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Product Options

For products specified by reference standards, description, or performance only, provide product conforming to the Specifications.

B. No Substitutions

1. After a product has been approved, no change in brand or make will be permitted unless (i) satisfactory written evidence is presented to demonstrate that the manufacturer cannot make scheduled delivery of approved product, and that such delivery failure will adversely affect the project's critical path, (ii) the product delivered has been rejected and the substitution of suitable product is required to maintain the project's critical path, or (iii) other conditions have become apparent which indicate that approval of such other material is, in the sole opinion of the Engineer (Owner's Representative), in the best interest of the Owner.

2. No substitutions will be allowed when the phrase "no substitutions" or "no substitutions will be allowed," or words of similar effect, is specified or indicated with any article, device, product, material, fixture, or form or type of construction.

C. Equals

Reference in the Specifications or on the Plans to any article, device, product, material, fixture, form, or type of construction by name, make, or catalog number establishes a standard of quality and does not eliminate from competition other products of equal or better quality by other manufacturers, where fully suitable, as approved by the Engineer. Applications for approval of substitutions for the specified items in accordance with the General Conditions and will be considered only upon request of the Contractor, not of individual trades or suppliers and only for a specific purpose; no blanket approvals will be granted. No approval of a substitution will be valid unless it is in written form.

D. Work Affected by Substitution

If any proposed substitution affects a correlated function, adjacent construction, or the work of other contractors, then the necessary changes and modifications to the affected work are considered an essential part of the proposed substitution, to be accomplished by the Contractor as a part of the work, if and when approved. Submit detailed drawings and other information necessary to show and explain the proposed modifications with the request for approval of the substitution. Include data to substantiate that the proposed substitution is in accordance with the Contract Documents, and that the operations and maintenance costs are equal to or less than those for the named products.

E. Structure, Piping, and Electrical Changes and Equipment Drawings

Structures shown on the plans for the various items of equipment are the result of the best obtainable information from various sources. Due to variances in equipment details between equipment manufacturers, the Contractor may find it necessary to make changes in concrete outlines to accommodate the equipment furnished. Contractor shall not undertake to construct any structure containing equipment until he has obtained approved certified dimension prints of the equipment involved. Any structure and/or piping and/or electrical changes necessary to accommodate the equipment furnished shall be made at no additional cost to the Owner.

1.10 EXTRA EQUIPMENT, MATERIAL, AND TOOLS

A. Securely package equipment, material, and tools specified or indicated to be turned over to the Owner, complete with accessories, in clearly identified cartons suitable for storage. Deliver to a storage location designated by the Owner's Representative. At the time of delivery, provide in triplicate an itemized list of these items to the Owner's Representative for dating and for his signature of receipt. Mail a copy of the executed receipt to the Engineer. Show on cartons and receipt(s), for each item, the specific provision of the Contract Documents requiring that the item be delivered to the Owner.

1.11 SALVAGE ITEMS

A. The Owner reserves the right to retain all existing reusable materials and equipment to be demolished or removed. All other such materials (i.e. removed concrete and asphalt) and/or equipment shall become the property of the Contractor and shall be removed from the site. No material or equipment shall be removed from the site without confirmation by the Owner. Material and equipment to be retained by the Owner shall be delivered by the Contractor to a storage area on the site designated by the Owner.

1.12 CUTTING AND PATCHING

A. Employ skilled and experienced installer(s) to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements which affects:

1. Structural integrity of element

2. Integrity of weather-exposed or moisture-resistant elements

3. Efficiency, maintenance, or safety of element

4. Visual qualities of sight exposed elements

5. Work of Owner or separate contractor

C. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.

D. Cut masonry and concrete materials using masonry saw or core drill.

E. Restore work with new Products in accordance with requirements of Contract Documents.

F. Fit work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

G. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

H. Refinish surface to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

I. Identify any hazardous substance or condition exposed during the work to the Owner's Representative for decision or remedy.

1.13 ON-SITE CONFERENCES AND ON-SITE TESTING

A. Notify the Owner and the Owner's Representative a minimum of ten (10) days in advance of any on-site conference or on-site test requiring the attendance of the Owner, Owner's Representative, or their representative by the Specifications. If the attendance of the Owner's Representative or Engineer is required, schedule the on-site conference or on-site test to occur during a regularly scheduled site visit by the Owner's Representative or Engineer. If scheduled outside of a regularly scheduled visit by the Owner's Representative or Engineer, attendance by the Owner's Representative or Engineer shall be at its option.

1.14 ENVIRONMENTAL CONDITIONS

A. All erosion and sedimentation control work contained in the project shall be in conformance with the Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP). Contractor shall minimize wetland impacts as indicated in the Contract Documents and in accordance with the C-SWPPP.

1.15 TIME FOR COMPLETION

A. Achieve substantial and final completion in accordance with the Agreement and Section 01700.

B. Liquidated Damages

1. If the project remains incomplete after the established time of completion, the liquidated damages sustained by the Owner shall be as stated in the Agreement.

C. Equipment Warranty

1. Equipment shall be warranted for a period of one (1) year from the date of substantial completion unless otherwise noted in the Specifications.

1.16 AS-BUILT PLANS

A. Survey shall be completed by a professional surveyor licensed in the state of South Carolina.

B. Surveyor shall consult Greenville Water for detailed instructions prior to beginning the work.

C. Surveyor is required to use Greenville Water's GPS Data Dictionary to properly record data for each surveyed component of the water system.

D. Contractor shall process survey data and provide the As-Built Plans to the Engineer in CAD format (.dwg file). The CAD file shall include GPS points grouped into appropriate layers. The As-Built Plans shall include all information listed below for each item, clearly identified:

1. Water Mains
    a. Installation Date
    b. Diameter
    c. Material
    d. Manufacturer
2. Valves
    a. Installation Date
    b. Diameter
    c. Type
    d. Open Direction
    e. Restrained
3. Hydrants
    a. Installation Date
    b. Year of Manufacture
    c. Barrell Size
    d. Open Direction
    e. Make
    f. Model
    g. Lead
    h. Valved

1.17 SPECIAL PROVISIONS

The following special conditions apply to all work under this contract.

A. Historical Preservation

If, during the execution of the processed work, historical and archaeological artifacts are uncovered, the Contractor shall immediately notify the Engineer. Any artifacts recovered during construction shall be saved for examination and ultimate disposition by the State Historic Preservation Officer.

B. Chemicals

All chemicals used during project construction, or furnished for project operation, whether herbicide, pesticide, disinfectant, polymers, reactant, or of any other classification must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instruction.

C. Utilities

Telephone lines, power lines, cable, and pipelines could be encountered and should be anticipated along roadways and rights-of-way. The Contractor shall contact the representatives of all utilities around the construction sites to determine the exact locations of all existing underground utility lines, cables, pipelines, and aboveground facilities, ensuring that each utility is physically marked prior to excavation in a particular area. The Contractor shall make every effort to avoid damage to the public utility lines, cables, and facilities. Careful exploratory machine excavation with manual assistance will be expected to avoid damage to existing utility lines, pipelines, and facilities. The Owner does not guarantee that all existing buildings, structures, fences, pipelines, electrical lines, conduit, telephone, cables, service connections, or other facilities are shown on the Plans. It will be the Contractor's responsibility to locate and protect all existing facilities.

D. Drug Free Workplace Act of 1988

Any Contractor entering into a contract amounting to more than $25,000.00 is required to maintain a drug-free workplace. Drug-free workplace means the site where the work under construction is done. To comply, the Contractor must certify that he will provide a drug-free workplace. A Contractor notified of drug convictions must either take appropriate action against the employee, up to and including discharge, or may require that the employee participate in a drug-abuse program. A Contractor faces termination of this contract-agreement, suspension of payment or debarment if found in non-compliance of this Act. Certification of a drug-free workplace shall require the following:

1. The posting and supplying of printed copies of a statement informing all employees engaged in work under this contract that drug use or distribution is prohibited and will subject the employee to specific sanctions.

2. Establishment of a drug-free awareness program to inform employees of drug abuse dangers.

3. Contractor must require employees engaging in work under this contract to follow the statement in #1 above, and to notify the Contractor of any drug convictions occurring in the workplace within five (5) days of conviction.

1.18 CONFLICTING CONDITIONS

A. In case of conflict or inconsistency between any provisions or conditions of the Contract Documents, the more stringent requirements will prevail unless otherwise determined by the Engineer.

1.19 AMERICAN MADE PRODUCTS

A. In accordance with Public Law, the Contractor is encouraged to purchase and use American made products.

1.20 ENVIRONMENTAL REQUIREMENTS

The following lists of actions are required for successful completion of the project and must be adhered to during project design and construction.

A. Floodplains

Finished grade contours shall be returned to pre-construction contours.

B. Wetlands

Silt fencing and BMPs shall be used to protect off-site wetland areas.

C. Cultural Resources

If any items of archeological significance are discovered before or during the project, construction will be stopped and the State Historic Preservation Office, Tribal Historic Preservation Office, the Owner's Agent, and the Owner must be contacted. Work shall not resume until all parties have given their concurrence.

D. Water Quality Issues & Coastal Resources

BMPs shall be used to retain runoff and protect other areas from possible contamination.

E. Miscellaneous Issues (Air Quality, Transportation, and Noise)

Contractor shall wet down the construction sites during dry periods. The contractor shall maintain the construction sites in accordance with SCDOT standards to protect pedestrians, motorists, and workers. Noise will be mitigated by restricting construction hours to 7:00 am to 7:00 pm, Monday through Friday.

The project as proposed has been evaluated to be consistent with all applicable environmental requirements. If the project or any project element deviates from or is modified from the original approved project, additional environmental review may be required.

PART II. PRODUCTS

Not used

PART III. EXECUTION

Not used

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART I. GENERAL

1.1 SECTION INCLUDES

This section describes the measurement and payment for work to be done under the items listed in the bid.

The price bid in each instance shall constitute full compensation for furnishing, hauling, and installing complete all materials; for clearing, excavation, dewatering, dredging, and all necessary sheeting and bracing; for gravel and earth backfill and compaction; for diversion of stream or sewage flows; for removing and replacing curbs, gutters, sidewalks, property corners, signs, fences, lawns, waterlines, drain lines, and structures; for maintenance of drives and streets, protection of power and communication lines; for providing all barricades, lighting, and flagmen as required for the protection of the public; for all required insurance, taxes, utilities, supplies, services and transportation; for layout and control of the work, cleanup and grassing; and for the furnishing of all equipment, tools, labor and incidentals, and the performance of all work to complete each item in full accordance with the Contract Drawings and Specifications.

1.2 MEASUREMENT AND PAYMENT

Items of work will be paid for as listed in the bid and as described herein. Each unit price or lump sum amount shall include all labor, materials, tools, equipment, transportation, removal, overhead, profit, insurance, taxes, and all other costs necessary to complete the work in accordance with the contract documents. No additional compensation will be considered, except for extensions of unit price quantities beyond those shown in the bid or for work classified as extra work or changes.

A. Base Bid

1. Mobilization will be paid for as a lump sum price (not to exceed 3% of Total Bid Price) which shall include all costs to complete the work.

2. DIP Water Main will be paid for at the unit price per linear foot for each type and size measured overall on direct lines between centers of fittings, connections, and ends, which includes but is not limited to all costs of pipe, clearing, grubbing, unclassified excavation, dewatering, sheeting, handling, placing, hauling, installing, pressure and leakage testing, backfilling, compaction testing, cleanup, and all associated cost, complete. All measurements shall be taken as the horizontal distance between fittings or other connections. Water main in encasements shall be included in price of either a bore and jack, directional bore, or an encasement installed in open cut. Ductile iron pipe fittings (including joint restraints) shall be paid for as a separate line item.

3. DIP Water Main RJ Bore and Jack in Steel Encasement will be paid for at the unit price per linear foot for each type and size measured horizontally from ends of the flexible restrained joint DIP which includes but is not limited to all costs of setup, unclassified excavation, backfill, dewatering, sheeting, handling, placing, hauling, installing, boring and jacking (see Bore and Drill Through Rock), carrier pipe and accessories, encasement pipe, connections, testing, cleanup and restoration, and joint restraints, complete. DIP pipe with flexible restrained joints shall be TR FLEX® by US Pipe or approved equal.

4. Rock Excavation shall be paid for as an extra in addition to payment for pipe provided for elsewhere in the Specifications on a cubic yard basis. Payment will be made for the measured quantity of rock excavated. The maximum allowable volume of rock excavation for payment shall be based on a trench width equal to the outside diameter of the pipe barrel plus 18 inches, but not less than 36 inches, and depth of rock on the pipe centerline, from the top of the rock to the bottom of the rock or the specified bottom of the trench, whichever has the higher elevation. The Engineer must be given reasonable notice to measure all rock. No allowance shall be made for excavating to extra widths for construction of manholes or other appurtenances, for excavating to sloping sides, or for excavations made necessary by the physical limitations of the Contractor's equipment. Cost of such additional rock excavation shall be included in the unit price bid for the item to which it pertains. Payment for blasting monitoring shall be included in the unit price for rock excavation.

5. Connection to Existing System will be paid for as a per unit price for each connection to an existing system such as a manhole or existing piping. The price shall include all work required for a satisfactory connection, including the relocation of existing air release valve assemblies and boss taps. Coatings or other special items will be paid for under other items if items are designated in the bid form. Otherwise, include all costs in the connection item, complete.

6. Ductile Iron Fittings will be paid for at the unit price per pound of fittings based upon the installed and verified quantities. The weight for Ductile Iron Fittings listed on the Bid Form does **NOT** include weight of restrained joints. The cost of all required restrained joints shall be included in the cost of Ductile Iron Fittings. See Sheet C861 in the Contract Drawings for restrained joint detail.

7. Gate Valve w/ Joint Restraint in Valve Box will be paid for at the unit price to complete installation of each size valve w/ required joint restraint installed in properly sized valve box. The price shall include but is not limited to all costs of excavation and backfill, dewatering, installation, materials and structure, bedding, steps, line connections and incidentals, complete.

8. Butterfly Valve w/ Joint Restraint in Utility Vault will be paid for at the unit price to complete installation of each size valve w/ required joint restraint installed in properly sized valve box as shown on the Contract Drawings. The price shall include but is not limited to all costs of excavation and backfill, dewatering, installation, materials and structure, bedding, steps, line connections and incidentals, complete.

9. Pipe Concrete Arch Encasement will be paid for at the unit price to complete installation of each of the pipe concrete arch encasements. The price shall include but is not limited to all costs of excavation and backfill, dewatering, installation, materials and structure, bedding, steps, and incidentals, complete.

10. Air Release Valve Assembly will be paid for at the unit price to complete installation of each of the specified air release valve assemblies. The price shall include but is not limited to all costs of fittings, pipe, taps, excavation and backfill, dewatering, installation, materials and structure, bedding, steps, line connections and incidentals, complete.

11. Blow Off Valve Assembly will be paid for at the unit price to complete installation of each of the specified blow off valve assemblies. The price shall include but is not limited to all costs of fittings, pipe, taps, excavation and backfill, dewatering, installation, materials and structure, bedding, steps, line connections and incidentals, complete. The cost of this item includes all required pipe, fittings, and other materials placed beyond the connecting tee on water main (including pipe cap but not including the tee installed on water main). The tee installed on water main is included under Ductile Iron Fittings.

12. Fire Hydrant Assembly will be paid for at the unit price to complete installation of the specified fire hydrant assemblies for each size of water main. The price shall include but is not limited to all costs of fittings, pipe, excavation and backfill, dewatering, installation, materials and structure, bedding, steps, line connections and incidentals, complete. This item includes all required materials and fittings placed beyond the connecting tee on water main (not including the tee installed on water main). The cost of tee installed on water main is included in Ductile Iron Fittings.

13. Cut and Replace Asphalt Roadway (County & SCDOT) will be paid for at the unit price per linear foot of cut and repair work associated with water main trenching across paved roadways (including aprons) and shall include neatly saw cutting all pavements to be patched, and all satisfactory backfill including either select fill materials placed in lifts and compacted in accordance with SCDOT requirements or using flowable fill as Contract Drawings allow, complete. Except in cases where the entire roadway travel lane is being milled and resurfaced, costs of saw cutting and replacing the surface course of the roadway shall be included. Width of saw cuts shall comply with detail shown in Contract Drawings. Cutting, replacing, and/or resurfacing of roadways not indicated on Contract Drawings or required due to pipe installation which is not under the asphalt shall be included in the per linear foot price of DIP Water Main.

14. Mill 2” and Resurface Asphalt Roadway will be paid for at the unit price per square yard of milled travel lane as measured in place. The length of travel lane to be resurfaced shall extend, at each end, 10 feet beyond where the installed pipe crosses the edge of pavement. Cost for this item shall include all work to mill asphalt to a depth of 2 inches and resurface the entire width of the disturbed travel lane. Resurfacing shall be accomplished by methods indicated on the Contract Drawings, complete.

15. Cut and Replace Asphalt Driveway will be paid for at the unit price per linear foot of cut and repair work associated with water main trenching across paved driveways (including aprons) which shall include neatly saw cutting all pavements to be patched, and all satisfactory backfill including either select fill materials placed in lifts and compacted in accordance with SCDOT requirements or using flowable fill as Contract Drawings allow, complete. Cost of milling and resurfacing are not included (see Mill 1.5” Asphalt Driveway and Resurface Asphalt Driveway Width of saw cuts shall comply with detail shown in Contract Drawings. Cutting, replacing, and/or resurfacing of asphalt driveways/parking lots not indicated on Contract Drawings or required due to pipe installation which is not under the asphalt shall be included in the per linear foot price of DIP Water Main.

16. Mill 1.5” Asphalt Driveway will be paid for at the unit price per square yard of milled driveway as measured in place. Cost for this item shall include all work to mill asphalt to a depth of 1.5 inches as indicated on Contract Drawings. The extent of milled area may be increased only as necessary to provide a smooth transition

between driveway and roadway. Asphalt resurfacing is not included (see Resurface Asphalt Driveway).

17. Resurface Asphalt Driveway will be paid for at the unit price per square yard of resurfaced driveway as measured in place. Cost for this item shall include all work to resurface the entire width of driveway, from the right-of-way to the edge of roadway (including any sawcut areas and milled areas), unless specified otherwise on the Contract Drawings. Contractor shall take care to provide a smooth transition between driveway and roadway. Resurfacing shall be accomplished by methods indicated on the Contract Drawings, complete.

18. Cut and Replace Concrete Driveway will be paid for at the unit price per linear foot as measured in place. Cost for this item shall include all work to provide a satisfactory patch for concrete driveways (including any aprons) cut during the pipe installation and shall include suitable compacted backfill, base, or other materials as detailed, concrete patching, and resurfacing of the driveway as indicated on the Contract Drawings, complete. Concrete shall be cut and replaced to nearest existing joint. At a minimum, sawcut width shall be 7 feet. Cutting, replacing, and/or resurfacing of concrete driveways/parking lots not indicated on Contract Drawings or required due to pipe installation which is not under the concrete shall be included in the per linear foot price of DIP Water Main.

19. Cut and Replace Concrete Curb and Gutter will be paid for at the unit price per linear foot (measured parallel to EOP) of furnished and installed concrete with joints and finishing, complete. Concrete shall be cut and replaced to the nearest existing joint. Cutting and/or replacing of concrete gutters not indicated on Contract Drawings or required due to pipe installation shall be included in the per linear foot price of DIP Water Main.

20. Seeding and Grassing will be paid for as a lump sum price which shall include all costs to complete the work.

21. Sediment and Erosion Control for water main installation will be paid for as a lump sum price which shall include all costs to furnish and install temporary and permanent measures needed to control erosion. This item includes but is not limited to all silt fences, sediment tubes, inlet protection, construction entrances, temporary and permanent grassing, complete.

22. Traffic Control will be paid for as a lump sum price which shall include all costs to complete the work.

23. As-Built Survey and Plans will be paid for as a lump sum price which shall include all costs to complete the work as specified in Section 1000. Survey shall be completed by a professional surveyor licensed in the state of South Carolina.

24. No separate cost item for mobilization will be allowed. Cost of project signs shall be included in the unit or lump sum item pricing for each division or contract.

B. Adder Items

1. Steel Encasement Bore and Drill Through Rock shall be paid for as an extra in addition to payment for DIP Water Main with RJ Bore & Jack in Steel Encasement and shall be measured by linear foot of pipe that requires boring and drilling through rock. Item shall include all costs of additional work associated with boring and drilling through rock that is not already included in DIP Water Main Bore and Jack in Steel Encasement. Unit price shall account for costs associated with all sizes of bores for which Contractor must bore and drill through rock.

PART II. PRODUCTS

Not used

PART III. EXECUTION

Not used

END OF SECTION

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SECTION 01039

COORDINATION AND MEETINGS

PART I. GENERAL

1.1 SECTION INCLUDES

A. Coordination

B. Field engineering

C. Preconstruction meeting

D. Site mobilization meeting

E. Progress meetings

F. Preinstallation meetings

G. Preparation

H. Field verifications

1.2 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on the Plans. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and cleanup of work of separate sections in preparation for substantial completion and for portions of work designated for Owner's partial occupancy.

F. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Not used

1.4 FIELD ENGINEERING

A. Employ a Land Surveyor registered in the State of South Carolina and acceptable to Owner's Representative.

B. Contractor shall locate and protect survey control and reference points.

C. The control datum for survey is shown on the Plans.

D. Verify setbacks and easements, and confirm dimensions and elevations listed in the Plans.

E. Provide field engineering services. Layout buildings, structures, and the site, and establish elevations, lines, and levels, utilizing recognized engineering survey practices.

F. Submit a copy of registered site drawing and certificate signed by the Land Surveyor that the elevations and locations of the completed work are in conformance with the Contract Documents.

1.5 PRE-CONSTRUCTION MEETING

A. Owner's Representative will schedule a meeting after the Notice to Proceed is issued.

B. Attendance Required: Owner, Owner's Representative, and Contractor.

C. Agenda

1. Distribution of Owner-Contractor Agreement

2. Submission of executed bonds and insurance certificates

3. Distribution of the Contract Documents

4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule

5. Designation of personnel representing the parties in the Contract, and the Owner's Representative

6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, change orders, and contract closeout procedures

7. Scheduling

8. Use of premises by Owner and Contractor

9. Owner's requirements and partial occupancy

10. Construction facilities and controls provided by Owner

11. Temporary utilities provided by Owner

12. Survey and building layout

13. Security and housekeeping procedures

14. Procedures for testing

15. Procedures for maintaining record documents

16. Requirements for start-up of equipment

17. Inspection and acceptance of equipment put into service during construction period

D. The Owner's Representative will record minutes and distribute copies to participants within five (5) days after the meeting.

1.6 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the work at maximum monthly intervals.

B. Owner's Representative will arrange meetings, prepare agenda with copies for participants, and preside at meetings.

C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Owner's Representative, as appropriate to agenda topics for each meeting.

D. Agenda

1. Review minutes of previous meetings

2. Review of work progress

3. Field observations, problems, and decisions

4. Identification of problems, which impede planned progress

5. Review of submittals schedule and status of submittals

6. Review of off-site fabrication and delivery schedules

7. Maintenance of progress schedule

8. Corrective measures to regain projected schedules

9. Planned progress during succeeding work period

10. Coordination of projected progress

11. Maintenance of quality and work standards

12. Effect of proposed changes on progress schedule and coordination

13. Other business relating to work

E. The Owner's Representative will record minutes and distribute copies within five (5) days after meeting to participants.

1.7 PREINSTALLATION MEETING

A. When required in individual specification sections, convene a pre-installation meeting at work site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify the Owner, Owner's Representative, and affected parties and schedule meeting during regularly scheduled Owner's Representative's site visits.

D. Prepare agenda and preside at meeting:

1. Review conditions of installation, preparation, and installation procedures.

2. Review coordination with related work.

E. The Owner's Representative will record minutes and distribute copies within five (5) days after meeting to participants.

1.8 SPECIAL INSPECTION PROGRAM

A. Coordinate the work so that a special inspection program conducted by the Owner or Owner's Representatives can be accomplished. Some inspections require the Owner or Owner's Representatives to review items submitted by the Contractor. Make available such items on-site at the Contractor's job office.

PART II. PRODUCTS

Not used

PART III. EXECUTION

3.1 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.2 FIELD VERIFICATIONS

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify that utility services are available, of the correct characteristics, and in the correct location.

END OF SECTION

SECTION 01300

SUBMITTALS

PART I. GENERAL

1.1 GENERAL

Submittals include a submittal register listing all anticipated submittals, shop drawings, product data, and samples as defined in the Contract Documents and include certificates, test data, schedules, and other submitted data required to demonstrate compliance with the contract documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01000 - Special Conditions

1.3 SUBMITTAL DESCRIPTIONS

Submit one (1) high resolution color PDF file for Engineer's review. Provide two (2) hard copies to Owner of all approved submittals at the end of the Project.

A. SD-01, Data

Submittals which provide calculations, descriptions, or other documentation regarding the work.

B. SD-02, Manufacturer's Catalog Data

Data composed of catalog cuts, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents. Reviews and submittals shall be as specified for shop drawings. Clearly mark product data to identify the applicable products or models proposed for use. Clearly identify items where options or modifications are required by the contract documents.

C. SD-03, Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, detail of fabrications, layout of particular elements, connections, and other relational aspects of the work.

1. Shop Drawing

Drawing size shall not exceed twenty-four (24) inches by thirty-six (36) inches. After review, the Engineer will return the electronic drawings with any applicable notations and an appropriate stamp. If corrections are to be made, the original drawings shall be revised and a new electronic drawing submitted, and so repeated until approved. Upon approval, a reproducible marked as such will be returned to the Contractor. A minimum clear space, three and one half (3-1/2) inches high by four and one half (4-1/2) inches long, shall be left on the reproducible print above or to the left of the title block for application of the approval stamp. The Contractor shall be responsible for the prints required for the work, and these prints shall be from the final reproducible bearing the final stamp of the Engineer.

2. Contract Drawings

The Contractor, his subcontractors, and his or their fabricators shall not reproduce the contract drawings and submit these drawings as shop drawings, except in cases specifically approved by the Engineer prior to shop drawing submittal. Without exception, submittals will be returned without action when contract drawings are used for structural steel, steel joists, concrete reinforcement, piping, cabinetwork, acoustical ceilings, and window walls.

D. SD-04, Design Data

Design calculations, mix designs, analyses, or other data, written in nature and pertaining to a part of the work.

E. SD-05, Instructions

Preprinted material describing installation of a product, system, or material, including special notices and Material Safety Data Sheets, if any, concerning impedances, hazards, and safety precautions.

F. SD-06, Schedules

A tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

G. SD-07, Statements

A document, required of the Contractor, or through the Contractor by way of a supplier, installer, manufacturer, or other lower tier contractor, the purpose of which is to further the quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verification of quality, and guaranties and warranties.

H. SD-08, Reports

Reports of inspection and laboratory test, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

I. SD-09, Test Reports

A report signed by an authorized official of a testing laboratory that a material, product, or system identical to the material, product, or system to be provided has been tested in accordance with requirements specified by naming the test method and material. The test report must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test. Testing must have been within three (3) years of the date of award of this Contract.

J. SD-10, Factory Test Reports

A written report which includes the findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for this project before it is shipped to the job site. The report must be signed by an authorized official of a testing laboratory and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material product, or system has passed or failed the test.

K. SD-11, Field Test Reports

A written report which includes the findings of a test made at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation. The report must be signed by an authorized official of a testing laboratory or agency and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test.

L. SD-12, Certificates

Certificates signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or materials meet specified requirements. Submit certificates certifying the method of installation or quality of installation at the completion of the work. The submittal must be dated after the award of this contract, name the project, and list the specific requirements which it is intended to address.

M. SD-13, Records

Documentation to ensure compliance with an administrative requirement, or to establish an administrative mechanism.

N. SD-14, Warranty Forms

Prior to installation, submit warranty forms complete in every respect, except for authorized signature(s) and date of commencement.

O. SD-15, Service and Maintenance Agreements

Prior to installation, submit service and maintenance agreements complete in every respect, except for authorized signature and date of commencement.

P. SD-16, Samples

Prior to installation, submit samples of any paint colors, fence fabric, roofing color or any other material samples to owner or owner’s representative for review and selection.

Q. SD-17, Operation and Maintenance Manuals

Prior to stat-up, provide Operation and Maintenance Manuals for review in accordance with Section 01731 – Operation and Maintenance Data for Public Works Projects.

1.4 SUBMITTAL REGISTER

Within thirty (30) days after Notice to Proceed is issued, submit a complete listing of all anticipated submittals. Partial lists will not be considered. Include description of submittal, type of submittal, detailed specification and drawing references, transmittal numbers, and approximate dates scheduled for submission. Clearly label register with the names of the project and the Contractor, and any other necessary information.

1.5 CONTRACTOR PREPARATION

A. Certification

Contractor submittals shall include the following certification:

"I hereby certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract documents except as otherwise stated."

B. Contractor Review and Coordination

Review and coordinate submittals with other related or affected work before they are submitted for approval. By approving the submittals, the Contractor thereby represents that he has determined and verified applicable field measurements, field construction criteria, materials, catalog numbers and similar data, and has checked and coordinated each shop drawing and sample with the requirements of the work and for conformance with the Contract Documents. Submittals submitted without such certification and coordination will be returned to the Contractor disapproved and will be considered not a formal submission. Delays in construction because of late submission or resubmission of required submittals requested by the Engineer shall be the sole responsibility of the Contractor.

C. Deviations

If a submittal deviates from the drawings and project manual because of standard shop practice, substitutions approved in accordance with the Contract Documents, or any other reason, make mention of such deviation in the letter of transmittal in order that, if applicable, suitable action may be taken for proper adjustment and approval of review may be based on the stated deviation. Otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract Documents and Drawings even though such submittals may have been approved.

D. Assemblies

Where an item is part of an assembly and must be fully coordinated with that assembly, submit the entire assembly together after the Contractor has coordinated the work within the assembly so that proper evaluation of the submittals may be made. Indication that the items have not been coordinated shall show cause for disapproval of the entire group until such coordination has been made. The Engineer’s approval of a separate item shall not indicate approval of an assembly in which the item functions.

E. Extent of Submittals

Submit only those submittals required by the Contract Documents. The Engineer reserves the right to refrain from reviewing other submittals.

1. Do not include items from more than one (1) specification section per submittal.

2. Contractor may require additional documentation from subcontractors or suppliers for his own use and at no additional cost to the Owner. Such documentation shall not be submitted for review without prior written consent from the Engineer.

1.6 FORM OF SUBMITTAL

Submit letter of transmittal with each submission listing the contents of the submission and identifying each item by reference to specification section or drawing. The Engineer will furnish the standard letter of transmittal form. Clearly label shop drawings with the name of the project and other necessary information. Bound product data and other similar material that cannot be so labeled conveniently in suitable covers bearing the identifying data. Distribution of submittals by the Engineer will be as specified in Paragraph "Engineer's Procedures." Additional copies, as required, shall be marked by the Contractor for his use after submittals have been approved.

1.7 RESUBMISSION

Change or correct submittals as required by the Engineer and resubmit until approved. Indicate any changes which have been made other than those requested by the Engineer.

1.8 REIMBURSEMENT FROM CONTRACTOR

The Owner has retained the services of the Engineer for the review of the Contractor's submittals. As part of its Basic Services under the Owner/Engineer Agreement, the Engineer will review a first and second submission of all submittals required by the Contract Documents at no additional cost to the Owner. However, if the Engineer is required to review a third or later submission of any submittal due to no fault of the Engineer, is required to review more than the number of submittal copies specified in paragraph "Form of Submittal" or review submittals in addition to those required by the Contract Documents for the benefit of the Contractor or any Subcontractor or Supplier, or is required to review submittals for Contractor proposed substitutions for previously approved items, the Contractor shall reimburse the Owner in accordance with the General Conditions.

1.9 ENGINEER'S PROCEDURES

A. Engineer Review

Submittals will be reviewed with reasonable promptness. Submittals will be stamped by the Engineer with one of the following actions:

1. "Approved" indicates approval with no exception taken and the ordering or fabrication of work shown may proceed. However, the Owner's Representative's approval of any submittal shall not relieve the Contractor from the responsibility of complying with all requirements of this contract, including the obligation to provide submittals that are accurate and complete. The Owner assumes no responsibility for figured dimensions on shop drawings.

2. "Approved as Noted" indicates approval subject to the noted corrections. Ordering or fabrication of work shown may proceed on the basis of corrections indicated.

3. "Correct and Resubmit" indicates that additional information or changes (as noted) are required prior to taking further action. Corrections shall be made to the submittal and it shall be resubmitted. Ordering or fabrication of work shall not proceed.

4. "Disapproved/Rejected" indicates information provided reveals that submittal does not conform to the contract requirements. Submittal conforming to the contract requirements shall be submitted for approval.

5. "No Action Taken" indicates one of the following:

   a. Submittal incomplete -- Engineer cannot properly review

   b. Insufficient copies submitted

   c. Transmittal form incomplete

   d. Contractor's certificate approving submittal not signed or missing

   e. Other causes or reasons as noted

1.10 DISTRIBUTION OF SUBMITTALS

Approved shop drawings, product data, manufacturer's literature, certificates will be distributed by the Engineer as follows:

A. Reproducible shop drawing and one (1) copy of product data and manufacturer's literature in electronic PDF format to the Contractor.

B. One (1) electronic PDF copy of all submittals to the Owner's project representative.

C. One (1) electronic PDF copy of all submittals to the Owner. Contractor shall provide two (2) hard copies of all approved submittals at the end of the project.

D. One (1) electronic PDF copy of all submittals will be retained by the Engineer.

1.11 CHANGES AFTER APPROVAL

Make no change in submittal marked "Approved" or "Approved as Noted" without obtaining the prior written consent of the Engineer. If such written consent is obtained, revise the submittal to show fully the altered parts of the work and resubmit according to the procedures specified herein. State on resubmittal that the work shown supersedes and voids identified parts of the same work previously shown. Give full identification on the drawings previously approved by the Engineer and the date of such action.

1.12 PROCEEDING WITHOUT APPROVAL

No submittal may be used in the shop or on the work, except in accordance with the foregoing paragraphs. Proceeding with any construction and ordering or fabricating materials before all relevant drawings have been "Approved" or "Approved as Noted" shall be done at the Contractor's sole risk.

PART II. PRODUCTS

Not used

PART III. EXECUTION

Not used

END OF SECTION

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SECTION 01300

SUBMITTALS

PART I. GENERAL

1.1 GENERAL

Submittals include a submittal register listing all anticipated submittals, shop drawings, product data, and samples as defined in the Contract Documents and include certificates, test data, schedules, and other submitted data required to demonstrate compliance with the contract documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01000 - Special Conditions

1.3 SUBMITTAL DESCRIPTIONS

Submit one (1) high resolution color PDF file for Engineer's review. Provide two (2) hard copies to Owner of all approved submittals at the end of the Project.

A. SD-01, Data

Submittals which provide calculations, descriptions, or other documentation regarding the work.

B. SD-02, Manufacturer's Catalog Data

Data composed of catalog cuts, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents. Reviews and submittals shall be as specified for shop drawings. Clearly mark product data to identify the applicable products or models proposed for use. Clearly identify items where options or modifications are required by the contract documents.

C. SD-03, Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, detail of fabrications, layout of particular elements, connections, and other relational aspects of the work.

1. Shop Drawing

Drawing size shall not exceed twenty-four (24) inches by thirty-six (36) inches. After review, the Engineer will return the electronic drawings with any applicable notations and an appropriate stamp. If corrections are to be made, the original drawings shall be revised and a new electronic drawing submitted, and so repeated until approved. Upon approval, a reproducible marked as such will be returned to the Contractor. A minimum clear space, three and one half (3-1/2) inches high by four and one half (4-1/2) inches long, shall be left on the reproducible print above or to the left of the title block for application of the approval stamp. The Contractor shall be responsible for the prints required for the work, and these prints shall be from the final reproducible bearing the final stamp of the Engineer.

2. Contract Drawings

The Contractor, his subcontractors, and his or their fabricators shall not reproduce the contract drawings and submit these drawings as shop drawings, except in cases specifically approved by the Engineer prior to shop drawing submittal. Without exception, submittals will be returned without action when contract drawings are used for structural steel, steel joists, concrete reinforcement, piping, cabinetwork, acoustical ceilings, and window walls.

D. SD-04, Design Data

Design calculations, mix designs, analyses, or other data, written in nature and pertaining to a part of the work.

E. SD-05, Instructions

Preprinted material describing installation of a product, system, or material, including special notices and Material Safety Data Sheets, if any, concerning impedances, hazards, and safety precautions.

F. SD-06, Schedules

A tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

G. SD-07, Statements

A document, required of the Contractor, or through the Contractor by way of a supplier, installer, manufacturer, or other lower tier contractor, the purpose of which is to further the quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verification of quality, and guaranties and warranties.

H. SD-08, Reports

Reports of inspection and laboratory test, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

I. SD-09, Test Reports

A report signed by an authorized official of a testing laboratory that a material, product, or system identical to the material, product, or system to be provided has been tested in accordance with requirements specified by naming the test method and material. The test report must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test. Testing must have been within three (3) years of the date of award of this Contract.

J. SD-10, Factory Test Reports

A written report which includes the findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for this project before it is shipped to the job site. The report must be signed by an authorized official of a testing laboratory and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material product, or system has passed or failed the test.

K. SD-11, Field Test Reports

A written report which includes the findings of a test made at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation. The report must be signed by an authorized official of a testing laboratory or agency and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test.

L. SD-12, Certificates

Certificates signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or materials meet specified requirements. Submit certificates certifying the method of installation or quality of installation at the completion of the work. The submittal must be dated after the award of this contract, name the project, and list the specific requirements which it is intended to address.

M. SD-13, Records

Documentation to ensure compliance with an administrative requirement, or to establish an administrative mechanism.

N. SD-14, Warranty Forms

Prior to installation, submit warranty forms complete in every respect, except for authorized signature(s) and date of commencement.

O. SD-15, Service and Maintenance Agreements

Prior to installation, submit service and maintenance agreements complete in every respect, except for authorized signature and date of commencement.

P. SD-16, Samples

Prior to installation, submit samples of any paint colors, fence fabric, roofing color or any other material samples to owner or owner’s representative for review and selection.

Q. SD-17, Operation and Maintenance Manuals

Prior to stat-up, provide Operation and Maintenance Manuals for review in accordance with Section 01731 – Operation and Maintenance Data for Public Works Projects.

1.4 SUBMITTAL REGISTER

Within thirty (30) days after Notice to Proceed is issued, submit a complete listing of all anticipated submittals. Partial lists will not be considered. Include description of submittal, type of submittal, detailed specification and drawing references, transmittal numbers, and approximate dates scheduled for submission. Clearly label register with the names of the project and the Contractor, and any other necessary information.

1.5 CONTRACTOR PREPARATION

A. Certification

Contractor submittals shall include the following certification:

"I hereby certify that the above submitted items have been reviewed in detail and are correct and in strict conformance with the contract documents except as otherwise stated."

B. Contractor Review and Coordination

Review and coordinate submittals with other related or affected work before they are submitted for approval. By approving the submittals, the Contractor thereby represents that he has determined and verified applicable field measurements, field construction criteria, materials, catalog numbers and similar data, and has checked and coordinated each shop drawing and sample with the requirements of the work and for conformance with the Contract Documents. Submittals submitted without such certification and coordination will be returned to the Contractor disapproved and will be considered not a formal submission. Delays in construction because of late submission or resubmission of required submittals requested by the Engineer shall be the sole responsibility of the Contractor.

C. Deviations

If a submittal deviates from the drawings and project manual because of standard shop practice, substitutions approved in accordance with the Contract Documents, or any other reason, make mention of such deviation in the letter of transmittal in order that, if applicable, suitable action may be taken for proper adjustment and approval of review may be based on the stated deviation. Otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract Documents and Drawings even though such submittals may have been approved.

D. Assemblies

Where an item is part of an assembly and must be fully coordinated with that assembly, submit the entire assembly together after the Contractor has coordinated the work within the assembly so that proper evaluation of the submittals may be made. Indication that the items have not been coordinated shall show cause for disapproval of the entire group until such coordination has been made. The Engineer’s approval of a separate item shall not indicate approval of an assembly in which the item functions.

E. Extent of Submittals

Submit only those submittals required by the Contract Documents. The Engineer reserves the right to refrain from reviewing other submittals.

1. Do not include items from more than one (1) specification section per submittal.

2. Contractor may require additional documentation from subcontractors or suppliers for his own use and at no additional cost to the Owner. Such documentation shall not be submitted for review without prior written consent from the Engineer.

1.6 FORM OF SUBMITTAL

Submit letter of transmittal with each submission listing the contents of the submission and identifying each item by reference to specification section or drawing. The Engineer will furnish the standard letter of transmittal form. Clearly label shop drawings with the name of the project and other necessary information. Bound product data and other similar material that cannot be so labeled conveniently in suitable covers bearing the identifying data. Distribution of submittals by the Engineer will be as specified in Paragraph "Engineer's Procedures." Additional copies, as required, shall be marked by the Contractor for his use after submittals have been approved.

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1.9 ENGINEER'S PROCEDURES

A. Engineer Review

Submittals will be reviewed with reasonable promptness. Submittals will be stamped by the Engineer with one of the following actions:

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D. One (1) electronic PDF copy of all submittals will be retained by the Engineer.

1.11 CHANGES AFTER APPROVAL

Make no change in submittal marked "Approved" or "Approved as Noted" without obtaining the prior written consent of the Engineer. If such written consent is obtained, revise the submittal to show fully the altered parts of the work and resubmit according to the procedures specified herein. State on resubmittal that the work shown supersedes and voids identified parts of the same work previously shown. Give full identification on the drawings previously approved by the Engineer and the date of such action.

1.12 PROCEEDING WITHOUT APPROVAL

No submittal may be used in the shop or on the work, except in accordance with the foregoing paragraphs. Proceeding with any construction and ordering or fabricating materials before all relevant drawings have been "Approved" or "Approved as Noted" shall be done at the Contractor's sole risk.

PART II. PRODUCTS

Not used

PART III. EXECUTION

Not used

END OF SECTION

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SECTION 01400

QUALITY CONTROL

PART I. GENERAL

1.1 SECTION INCLUDES

A. Quality assurance - control of installation

B. Tolerances

C. References

D. Testing laboratory services

E. Manufacturers' field services and reports

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 - Submittals

B. Section 01700 - Project Closeout

1.2 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply with manufacturers' instructions, including each step-in sequence.

C. Should manufacturers' instructions conflict with contract documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the work, except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

1.3 TOLERANCES

A. Monitor tolerance control of installed products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with contract documents, request clarification from Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date specified in the individual specification sections, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. The contractual relationship, duties, and responsibilities of the parties in contract nor those of the Engineer shall not be altered from the contract documents by mention or inference otherwise in any reference document.

1.5 TESTING LABORATORY SERVICES

A. Specified laboratory tests of materials and finished articles shall be made by bureaus, laboratories or agencies approved by the Engineer and the certified reports of such tests shall be submitted in triplicate to the Engineer.

B. Cost of laboratory and field testing will be paid by the Contractor. Failure of any material to pass the specified test will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make of that material.

C. Samples of various materials delivered on the site or in place may be taken by the Engineer for testing. However, the cost of retesting caused by deficient materials or workmanship shall be paid for by the Contractor.

D. Samples failing to meet the contract requirements will automatically void previous approvals of the items tested.

1.6 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions; conditions of surfaces and installation; quality of workmanship; start-up of equipment; testing, adjustment and balancing of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations in accordance with Section 01300.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Submit report in within 30 days of observation to Engineer for information in accordance with Section 01300 - Submittals.

PART II. PRODUCTS

Not used

PART III. EXECUTION

Not used

END OF SECTION

SECTION 01300

SUBMITTALS

PART I. GENERAL

1.1 GENERAL

Submittals include a submittal register listing all anticipated submittals, shop drawings, product data, and samples as defined in the Contract Documents and include certificates, test data, schedules, and other submitted data required to demonstrate compliance with the contract documents.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01000 - Special Conditions

1.3 SUBMITTAL DESCRIPTIONS

Submit one (1) high resolution color PDF file for Engineer's review. Provide two (2) hard copies to Owner of all approved submittals at the end of the Project.

A. SD-01, Data

Submittals which provide calculations, descriptions, or other documentation regarding the work.

B. SD-02, Manufacturer's Catalog Data

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C. SD-03, Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, detail of fabrications, layout of particular elements, connections, and other relational aspects of the work.

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D. SD-04, Design Data

Design calculations, mix designs, analyses, or other data, written in nature and pertaining to a part of the work.

E. SD-05, Instructions

Preprinted material describing installation of a product, system, or material, including special notices and Material Safety Data Sheets, if any, concerning impedances, hazards, and safety precautions.

F. SD-06, Schedules

A tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

G. SD-07, Statements

A document, required of the Contractor, or through the Contractor by way of a supplier, installer, manufacturer, or other lower tier contractor, the purpose of which is to further the quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verification of quality, and guaranties and warranties.

H. SD-08, Reports

Reports of inspection and laboratory test, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

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J. SD-10, Factory Test Reports

A written report which includes the findings of a test required to be performed by the Contractor on an actual portion of the work or prototype prepared for this project before it is shipped to the job site. The report must be signed by an authorized official of a testing laboratory and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material product, or system has passed or failed the test.

K. SD-11, Field Test Reports

A written report which includes the findings of a test made at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation. The report must be signed by an authorized official of a testing laboratory or agency and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test.

L. SD-12, Certificates

Certificates signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or materials meet specified requirements. Submit certificates certifying the method of installation or quality of installation at the completion of the work. The submittal must be dated after the award of this contract, name the project, and list the specific requirements which it is intended to address.

M. SD-13, Records

Documentation to ensure compliance with an administrative requirement, or to establish an administrative mechanism.

N. SD-14, Warranty Forms

Prior to installation, submit warranty forms complete in every respect, except for authorized signature(s) and date of commencement.

O. SD-15, Service and Maintenance Agreements

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P. SD-16, Samples

Prior to installation, submit samples of any paint colors, fence fabric, roofing color or any other material samples to owner or owner’s representative for review and selection.

Q. SD-17, Operation and Maintenance Manuals

Prior to stat-up, provide Operation and Maintenance Manuals for review in accordance with Section 01731 – Operation and Maintenance Data for Public Works Projects.

1.4 SUBMITTAL REGISTER

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1.5 CONTRACTOR PREPARATION

A. Certification

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C. Deviations

If a submittal deviates from the drawings and project manual because of standard shop practice, substitutions approved in accordance with the Contract Documents, or any other reason, make mention of such deviation in the letter of transmittal in order that, if applicable, suitable action may be taken for proper adjustment and approval of review may be based on the stated deviation. Otherwise, the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract Documents and Drawings even though such submittals may have been approved.

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A. Engineer Review

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D. One (1) electronic PDF copy of all submittals will be retained by the Engineer.

1.11 CHANGES AFTER APPROVAL

Make no change in submittal marked "Approved" or "Approved as Noted" without obtaining the prior written consent of the Engineer. If such written consent is obtained, revise the submittal to show fully the altered parts of the work and resubmit according to the procedures specified herein. State on resubmittal that the work shown supersedes and voids identified parts of the same work previously shown. Give full identification on the drawings previously approved by the Engineer and the date of such action.

1.12 PROCEEDING WITHOUT APPROVAL

No submittal may be used in the shop or on the work, except in accordance with the foregoing paragraphs. Proceeding with any construction and ordering or fabricating materials before all relevant drawings have been "Approved" or "Approved as Noted" shall be done at the Contractor's sole risk.

PART II. PRODUCTS

Not used

PART III. EXECUTION

Not used

END OF SECTION

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SECTION 01600

MATERIAL AND EQUIPMENT

PART I. GENERAL

1.1 SECTION INCLUDES

A. Products

B. Transportation and handling

C. Storage and protection

1.2 PRODUCTS

A. Do not use materials and equipment removed from existing premises except as specifically permitted by the contract documents.

B. Provide interchangeable components of the same manufacture for components being replaced.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Not used

1.4 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.5 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturers' instructions, with seals and labels intact and legible.

B. Store sensitive products in weather tight, climate-controlled enclosures.

C. For exterior storage of fabricated products, place on sloped supports, above ground.

D. Provide off-site storage and protection when site does not permit on-site storage or protection.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product.

F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

I. Maintain storage area in a neat and clean condition at all times.

PART II. PRODUCTS

Not used

PART III. EXECUTION

Not used

END OF SECTION

SECTION 01700

PROJECT CLOSEOUT

PART I. GENERAL

1.1 DEFINITION

Closeout is hereby defined to include general requirements near the end of contract time, in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner, and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in other sections. Time of closeout is directly related to "Substantial Completion", and, therefore, may be either a single time period for entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. That time variation (if any) shall be applicable to other provisions of this section; regardless of whether resulting from "phased completion" originally specified by the contract documents or subsequently agreed upon by Owner and Contractor.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

1.3 SUBSTANTIAL COMPLETION

A. Request for Inspection

Prior to requesting Engineer's inspection for certification of substantial completion, as required by General complete the following, as appropriate, and list known exceptions, if any, in request:

1. In progress payment request coincident with or following date claimed, show either 100-percent completion for portion of work claimed as "substantially complete," or list incomplete items, value of incompleteness, and reasons for being incomplete.

2. Submit statement showing accounting of changes to the Contract Sum.

3. Submit warranties, workmanship/maintenance bonds, service and maintenance agreements, final certifications, and similar documents.

a. Provide notarized copies.

b. Execute and assemble documents from subcontractors, suppliers, and manufacturers.

c. Provide Table of Contents and assemble in three D side ring binder with durable plastic cover.

d. For items of Work delayed beyond data of substantial completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.

4. Obtain and submit releases enabling Owner's full and unrestricted use of the work and access to services and utilities, including (where required) occupancy permits, operating certificates, and similar releases.

5. Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.

6. Submit certifications of compliance for each test and inspection required by all sections of the project manual. The certifications shall be signed by the Contractor and by the parties conducting the test. All electrical, plumbing, heating and other work as applicable shall be inspected by the proper authorities as required by the technical sections of the specifications and all applicable laws, codes and ordinances. Inspection certificates signed by the proper authorities for such work shall be submitted together will all required bonds and guarantees.

7. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.

8. Make final changeover of locks and transmit keys to Owner and advise Owner's personnel to change over the security provisions.

9. Complete start-up testing of systems, air balancing, adjustment and calibration of temperature control system, and instruction of Owner's operating/maintenance personnel. Remove temporary filters and install new filters in all air-handling units.

10. Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.

11. Remove temporary lamps and install new lamps in all fixtures.

12. Touch up and otherwise repair and restore marred exposed finishes.

13. Complete final clean up requirements.

B. Notice of Substantial Completion

After completion of the above-specified items, submit written notice to the Owner and the Engineer that the work, or designated portion thereof, is substantially complete and request an inspection of same. Include a comprehensive list of items to be completed or corrected. Proceed promptly to complete and correct items on the list. Given a minimum of ten (10) days notice to allow the Engineer sufficient time to schedule and coordinate the inspection.

C. Inspection

Upon receipt of the Contractor's request, the Engineer will make an inspection to determine whether the work is substantially complete in accordance with the General Conditions.

D. Restrictions on Number of Inspections

The Engineer will conduct only one Contractor requested inspection to determine substantial completion of the work at no cost to the Contractor. If, after the performance of an initial substantial completion inspection, the Engineer determines that the work is not substantially complete, the Contractor shall reimburse the Owner for the costs of all subsequent inspections in accordance with the General Conditions.

1.4 FINAL ACCEPTANCE

A. Prerequisites for Final Inspection

Prior to requesting Engineer's final inspection for certification of final acceptance and final payment, as required by the General Conditions, complete the following, as appropriate, and list known exceptions, if any, in request:

1. Submit final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Submit certified copy of Engineer's final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, endorsed, and dated by the Engineer.

3. Reclean areas soiled during correction of deficiencies.

4. Submit final meter readings for utilities, measured record of stored fuel, and similar data as of time of substantial completion or when Owner took possession of and responsibility for corresponding elements of the work.

5. Submit consent of surety.

6. Revise and submit evidence of final (continuing) insurance coverage, complying with insurance requirements.

7. Certify equipment and systems have been tested, balanced, and are operational.

B. Requesting Final Inspection

Upon completion of the above prerequisites, submit written notice to the Engineer that the work is complete and ready for final inspection. Give a minimum of ten (10) days notice to allow the Engineer sufficient time to schedule and coordinate the inspection.

C. Final Inspection Procedures

1. The Engineer will conduct the inspection with the Owner and the Contractor in accordance with General Conditions.

2. Should the Engineer feel that the work is complete, the Engineer will prepare a certificate of final acceptance.

3. Should the Engineer consider the work, in any part, to be incomplete or defective, he will notify the Contractor in writing the particulars in which the inspection reveals that the work is incomplete or defective. The contractor shall immediately take all measures necessary to complete the work or remedy such deficiencies. Contractor is liable for subsequent inspections in accordance with the General Conditions.

4. The Engineer will conduct only one Contractor requested inspection to determine final completion of the work at no cost to the Contractor. If, after the performance of an initial final completion inspection, the Engineer determines that the work is not complete, the Contractor shall reimburse the Owner for the costs of all subsequent inspections in accordance with the General Conditions.

D. At Engineer's Concurrence

When the Engineer concurs that the work is complete, the Engineer will prepare a Certificate of Final Completion and submit the Certificate of Final Completion to the Owner.

1.5 FINAL CLEANING

Special cleaning for specific units of work is specified in sections of Divisions 2 through 26. General cleaning during progress of work is specified in the General Conditions. Provide final cleaning of the work consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Comply with manufacturers' instructions for cleaning operations. The following are examples, but not limitations, of cleaning levels required:

A. Remove labels that are not required as permanent labels.

B. Clean both sides of transparent materials, including mirrors and window/door glass, to a polished condition, removing substances, which are noticeable as vision-obscuring materials. Replace broken glass.

C. Clean exposed exterior and interior hard-surfaced finishes, including metals, masonry, stone, concrete, painted surfaces, plastics, tile, wood, special coatings, and similar surfaces, to a dirt-free condition, free of dust, stains, films, and similar noticeable distracting substances. Except as otherwise specified, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.

D. Wipe surfaces of mechanical and electrical equipment clean, including elevator equipment and similar equipment in addition to that specified in Divisions 23 and 26; remove excess lubrication and other substances.

E. Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

F. Clean concrete floors in non-occupied spaces broom clean.

G. Vacuum clean carpeted surfaces and similar soft surfaces.

H. Clean plumbing fixtures to a sanitary condition, free of stains including those resulting from water exposure.

I. Clean light fixtures and lamps to function with full efficiency.

J. Clean project site (yard and grounds), including landscape and development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition; remove stains, petrochemical spills, and other foreign deposits. Rake grounds which are neither planted nor paved, to a smooth, even-textured surface.

1.6 FINAL ADJUSTMENT OF ACCOUNTS

A. Final Statement

Submit a final statement of accounting to Engineer. The statement shall reflect all adjustments to the contract sum including the following:

1. The original contract sum

2. Additions and deductions resulting from:

a. Previous change orders

b. Allowances

c. Unit prices

d. Deductions for uncorrected work

e. Penalties and bonuses

f. Deductions for liquidated damages in accordance with Contract Documents

g. Deductions for additional submittal reviews in accordance with Section 01300 - Submittals.

h. Deductions for reinspection(s) for substantial and final completions in accordance with this Section

i. Deductions for default payments in accordance with General Conditions

j. Deductions for extensive number of claims and the majority of such claims are rejected in accordance with General Conditions

k. Other adjustments

3. Total contract sum, as adjusted

4. Previous payments

5. Sum remaining due

B. Final Change Order

Engineer will prepare a final change order, reflecting approved adjustments to the contract sum not previously made by change orders.

1.7 FINAL APPLICATION FOR PAYMENT

Contractor shall submit the final application for payment in accordance with procedures and requirements stated in the General Conditions.

1.8 WARRANTY

A. Contractor shall warrant the fitness and soundness of all work performed and all materials and equipment installed under the contract for a period of one (1) year after the date of Substantial Completion, or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents. If any Work is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions: (i) correct such defective Work, or, if it has been rejected by Owner, remove it from the site and replace it with Work that is not defective, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or the rejected Work removed and replaced, and all claims, costs, losses, and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

B. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from the date of Substantial Completion established for that particular item of equipment.

C. Where defective Work (and damage to other Work resulting therefrom) has been corrected, removed or replaced under this Section, the correction period hereunder with respect to such Work will be extended for an additional period of one (1) year after such correction or removal and replacement has been satisfactorily completed.

PART II. PRODUCTS

Not used

PART III. EXECUTION

Not used

END OF SECTION

SECTION 02110

SITE CLEARING

PART I. GENERAL

1.1 SECTION INCLUDES

A. Site clearing

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 - Submittals

B. Section 02122 - Tree Protection and Trimming

C. Section 02203 - Erosion Control

D. Greenville Water Construction Specifications for Water Mains

1.4 REFERENCES

Not used

1.5 SUBMITTALS

Submit under provisions of Section 01300 - Submittals.

A. SD-12, Certificates

1. Burning permit

1.6 REGULATORY REQUIREMENTS

A. If burning is permitted obtain necessary permits from local governments having jurisdiction over project site. Submit copy of permit to the Owner’s Representative.

PART II. PRODUCTS

Not used

PART III. EXECUTION

3.1 CLEARING

A. Clear area within limits of work with the minimum width reasonably required for access to work and for construction of the project. The width of clearing shall be held to a minimum and shall be no more than as follows without written consent of the Engineer.

Cut (ft.)	Width (ft.)
0-12	25
12-18	40
Over 18	50

B. Fell and dispose of trees and other vegetation in area.

C. Protect individual trees, groups of trees, and other vegetation adjacent to cleared area, which are not removed, from damage incident to construction operations.

D. Use clearing operations that prevent damage to trees left standing and that provide for safety of employees and others.

E. Remove entirely trees and other vegetation to be removed, including roots and stumps.

3.2 PROTECTION OF PROPERTY, EMPLOYEES, AND GENERAL PUBLIC

A. Provide watchmen, fences, planking, bridges, bracing, sheeting, shoring, lights, barricades, and warning signs as necessary to protect property, adjacent property, employees, and general public, and comply with applicable federal, state, and local regulations.

3.3 EXISTING UTILITIES

A. Existing utilities are in accordance with available records. Drawings may not represent utilities that may be encountered, or exact locations of utilities shown.

B. Before work is started, contact corporations, companies, individuals, and local authorities owning, maintaining, or regulating conduits, wires, and pipes running to or on property to make suitable arrangements for handling and disposal of such lines. Notify Utility Company to mark locations of underground utility lines. Perform investigations including scanning the area electronically to field-locate underground utilities.

3.4 GRUBBING

A. Remove tree stumps and roots larger than two (2) inches in diameter and matted roots.

B. In building and paved areas, excavate stumps, roots, logs and other timber, matted roots, organic material, and debris and remove to a depth not less than 18 inches below any subgrade.

C. Fill depressions made by grubbing with suitable material and compact to make surface conform to original surface of adjacent ground.

3.5 BLASTING

A. Use of explosives will not be permitted unless approved by Engineer.

3.6 DISPOSAL OF MATERIAL

A. Completely remove and dispose of material resulting from clearing as part of the Work. Remove material and dispose of offsite in accordance with applicable laws and regulations including local noise, dust, and erosion control regulations.

B. Perform burning in accordance with federal, state, and local laws and regulations, and control in manner to prevent damage to nearby property. Attend fires until they have burned out or have been extinguished. Refuse from burning operations and material that cannot be burned and is not indicated to be salvaged is property of Contractor. Remove refuse from site in accordance with applicable laws and regulations including local noise, dust, and erosion control regulations.

END OF SECTION

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SECTION 02122

TREE PROTECTION AND TRIMMING

PART I. GENERAL

1.1 SECTION INCLUDES

A. Trimming and protection of trees that are not indicated to be removed but are close to new construction, as herein specified.

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

1.4 REFERENCES

Not Used

1.5 SUBMITTALS

Submit under provisions of Section 01300 - Submittals

A. SD-12, Certification

Submit written certification by a qualified arborist that trees indicated to remain have been protected during the course of construction in accordance with recognized standards and that where damage did occur, trees were promptly and properly treated. Indicate which damaged trees (if any) are incapable of retaining full growth potential and are recommended to be replaced.

1.6 QUALITY ASSURANCE

A. Arborist Qualifications

1. Engage a qualified arborist who has successfully completed tree protection and trimming, to perform the following work:

a. Remove branches from trees that are to remain, if required.

a. Recommend procedures to compensate for loss of roots and perform initial pruning of branches and stimulation of root growth where removed to accommodate new construction.

b. Recommend procedures for excavation and grading work juxtaposed to established plants.

c. Perform tree repair work for damage incurred by new construction.

1.7 PROJECT CONDITIONS

A. General

Provide tree barricades, as detailed, located outside dripline (outer perimeter of branches) to protect trees and other plants that are to remain from damage. These barricades shall be in place prior to the commencement of the clearing operations.

B. Protect Root Systems

Do not store construction materials, debris, or excavated material within dripline of trees to remain. Do not permit vehicles within dripline. Restrict foot traffic to prevent excessive compaction of soil over root systems within dripline.

1.8 TREE PROTECTION

A. General

The intent of this clause is to emphasize the importance of all trees to be saved. All trees to be saved shall be maintained in an undamaged condition. Damage shall be defined as the act of scarring, nailing, cutting, breaking limbs, etc., of any tree or its roots system in such a manner as may cause the tree to be permanently damaged. The Contractor shall be responsible for damage on the part of the operator or operators, whether by method of excavation, use of improper equipment, incompetency of the operator, or failure to properly inform the operator. The Contractor shall remove from the site any trees damaged beyond repair as determined by the Engineer.

B. Damaged Tree Remedies

The Contractor agrees to replace existing trees with new in-kind trees in the event of damage, injury, loss or removal of trees designated to be saved under the provisions of this section.

PART II. PRODUCTS

Not used

PART III. EXECUTION

3.1 GENERAL

A. The Contractor shall be responsible for preventing damage to existing trees designated to remain, and adjacent to, or within, construction area and material and equipment storage areas.

B. Protect tree root systems from damage due to noxious materials caused by run-off or spillage during mixing, placement, or storage of construction materials. Protect root systems from flooding, eroding, or excessive wetting resulting from dewatering operations.

C. Do not allow fire under or adjacent to trees or other plants that are to remain.

D. Remove branches from trees that are to remain, if required to clear new construction.

1. In removing large limbs, the initial cut shall be made on the underside at a safe distance from the trunk or lateral, to prevent ripping of bark.

2. Cut branches and roots, if required, with sharp pruning instruments; do not break or chop.

3. The Contractor shall exercise care to ensure that branches or trimmings do not endanger or cause damage to property when removal occurs. Large branches or limbs that cannot be removed in one piece shall be removed in sections and lowered by ropes. Any damage to property resulting from negligence by the Contractor shall be repaired or replaced without additional compensation. Stubs or improper cuts resulting from former pruning or limbs that have been broken shall be cut off flush in order to promote proper healing.

3.2 EXCAVATION AROUND TREES

A. Excavate within proximity of trees only where indicated. Do not machine excavate within dripline.

B. Where excavating for new construction is required within dripline of trees, hand excavate to minimize damage to root systems. Provide sheeting at excavations if required. Use narrow-tine spading forks and comb soil to expose roots.

C. Relocate roots in backfill areas wherever possible. If large, main lateral roots are encountered, expose beyond excavation limits as required to bend and relocate without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately three (3) inches back from new construction.

D. Do not allow exposed roots to dry out before permanent backfill is placed; provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in moist condition and temporarily support and protect from damage until permanently relocated and covered with earth.

E. Where trenching for utilities is required within dripline, tunnel under or around roots by hand digging. Do not cut main lateral roots or tap roots; cut only smaller roots that interfere with installation of new work. Cut roots with sharp pruning instruments; do not break or chop.

F. Prune branches to balance loss to root system caused by damage or cutting of root system.

3.3 GRADING AND FILLING AROUND TREES

Maintain existing grade within dripline of trees.

A. Lowering Grades

1. Where existing grade is above new finish grade shown around trees, gradually slope grade away from trees as recommended by arborist. Do not reduce grade within dripline.

2. Prune branches to stimulate root growth and to compensate for loss of roots. Provide subsequent maintenance during the Contract period as recommended by arborist. Provide the Owner with typed instructions for recommended long-range maintenance procedures to be followed after completion of construction operations.

3.4 RAISING GRADES

A. Minor Fills

Where existing grade is six (6) inches or less below elevation of finish grade shown, use topsoil fill material specified. Place in single layer and do not compact; hand grade to required finish elevations.

B. Moderate Fills

Where existing grade is more than six (6) inches, but less than twelve (12) inches below finish grade elevation, place a layer of drainage fill on existing grade before placing topsoil. Carefully place against trunk of tree approximately two (2) inches above finish grade elevation and extend not less than eighteen (18) inches from tree trunk on all sides. For balance of area within dripline perimeter, place drainage fill to an elevation six (6) inches below grade and complete fill with a layer of topsoil to finish grade elevation. Do not compact drainage fill or topsoil layers; hand grade to required elevations.

3.5 REPAIR AND REPLACEMENT OF TREES

A. All trees designated to be saved which have been damaged during the construction practices by Contractor shall, upon notification by the Engineer, be inspected and treated by a Tree Surgeon at the Contractor's expense.

B. Repair trees damaged by construction operations. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged trees.

C. Remove and replace dead and damaged trees that the Engineer determines to be incapable of restoration to normal growth pattern.

D. Provide new trees of same size and species as those being replaced.

E. If trees over six (6) inches in caliper measurement (taken twelve (12) inches above grade) are required to be replaced, provide new trees of six (6) inch caliper size and of species selected by the Landscape Architect.

3.6 DISPOSAL

Burning on the Owner's property will be permitted only in designated areas and at times directed by the Owner. The Contractor shall be responsible for contacting the appropriate authorities prior to burning. Attend burning materials until fires have burned out or have been extinguished. Burning shall be in compliance with state and local regulations.

END OF SECTION

SECTION 02203

EROSION CONTROL

PART I. GENERAL

1.1 SECTION INCLUDES

A. Erosion and sediment control measures provided during the entire construction period as specified herein.

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Greenville Water Construction Specifications for Water Mains

1.4 REFERENCES

Publication listed below forms part of section to extent referenced. Publication is referenced in text by basic designation only. Refer to Drawings and the Greenville Water Construction Specifications for Seeding and Grassing. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

A. SCDHEC South Carolina Stormwater Management BMP Handbook

1.5 SUBMITTALS

Submit under provisions of Section 01300 - Submittals

A. SD-12, Certificates

1.6 ENVIRONMENTAL REQUIREMENTS

If required, erosion and sediment control plan and Land Disturbance Permit will be prepared, submitted, and paid for by Owner.

PART II. PRODUCTS

Conform to requirements of Referenced Handbook.

PART III. EXECUTION

3.1 GENERAL

Contractor shall comply with all local, state, and federal laws, ordinances, rules and regulations pertaining to erosion and sediment control, including those promulgated by the State of South Carolina in accordance with the *South Carolina Stormwater Management and Sediment Control*

Handbook for Land Disturbing Activities. Contractor shall indemnify and hold harmless the Owner and Engineer from and against all claims, damages, losses, and expenses resulting from such work.

3.2 EROSION AND SEDIMENT CONTROL MEASURES

A. Contractor shall take all measures to control erosion and sedimentation along pipeline rights-of-way, at the construction site, including borrow and waste areas and temporary access roads, and at off-site areas especially vulnerable to damage from erosion and sedimentation. Work shall be scheduled so that areas subject to erosion are exposed for the shortest possible time. Temporary protection shall be required for exposed or disturbed areas until permanent vegetation is established and shall consist of temporary grass cover (see Greenville Water Construction Specifications for Water Mains), mulch, netting or plastic sheets; except that temporary grass cover shall be provided where specifically noted on the plans. All temporary erosion and sediment control measures shall be removed within 30 days after final site stabilization is achieved or after the temporary measures are no longer required, unless otherwise directed. Trapped sediment remaining in place after removal of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

B. Erosion and sediment control measures shown on the drawings are intended to represent the minimum measures required. Based upon site conditions and construction procedures and methods utilized by the Contractor, additional measures may be required. These shall be provided by the Contractor at no additional expense to the Owner.

C. Temporary protection for storm drainage pipes shall be provided as required for construction. This measure shall generally consist of a temporary sediment trap to catch silt and sediments to prevent off-site sedimentation from occurring. After these measures are installed, they shall be seeded and mulched and maintained until ditches are stabilized. Upon stabilization of upstream channels, the temporary traps are to be removed and the area regraded to the final contours or cross-section. The area shall be reseeded, mulched and maintained until permanent vegetative covering is established.

3.3 EMERGENCY CONDITIONS

If unusually intense storms cause planned control measures to fail, prompt restoration and cleanup of sediment deposits shall be made, including damage to adjacent property. If construction is delayed or shut down, temporary cover of exposed and disturbed areas shall be provided.

3.4 MAINTENANCE

A. All erosion and sediment control practices will be checked for stability and operation following every run-off producing rainfall, but in no case less than once every week. Any needed repairs will be made immediately to maintain all practices as designed.

B. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased, unless activity in that portion of the site will resume within 14 days.

C. Silt/sediment fences, tubes, and protectors will be repaired as necessary to maintain a barrier. Sediment will be removed from behind the fence or protector when it becomes about 0.5 feet deep and/or 1/3 the height of the exposed sediment tube. Removed sediment shall be disposed in a suitable area and stabilized to prevent erosion and sedimentation.

D. All seed areas will be fertilized, reseeded as necessary, and mulched to maintain a vigorous, dense vegetative cover.

E. Additional control devices may be required during construction in order to control erosion and/or off-site sedimentation. All temporary control devices shall be removed once construction is completed and the site is stabilized.

F. If water is encountered while trenching, the water should be filtered to remove any sediments before being pumped back to the creek.

G. Where practicable, trenches should be filled, covered, and temporary seeding applied at the end of each day.

H. Contractor must take necessary action to minimize the tracking of mud onto the paved roadway from construction areas. The contractor shall daily remove mud/soil from pavement, as maybe required.

I. All waters of the state (WoS), including wetlands, are to be flagged or otherwise clearly marked in the field. A double row of silt fence is to be installed in all areas where a 50-foot buffer can not be maintained between the disturbed areas in all WoS. A 10-foot buffer should be maintained between the last row of silt fence and all WoS.

J. Litter, construction debris, oils, fuels, and building products with significant potential for impact (such as stockpiles of freshly treated lumber) and construction chemicals that could be exposed to storm water must be prevented from becoming a pollutant source in storm water discharges.

END OF SECTION

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SECTION 02205

SOIL MATERIALS

PART I. GENERAL

1.1 SECTION INCLUDES

A. Soil classifications

B. Topsoil

C. Rock definition

D. Suitable material

E. Initial backfill material

F. Unsuitable material

G. Stockpiling and stockpile cleanup

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 01400 - Quality Control

C. Greenville Water Construction Specifications for Water Mains

1.4 REFERENCES

Publications listed below form part of section to extent referenced. Publications are referenced in text by basic designation only. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards

A. American Society for Testing Materials (ASTM)

1. ASTM D 1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort

2. ASTM D 2487 Classification of Soils for Engineering Purposes

1.5 SUBMITTALS

Submit under provisions of Section 01300 – Submittals.

A. SD-09, Test Reports

1. Soil materials

a. Materials Source

Submit name of imported materials suppliers. Provide materials from same source throughout the Work. Change of source requires Owner's Representative approval.

1.6 DEFINITIONS

A. Topsoil

Defined as loose loam capable of supporting good growth of grass and free from roots, stones, and other undesirable material.

B. Rock

Defined as a naturally occurring hard inorganic material that is in-situ. Rock may be either of sedimentary, igneous, or metamorphic origin, and is solid, bedded, jointed, or fractured, and cannot be removed without ram hammering or systematic drilling and blasting, and boulder masonry, or concrete, except pavement, exceeding one (1) cubic yard in volume.

C. Suitable Material

Defined as earth free of debris, roots, frozen material, organic matter, slag, cinders, stone, or rock larger in dimension than two (2) inches in diameter, or other harmful matter; and capable of compaction specified.

PART II. PRODUCTS

2.1 ON-SITE SOIL CLASSIFICATIONS

A. Soils and compaction characteristics have been established for selected samples of material at site. Results of tests are included in the geotechnical report(s). Do not take as guarantee that other materials will not be encountered or that proportions of materials will not vary from proportions indicated.

2.2 OFF-SITE SOIL CLASSIFICATIONS

A. Classify soils by test procedures outlined in ASTM D 2487 and by compaction characteristics established in accordance with ASTM D 1557 for off-site fill material to verify its suitability.

2.3 SUITABLE MATERIAL FOR BUILDINGS, STRUCTURES, TRENCHES, AND SUBGRADES

A. Use suitable material for fill and backfill beneath buildings and structures, for backfill adjacent to buildings and structures, for trench backfill and for subgrade preparation that is GW, GP, GM, GC, SW, SP, SM, or SC, CL, or ML as classified by Unified Soil Classification System in accordance with ASTM D 2487. Verify that largest particles in fill and backfill are no greater in dimension than 1/2 thickness of minimum compacted lift thickness required for its intended use. Determine suitability of materials from on-site excavations by soil classification by test procedures outlined in ASTM D 2487, and by compaction characteristics in accordance with ASTM D 1557. Have results of tests approved by Owner's Representative prior to use of material.

2.4 INITIAL BACKFILL MATERIAL

A. Use suitable material free from rocks two (2) inches or larger in dimension or free from rocks of such size as recommended by pipe manufacturer, whichever is smaller.

2.5 SUITABLE MATERIAL FOR GENERAL AND OVERLOT FILL

A. Use suitable material consisting of unclassified material from excavations. Provide additional material necessary to establish indicated grades, as part of lump-sum contract price for work.

B. Provide additional materials necessary to establish indicated grades, paid for in accordance with contract unit price. Do not use material defined hereinbefore as rock or containing rock fragments of such size that it cannot be placed in layers of thickness prescribed without crushing, pulverizing, or breaking down pieces.

2.6 IMPERVIOUS FILL

A. Material that is SC, ML, CL, MH, or CH, as classified by Unified Soil Classification in accordance with ASTM D 2487.

2.7 UNSUITABLE MATERIALS

A. Materials that fail to meet requirements specified hereinbefore for suitable materials and materials which, in opinion of Owner's Representative, contain detrimental quantities of organic material such as leaves, grass, roots, brush, and rubbish. Wet subgrade material meeting other requirements for suitable material is classified as suitable.

PART III. EXECUTION

3.1 STOCKPILING

A. Stockpile materials on site at locations designated by Owner's Representative.

B. Stockpile in sufficient quantities to meet project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

E. Surround base of stockpiled materials with temporary sediment barrier. Do not allow slopes of stockpiled material to exceed material's natural angle of repose and in no event to be steeper than two (2) horizontal to one (1) vertical.

3.2 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free-standing surface water.

3.3 TESTS

A. Compaction tests shall be conducted every 250 lf of water main unless, instructed otherwise by Engineer. Compaction shall be at least 95% under paved surface and at least 90% along ditch sections. Compaction testing shall be performed using Standard Proctor density.

B. Costs of compaction testing shall be paid for by the Contractor and included in the cost per linear feet of pipe installed.

C. Submit certified reports of tests to Owner's Representative. Refer to Section 01400 - Quality Control for payment in connection with costs for sampling and testing.

END OF SECTION

SECTION 02207

AGGREGATE MATERIALS

PART I. GENERAL

1.1 SECTION INCLUDES

A. Pipe bedding material

B. Aggregate subbase material for paving

C. Aggregate base material for paving

D. Select fill material

E. Flowable fill material

F. Porous fill material

G. Source quality control

H. Stockpiling and stockpile cleanup

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 - Submittals

B. Section 01400 - Quality Control

C. Greenville Water Construction Specifications for Water Mains

1.4 REFERENCES

Publications listed below form part of section to extent referenced. Publications are referenced in text by basic designation only. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards

A. American Society for Testing and Materials (ASTM)

1. ASTM C 33 Concrete Aggregates

2. ASTM C 127 Test Method for Specific Gravity and Absorption of Coarse Aggregate

3. ASTM C 128 Test Method for Specific Gravity and Absorption of Fine Aggregate

4. ASTM C 131 Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in Los Angeles Machine

5. ASTM C 136 Test Methods for Sieve Analysis of Fine and Coarse Aggregates

6. ASTM D 448 Sizes of Aggregate for Road and Bridge Construction

7. ASTM D 2940 Graded Aggregate Material for Bases or Subbases for Highways or Airports

8. ASTM D 4318 Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

B. South Carolina Department of Transportation (SCDOT)

1. SCDOT Standard Specifications for Highway Construction

1.5 SUBMITTALS

Submit under provisions of Section 01300 - Submittals.

A. SD-09, Test Reports

1. Aggregate materials

B. SD-12, Certificates

1. Aggregate materials

2. Materials Source

Submit name of imported materials suppliers. Provide materials from same source throughout the Work. Change of source requires Owner's Representative approval.

PART II. PRODUCTS

2.1 MATERIALS

A. Bedding Material for Pipe and Manholes

Use bedding materials of well-graded, hard, durable aggregates, conforming to ASTM C 33 Size 56 or 57 unless otherwise noted.

B. Aggregate Base for Paving

Use material conforming to SCDOT Section 305.

C. Select Fill

Use where indicated or specified select fill defined in ASTM D2940 except use continuously graded aggregate within the following limits:

Percentage by Weight

Sieve Designation	Passing Square-Mesh Sieve
1-1/2 inch	100
1 inch	90-100
3/8 inch	50-85
No. 4	35-65
No. 10	25-50
No. 40	15-30
No. 200	5-10

Gradation is based on aggregates of uniform specific gravity. When aggregates of varying specific gravities are used, percentages passing various sieves are subject to appropriate corrections in accordance with ASTM C 127 and ASTM C 128.

D. Flowable Fill

Excavatable air-entrained as described in SCDOT Supplemental Specifications SC-M-210.

E. Porous Fill

For porous fill use size No. 57 aggregate as defined in ASTM C33.

2.2 SOURCE QUALITY CONTROL

A. Perform tests and analysis of aggregate material in accordance with ASTM C 136.

B. If tests indicate materials do not meet specified requirements, change material and retest.

PART III. EXECUTION

3.1 STOCKPILING

A. Stockpile materials on site at locations designated by the Owner's Representative.

B. Stockpile in sufficient quantities to meet project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials.

E. Surround base of stockpiled material with temporary sediment barrier. Do not allow slopes of stockpiled material to exceed materials natural angle of repose, and in no event to be steeper than two (2) horizontal to one (1) vertical.

3.2 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent freestanding surface water.

B. Leave unused materials in neat, compact stockpile.

C. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent freestanding surface water.

3.3 TESTS

A. Submit certified reports of testing to Owner's Representative. Payment for costs in connection with sampling and testing is specified in Section 01400 - Quality Control.

END OF SECTION

SECTION 02231

AGGREGATE BASE COURSE

PART I. GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 01400 – Quality Control

C. Section 02207 - Aggregate Materials

D. Section 02510 - Asphalt Concrete Pavement

1.4 REFERENCES

Publications listed below form part of section to extent referenced. Publications are referenced in text by basic designation only. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

A. American Society for Testing Materials (ASTM)

1. ASTM D 698 Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort

2. ASTM D 1556 Test Method for Density and Unit Weight of Soil In-Place by the Sand Cone Method

3. ASTM D 1557 Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort

4. ASTM D 2167 Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method

5. ASTM D 6938 Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

B. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO T180 Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and a 18-in. Drop

C. South Carolina Department of Transportation (SCDOT)

1. SCDOT Standard Specifications for Highway Construction

1.5 SUBMITTALS

Submit under provisions of Section 01300 - Submittals.

A. SD-08, Statements

Herbicide

B. SD-12, Field Test Reports

1. Moisture-density

2. Compaction

3. Aggregate materials

4. Tolerances-flatness

PART II. PRODUCTS

2.1 FILL MATERIALS

A. Bedding Material for Pipes and Manholes

As specified in Section 02207 – Aggregate Materials

B. Aggregate Base for Paving

As specified in Section 02207 – Aggregate Materials

C. Select Fill

As specified in Section 02207 – Aggregate Materials

D. Herbicide

EPA Approved

PART III. EXECUTION

3.1 EXAMINATION

A. Verify substrate has been inspected, gradients and elevations are correct and dry.

3.2 AGGREGATE PLACEMENT

A. Spread aggregate over prepared substrate to a total compacted thickness as indicated.

B. Place aggregate in maximum 6-inch layers and compact.

C. Level and contour surfaces to elevations and gradients indicated.

D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

F. Construct aggregate base for pavement in accordance with SCDOT Section 305.

3.3 TOLERANCES

A. Flatness

Maximum variation of 1/4 inch measured with 10-foot straightedge

B. Scheduled Compacted Thickness

Within 1/4 inch

C. Variation from Design Elevation

Within 1/2 inch

3.4 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01400 – Quality Control.

B. Compaction testing in accordance with AASHTO T180.

C. When tests indicate Work does not meet specified requirements, remove Work, replace, and retest.

D. Frequency of Tests

One (1) test per layer per 5000 square foot of base

E. Submit test results

END OF SECTION

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SECTION 02261

RIPRAP

PART I. GENERAL

1.1 SECTION INCLUDES

A. Preventing scour, erosion, or slipping of embankments with protective covering of stone

1. Slopes of embankment

2. Around culvert outlets or inlets

3. Slopes and bottoms of ditches

4. Around foundations

B. Filler Sheer and gravel layer below the riprap

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02207 – Aggregate Materials

1.4 REFERENCES

Publications listed below form part of section to extent referenced. Publications are referenced in text by basic designation only. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

A. American Society for Testing and Materials (ASTM)

1. ASTM C 33 Concrete Aggregates

1.5 SUBMITTALS

Not Used

PART II. PRODUCTS

2.1 MATERIALS

A. Filter Sheet

Polypropylene filter sheet equal to Carthage 6% (C6%) as manufactured by Carthage Mills, Inc.; Cincinnati, Ohio. Provide a filter sheet with an Equivalent Opening Size (EOS) of not less than 70 and not greater than 80.

B. Gravel Sub-Base

Coarse aggregate consisting of gravel, crushed gravel, crushed stone, or a combination thereof; equal in size to Gradation 67, unless otherwise approved by the Engineer.

C. Stone

Sound, dense, durable quarry or field stone free of cracks or iron pyrite intrusions, without other structural defects and of such quality that they will not disintegrate on exposure to water or weathering. Use stone suitable in all respects for the purpose intended. At least 60% of the stone pieces shall weigh more than 60 pounds.

Stone Weight:	Minimum: 25 Pounds Maximum: 150 Pounds W_{50}: 40 Pounds
Stone Size (Except Spalls):	Maximum Dimension: 15 Inches D_{50}: 8 inches

PART III. EXECUTION

3.1 INSPECTION

A. Inspect slopes or ground surface on which riprap is to be placed. Trim the area to the lines and grades indicated on the Drawings or as directed by the Engineers. Properly compact any earth depressions filled while trimming slopes.

3.2 INSTALLATION

A. Filter Sheet

Place filter sheet in a loosely laid condition so that it might conform to the irregularities in the soil when heavier members are placed upon it. Lap adjoining sheets a minimum of 1 foot.

B. Riprap

1. Commence placement of riprap in a trench of sufficient depth to allow the surface of the riprap to be blended into the surface of the surrounding ground.

2. Handle or dump the stone into place to produce a compact, well graded mass with a minimum percentage of voids. Place the material to its full course thickness, measured perpendicular to the slope, in one operation and in such a manner that the slopes will be disturbed as little as possible. Distribute the larger pieces and place the final layer of rock so that there will be no segregated pockets of small pieces or groups of large pieces which would cause large open voids. Rearrange the individual pieces, as required, by mechanical equipment or by hand, to the extent necessary to obtain a reasonably well-graded distribution of sizes as specified. The surface of the completed riprap shall be uniform in appearance, free from humps or depressions.

3. Unless otherwise noted, provide 8-inch minimum thickness, of completed riprap, measured perpendicular to the slope. To ensure that the filter sheet is not ruptured, do not drop any stone more than 3 feet above surface.

END OF SECTION

SECTION 02300

BORING AND TUNNELING

PART I. GENERAL

1.1 SECTION INCLUDES

A. Boring and Tunneling Operations

1. Boring equipment

2. Blasting

3. Encasement Pipe

4. Steel liner plates

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 02222 – Excavating

C. Section 02229 – Rock Removal

D. Section 02667 – Water Lines

1.4 REFERENCES

Publications listed below form part of section to extent referenced. Publications are referenced in text by basic designation only. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

A. American Society for Testing and Materials (ASTM)

1. ASTM A 153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware

2. ASTM A 252 Welded and Seamless Steel Pipe Piles

B. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO M 167M Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches

2. AASHTO M 190 Asphalt-Coated Corrugated Metal Culvert Pipe and Pipe-Arches

C. American Welding Society (AWS)

1. AWS Standards

D. American Railway Engineering Association (AREMA)

1. AREMA Manual for Railway Engineering

1.5 SUBMITTALS

Submit under provisions of Section 01300 - Submittals.

A. SD-03, Drawings

B. SD-07, Statements

C. SD-13, Records

1. Experience record including a list of equipment and personnel to be used, and a list of at least five (5) previous successful similar installations under highways or railroads within the past five (5) years. Failure to submit an experience record or submittal of a record not meeting these requirements will be cause for rejection of the boring and tunneling subcontractor.

1.6 GENERAL REQUIREMENTS

Boring and tunneling operations shall be performed in accordance with all requirements of the state department of transportation or the railroad, as applicable, including insurance, inspection, temporary work, watchmen, flagmen, protection of personnel and property, work restrictions, work scheduling and blasting. Unless otherwise specified or directed, the Contractor shall pay for all costs in connection with meeting these requirements. The Contractor shall be responsible for repair or replacement of all existing structures and facilities, including settlement of roadways, damaged or disturbed as a result of the work, at no additional cost to the Owner and department of transportation or railroad, within a period of one year after completion of boring and tunneling operations. All work shall be completed to the full satisfaction of the department of transportation or railroad.

1.7 BLASTING

A. Department of Transportation

No blasting will be done without prior written approval of the department of transportation. If requested, the Contractor shall furnish the department of transportation with details of the proposed blasting method. Blasting shall comply with all federal, state and local regulations pertaining to the use of explosives.

PART II. MATERIAL

2.1 Carrier Pipe

Carrier pipe shall be as specified in Section 02667 – Water Lines.

2.2 Encasement Pipe

A. Encasement Pipe installed by boring and jacking shall be welded steel pipe with yield strength of 35,000 psi conforming to ASTM A 252, Grade 2, and shall be the size shown on the plans. Pipe shall be bituminous coated on the outside. Minimum wall thickness shall be as follows:

Diameter (in.)	Thickness (in.)	Diameter (in.)	Thickness (in.)
Under 10	0.188	26	0.406
12-14	0.250	28	0.438
16	0.281	30	0.469
18	0.312	32	0.500
20-22	0.344	34-36	0.532
24	0.375	42	0.625
		48	0.688

B. Carrier Pipe Supports Within Steel Casing

1. Shall be heavy-duty two-piece type 304L stainless steel bands of a minimum width of 12 inches with a minimum of four (4) abrasion resistant dielectric runners. All bolts shall be made of 304L stainless steel. The spacer shall serve as a stable, effective skid during installation of the carrier pipe, compressing the collar against the carrier pipe. Casing spacers shall be placed at intervals no greater than 10 feet. Casing spacer shall be as made by Spider or approved equal.

2. Carrier pipe shall be extended beyond the steel casing and sealed on each end with a wrap-around synthetic rubber seal with type 304 stainless steel banding straps. The seal shall be made of 1/8 -inch synthetic rubber with excellent chemical resistant characteristics. The wrap around rubber shall be supplied with two (2) pressure sensitive butyl mastic strips to seal the joint overlap. The casing end seals shall be as manufactured by APS or other engineer approved equal.

2.3 Steel Liner Plate

Steel Liner Plate for tunnels shall be fabricated from structural steel plates of the four-flange type, or the two-flange type with lap seam longitudinal joint, with ultimate tensile strength of 42,000 psi and yield strength of 28,000 psi. Liner plates shall be galvanized in accordance with AASHTO M 167M, and bituminous coated in accordance with AASHTO M 190. Thickness of liner plate shall be not less than 0.105-inch (12 gage).

A. Bolts, nuts, washers, and other accessory hardware shall be hot-dipped galvanized in accordance with ASTM A 153.

B. Grout holes shall be provided in the liner plate at not more than 4 foot-6-inch centers along the tunnel and staggered around the circumference of the liner. Grout holes shall be threaded with cast iron plugs.

PART III. EXECUTION

3.1 General Requirements

Unless otherwise specified or directed, encasement up through 48-inch diameter shall be welded steel pipe installed by boring and jacking, and encasement larger than 48-inch diameter shall be steel liner plate installed by tunneling. No open excavation will be allowed within the limits of the encasement without the Engineer's approval. All sheeting, shoring, and bracing shall be provided as

necessary for the satisfactory and safe performance of the work and will be subject to the approval of the Engineer and in accordance with the requirements of the department of transportation or railroad. All work areas shall be maintained in a suitable dry condition at all times, with methods of dewatering, draining, pumping and disposal of water subject to approval of the Engineer and department of transportation or railroad.

3.2 Boring

A. Encasement pipe shall be installed by boring and jacking with welded joints to the required lines and grades. The Contractor shall bear the cost of any corrective action required to meet the line and grade requirements shown on the plans. Welding shall conform to the requirements of the American Welding Society and the American Railway Engineering Association for this type of work. The distance to which boring is carried ahead of the pipe shall be not more than is absolutely necessary for installation purposes and will be subject to approval of the Engineer. The work shall be performed so that no voids occur in the earth surrounding the pipe and so that ground settlement adjacent to and within the limits of the pipeline crossing is eliminated. If voids occur or are encountered outside the pipe, grout holes shall be drilled at 10-foot centers in the top of the encasement pipe and the voids filled with one (1) to three (3) ratio Portland cement grout applied at sufficient pressure to fill the voids and prevent embankment settlement.

B. If it becomes necessary to abandon an incomplete or unacceptable bore, the abandoned encasement shall be capped and filled completely with one (1) to three (3) ratio Portland cement grout. Abandonment procedures shall be completed prior to moving to another boring location. All costs in connection with an abandoned bore, including the construction cost and capping and filling costs, shall be the Contractor's expense.

END OF SECTION

SECTION 02510

ASPHALT CONCRETE PAVEMENT

PART I. GENERAL

1.1 SECTION INCLUDES

A. Asphalt concrete pavement

B. Asphalt surface treatment

C. Aggregate base

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

B. Selected materials and methods for work in this section are in accordance with applicable provisions of the South Carolina Department of Transportation Road and Bridge Specifications, referred to hereinafter by SCDOT Section. Subsections of specifications describing method of measurement and basis of payment shall not apply to this work. The term "Department" when used in the Road and Bridge Specifications shall be understood to mean the Owner's Representative.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 01400 – Quality Control

C. Section 02205 - Soil Materials

D. Section 02207 - Aggregate Materials

E. Section 02231 – Aggregate Base Course

F. Section 03300 - Cast-in-Place Concrete

1.4 REFERENCES

Publications listed below form part of specification to extent referenced. Publications are referenced in text by basic designation only. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

A. American Society for Testing and Materials (ASTM)

1.	ASTM D 4866	Coal Tar Pitch Emulsion Pavement Sealer Mix Formulation Containing Mineral Aggregates and Optional Polymeric Admixtures
2.	ASTM D 946	Penetration-Graded Asphalt Binder for Use in Pavement Construction

B. American Society of State Highway and Transportation Officials (AASHTO)

1. AASHTO M 213 — Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

C. Federal Highway Administration (FHWA)

1. FHWA Manual — Federal Highway Administration Manual on Uniform Traffic Control Devices for Streets and Highways

D. South Carolina Department of Transportation (SCDOT)

1. SCDOT — Standard Specifications for Highway Construction

1.5 SUBMITTALS

Submit under provisions of Section 01300.

A. SD-04, Design Data

1. Mix Designs

B. SD-11, Field Test Reports

C. SD-12, Certificates

1. Materials

PART II. PRODUCTS

2.1 MATERIALS

A. Hot Mixed Asphalt Pavement

See ASTM D946. In accordance with South Carolina Department of Transportation Standards, Section 401

B. Hot Mixed Asphalt Aggregate Base Course

In accordance with South Carolina Department of Transportation Standards, Section 310.

C. Hot Mixed Asphalt Intermediate Course

In accordance with South Carolina Department of Transportation Standards, Section 402

D. Hot Mixed Asphalt Surface Course

In accordance with South Carolina Department of Transportation Standards, Section 403

E. Mineral Filler

Finely ground particles of limestone, hydrated lime, or other mineral dust, free of foreign matter

F. Prime Coat

Homogeneous, rapid or medium curing, liquid asphalt or anionic emulsified asphalt meeting the requirements of Section 401 of South Carolina Department of Transportation Standards

G. Tack Coat

Emulsified asphalt in accordance with Section 401 of South Carolina Department of Transportation Standards

2.2 ASPHALT PAVING MIX

A. Use dry material to avoid foaming. Mix uniformly.

B. Base Course

Hot Mixed Asphalt Aggregate Base Course in accordance with South Carolina Department of Transportation Standards, Section 310

C. Intermediate (Binder) Course

Hot Mixed Asphalt Intermediate Course in accordance with South Carolina Department of Transportation Standards, Section 402

D. Surface Course

Hot Mixed Asphalt Surface Course in accordance with South Carolina Department of Transportation Standards, Section 403

2.3 SOURCE QUALITY CONTROL AND TESTS

A. Section 01400 - Quality Control: Provide mix design for asphalt.

B. Submit proposed mix design of each class of mix for review prior to beginning of work.

PART III. EXECUTION

3.1 EXAMINATION

A. Verify base conditions.

B. Verify that compacted subgrade and granular base is dry and ready to support paving and imposed loads. Proof rolling may be required at the Engineer's discretion.

C. Verify gradients and elevations of base are correct.

3.2 BASE

A. Section 02231 - Aggregate Base Course forms the base construction for work of this section.

3.3 PREPARATION – PRIME COAT

A. Apply primer on aggregate base or sub-base at a uniform rate in accordance with South Carolina Department of Transportation Standards for the base material being used. Primer shall be sprayed at the proper temperature to satisfy conditions at the time of application.

B. Apply primer to contact surfaces of curbs, gutters, and catch basin throats.

C. Use clean sand to blot excess primer.

3.4 PREPARATION - TACK COAT

A. Apply tack coat on dry (free from moisture) and thoroughly cleaned asphalt or concrete surfaces over subgrade surface at a uniform rate in accordance with South Carolina Department of Transportation Standards for the base material being used. Larger amounts of tack will be required on older and sunbaked pavements to ensure a bond between the surface being paved and the overlaying course.

B. Apply tack coat to contact surfaces of curbs, gutters and catch basin throats.

C. Coat surfaces of manhole and catch basin frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.5 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install Work in accordance with the SCDOT Standard Specifications for Highway Construction (latest edition).

B. Allow sufficient time for primer or tack coat to properly cure, in accordance with manufacturer’s requirements, prior to placing asphalt.

C. Place to specified compacted thickness as shown on the plans.

D. Verify that gutter drainage grilles and frames, manhole frames and other structures that are in the paved area are in the correct position and elevation.

E. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

F. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.6 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Allow sufficient time for primer or tack coat to properly cure, in accordance with manufacturer’s requirements, prior to placing asphalt binder course.

B. Place binder course to the specified compacted thickness as shown on the plans.

C. Place surface course within two (2) hours of placing and compacting binder course.

D. Place surface course to specified compacted thickness as shown on the plans.

E. Verify that gutter drainage grilles and frames, manhole frames, and other structure in the paved area are in the correct position and elevation.

F. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

G. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.7 CURBS

A. Install extruded asphalt curbs of where shown.

B. Concrete curbing and guttering shall be installed to the dimensions and where shown on the plans as specified herein and in accordance with Section 03300 - Cast in Place Concrete. All concrete shall be a minimum compressive strength of 3000 psi after 30 days. Expansion Joints in curbing shall be a pre-form joint filler which shall consist of preformed cane or other fibers of a cellular nature, securely bound together and uniformly saturated with a suitable bituminous binder and shall comply with the requirements of AASHTO M 213.

3.8 SEAL COAT

A. Not required

3.9 PAVEMENT MARKING

A. Apply new painted pavement markings for all parking spaces as shown on the drawings. All paint materials shall conform to the South Carolina Department of Transportation Standards for Pavement Markings.

3.10 TOLERANCES

A. Flatness

Maximum variation of 1/4 inch measured with 10-foot straight edge.

B. Scheduled Compacted Thickness

Within 1/4 inch

C. Variation from True Elevation

Within 1/2 inch as long as all asphalt has positive drainage and no birdbaths or areas holding water exist.

3.11 FIELD QUALITY CONTROL

A. Section 01400 - Quality Control and 01410 - Testing Laboratory Services

Provide field inspection and testing.

3.12 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for three (3) days or until surface temperature is less than 140 degrees F (60 degrees C).

END OF SECTION

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SECTION 02668

FLEXIBLE RESTRAINED JOINT DIP WATER MAIN

PART I. GENERAL

1.1 SECTION INCLUDES

A. Pipe and fittings for water line including domestic water line and fire protection

B. Valves

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 01400 – Quality Control

C. Section 01600 - Materials and Equipment

D. Section 01700 – Project Closeout

E. Section 02207 - Aggregate Materials

F. Section 02310 - Horizontal Directional Drilling (HDD)

G. Section 03300 - Cast-In-Place Concrete

H. Greenville Water Construction Specifications for Water Mains

1.4 REFERENCES

Publications listed below form part of specification to extent referenced. Publications are referenced in text by basic designation only. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

A. American Water Works Association (AWWA)

1. AWWA C 104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings

2. AWWA C 110 Ductile-Iron and Gray-Iron Fittings

3. AWWA C 111 Rubber-Gasket Joints for Ductile Iron and Grey-Iron Pressure Pipe Fittings

4. AWWA C 150 Thickness Design of Ductile-Iron Pipe

5. AWWA C 151 Ductile-Iron Pipe, Centrifugally Cast

6. AWWA C 153 Ductile-Iron Compact Fittings

7. AWWA C 600 Installation of Ductile-Iron Water Mains and Their Appurtenances

B. American National Standards Institute (ANSI)

1. ANSI A 21.4 Cement-Mortar Lining for Ductile Iron Pipe and Fittings

2. ANSI/NSF 61 Drinking Water System Components – Health Effects

C. Factory Mutual (FM)

1. FM approved Factory Mutual Approval Guide

D. Underwriters Laboratory, INC. (UL)

1. UL listed Product Directory

1.5 SUBMITTALS

Submit under provisions of Section 01300 - Submittals.

A. SD-01, Data

1. Pipe materials

2. Pipe fittings

3. Couplings

4. Thrust restraint

5. Accessories

B. SD-06, Instructions

1. Pipe material and joints

C. SD-13, Certificates

1. Certify that products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with utility company standards and municipality standards.

B. Valves

Manufacturer's name, and pressure rating marked on valve body.

1.7 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700 – Project Closeout.

B. Record actual location of piping mains, valves, connections, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600 – Materials and Equipment.

B. Deliver and store valves in shipping containers with labeling in place.

PART II. PRODUCTS

2.1 GENERAL

A. All pipe, fittings, packing, jointing materials, and valves shall conform to Section C of the AWWA Standards.

B. All water mains shall be provided with a minimum thirty-six (36) inches of cover. Where this is not possible, pipe shall be steel, concrete, or ductile iron or other approved material and method approved by DHEC and, when necessary, insulated to prevent freezing.

C. Pipe fittings, solder, or flux used in potable water lines shall be “lead-free”, which is defined as less than two tenths (0.2) percent lead in solder and flux and less than eight (8) percent lead in pipe and fittings. Leaded joints necessary for repair of CIP shall be exempt from this. Asbestos cement pipe cannot be used in potable water systems except in the repair of existing asbestos lines.

D. All materials in contact with potable water shall be third-party-certified as meeting the specifications ANSI/NSF Standard 61. Natural rubber or other materials which will support microbiological growth shall not be used for any gaskets, O-rings and other products used for joining pipes, setting meters or valves or other appurtenances which will expose the material to water. Lubricants that will support microbiological growth shall not be used for slip-on joints. Vegetable shortening shall not be used to lubricate joints.

E. 4" through 12" pipe and fittings shall be listed by Underwriters Laboratories for 350 psi and be approved by Factory Mutual for 250 psi.

F. For sizes 4" through 36" pipe and fittings shall utilize the conventional Tyton Gasket or approved equal.

2.2 PIPE

A. Pipe shall be constructed with ductile iron locking segments, inserted through a slot (or slots) in the bell face, which shall provide a positive axial lock between the bell interior surface and a retainer weldment on the spigot end of the pipe.

B. Pipe shall be provided with standard cement-mortar lining that meets ASTM C150 Type II.

2.3 JOINTS

A. Joints must have a working pressure rating equivalent to the working pressure rating of the parent pipe, with a maximum restrained joint working pressure rating of 350 psi except that 30"–36” have a 100-psi reduction in joint rating for a given parent pipe pressure class e.g. 30”–36” flexible restrained joint shall be rated for a maximum 250 psi with Pressure Class 350 parent pipe. Conversely, a 24” PC 200 pipe shall have a restrained joint rating of 200 psi.

2.4 THRUST RESTRAINT

A. Mechanical joint restraints shall be provided as specified on Sheet C681 of the Plans. Joint restraints shall be MEGALUG® or approved equal.

B. Restraint of field cut pipe shall be provided with TR Flex Gripper Ring, TR Flex Pipe field weldments, or approved equal

C. Restrained push-on joints for pipe and fittings shall be designed for a water working pressure of 350 psi for sizes 4" through 24" and 250 psi for sizes 30" through 36".

PART III. EXECUTION

3.1 EXAMINATION

A. Verify the existing conditions.

3.2 PREPARATION

A. Cleaning

All foreign matter in the socket must be removed, i.e., mud, sand, cinders, gravel, pebbles, trash, frozen material, etc. The gasket seat should be thoroughly inspected to be certain it is clean. Foreign matter in the gasket seat may cause a leak. The gasket must be wiped clean with a clean cloth, flexed, and then placed into the socket with the rounded bulb end entering first.

B. Looping the Gasket

Looping the gasket in the initial insertion will facilitate seating the gasket heel evenly around the retainer seat. 4" through 12" sizes require only one loop. For larger sizes, additional loops may be required: 14" through 36", two to three loops; 42" through 54", four to six loops; 60" and 64", six or more loops. Evenly space the loops around the socket with each loop raised 4–5 inches. After loops are established, push each loop down to finish installation of the gasket.

C. Sub-freezing Weather

When installing pipe in sub-freezing weather, the gaskets, prior to their use, must be kept at a temperature of at least 40°F by suitable means, such as storing in a heated area or keeping them immersed in a tank of warm water. If the gaskets are kept in warm water, they should be dried before placing in the pipe socket.

D. Lubrication

After the gasket has been inserted into the gasket seating area of the socket, a thin film of joint lubricant should be applied to the inside surface of the gasket which will come in contact with the beveled end of the pipe. In warm, dry weather conditions, the lubricant can dry out, especially when applied to warm or hot pipe, it will be necessary to add a small amount of water to hydrate the lubricant. Joint lubricant shall be Tyton Joint Lubricant or approved equal. Clean the spigot end of the pipe back to the assembly stripes. Apply joint lubricant to the cleaned spigot end. Do not allow the lubricated surface to touch the ground or trench sides prior to installation.

3.3 PIPE INSTALLATION

A. Maintain separation of water main from sewer and gas line piping in accordance with local, state, and federal codes.

1. SCDHEC Requirements

Maintain separation of water main from sewer and storm drain piping in accordance with " Ten States Standard " code and the latest approved version of Section R61-58.4D (12) of SCDHEC's State Primary Drinking Water Regulations as duplicated herein.

South Carolina State Primary Drinking Water Regulations - Section R61-58.4D (12)

a. Parallel installation

Water mains shall be laid at least ten (10) feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten-foot separation, the Department may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least eighteen (18) inches above the top of the sewer.

b. Crossings

Water mains crossing sewers shall be laid to provide a minimum vertical separation of eighteen (18) inches between the outside of the water main and the outside of the sewer. This shall be the case whether the water main is either above or below the sewer line. Whenever possible, the water main shall be located above the sewer line. Where a new water main crosses a new sewer line, a full length of pipe shall be used for both the water main and sewer line and the crossing shall be arranged so that the joints of each line will be as far as possible from the point of crossing and each other. Where a new water main crosses an existing sewer line, one full length of water pipe shall be located so both joints will be as far from the sewer line as possible. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer line to prevent damage to the water main.

c. Exception

When it is impossible to obtain the distances specified in a and b above, an alternative design may be allowed. Any alternative design shall:

i. Maximize the distances between the water main and sewer line and the joints of each;

ii. Use materials which meet the requirements SCDHEC Regulation 61-58.4(D)(1) for the sewer line; and,

iii. Allow enough distance to make repairs to one of the lines without damaging the other.

d. Force mains

There shall be at least a ten (10) foot horizontal separation between water mains and sanitary sewer force mains. There shall be an eighteen (18) inch vertical separation at crossing as required in R.61-58.4(D)(12)(a) and (b).

e. Sewer manholes

No water pipe shall pass through or come in contact with any part of a sewer manhole. Water lines may come in contact with storm sewers or catch basins if there is no other practical alternative, provided that ductile iron is used, no joints of the water line are within the storm sewer or catch basin and the joints are located as far as possible from the storm sewer or catch basin.

f. Drain-fields and Spray-fields

Potable water lines shall not be laid less than twenty-five (25) feet horizontally from any portion of a waste-water tile-field or spray- field, or shall be otherwise protected by an acceptable method approved by the Department.

B. Install pipe according to manufacturer's recommendations, unless otherwise noted.

C. Install pipe to indicated elevation to within tolerance of one (1) inch.

D. Install ductile iron piping and fittings to AWWA C 600.

E. Establish elevations of buried piping to ensure not less than three (3) feet of cover.

3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. See Greenville Water Construction Specifications for Water Mains

3.5 FIELD QUALITY CONTROL

A. Perform field-testing under provisions of Section 01400 – Quality Control and according to NFPA 24.

E. Hydrostatically test newly laid pipeline and valved section thereof. See Greenville Water Construction Specifications for Water Mains.

END OF SECTION

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART I. GENERAL

1.1 SECTION INCLUDES

A. All cast-in-place concrete

B. Control, expansion, and contraction joint devices associated with concrete work

1.2 RELATED DOCUMENTS

A. Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 01300 – Submittals

B. Section 01700 – Project Closeout

C. Greenville Water Construction Specifications for Water Mains

1.4 REFERENCES

The publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only. Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards.

A. American Society for Testing and Materials (ASTM)

1.	ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
2.	ASTM A615	Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
3.	ASTM C33	Concrete Aggregates
4.	ASTM C94	Ready-Mixed Concrete
5.	ASTM C131	Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
6.	ASTM C143	Test Method for Slump of Hydraulic-Cement Concrete
7.	ASTM C150	Portland Cement
8.	ASTM C260	Air-Entraining Admixtures for Concrete
9.	ASTM C494	Chemical Admixtures for Concrete

10. ASTM C1107 Packaged Dry, Hydraulic-Cement Grout (Non-shrink)

11. ASTM D1752 Preformed Sponge Rubber, and Cork, and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

B. American Concrete Institute (ACI)

1. ACI 301 Structural Concrete

2. ACI 305R Hot Weather Concreting

3. ACI 306R Cold Weather Concreting

4. ACI 318 Building Code Requirements for Structural Concrete and Commentary

C. American Welding Society (AWS)

1. ANSI/AWS D1.1 Structural Welding Code - Steel

2. ANSI/AWS D1.4 Structural Welding Code - Reinforcing Steel

D. Corps of Engineers (COE)

1. COE CRD-C 513 Rubber Waterstops

2. COE CRD-C 572 Polyvinylchloride Waterstops

E. Federal Specifications (FS)

1. FF-S-325 Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry)

1.5 SUBMITTALS

Submit under provisions of Section 01300.

A. SD-02, Manufacturer's Catalog Data

Submit catalog data, manufacturer's literature, and other data required indicating compliance with the specifications for the following, as required:

1. Admixtures

2. Anchorage items

3. Concrete anchors

4. Bonding agents

5. Curing compounds

6. Premolded expansion-joint filler strips

7. Non-Shrink grout

8. Release agents

9. Waterstops

10. Reinforcement supports

B. SD-03, Drawings

Submit shop drawings as specified in ACI 301. Submit shop drawings showing the location of all proposed construction joints separate from the steel reinforcement shop drawings.

1. Construction joints

2. Steel reinforcement

C. SD-04, Design Data

1. Concrete mix designs

a. Include test results and necessary substantiating data used to establish the mix designs, plus curves plotted to establish water-cement ratio when trial mixtures are used.

D. SD-08, Reports

E. SD-12, Certificates

1. Certificates

Prohibiting the use of calcium chloride or admixtures containing calcium chloride.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 – Specification for Structural Concrete except as modified.

B. Acquire cement and aggregate from same source for all work.

C. Conform to ACI 305R – Specification for Hot Weather Concreting when concreting during hot weather.

D. Conform to ACI 306R – Specification for Cold Weather Concreting when concreting during cold weather.

1.7 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700 – Project Closeout.

B. Accurately record actual locations of embedded utilities and components which are concealed from view.

1.8 COORDINATION

Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

PART II. PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement

1. ASTM C150, Type I or II. Provide cement for concrete with a uniform color classification.

B. Aggregate

1. Concrete for Containers of Liquids: For concrete for containers of liquids, use size No. 57 as specified in ASTM C33, unless a smaller size aggregate is required to conform to provisions of Section 3.6 of ACI 301. Conform to requirements of ASTM C33 and the following:

Limits for Deleterious Substances in Coarse Aggregate for Concrete	Maximum Percent by Weight of Total Sample
Clay lumps and friable particles	2.0
Chert (less than 2.4 specific gravity, SSD)	1.0
Sum of clay lumps, friable particles, and chert (less than 2.4 specific gravity, SSD)	2.0
Flat and elongated particles (long dimensions more than 5 times short dimensions)	15.0

2. Gradation of Fine Aggregate for Concrete for Exposed Slabs

	Percent Passing		
Sieve Designation	Normal-Weight Aggregate	Lightweight Aggregate	Heavy-Duty Toppings, Class 6 Floors
3/8 in.	100	00	100
No. 4	95-100	85-100	95-100
No. 8	80-90	---	65-80
No. 16	50-75	40-80	45-65
No. 30	30-50	30-65	25-45
No. 50	10-20	10-35	5-15
No. 100	2-5	5-20	0-5

2.2 ADMIXTURES

A. Air Entrainment

ASTM C260. Furnish with relative durability of ninety-five (95) minimum.

B. Chemicals

ASTM C494

C. Flyash

ASTM C618

2.3 CONCRETE PROPORTIONING AND USAGE

A. Proportioning of Structural Concrete

Proportion structural concrete of the classes required as specified in Section 3.9 of ACI 301 to produce the following twenty-eight (28) day compressive strengths:

Class	f'c (psi)
AA	5000
A	4000
B	3000

B. Usage

Use concrete class as follows:

1. Class AA Concrete

   For precast concrete

2. Class A Concrete

   For all concrete unless noted otherwise

3. Class B Concrete

   For footings, piers, and sidewalks unless otherwise noted

C. Slump

1. Slump of Normal-Weight Concrete: ASTM C143

	Slump in Inches	
Types of Construction	Maximum	Minimum
Reinforced foundation walls and Footings	3	1
Reinforced slabs, beams, and walls	4	1
Building piers	4	1
Sidewalks, and slabs-on-grade	3	1

2. Achieve increased slump only with use of high-range water-reducing admixture (superplasticizer).

3. Limitations on Slump: Do not allow the slump of lightweight concrete as determined by ASTM C143 to exceed three (3) inches, unless specifically authorized by the Architect-Engineer. Deliver concrete to the jobsite at a slump of two (2) to three (3) inches. Provide other concrete with slump ranges as specified herein.

D. Maximum Water/Cement Ratio for Concrete Used

	Maximum Water/Cement Ratio
Concrete subject to freezing and thawing	0.50

E. Retarding, Accelerating and Water-Reducing Admixtures

Use of admixtures to retard setting of the concrete during hot weather, to accelerate setting during cold weather, and to reduce water content without impairing workability, will be permitted if the admixtures conform to ASTM C494, and the relative durability factor for air-entrained concrete containing the admixture is at least one hundred (100) percent of control.

F. Hot Weather Concreting

For hot weather concreting, the Architect-Engineer may require the use of a water-reducing and retarding admixture (Type D) for concrete with a thickness of thirty (30) inches or greater and for concrete whenever the temperature at the time concrete is cast exceeds eighty (80) degrees Fahrenheit. Select admixture conforming to the requirements of these specifications and submit mix design with admixture prior to usage.

G. Admixtures and Design Mixes

Use admixtures in concrete design mixes in the same manner and proportions as in the field, so that the effects of the admixtures are included in preliminary tests submitted for approval prior to the start of construction.

1. Where more than one admixture is used, use compatible admixtures, preferably by the same manufacturer.

2. Use of calcium chloride or admixtures containing calcium chloride is strictly prohibited. Submit certificate evidencing compliance with the restriction.

2.4 FORMS

A. Prefabricated Forms

1. Preformed Steel Forms

Minimum sixteen (16) gage, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

2. Glass Fiber Fabric Reinforced Plastic Forms

Matched, tight fitting stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

3. Tubular Column Type

Round, spirally wound laminated fiber, wood, or glass fiber material, surface treated with release agent, non-reusable, of sizes required.

4. Forms for Exposed Concrete Surfaces

Exterior grade, high density overlay plywood, steel, or wood forms with smooth, tempered hardboard formliners.

B. Corners

Fillet or Chamfer, rigid plastic, or wood strip type

C. Flashing Reglets

Galvanized steel twenty-two (22) gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

D. Form Deck

High-tensile steel forming, one and five-sixteenths (1-5/16) inches deep, twenty-eight (28) gauge, galvanized as manufactured by Bowman Strongform, Wheeling Tensilform or Roll Form Permaform.

E. Form Ties

Snap-off type, galvanized metal, adjustable length, cone type, with waterproofing washer, free of defects that could leave holes larger than one (1) inch in concrete surface.

2.5 REINFORCEMENT

A. Reinforcing Steel

ASTM A615, sixty (60) kips per square inch yield grade; deformed billet steel bars

B. Smooth Dowels

ASTM A615, plain or ASTM A53, Schedule 80 with closed end

C. Chairs, Bolsters, Bar Supports, and Spacers

ASTM A615, plain or ASTM A53, Schedule 80 with closed end

D. Reinforcing Steel Mat

ASTM A704, ASTM A615, sixty (60) kips per square inch yield grade; steel bars or rods

E. Stirrup Steel

ASTM A82, unfinished or epoxy coated

F. Welded Wire Fabric

1. ASTM A497 Welded Deformed Type; in flat sheets, unfinished or epoxy coated

2. Sized and shaped for strength and support of reinforcement during concrete placement conditions. For concrete exposed to view in finished work, provide stainless steel or high-density polyethylene tips to keep metal portion at least one fourth (1/4) inch from the form or surface. Clay brick or concrete masonry brick is not acceptable.

2.6 OTHER MATERIALS

A. Form Release Agent

Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

B. Bonding Agent

Polymer resin emulsion or Polyvinyl Acetate or Two component modified epoxy resin.

C. Anchorage Items

Standard manufacture of the type required to engage with anchors installed under other sections of these specifications, and subject to approval by the Architect-Engineer. Provide inserts of galvanized malleable iron or steel, with adequate strength for the load to be carried, threaded, or slotted as required by their usage, with integral lugs to prevent turning.

D. Non-Shrink Grout

ASTM C1107; Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of seven thousand (7,000) pounds per square inch in twenty-eight (28) days. Do not use metallic grout.

E. Pre-molded Joint Filler Type C

ASTM D 1752; Pre-molded sponge rubber fully compressible with recovery rate of minimum ninety-five (95) percent; three eighths (3/8) inch thick minimum.

PART III. EXECUTION

3.1 EXAMINATION

Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 FORMWORK

A. Earth Cuts

Unless otherwise authorized by the Architect-Engineer, use earth cuts as forms for the vertical surfaces of footings and pile caps.

B. Formwork Tolerances

Construct formwork so that concrete surfaces will conform to the tolerance limits in Table 3.3.2.3 of ACI 301 and to the following additional limits:

1. Footings and Pile Caps

Variation of bearing surface from indicated elevations as shown on plans- plus or minus one half (1/2) inch.

2. Anchor Bolts

a. Variations from indicated location in plan - plus or minus one fourth (1/4) inch

b. Variations from specified elevation - plus or minus one half (1/2) inch

c. Anchor bolt projection - minus one fourth (1/4) inch, plus one half (1/2) inch

d. Plumbness of anchor bolts - plus or minus one sixteenths (1/16) inch

C. Cleanliness

Apply provisions of Section 5.7.1 of ACI 318 regarding cleanliness of spaces to be occupied by concrete to cellular and composite steel deck. Prior to concrete placement, remove foreign material from surfaces to receive concrete, and thoroughly clean the cellular and composite steel deck of oil, paint, and other substances that reduce or destroy bond.

3.3 PLACEMENT

A. Installation of Underground and Embedded Items

Install pipes and conduits below the concrete unless otherwise indicated. Place fill required to raise the subgrade in accordance with Section 02205 – Soil Materials. Install porous fill not less than four (4) inches in compacted thickness under slabs, sidewalks, tank bottoms, pile caps, and foundations. Level and uniformly compact the fill to a reasonably true and even surface, with the surfaces clean and free from frost, ice, mud, and water. Lay waterproof paper, polyethylene sheeting of nominal four (4) mil minimum thickness, or polyethylene-coated burlap over all surfaces receiving concrete.

B. Concrete Footings, Exterior Slabs, and Exterior Foundations

Place concrete footings, exterior slabs, and exterior foundations on undisturbed surfaces conforming to Section 02205 – Soil Materials, with surfaces clean and free from frost, ice, mud, and water. Lay waterproof paper, polyethylene sheeting of nominal four (4) mil minimum thickness, or polyethylene-coated burlap over dry or pervious surfaces receiving concrete. Place concrete footings and exterior foundations directly on impervious surfaces that are thoroughly moistened but not muddy at the time concrete is placed.

C. Smooth Dowels

Install smooth dowels at right angles to construction joints. Align dowels paralleled to the finished surface. Hold and support dowels rigidly during placement of the concrete. Oil or grease one end of dowels or coat dowels with high-density polyethylene with a minimum thickness of fourteen (14) mils.

D. Horizontal Wall Joints

Use horizontal wall joints only at underside of floor members or at floor level, unless otherwise specifically approved by the Architect-Engineer. Form horizontal wall joints in accordance with approved details.

E. Unit of Operation

Do not allow the unit of operation, except for slabs on grade, exceed sixty (60) feet in any horizontal direction and less than forty-eight (48) hours elapse between casting of adjoining units, unless these requirements are waived by the Architect-Engineer. Make provisions for jointing successive units as indicated or required. Prepare construction joints for bonding as specified in Section 5.3.5 of ACI 301. Keep joints in walls and columns level. Place concrete in layers no more than eighteen (18) inches deep. Compact each layer by mechanical internally vibrating equipment, supplemented by hand spading, rodding, and tamping, as directed.

F. Time Limitations

Place concrete mixed in stationary mixers and transported by nonagitating equipment in the forms within forty-five (45) minutes of the time ingredients are charged into the mixing drum. Deliver concrete that is truck mixed or transported in truck mixers or truck agitators to the site and discharge completed in the forms within the time specified in paragraph 11.7 of ASTM C 94, except that when the concrete temperature exceeds eighty-five (85) degrees Fahrenheit, reduce the time to forty-five (45) minutes. Place transit-mixed concrete that is completely mixed at the site of concrete placement or batched cement and aggregates transported to mixers in the forms within one and a half (1-1/2) hours after cement has been added. Place concrete in the forms within fifteen (15) minutes after discharge from the mixer at the jobsite.

G. Prohibition on Use of Aluminum

If concrete is placed by pumping, do not use aluminum in any parts of the pumping system which contact or might contaminate the concrete. Do not use aluminum chutes and conveyors.

H. Floor and Slabs with Drains

Exercise special care to slope the floors uniformly to the drains. Provide floors with drains with a twenty-four (24) inch radius sweep-in centered on the drain, with a depression of one half (1/2) inch at low points, sloped not less than one fourth (1/4) inch per foot unless otherwise indicated. In all areas where materials requiring more than a one forth (1/4) inch drop are to be overlaid, depress the concrete base slab as shown to provide a finished floor at the same elevation as surrounding areas.

3.4 SLABS-ON-GRADE

A. General

Install pipes and conduits below the concrete unless otherwise indicated. Place suitable fill required to raise subgrade by a reasonable method. Install porous fill no less than four (4) inches in compacted thickness under slab on grade. Compact porous fill by not less than two (2) passes of a vibratory compactor. Level and uniformly compact the fill to a reasonably true and even surface. Immediately before concrete is placed, cover the fill with a vapor barrier lapped at least six (6) inches at all edges and sealed. Install vapor barrier to avoid punctures or tears and extend up walls unbroken to the top of the slab.

B. Reinforcement

1. Place welded wire fabric continuous between crack control joints. Lap welded wire fabric at least one (1) full mesh plus two (2) inches staggered to avoid continuous lap in either direction. Securely wire or clip with standard clips.

2. When concrete below welded wire fabric (WWF) is placed before the WWF is installed, place the WWF and the concrete over the WWF not more than forty-five (45) minutes after the lower layer has been placed, so that the upper layer is cast and compacted while the lower layer is still plastic.

C. Placing

Compact, screed to grade, and prepare concrete for the specified finish. Place concrete continuously so that each unit of operation will be monolithic in construction. Provide diamond-shaped or circular isolation joints in slabs on grade at columns for full slab depth and construct so that corners of isolation joints will meet at crack-control joints.
NOTE: Indicated reinforcement size and spacing on drawings.

3.5 CURING

A. Cure surfaces in accordance with ACI 301.

B. Where curing compound is used, apply in accordance with manufacturer's instructions in two (2) coats with second coat applied at right angles to first.

C. Protect finished work.

D. Do not permit traffic over unprotected floor surface.

E. Ensure surfaces to receive adhered materials are clean, dry, smooth, and free from deleterious materials and projections.

3.6 CONCRETE WALKS, CURBS, AND CURB AND GUTTER

A. Subgrade

Compact subgrade at the required grades. Remove spongy and otherwise unsuitable material and replace with approved material. Place concrete walks upon four (4) inch porous fill.

B. Concrete Walks

Place concrete walks to not less than four (4) inch thickness. Place contraction joints every five (5) linear feet in each direction, formed in the fresh concrete by cutting a groove with a jointing tool to a depth of at least one-fourth (1/4) the slab thickness. Install transverse expansion joints at returns, at driveways, and opposite expansion joints in adjacent curbs and curb and gutter. Where curbs and curb and gutter are not adjacent, install transverse expansion joints at intervals of approximately forty (40) feet. Broom finish sidewalks. Place scoring in a transverse direction. Edge sidewalks and joints with a tool having a radius not greater than one eighth (1/8) inch. Slope sidewalks adjacent to curbs and curb and gutter a slope of one forth (1/4) inch per foot toward the curb and curb and gutter, except where grade indicate otherwise. Slope sidewalks, not adjacent to curbs and curb and gutter, one forth (1/4) inch per foot or crown as directed with a transverse slope of one fourth (1/4) inch per foot, except where grades indicate otherwise. Do not vary surface of the concrete in

cross section in excess of one forth (1/4) inch in five (5) feet, except where grades indicate otherwise.

C. Concrete Walk Reinforcing

Reinforce concrete walks with 6x6-Wl.4xWl.4 welded wire fabric.

D. Concrete Curbs and Curb and Gutter

Construct concrete curbs and curb and gutter to the section indicated. Incorporate horizontal and vertical curves as indicated or required. Use steel forms as approved by the Owner's Representative. At the option of the Contractor and approval of Engineer, use precast or cast-in-place curbs and curb and gutter. Divide cast-in-place curbs and curb and gutter into sections eight (8) to ten (10) feet in length using steel divider plates. Extend divider plates completely through the concrete. Remove divider plates after concrete has set. Cast precast curbs and curb and gutter in lengths of four (4) to five (5) feet. Finish exposed surfaces of concrete smooth. Tool sharp edges and the edges of joints and divisions to a one forth (1/4) inch radius. Install steel reinforcement where the curb and curb and gutter crosses pipe trenches or other similarly insecure foundation. Place two (2) No. 4 deformed bars near the bottom of the curb and curb and gutter. Extend at least twenty-four (24) inches beyond the insecure area. Install transverse expansion joints at curb and curb and gutter returns and at intervals of approximately forty (40) feet.

3.7 FINISHES

A. General

In accordance with paragraphs 5.3.4 of ACI 301, except as otherwise specified herein.

B. Concrete Surfaces Exposed to View

1. Construction

Produce concrete exposed to view in the completed structure using materials and workmanship of such quality that only nominal finishing will be required. Apply the provisions of Sections 5.3.6.2, 5.3.6.3, and 5.3.6.4 of ACI 301 to all exterior concrete surfaces exposed to view.

2. Release Agents

Coat forms with an approved release agent before the initial placement of concrete and between subsequent placements in accordance with the manufacturer's printed instructions. Do not wet form boards with water before concrete is placed.

3. Form Ties

Arrange form ties uniformly and symmetrically.

4. Surface Defects

Repaired as specified in Chapter 9 of ACI 301.

5. Structural Repairs

Make structural repairs using the specified epoxy-bonding agent. Obtain approval from Architect-Engineer on methods and procedures. Use a low-viscosity epoxy bonding agent, where the epoxy must be injected.

6. Protection

Exercise care to prevent chipping of corners and other damage to concrete when forms are removed. Protect columns, stair treads and risers, exposed corners, and other surfaces that may be damaged by ensuing operations by boxing, corner boards, or other approved means until construction is completed.

C. Exposed Vertical Surfaces

Immediately after removal of forms and before concrete is dry, chip off fins and other projections. Repair voids, honeycomb, aggregate pockets, and other surface defects exceeding one half (1/2) inch in any dimension as specified in Chapter 9 of ACI 301. In areas where concentrations of small voids one half (1/2) inch or less occur, patch a sufficient number to produce a uniform appearance across the entire panel. Smooth projections and fins with wet carborundum stones or power grinders to the extent directed by the Owner's Representative. Pull tie rods, and fill voids formed by wood or plastic cones with an approved mortar to a point three fourths (3/4) inch from finish surface. Make color of patch as directed by the Owner's Representative. Patch irregular lines at edges of ceiling ribs to produce a neat, uniform appearance.

D. Exposed-to-View Exterior Surfaces and Interior Vertical Surfaces

Provide a smooth form finish.

E. Tie Holes and Repairable Defective Areas Occurring in Concrete Surfaces Exposed to View in the Finished Work

Coat exposed surfaces with bonding agent before being patched.

F. Cleaning

Thoroughly clean exposed concrete to remove stains, laitance, dust, form oil, and other surface residue by use of water, stiff brushes, sandpaper, or other means approved by the Architect-Engineer.

3.8 TESTING

Have testing performed by a recognized independent testing laboratory approved by the Architect-Engineer. Have testing done in accordance with the provisions of ACI 301 and as hereinafter specified, except that the cost of all testing shall be borne by the Contractor. The requirements for strength tests may be waived by the Architect-Engineer when fifteen (15) cubic yards or less of concrete is placed in relatively minor work. In addition to the data required by Section 16.6.2 of ACI 301, include in strength test reports the proportions of ingredients used in the concrete mix, the slump, the unit weight, and for air-entrained concrete, the air content of the concrete. Submit two (2) copies of the reports of such tests. Receipt thereof will be acknowledged, and action will be taken only when corrective measures appear to be required.

3.9 DEFECTIVE CONCRETE

A. Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements and ACI 301 acceptance criteria.

B. Excessive honeycomb or embedded debris in concrete is not acceptable.

C. Repair or replacement of defective concrete will be determined by the Owner's Representative.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete upon express direction of Owner's Representative for each individual area.

END OF SECTION

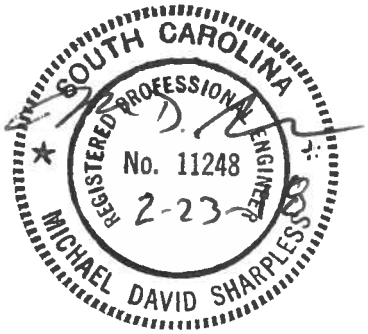
COMMISIONERS OF PUBLIC WORKS
OF THE CITY OF GREENVILLE
SOUTH CAROLINA

GREENVILLE WATER

CONSTRUCTION SPECIFICATIONS

FOR

WATER MAINS



February 2018

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SECTION 1

SOUTH CAROLINA DEPARTMENT OF HEALTH AND
ENVIRONMENTAL CONTROL REQUIREMENTS

1-1. All material or products which come into contact with drinking water shall be third party certified as meeting the specifications of the American National Institute/National Sanitation Foundation Standard 61, Drinking Water System Components – Health Effects. The certifying party shall be accredited by the American National Standards Institute.

1-2. All pipe, fittings packing, jointing materials, valves and fire hydrants shall conform to Section C of the AWWA Standards.

1-3. Water mains which have been previously used for conveying potable water may be reused provided they meet applicable criteria from AWWA Section C, ANSI-NSF 61, and ASTM D1785 or D2241. The mains must be thoroughly cleaned and restored practically to their original condition.

1-4. Asbestos cement pipe shall not be used in potable water systems except in the repair of existing asbestos cement lines.

1-5. Thermoplastic pipe shall not be used above grade.

1-6. Materials shall meet the following:

a. DIP: AWWA C150/A21.50 & AWWA C151/A21.51
b. Steel: AWWA C200 or ASTM A53 or A120.
c. Valves: AWWA C500 (Metal Seated Gate Valve), C504 (Butterfly Valve) or C509 (Resilient Seated Gate Valve).
d. Hydrants: AWWA C502

1-7. Natural rubber of other material which will support microbiological growth may not be used for any gaskets, O-rings, and other products used for jointing pipes, setting meters or valves, or other appurtenances which will expose the material to the water.

1-8. Lubricants which will support microbiological growth shall not be used for slip-on joints.

1-9. The use of vegetable shortening is prohibited.

1-10. Any pipe, solder, or flux which is used in the installation or repair of any public water system, used in any plumbing which provides water through connection to a public water system, for human consumption, shall be lead free in accordance with the Reduction of Lead in Drinking Water Act. Lead free, for solder and flux, means those containing not more than 0.2 percent lead. Lead free means not more than a weighted average of 0.25 percent lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings and fixtures. Leaded joints necessary for the repair of CIP shall be exempt from the above.

1-11. No flushing device shall be directly connected to any sewer.

1-12. Air relief valves shall be provided in accordance with sound engineering practice at high points in water mains as required. Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur.

1-13. Chambers, pits or manholes containing valves, blow-offs, meters, air relief valves, or other such appurtenances to a distribution system, shall not be connected directly to any storm drain or sanitary sewer.

1-14. Installation of water mains and appurtenances shall be conducted in accordance with Section C of the AWWA Standards and/or manufacturer's recommended installation procedures.

1-15. Bedding:

a. A continuous and uniform bedding shall be provided in the trench for all buried pipe.

b. Backfill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe.

c. Stones, other than crushed bedding, shall not come in contact with the pipe and shall not be within 6 inches of the pipe.

1-16. All water mains shall be provided with a minimum of 30 inches of cover, unless pipe material is steel, concrete, DIP, or other approved material, and if exposed should be insulated to prevent freezing.

1-17. All tees, bends, plugs and hydrants on lines 2.5 inches in diameter and larger shall be provided with reaction blocking, tie rods, or other approved method of restraint.

1-18. All water mains shall be detectable within 3 feet with electronic locating equipment.

1-19. Water mains shall be located out of contaminated areas, unless using pipe materials that will protect (i.e., DIP with chemical resistant gaskets). Re-route line if possible.

1-20. Separation of water mains and sewers:

a. Parallel Installation: Water mains shall be laid at least 10 feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten foot separation, the Department may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

b. Crossings: Water mains crossing sewers shall be laid to provide a minimum vertical separation of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case whether the water main is either above or below the sewer line. Whenever possible, the water main shall be located above the sewer line. Where a new water main crosses a new sewer line, a full length of pipe shall be used for both the water main and sewer line and the crossing shall be arranged so that the joints of each line will be as far as possible from the point of crossing and each other. Where a new water main crosses an existing sewer line, one full length of water pipe shall be located so both joints will be as far from the sewer line as possible. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer line to prevent damage to the water main.

c. Special Conditions: When it is impossible to obtain the distances specified by DHEC the Department may allow an alternative design. Any alternative design shall:

i. maximize the distances between the water main and sewer line and the joints of each;

ii. use materials which meet DHEC requirements for the sewer line; and,

iii. allow enough distance to make repairs to one of the lines without damaging the other.

d. Force mains: There shall be at least a 10-foot horizontal separation between water mains and sanitary sewer force mains. There shall be an 18-inch vertical separation at crossing as required by DHEC.

e. Sewer Manholes: No water pipe shall pass through or come in contact with any part of a sewer manhole. Water lines may come in contact with storm sewers or catch basins if there is no other practical alternative, provided that ductile iron is used, no joints of the water line are within the storm sewer or catch basin and the joints are located as far as possible from the storm sewer or catch basin.

f. Drain-fields and Spray-fields: Potable water lines shall not be laid less than 25 feet horizontally from any portion of a waste-water tile-field or spray-field, or shall be otherwise protected by an acceptable method approved by the Department.

1-21. Above-water crossings: The pipe shall be adequately supported and anchored, protected from damage and freezing, accessible for repair or replacement.

1-22. Underwater crossings: A minimum of 2 feet of cover shall be provided over the pipe. When crossing water courses that are greater than 15 feet in width, the following shall be provided:

a. The pipe material and joints shall be designed appropriately.

b. Valves shall be located so the section can be isolated for testing or repair; the valves (on both sides of crossing) shall be easily accessible and not subject to flooding.

c. A blow-off shall be provided on the side opposite the supply service sized in accordance with DHEC Standards. Direct away from streams, over ground.

d. Use DIP with mechanical joints for any lines being installed in rock.

1-23. Cross Connection Control (Backflow Prevention Devices):

a. There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contamination materials may be discharged or drawn into the system.

b. No by-passes shall be allowed, unless the bypass is also equipped with an equal, approved back-flow prevention device.

c. High hazard category cross connections shall require an air gap separation or an approved reduced pressure backflow preventer.

d. Reduced pressure principal backflow prevention assemblies shall not be installed in any area location subject to possible flooding. This includes pits or vaults which are not provided with a gravity drain to the ground's surface that is capable of exceeding the discharge rate of the relief valve. Generally, if installed in a pit, the drain line shall be 2 times the size of the line entering the backflow prevention device. The drain cannot empty into any type of ditch, storm drain, or sewer, which could flood water back into the pit.

e. All piping up to the inlet of the backflow prevention device must be suitable for potable water. The pipe must be AWWA or NSF approved. Black steel pipe cannot be used on the inlet side of the device.

f. Fire line sprinkler systems and dedicated fire lines, except those in the high hazard category shall be protected by an approved double check valve assembly.

End of Section

SECTION 2

TRENCH EXCAVATION AND BACKFILLING

2-1. SCOPE. This specification covers excavation work required for, and in connection with, the performance of the work specified and contracted for in these documents and shall include the necessary site preparation; excavation and trenching as required; the handling, storage, transportation, and disposal of all excavated material; all necessary sheeting, shoring and protective work; sub grade preparation; pumping and dewatering as necessary or required; pipe embedment; protection of adjacent property and underground structures; backfilling; specified compaction and consolidation of the backfill; and other appurtenant work.

2-2. GENERAL REQUIREMENTS. Excavation work shall be performed in a safe and proper manner, with suitable precautions being taken against hazards of every kind. The contractor shall be responsible for safety and shall comply with all laws and regulations pertaining to safety. Excavations shall provide adequate working space and clearances for the work to be performed therein.

Subgrade surfaces shall be clean and free of loose material of any kind when concrete is placed thereon. Excavations shall provide adequate clearance for installation and removal of concrete forms. In no case shall excavation faces be undercut for extended footings. Except where the exterior surfaces thereof are specified to be waterproofed, monolithic concrete manholes, pipe encasements and other concrete structures, or parts thereof, may be poured directly against excavation faces without the use of outer forms, provided that such faces are stable, and also provided that a layer of polyethylene firm is placed between the earth and the concrete.

Backfilling during freezing weather shall not be done except by permission of the Engineer. No frozen materials, snow or ice, shall be placed in any backfill.

2-3. CLASSIFICATION OF EXCAVATED MATERIALS. Classification of excavated materials will be made as follows:

a. Earth excavation will include the removal and subsequent handling of all loose rock, gravel, or decomposed or disintegrated shale which in the opinion of the Engineer can be effectively removed with power driven excavating equipment of a type and size required for the normal excavation of the specified trench involved; also all vegetation, debris, junk broken concrete, brick, stones or boulders and other materials encountered within excavation limits except rock.

b. Rock, as classified herein, is defined as being sandstone, limestone, flint, granite, quartzite, slate, hard shale, or similar material which requires blasting for its practical and effective removal. Should rock be encountered in two or more lengths, each ledge being not less than 3 inches in thickness and with interlaying

strata of earth, clay, or gravel not more than 12 inches thick in each stratum, the entire volume between the top of the top ledge and the bottom of the bottom ledge will be classified as rock.

2-4. BLASTING. The Contractor shall comply with all laws, ordinances, applicable safety code requirements, and regulations relative to the handling, storage, and use of explosives and the protection of life and property. He shall be responsible for all damage caused by his blasting operations.

Suitable weighted protective coverings shall be provided to confine all materials, lifted by blasting, within the limits of the excavation or trench.

All rock which cannot be handled and compacted as earth shall be kept separate from other excavated materials and shall not be mixed with other backfill or embankment materials except as specified or directed.

2-5. REMOVAL OF WATER. The Contractor shall provide and maintain adequate dewatering equipment to remove and dispose of all surface and ground water entering excavation, trenches, or other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe line to be installed, therein is completed to the extent that no damage from hydrostatic pressure, flotation, or other causes will result.

Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches, to the greatest extent practicable without causing damage to adjacent property.

2-6. SHEETING AND SHORING. Except where banks are cut back on a stable slope, excavation for structures and trenches shall be properly and substantially sheeted, braced, and shored, as necessary, to prevent caving or sliding, to provide protection for workmen and the work, and to provide protection for existing structures and facilities. Sheeting, bracing, and shoring shall be designed and built to withstand all loads that might be caused by earth movement or pressure, and shall be rigid, maintaining its shape and position under all circumstances.

2-7. STABILIZATION. Trench bottoms and subgrades for concrete structures shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workmen.

Trench bottoms or subgrades for concrete structures which are otherwise solid, but which become mucky on top due to construction operations, shall be reinforced with one or more layers of crushed stone or gravel embedded therein. The finished elevation of stabilized subgrades shall not be above the subgrade elevations shown on the plans or specified herein.

2-8. TRENCH EXCAVATION.

2-8.01. General. The Contractor shall not open more trench in advance of pipe laying than is

necessary to expedite the work and, in the event that pipe laying is stopped for any cause, 200 feet shall be the maximum length of open trench allowed on any section of the line under construction.

Under ordinary conditions, excavations shall be by open cut from the surface. Where the depth of trench and soil conditions permit, tunneling or boring may be required beneath cross walks, concrete driveways, curbs, gutters, pavements and other surface structures. For such tunneling or boring, no additional compensation will be allowed over the bid price based upon open cut excavation of equivalent depths below the ground surface.

Where indicated on the drawings, tunneling or boring shall be provided. For such tunneling or boring, compensation shall be made in accordance with the bid form.

2-8.02. Minimum Cover. Where pipe grades or elevations are not definitely fixed by the contract drawings, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover over the top of the pipe of 30-inches for galvanized steel pipe and 36 inches for ductile iron pipe.

2-8.03. Limiting Trench Widths and Pipe Clearances. Trenches shall be excavated to a width which will provide adequate working space and pipe clearances for proper pipe installation, jointing, and embedment. However, the limiting trench widths below an elevation 6 inches above the top of the installed pipe, and minimum permissible clearances between the installed pipe and either trench wall, shall be as follows.

Size of Pipe (inches)	Minimum Clearance (inches)
6 though 20	8
24 through 36	9
42	18
48	21
54	24
60 through 64	27

The stipulated minimum clearances are not minimum average clearance, but are minimum clear distances which will be permitted between any part of the pipe as laid and any part, projection or point of rock, shale, stone, or boulder.

When necessary to reduce the earth load on trench banks to prevent sliding and caving, the banks may be cut back on slopes which shall not extend lower than one foot above the top of the pipe.

2-8.04. Excavation Below Pipe Subgrade. Except where otherwise required, pipe trenches shall be excavated below pipe subgrade elevations, as shown on Figure 1, to provide for the installation of pipe foundation material as specified under "PIPE EMBEDMENT."

2-8.05. Bell Holes. Bell holes shall provide adequate clearance for the tools and methods used

in installing the pipe. No part of any bell or coupling shall be in contact with the trench bottom, trench walls, or the bedding material when the pipe is jointed.

2-9. PIPE EMBEDMENT. Embedment materials, both below and above the bottom of the pipe; the classes of embedment to be used; and the placement and compaction of embedment materials shall conform to the requirements shown on Figure 1 "Pipe Embedments," and to the following supplementary requirements.

2-9.01. Embedment Classes.

a. Class A Arch encasement shall be used where trench conditions dictate their use as determined by the Engineer.

b. Class B bedding, consisting of the specified granular material shall be used where such embedment is shown on the drawings or where conditions dictate its use as determined by the Engineer.

c. Class C bedding, consisting of the specified granular material shall be used where such embedment is shown on the drawings or where conditions dictate its use as determined by the Engineer.

d. Class D bedding, consisting of select job excavated material (being non-cohesive, finely divided soil, free of debris, stones, rock excavation detritus, organic materials or other objectionable material and having a moisture content which will insure proper pipe embedment) shall be used for all pipe lines unless otherwise indicated on the drawings.

2-9.02. Placement and Compaction. The approved embedment material shall be spread, and the surface graded to provide a uniform and continuous support, beneath the pipe at all points between bell holes or pipe joints. It will be permissible to slightly disturb the finished subgrade surface by the withdrawal of pipe slings or other lifting tackle.

After each pipe has been graded, aligned, and placed in final position on the bedding material and shoved home, sufficient pipe embedment materials shall be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to firmly hold and maintain the pipe in proper position and alignment during subsequent pipe jointing, embedment, and backfilling operations.

Embedment material shall be deposited and compacted uniformly and simultaneously on each side of the pipe to prevent lateral displacement of the pipe.

Tamped backfill embedment materials shall be placed uniform layers and shall have a moisture content which will insure that the maximum density will be obtained with the compaction method used.

2-10. TRENCH BACKFILL. All trench backfill above pipe embedment shall conform to the following requirements.

2-10.01. Tamped Backfill. Tamped backfill will be required for the full depth of the trench above the pipe embedment in the following locations:

a. Where beneath pavements, surfacing, driveways, curbs, gutters, walks, or other surface construction or structures.

b. Where in street, road, or highway shoulders that are maintained by governmental agencies requiring such backfill compaction.

Material for tamped backfill and the method of placement and compaction shall be as specified for tamped backfill for pipe embedment.

2-10.02 Uncompacted Backfill. Compaction of trench backfill above pipe embedments in locations other than those hereinbefore specified will not be required.

Uncompacted earth backfill material which is to be placed above embedments shall be free of brush, roots more than 2 inches in diameter, debris, and junk, but may contain rubble and detritus from rock excavation, stones, and boulders, in certain portions of the trench depth with the specific approval of the Engineer.

Uncompacted backfill material above embedments may be placed by any method or combination of methods, approved by the Engineer, which will not impose excessive concentrated or unbalanced loads, shock, or impact on, and which will not result in displacement of, the installed pipe.

Compact masses of stiff mucky clay, or gumbo, or other consolidated material more than one cubic foot in volume shall not be permitted to fall into the trench unless cushioned by at least 2 feet of loose backfill above the pipe embedment.

No hard rock, stone or boulder larger than 8 inches in its greatest dimension shall be placed within 3 feet of the top of pipe. Large stones may be placed in the remainder of the trench backfill only if well separated and so arranged that no interference with backfill settlement will result.

2.11. CUTTING AND RESTORING PAVEMENT AND WALKS. Pavement may be cut only where, in the manner, and to the extent specified herein, shown on the plans or authorized by the Engineer. Cuts shall be no larger than necessary to provide adequate working space for proper installation of pipe and pipe line appurtenances, as determined by the Engineer.

2-11.01. Concrete Pavement, and concrete base pavement, over trenches excavated for pipe lines shall be removed to a width 24 inches wider than the width of the trench at the pavement subgrade. The trench width at the trench bottom shall not be greater than at the top, and no under-cutting will be permitted. A shoulder not less than 12 inches in width at any point shall be

left between the cut edge of the pavement and the top edge of the trench. Pavement cuts shall be straight and parallel.

Concrete walks may be cut and replaced where the alignment of the pipe crosses perpendicular to such walk. Where the alignment of the pipe is beneath and parallel to existing walks the entire walk shall be removed and replaced.

2-11.02. Asphalt Pavement removed in the trenching operations shall be replaced, or patched, in accordance with the requirements, and subject to the control, of the authority owning, or having jurisdiction over and control of, such facilities in each case.

2-12. CLEANING UP. After the backfilling has been finished, grading and surfacing of the work areas shall be completed to the satisfaction of the Engineer. All excess excavated materials together with all debris, junk, stones, logs, stumps, roots, and other unsuitable materials shall be removed from the site and disposed of by, and at the expense of, the Contractor.

2-13. BASIS OF PAYMENT. All work performed under this specification shall be considered a subsidiary obligation of the Contractor with the exception of those items of work specifically identified on the bid form.

End of Section

SECTION 3

SEEDING AND SODDING

3-1. SCOPE. This section covers seeding and sodding to be performed after backfilling and final grading are complete.

All lawn, ditch, and street shoulder areas within street right-of-way and temporary construction easements that are damaged during the Work shall be restored, after completion of construction, to the complete satisfaction of Owner. All areas disturbed by Contractor outside the temporary construction easements shall be restored, at Contractor's expense, to the satisfaction of the property owner.

3-2. GENERAL. Sodding shall be required in established lawn areas. In addition, sodding shall be required where seeding will not remain due to washing.

Seeding and sodding shall be of the type and quality as acceptable to the property owner.

3-3. GUARANTEE.

3-3.01. Seeding. Contractor shall guarantee a uniform stand of seeding, free of weeds to the extent practical, and acceptable to Owner.

3-3.02. Sodding. Contractor shall guarantee the sodding Work to the extent that all transplanted sod shall be uniform in color, leaf texture, shoot density, and reasonably free of visible imperfections at acceptance.

3-4. MATERIALS.

3-4.01. Starter Fertilizer. Fertilizer shall be a complete pelleted or granulated fertilizer. The analysis in percent by weight shall be as follows, unless other recommendations are made by the soil testing laboratory:

Nitrogen	10%
Phosphorus	10%
Potassium	10%

3-4.02. Seed. The seed species shall be fescue and the mixture shall be fescue, ryegrass and bermuda.

3-4.03. Sod. Sod shall have been planted on cultivated agricultural land and grown specifically for sod purposes and shall conform to the quality standards of Nursery Grown Sod as defined by the Turfgrass Producers International. Sod shall be free of objectionable grassy and broad leaf weeds. The sod species shall be of the type and quality as to be acceptable to the property owner.

3-4.04. pH Adjustment. If laboratory soil testing indicates the need for increased soil pH the Contractor shall add agricultural lime as a soil amendment. Addition rates shall be determined by analysis of soil samples subjected to laboratory testing. Addition rates shall be as recommended by state Extension Service guidelines and/or local horticultural agencies.

3-4.05. Topsoil. Topsoil shall be fertile, natural soil, typical of the locality, free from stones, roots, sticks, clay, peat, weeds, and sod, and obtained from naturally well drained areas. It shall not be excessively acidic or alkaline nor contain toxic material harmful to plant growth. Stockpiled topsoil may be used but the Contractor shall furnish additional topsoil at his own expense if required.

3-4.06. Mulch. Mulch shall be a specially processed cellulose fiber containing no growth or germination inhibiting factors, or shall consist of straw from hay and shall include a tackifier. Mulch for hydroseeding operation shall be a wood mulch or combination wood and paper mulch.

3-5. PREPARATION

3-5.01. Clearing Prior to finish grading, areas to be seeded or sodded shall be cleared to remove stumps, stones, roots, cable, wire, debris or other materials that might hinder seeding or sodding and future turf maintenance.

3-5.02. Finish Grading. Seeding or sodding shall not be started until all earthwork has been substantially completed. Backfills and fills shall be allowed to settle, the topsoil spread, and finish grading completed before the Work is started. Finish grading shall result in a surface conforming to the contours indicated on the Drawings.

3-5.03. Application of Fertilizer and pH Adjustment. After finish grading, any fertilizer or chemicals for pH adjustment specified shall be applied uniformly to areas to be seeded.

Fertilizer application rate shall be 1,000 lbs/acre. Chemicals for pH adjustment shall be applied at a rate based on a soil test for pH. The rate shall be adequate to neutralize the soil.

3-5.04 Final Preparation Following application of additives and fertilizers the areas to be seeded or sodded shall be tilled to a true depth of 4 inches by disking, harrowing, or other accepted methods to thoroughly incorporate the additives and fertilizer, destroy vegetation, and pulverize the soil. After tilling, the bed shall be smoothed by dragging or floating. The surface shall be cleared of all stones, stumps, roots, wire, grade stakes, and other objects that might hinder future turf maintenance operations.

3-6. SEEDING.

3-6.01 Seed Application. Seed shall be applied within 72 hours after preparation of the seedbed. Seed shall be applied with equipment designed to give uniform application. Any method or combination of methods which uniformly distributes the seed directly in contact with the soil, covers the seed, and firms the bed, may be selected. Seed shall be placed approximately 1/4 inch below the surface at a rate of 100 lbs/acre.

3-6.02. Mulching. All seeded areas shall be mulched within 24 hours following seed application. Mulch shall be placed at a rate of 1-1/2 tons/acre.

3-7. HYDROSEEDING.

3-7.01. Seed Application. Seed shall be applied within 72 hours after preparation of the seedbed. The wood cellulose fiber mulch shall be applied at the minimum rate of 1,500 lb/acre in two separate operations. Ten percent of the specified rate of fiber mulch shall be applied with the seed and the remainder applied after seeding.

3-8. SODDING.

3-8.01. Application of Sod. Sod shall be placed within 72 hours after preparation of the sod bed. Sod shall be cut and moved only when the soil moisture conditions are such that favorable results can be expected. When the soil is too dry, the sod shall be cut only after Contractor has watered the sod sufficiently to moisten the soil to the depth at which the sod is to be cut.

Care shall be exercised at all times to retain the native soil on the roots of the sod during the process of stripping, transporting, and planting. Dumping from vehicles will not be permitted.

The sod shall be transplanted within 24 hours from the time of stripping, unless stored in a satisfactory manner. During delivery and while in stacks, the sod shall be kept moist and shall be protected from exposure to the air and sun.

Sod shall be laid smoothly, edge-to-edge, and with staggered joints. The sod shall be immediately pressed firmly into contact with the sod bed by tamping or rolling with acceptable equipment so as to eliminate all air pockets, provide a true and even surface, and assure knitting.

Staking is not required, except in ditch flow lines; however, Contractor will be responsible for replacing all sod that is displaced by erosion during the maintenance period. Only wooden (lath) stakes shall be used.

3-9. WATERING.

3-9.01. Sodded Areas. Contractor shall provide all water, labor, and equipment for watering sodded areas. Sodded areas representing one day's planting shall be watered sufficiently to wet the sod pads and at least 2 inches of the sod bed. Thereafter, in the absence of adequate rainfall, watering shall be performed daily and as often as necessary to keep the sod pads moist at all times. Watering of sod shall continue as needed until final acceptance.

3-10. REPLANTING.

3-10.01. Seeded Areas. Unacceptably seeded areas shall be overseeded or completely reseeded as instructed by Engineer.

3-10.02. Sodded Areas. Prior to acceptance, sodded areas that show signs of substantial desiccation as evident by a loss of color and a distinct yellowing shall be resodded and shall continue to be resodded until an acceptable sod cover is obtained. Replanting operations shall be as specified except that fertilizer and lime shall be deleted from the operation.

3-11. MAINTENANCE. All areas shall be maintained until final acceptance of the project.

3-11.01. Seeded Areas. Maintenance shall include any necessary reseeding, repair of erosion damage, and replacement of displaced mulch until covered with seedlings. In the event erosion occurs from either watering operations or rainfall, such damage shall be repaired.

3-11.02. Sodded Areas. Original grades of the sodded areas shall be maintained after commencement of planting operations and until acceptance. Any damage to the finished surface shall be repaired. In the event erosion occurs from either watering operations or rainfall, such damage shall be repaired. Ruts, ridges, tracks, and other surface irregularities shall be corrected and areas resodded.

End of Section

SECTION 4

INSTALLATION OF DUCTILE IRON PIPE AND APPURTENANCES

4-1. HANDLING DUCTILE IRON PIPE AND FITTINGS. Pipe, fittings, valves, hydrants and accessories shall be handled in such a manner to insure installation in the work in sound, undamaged condition and conforming in all respects to specified requirements. Particular care shall be taken not to injure the coatings and linings of pipe and fittings.

Equipment, tools, and methods used in unloading, reloading, hauling and laying pipe and fittings shall be such that no damage is done thereto or the cement lining therein. Hooks used for insertion in ends of pipe shall have broad, well padded contact surfaces and shall be of such design and length that they will provide uniform support for a distance back from the end of the pipe of not less than one-third of the internal pipe diameter.

Pipe and fittings in which the cement lining has been broken or loosened shall be replaced by and at the expense of the Contractor. Where the damaged areas are small and readily accessible, the Contractor may be permitted to repair the lining, subject to the approval of the Engineer.

All pipe coating which has been damaged shall be repaired by the Contractor before installing the pipe.

4-2. CUTTING PIPE. Cutting of ductile iron pipe shall be done in a neat manner, without damage to the pipe or to the cement lining therein. Pipe cuts shall be smooth, straight, and at right angles to the pipe axis. All cutting of pipe shall be done with mechanical pipe cutters of an approved type.

4-3. CLEANING. The interior of all pipe and fittings shall be thoroughly cleaned of all foreign matter before being installed and shall be kept clean until the work has been accepted. All lumps, blisters, and excess coating shall be removed from exterior spigot and interior bell surfaces. Such surfaces shall be wire brushed and wiped clean and dry and free from oil and grease before placing the spigot in the bell. All joint contact surfaces shall be kept clean until the jointing is completed.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being installed. No debris, tools, clothing, or other materials shall be placed in the pipe.

Whenever pipe laying is stopped, the open end of the line shall be sealed with a watertight plug. All water that may have entered the trench shall be removed prior to removing the plug. It is essential that no mud, trench water, or other foreign matter be permitted to enter the pipe line at any time.

4-4. INSPECTION. During installation, while suspended and hanging free, each pipe and fitting shall be inspected for defects and rung with a light hammer to detect cracks. All defective, damaged, or unsound pipe and fittings shall be rejected and removed from the site of the work.

4-5. ALIGNMENT. All pipe shall be installed to the grade and alignment indicated by the drawings and as established by line and grade stakes, laser beam equipment or surveying instruments, or as otherwise determined, fixed, or approved by the Engineer. Pipe lines or runs

intended to be straight shall be laid straight. Deflections from a straight line or grade shall not exceed the values stipulated in Table 4 of AWWA C600. Either shorter pipe sections, or special bends shall be installed where the alignment or grade requires them.

4-6. PUSH ON TYPE JOINTS. After a length of pipe has been laid on the previously prepared pipe subgrade, with the spigot end close to the bell of the previously installed pipe, all interior bell and exterior spigot surfaces of the joint to be made shall be thoroughly cleaned, the rubber gasket installed in the gasket groove in the joint socket, and all joint surfaces well lubricated with a heavy vegetable soap solution. The pipe shall then be pulled or pushed into final position and to the full depth of the joint socket, by means of suitable jacks, tackle, or power driven equipment.

All instructions and recommendations of the pipe manufacturer, relative to gasket installation and other jointing operations, shall be observed and followed by the Contractor.

It is essential that each gasket is in proper position when the pipe is shoved "home" in order that a tight joint be secured, and care shall be taken when installing the gasket to see that it will not be displaced during jointing operations. A leaking joint will be in evidence of an improperly made joint. Each defective joint, if any, discovered after the pipe has been laid shall be repaired by and at the expense of the Contractor by a method acceptable to and approved by the Engineer.

4-7. MECHANICAL JOINTS. Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned and reassembled. Over tightening bolts to compensate for poor installation practice will not be permitted.

4-8. FLANGED JOINTS. When bolting flanged joints, care shall be taken to insure that there is no restraint on the opposite end of the pipe or fitting which would prevent uniform gasket compression or which would cause unnecessary stress in the flanges. One flange shall be free to move in any direction while the flange bolts are being tightened. Bell and spigot joints shall not be packed or assembled until all flanged joints affected thereby have been tightened. Bolts shall be tightened gradually and at a uniform rate, in such a manner that gasket compression is uniform over the entire area of the gasket.

4-9. CONNECTIONS WITH EXISTING PIPE LINES. Where connections are made between new work and existing piping, such connections shall be made as shown on the drawings, using suitable and proper fittings to suit the conditions encountered.

Each connection with an existing water pipe shall be made at a time and under conditions which will least interfere with service to customers affected thereby, and as authorized by the Owner. Suitable facilities shall be provided for proper dewatering, drainage, and disposal of all water removed from the dewatered lines and excavations, without damage to adjacent property.

Great care shall be taken to prevent pipeline contamination when dewatering, and making connections with, existing pipelines used for the conveyance or distribution of water for public use. No trench water, mud, or other contaminating substances shall be permitted to get into the connected line or lines at any time during the progress of the work. The interiors of all pipe, fittings,

and valves, both new and re-used, installed in such connections, shall be thoroughly cleaned and then swabbed with, or dipped in, strong chlorine solution having a chlorine content of 200 parts per million.

4-10. POLYETHYLENE ENCASEMENT. If required or noted per plans, polyethylene encasement for use with ductile iron pipe shall be installed in accordance with AWWA C600 and ANSI/AWWA C105/A21.5 and also in accordance with all recommendations and practices of the AWWA M41, Manual of Water Supply Practices.

4-11. SETTING VALVES AND FITTINGS. Valves, plugs and other fittings shall be installed in the manner herein specified for cleaning, laying and jointing pipe and shall be located as shown on the drawings or as directed by the Engineer.

Each valve shall be inspected before installation to insure that all foreign substances have been removed from within the valve body, and shall be opened and closed to see that all parts are in first-class working condition. Geared valves shall be inspected to see that the gears are properly lubricated.

Each valve which is installed in direct contact with earth backfill shall be provided with a valve box of such type and design that surface loads, impact or shock will not be transmitted through the box to the valve.

Valves and valve boxes shall be set plumb. Each valve box shall be placed directly over the valve it serves, with the top of the box brought flush with the finished grade. After being placed in proper position, earth shall be filled in around each valve box and thoroughly tamped for a distance on each side of the box of 4 feet at top of the trench.

Blow-offs and air release valves shall be provided with gate valves or ball valves and shall be located and installed as shown on the plans. All dead ends shall be provided with a blow-off as shown.

4-12. SETTING HYDRANTS. Hydrants shall be located as shown on the drawings, or as directed by the Engineer, and shall be connected to the main with a 6-inch ductile iron branch controlled by an independent gate valve located as close to the supplying main as practical.

All hydrants shall stand plumb; shall be set to established grade with ground flanges slightly above, but not more than 6 inches above, the finished ground elevation; and shall be provided with suitable reaction blocking, bracing or joint harness to prevent any movement caused by internal water pressure. See Figure 2 - Typical Hydrant Installation.

In pervious soil, hydrant drainage shall be provided at its base by placing coarse gravel or graded crushed stone from the bottom of the trench to at least 6-inches above the waste opening in the hydrant and to a distance of 1-foot around the elbow except at the back where blocking occurs. Hydrant drains shall not be connected to or located within 10 feet of sewer systems. Thrust blocking should not block weep holes. Wherever a hydrant is set in clay or other impervious soil, a drainage pit 2 feet in diameter and 3 feet deep shall be excavated below each such hydrant and filled

with coarse gravel or screened crushed stone.

4-13. REACTION ANCHORAGE AND BLOCKING. All tees and bends shall be provided with suitable reaction blocking, struts, anchors, clamps, joint harness, or other adequate means for preventing any movement of the pipe caused by unbalanced internal water pressure. For sizing guideline, see Figure 3 - Typical Horizontal Thrust Block.

4-13.01. Trench Installation. Where in trench, the fittings shall be provided with concrete thrust blocking between the fitting and solid, undisturbed ground, except where solid ground blocking support is not available. Such reaction or thrust backing shall consist of concrete installed in such a manner that all joints between pipe and fittings are accessible for repair or replacement.

At the tops of slopes vertical angle bends shall be anchored by means of steel strap or rod anchors securely embedded in or attached to a mass of concrete of sufficient weight to resist the hydraulic thrust at the maximum pressures to which the pipe will be subjected. Bends at the base of slopes shall be provided with adequate concrete embedment to resist similar thrust.

The bearing area of concrete reaction blocking against the ground or trench bank shall be as shown by the plans or as directed by the Engineer in each case. In the event that adequate support against undisturbed ground cannot be obtained, metal harness anchorages consisting of steel rods or bolts across the joint and securely anchored to pipe and fittings or other adequate anchorage facilities approved by the Engineer shall be installed to provide the necessary support. Should the lack of a solid vertical excavation face be due to careless or otherwise improper trench excavation, the entire cost of furnishing and installing metal harness anchorages in excess of the contract value of the concrete blocking replaced by such anchorages shall be borne by the Contractor.

4-13.02. For Other Locations. Reaction blocking, struts, anchorages, or other supports for fittings installed in fills or other unstable ground, above grade, or exposed within structures, shall be provided as required by the plans or as directed by the Engineer.

4-14. PROTECTION OF METAL SURFACES. All steel clamps, rods, bolts and other metal accessories used in reaction anchorages or joint harness subject to submergence or contact with earth or other fill material and not encased in concrete shall be adequately protected from corrosion with not less than two coats of Carboline “Bitumastic 50” or Tnemec “46-465 H.B. Tnemecol,” or approved equal, medium consistency coal tar coating material, applied to clean, dry metal surfaces. The first coat shall be dry and hard before the second coat is applied. Metal surfaces exposed above grade or within structures shall be painted with two coats (in addition to a primer coat) of a paint approved by the Engineer.

4-15. LEAKAGE. It is the intent of this specification that (a) all joints shall be watertight and free from visible leaks, and (b) each leak which may be discovered, at any time prior to the expiration of one year after the date of final acceptance of the work by the Owner, shall be repaired promptly by and at the expense of the Contractor.

4-16. PRESSURE TESTS. Pressure and leakage tests must be conducted in accordance with AWWA Standards C600. The duration of the pressure and leakage test must be at least two (2)

hours. The formulas to be used for calculating the allowable leakage per hour shall be:

$$L = [SD(P)^{1/2}] \div 133{,}200$$

L-allowable leakage (gal/hr)
S-length of pipeline to be tested (feet)
D-diameter of pipe(inches)
P-average test pressure(psig)

All visible leaks shall be repaired regardless of the amount of leakage.

All ductile iron piping or pipe lines which are designed to operate under a working pressure of or in excess of 40 psi shall be subjected to a hydrostatic pressure test as hereinafter specified. Unless otherwise authorized by the Engineer, pressure tests of underground or otherwise concealed piping shall be made prior to covering the pipe joints.

The test pressure to be applied in each case shall be either (a) 50 psi in excess of the normal maximum working pressure based on the elevation of the highest point in the piping assembly or system under test, or (b) 1.5 times the maximum pressure, whichever is the greatest.

The Contractor shall provide all necessary piping connections between the pipe line or piping and the nearest available source of test water, testing pumping equipment, pressure gauge, and other equipment, materials, and facilities necessary for the required tests. The Owner will furnish all water necessary for filling the lines and for making the required tests.

All pipe, fittings, valves, pipe joints, and other materials which are found to be defective shall be removed immediately and replaced with new and acceptable material, by and at the expense of the Contractor.

4-17. DISINFECTING WATER MAINS. Disinfection of lines, as required by the rules and regulations of the South Carolina Department of Health and Environmental Control and in conformity with the requirements of "A Procedure for Disinfecting Water Mains" prepared and approved by the AWWA (Designated C-651), will be performed by the Contractor, with sampling and sample testing performed by the Owner.

4-17.01. In general, one approved method referred to as “continuous feed method” is as follows:

a. Before being placed in service, all new mains shall be thoroughly flushed then chlorinated with not less than twenty-five (25) milligrams per liter of available chlorine.

b. Water from the existing distribution system or other source of supply shall be controlled so as to flow slowly into the newly laid pipeline during the application of chlorine.

c. The solution shall be retained in the pipeline for not less than twenty-four (24) hours and then flushed thoroughly with potable water of satisfactory bacteriological quality before starting the sampling program.

4-17.02. The contractor or owner shall collect a minimum of two (2) samples from each sampling site for total coliform analysis. The number of sites depends on the amount of new construction but must include all dead-end lines, be representative of the water in the newly constructed mains, and shall be collected a minimum of every 1,200 linear feet.

4-17.03. Prior to sampling, the chlorine residual must be reduced to normal system residual levels or be non-detectable in those systems not chlorinating.

4-17.04. These samples must be collected at least twenty-four (24) hours apart and must show the water line to be absent of total coliform bacteria.

4-17.05. The chlorine residual must also be measured and reported.

4-17.06. If the membrane filter method of analysis is used for the coliform analysis, non-coliform growth must also be reported.

4-17.07. If the non-coliform growth is greater than eighty (80) colonies per one hundred (100) milliliters, the sample result is invalid and must be repeated.

4-17.08. All samples must be analyzed by a State certified laboratory.

4-18. BLOW-OFFS - for installation guidelines see Figure 4 – 2-Inch Blow-Off.

a. Blow-offs should be located in a box or other structure to facilitate proper use. The orifice should be provided on the fixed piping, in the valve box.

b. Blow-offs should not be directed towards roads or so that the water will flow into creeks, etc. at stream crossings direct away from streams, over ground.

c. Orifice sized as follows:

Pipe Diameter	Minimum Flow Required	Orifice Size
2 inch	25 gpm	0.75 inch
2.5 inch	40 gpm	1 inch
3 inch	60 gpm	1.25 inch
4 inch	100 gpm	1.5 inch
6 inch	220 gpm	2 inch
8 inch	400 gpm	2.5 inch
10 inch	612 gpm	Fire Hydrant
12 inch	882 gpm	Fire Hydrant
16 inch	1,570 gpm	Special Blow-off

4-19. AIR RELEASE VALVES - The open end of an air release pipe from automatic valves or from a manually operated valve shall be extended to the top of the pit and provided with a screened downward facing elbow. For installation guidelines see Figure 5 - Air Release Valve.

End of Section

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SECTION 5

MATERIAL SPECIFICATIONS

5-1. SCOPE. This specification covers materials to be used for pipe, fittings, gate valves, fire hydrants, and valve boxes for underground water main and water service line installations.

5-2. GENERAL REQUIREMENTS. All materials listed in this specification shall be made in the United States of America.

5-3. PIPE.

5-3.01. Ductile Iron Pipe - Manufactured and tested in accordance with ANSI A21.51, Minimum Pressure Class 350, except 16-inch and larger pipe shall be pressure class 250. Cement lining per ANSI A21.4. Push-on joints per ANSI A21.11, except gaskets shall be synthetic rubber.

5-3.02. Galvanized Steel Pipe - Standard weight with threaded and coupled joints meeting the requirement of AWWA C200.

5-3.03. Copper Tubing – For underground fire protection service, 2-1/2-inch diameter and smaller, pipe shall be copper tubing, ASTM B88, Type K, annealed with no sweat fittings.

5-3.04. HDPE Pipe – 3/4-inch to 2-inch CTS, rated 250 psi with 12 gauge tracer wire attached by the HDPE pipe manufacturer. HDPE pipe with tracer wire attached by party other than the HDPE pipe manufacturer will not be accepted. Provide additional wire as needed to connect to adjacent metal piping or valves.

5-3.05. PEXa Pipe – 3/4-inch to 2-inch CTS, rated 200 psi working pressure, meeting AWWA C904 standards. Pipe shall have an ultraviolet light (UV) shield with a minimum recommended UV exposure time of one year when tested in accordance with ASTM F2657. Manufacturer shall warrant the product for 25 years. A 12 gauge tracer wire shall be attached by the PEXa pipe manufacturer. PEXa pipe with tracer wire attached by party other than the PEXa pipe manufacturer will not be accepted. Provide additional wire as needed to connect to adjacent metal piping or valves.

5-4. FITTINGS.

5-4.01. Compact Ductile Iron Fittings – 4-inch through 12-inch fittings shall be made from Ductile Iron Grade 70-50-05 per ANSI A21.53. Fittings and accessories shall be mechanical or push-on joint per ANSI A21.10 and A21.11. Wall Thickness shall have a Pressure Rating of 350 psi. Exterior bituminous coating per ANSI A21.10 and A21.11, Cement lining per ANSI A21.4.

5-4.02. Ductile Iron Fittings – 3-inch through 48-inch. All ductile iron fittings shall be manufactured and tested per ANSI A21.10. The iron shall be Grade 70-50-05 for ductile iron fittings. Metal thickness shall conform to AWWA C100, Class D. Mechanical or push-on joints

shall comply with ANSI A21.11.

5-4.03. Galvanized Iron Fittings. All 2-inch fittings shall be standard weight malleable galvanized iron with standard iron pipe thread.

5-4.04. HDPE and PEX Fittings. Fittings for HDPE and PEX pipe shall be brass compression fittings as manufactured by Ford or Mueller.

5-5. RESTRAINED JOINTS.

5-5.01. Mechanical Joint Restrained Joints – As an alternative to standard restrained joints, EBAA Iron "Megalugs" Series 1100 or 1700, Star Pipe Products "Stargrip" Series 3000 or Tyler Union "TUF Grip" Series 1000, without substitute, may be used for 6-inch through 20-inch ductile iron pipe. The locations for these types of joints shall be acceptable to Engineer.

5-5.02. Field Lock Gaskets – As an alternative to standard restrained joints, field lock gaskets, may be used for 4-inch through 20-inch ductile iron pipe. The locations for field lock gaskets shall be acceptable to Engineer. Field lock gaskets shall be of a color that distinguishes them from normal push on joint gaskets.

5-5.03. "ALPHA" Ends as manufactured by American Flow Control or equivalent are acceptable.

5-6. POLYETHYLENE ENCASEMENT. If required or noted per plans, polyethylene encasement for use with ductile iron pipe shall meet all the requirements for ANSI/AWWA C105/A21.5, Polyethylene Encasement for Ductile Iron Pipe Systems. Polyethylene encasement for use with ductile iron pipe systems shall consist of linear low density polyethylene (LLDPE), with a minimum thickness of eight mils.

5-7. GATE VALVES

5-7.01. Iron-Body Resilient-Seat (IBRS) Gate Valves - sizes 2-inch – 12-inch inclusive. Order Specification: Resilient Wedge, Non-Rising Stem (NRS), Rated at 200 psig WWP, O-Ring Seals, Standard 2-inch Square Wrench Nut, and conforming to ANSI/AWWA C509 or C515. Check with Engineering for direction of opening.

5-7.02. APPROVED IBRS GATE VALVES, SIZES 4-inch – 12-inch, INCLUSIVE:

NAME	CATALOG #, MJ or ALPHA ENDS
1. American Flow Control	Series 2500
2. Mueller	Series 2360 or 2361
3. U.S. Pipe	A-USPO
4. Clow Valve Co.	Model 2368 or 2369

Check with Engineering for specifications on all valves over 12-inch size.

5-7.03. APPROVED IBRS GATE VALVES, SIZE 2-inch: Threaded x Threaded Ends (NPT), with Standard 2-inch Square Wrench Nut, Open Left, conforming to AWWA C509 or C515, rated at 200 psi WWP.

	NAME	CATALOG #
1.	American Flow Control	Series 2500
2.	Mueller	Series 2360
3.	U.S. Pipe	A-USPO-8

5-8. FIRE HYDRANTS - All fire hydrants shall be 4-1/2-inch nominal valve opening, National Standard Nozzle Threads and Operating Details, Two 2-1/2-inch nozzles and One 4-1/2-inch nozzle, 6-inch M.J. Inlet Connection or ALPHA end, depth of bury to suit field conditions, painted highway safety yellow, breakable ground flange and conforming to AWWA C502. Check with Engineering for direction of opening. See Typical Hydrant Installation detail.

5-8.01. APPROVED FIRE HYDRANTS:

	NAME	CATALOG #
1.	American-Darling	MK 73-5
2.	Mueller Super Centurion 250	A-421

5-9. AIR RELEASE VALVES. Individual air release valves shall be provided and installed as indicated on the drawings. Each valve assembly shall be installed complete with appurtenant piping and valves as indicated on the drawings.

Individual air release valves shall have a 1-inch inlet connection unless otherwise noted on the drawings, and shall be GA Industries “Figure 920H,” Multiplex “Crispin Type N,” APCO “200A,” or Vent-O-Mat “Series RBX.” A gate valve shall be provided in the piping to each air release valve.

The valves shall be designed for water working pressure of 300 psi and shall have stainless steel floats. All working parts shall be constructed of brass, stainless steel, or other corrosion-resistant materials.

The exhaust from each valve shall be piped to a suitable disposal point.

5-10. VALVE BOXES shall be Greenville Water Standard Bingham and Taylor “107” or Vestal “V107.”

5-11. CORPORATION STOPS shall be Ford F1000-X-G-NL or Mueller G15008.

5-12. COUPLINGS shall be grip joint FIP or MIP x CTS, Ford C14-XX-G-NL or C84-XX-G-NL or Mueller.

5-13. CURB STOPS shall be iron to iron, Ford Z21-XXX-NL or Mueller. Curb stops x CTS shall be Ford Z41-XXX-G-NL or Mueller.

5-14. STAINLESS STEEL INSERTS for CTS tubing shall be Ford Insert or Mueller.

5-15. LID COVER FOR PLASTIC METER BOX shall be 12-1/2-inch, Bingham and Taylor, 12/12" Cast Iron.

5-16. METER BOXES shall be Carson 2200, 18-inch HDPE. Meter boxes for dual domestic and irrigation meters shall be NDS 13"x24"x15" 125BCDMCIFB. Traffic rated meter boxes shall be cast iron, Oldcastle 0018-18_D traffic rated with rim.

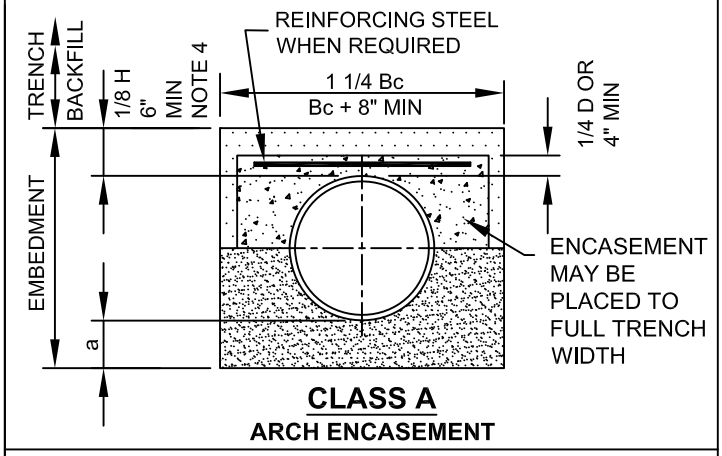
5-17. METER SETTERS shall be Ford, 9"x5/8" VHC71-9W-11-33-L/S-NL.

5-18. SWIVELS FOR METERS shall be Ford, CSS1 or CSS8.

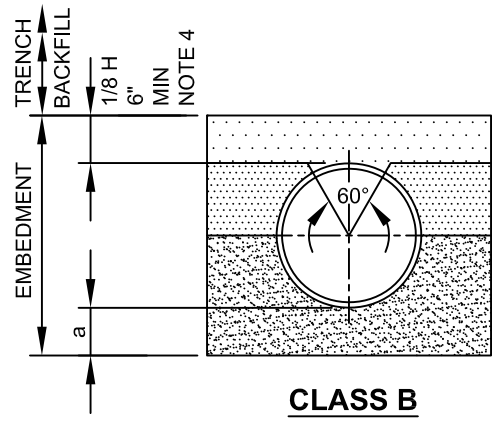
5-19. GRIP JOINT TEES shall be Ford, T444-XXX-NL or Mueller GJN4.

5-20. TAPPING SADDLES for 4-inch through 12-inch taps shall be Ford FTS or Romac FTS. Tapping saddles for smaller than 4-inch taps shall be Ford, Mueller or Romac double strap saddles.

End of Section

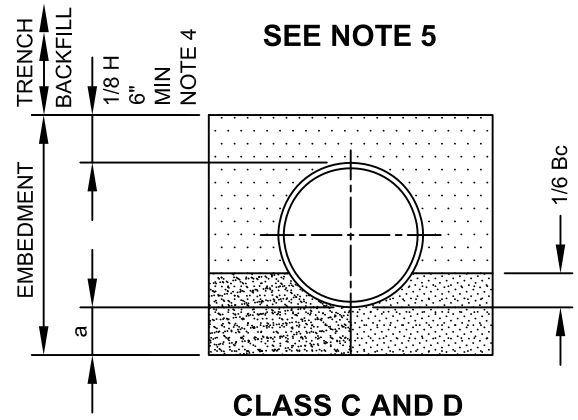


CLASS A
ARCH ENCASEMENT



CLASS B

SEE NOTE 5



CLASS C AND D

NOTES:

1. GRANULAR EMBEDMENT MATERIAL SHALL BE # 57 WASHED STONE OR PEA GRAVEL. EMBEDMENT MATERIAL SHALL BE PLACED IN LAYERS NOT MORE THAN 6" DEEP AND COMPACTED AS SPECIFIED.
2. HAND PLACED EMBEDMENT SHALL BE FINELY DIVIDED MATERIAL FREE FROM DEBRIS AND STONES.
3. COMPACTED EMBEDMENT SHALL BE FINELY DIVIDED JOB EXCAVATED MATERIAL FREE FROM DEBRIS, ORGANIC MATERIAL AND STONES, PLACED IN UNIFORM LAYERS NOT MORE THAN 8" THICK, AND COMPACTED TO 95% MAXIMUM DENSITY. GRANULAR EMBEDMENT MAY BE SUBSTITUTED FOR ALL OR PART OF THE COMPACTED EMBEDMENT.
4. EMBEDMENT ABOVE THE TOP OF THE PIPE SHALL BE AN UNCOMPACTED LAYER FOR ALL INSTALLATIONS.
5. FOR CLASS C USE GRANULAR EMBEDMENT. FOR CLASS D USE COMPACTED EMBEDMENT.
6. TRENCH OUTLINES DO NOT INDICATE ACTUAL TRENCH EXCAVATION SHAPE, SOIL CONDITIONS, OR PRESENCE OF SHEETING LEFT IN PLACE. EMBEDMENT MATERIAL SHALL EXTEND THE FULL WIDTH OF THE ACTUAL TRENCH EXCAVATION.

LEGEND

Bc	OUTSIDE DIAMETER OF PIPE
H	COVER ABOVE TOP OF PIPE
D	NOMINAL PIPE SIZE
a	EMBEDMENT BELOW PIPE (SEE TABLE)

HAND PLACED EMBEDMENT

COMPACTED EMBEDMENT

GRANULAR EMBEDMENT

CONCRETE

TABLE OF EMBEDMENT DEPTH BELOW PIPE

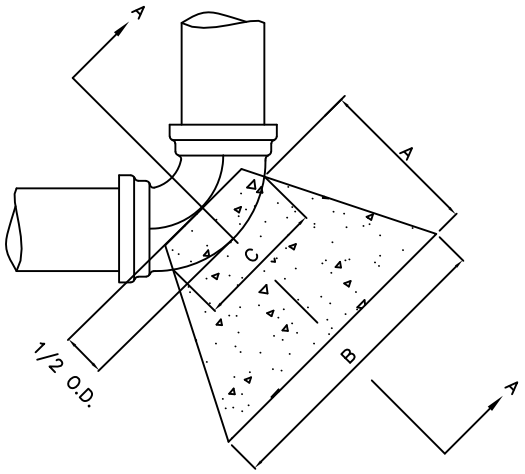
D	a MIN SOIL	a MIN ROCK
	In	In
27" & SMALLER	3	6
30" TO 60"	4	9
64" & LARGER	6	12

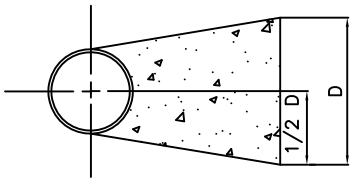
PIPE EMBEDMENTS

GreenvilleWater | FIGURE 1 | 10/30/2013

MINIMUM DIMENSIONS FOR CONCRETE BLOCKING

BEND	SIZE	A	B	C	D
11 1/4°	6"	1'–0"	2'–0"	4"	1'–0"
	8"	1'–0"	2'–0"	5"	1'–0"
	10"	1'–0"	2'–0"	6"	1'–0"
	12"	1'–0"	2'–0"	7"	1'–0"
	14"	2'–0"	2'–0"	11"	1'–6"
	16"	1'–0"	2'–0"	1'–0"	2'–0"
	20"	2'–0"	3'–0"	1'–3"	2'–0"
	24"	2'–0"	3'–0"	1'–6"	3'–0"
22 1/2°	6"	1'–0"	2'–0"	6"	1'–0"
	8"	1'–0"	2'–0"	7"	1'–0"
	10"	1'–0"	2'–0"	8"	1'–6"
	12"	1'–0"	2'–0"	10"	2'–0"
	14"	2'–0"	3'–0"	11"	2'–0"
	16"	2'–0"	4'–0"	1'–0"	2'–0"
	20"	2'–0"	4'–0"	1'–3"	3'–0"
	24"	3'–0"	4'–6"	1'–6"	4'–0"
45°	6"	1'–0"	2'–0"	6"	1'–0"
	8"	1'–0"	2'–0"	7"	2'–0"
	10"	2'–0"	3'–0"	9"	2'–0"
	12"	2'–0"	3'–0"	11"	3'–0"
	14"	2'–0"	4'–0"	11"	3'–0"
	16"	3'–0"	5'–0"	1'–0"	3'–0"
	20"	4'–0"	6'–0"	1'–3"	4'–0"
	24"	4'–0"	7'–0"	1'–6"	5'–0"
90°	6"	1'–0"	2'–0"	1'–0"	2'–0"
	8"	2'–0"	3'–0"	1'–2"	2'–6"
	10"	2'–6"	3'–9"	1'–6"	3'–0"
	12"	2'–0"	4'–0"	2'–0"	4'–0"
	14"	3'–0"	5'–0"	2'–0"	4'–6"
	16"	4'–0"	6'–0"	2'–2"	4'–9"
	20"	4'–0"	7'–0"	2'–8"	6'–4"
	24"	5'–0"	8'–0"	3'–4"	8'–0"
TEES & PLUGS	6"	1'–0"	2'–0"	10"	1'–6"
	8"	1'–9"	2'–6"	1'–1"	2'–0"
	10"	2'–0"	4'–0"	1'–3"	2'–0"
	12"	2'–6"	3'–9"	1'–7"	3'–0"
	14"	3'–0"	5'–0"	2'–0"	3'–0"
	16"	3'–0"	5'–0"	2'–2"	4'–0"
	20"	4'–0"	6'–0"	2'–8"	5'–0"
	24"	6'–0"	9'–0"	3'–4"	5'–0"





SECTION A–A

NOTE

SOIL CONDITIONS SHALL BE VERIFIED BY G. W. FIELD ENGINEER PRIOR TO DESIGN.

DESIGN DATA:

- DIMENSIONS OF THRUST BLOCK IN FEET BASED ON 2000 POUNDS PER SQUARE FOOT SOIL BEARING PRESSURE AND 200 POUNDS PER SQUARE INCH TEST PRESSURE
- CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS. HIGH EARLY CONCRETE SHALL BE USED.

GreenvilleWater

TYPICAL HORIZONTAL THRUST BLOCK

REVISED: 08/02/2013

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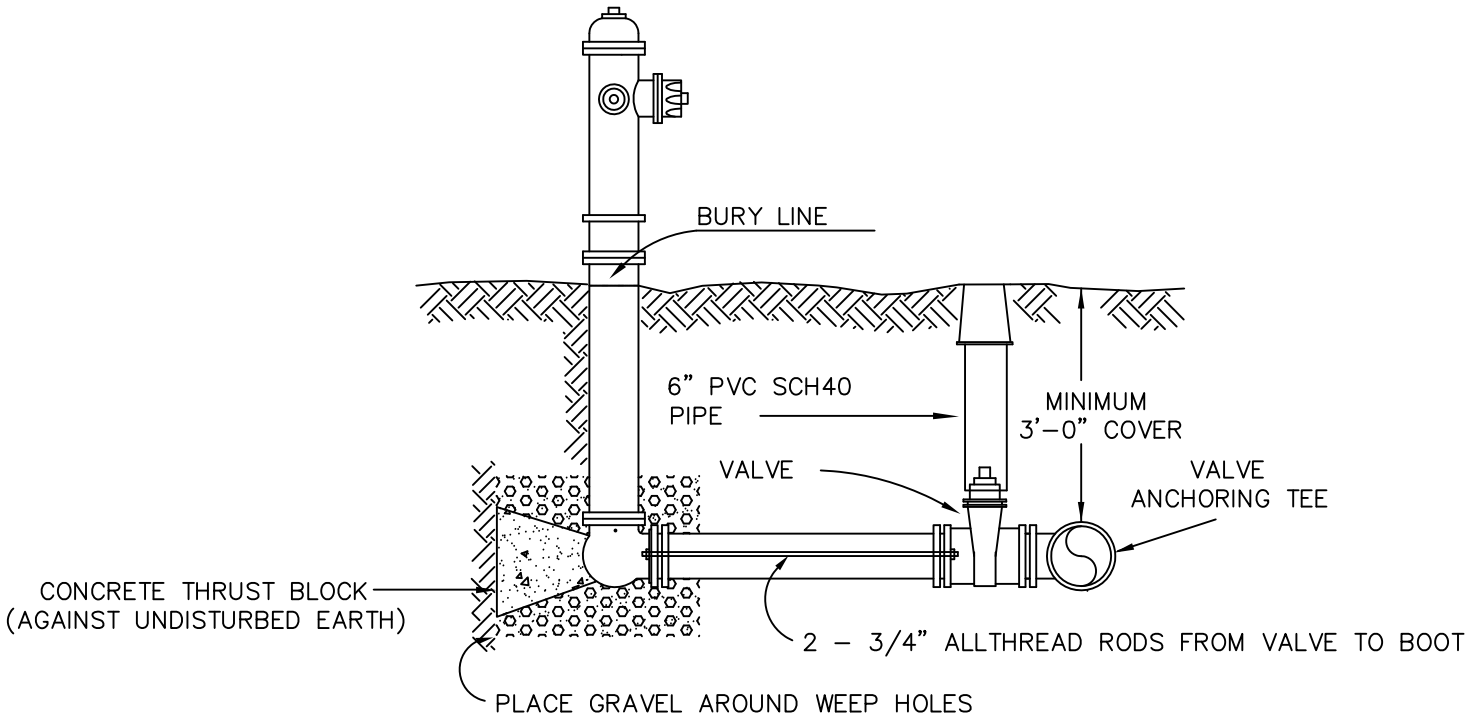


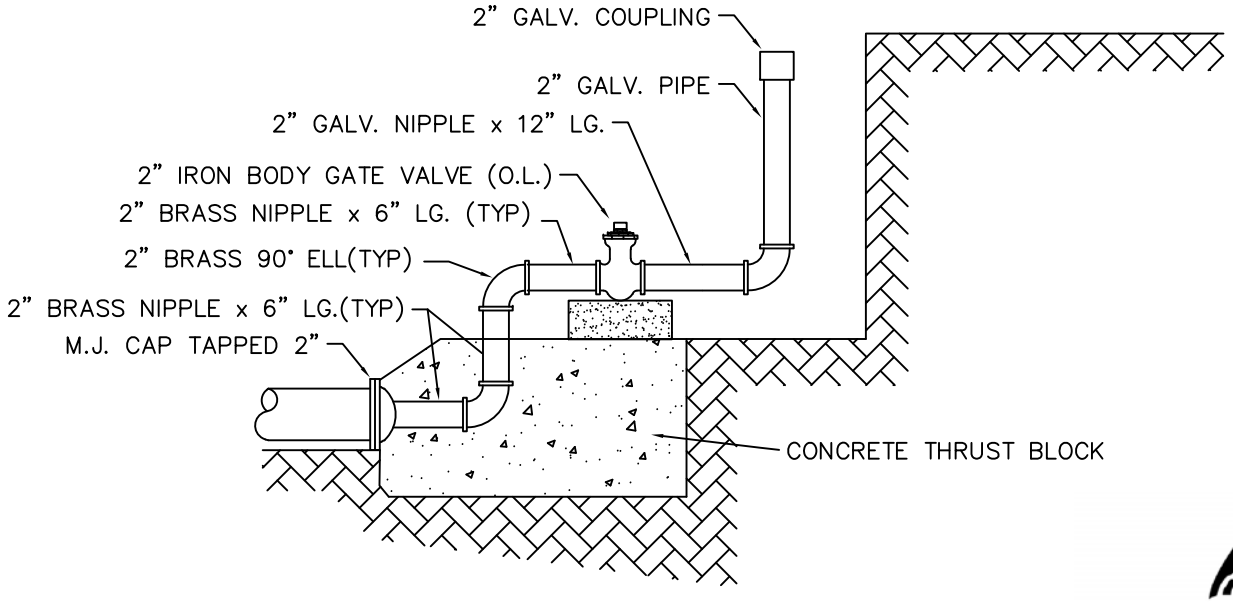
NOTES:

1) FIRE HYDRANT TO BE INSTALLED PLUMB.
2) FIRE HYDRANT TO BE 3-WAY WITH DEPTH OF BURY TO BE DETERMINED BY FIELD CONDITIONS.
3) HYDRANT LEAD TO BE PRESSURE CLASS 350 DUCTILE IRON.
4) WHEN FIRE HYDRANT RESTRAINT BY RODDING NECESSARY, TWO 3/4" ø ALLTHREAD RODS REQUIRED AS A MINIMUM.

GreenvilleWater

TYPICAL HYDRANT INSTALLATION

REVISED: 9/1/2015



NOTE: PRIOR TO BACKFILL, 6" C.I. SOIL PIPE AND VALVE BOX WILL BE PLACED OVER VALVE AND VERTICAL 2" PIPING (BOX ONLY).

GreenvilleWater

2" BLOW-OFF

REVISED: 08/30/2013

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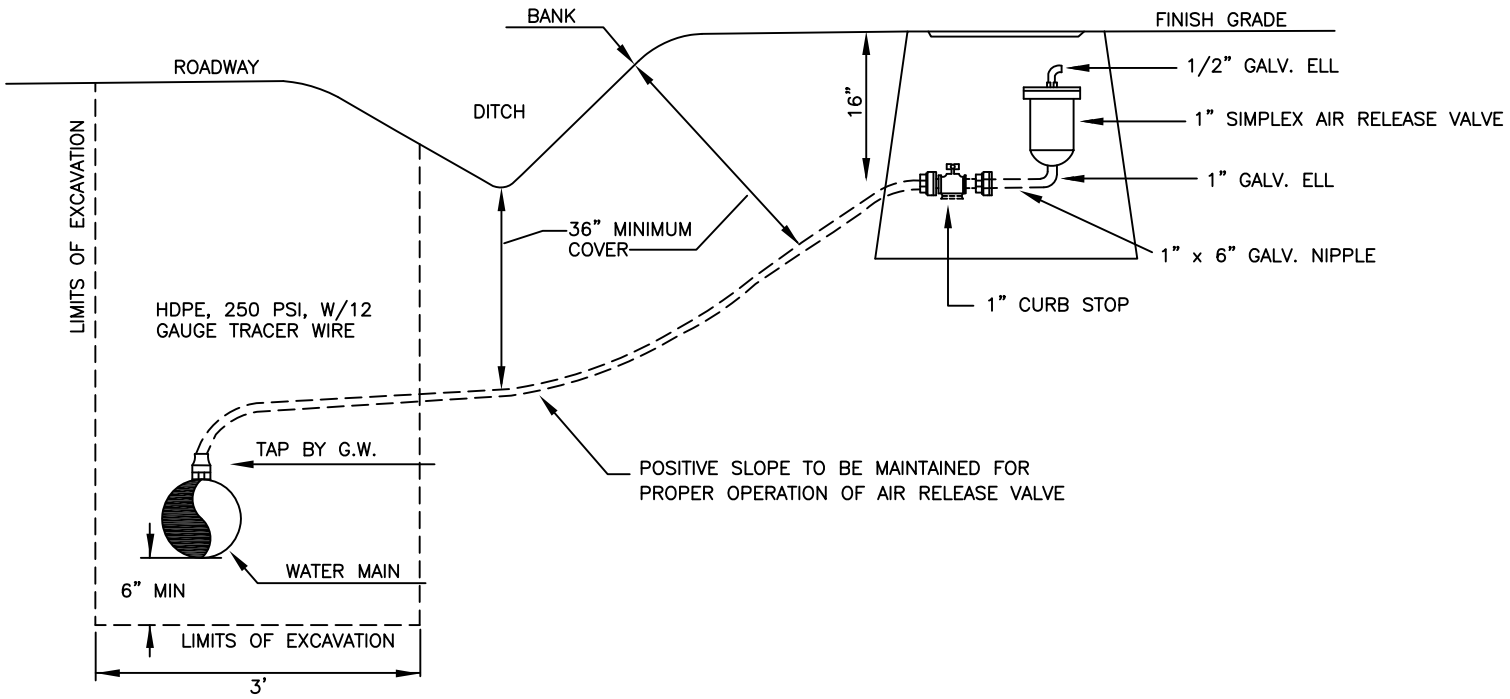

NOTE:
REQUIRED AS DIRECTED ON ALL WATER MAINS 10" AND LARGER.
ALL EXCAVATING TO BE DONE BY CONTRACTOR.
APPROXIMATE SIZE OF HOLE WHERE TAP IS MADE IS 3' X 5' (6" BEHIND AND UNDER MAIN WITH REMAINDER OF EXCAVATION ON TAP SIDE OF MAIN)
PLACE FOR AIR RELEASE BOX 3' X 3' X 21" DEEP.
SERVICE LINE 36" MIN. COVER UNDER ROADSIDE DITCH.
BOX NOT TO BE PLACED IN DRIVEWAY.
CONTRACTOR SHOULD CALL G.W. ENGINEERING TO REPORT WHEN READY FOR TAP TO BE MADE AND AIR RELEASE VALVE TO BE SET.

GreenvilleWater

AIR RELEASE VALVE

(TYPICAL DETAIL)

REVISED: 9/1/2015

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Attachment 4: Permits

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SC DHEC Construction Permit for Water-Wastewater Facilities

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Water Supply Construction Permit
Bureau of Water

S.C. Department of Health and Environmental Control

Permission is Hereby Granted To: **GREENVILLE WATER**
407 W BROAD ST
GREENVILLE SC 29601-1864

for the construction of a distribution system in accordance with the construction plans, specifications, design calculations and the SCDHEC Construction Permit Application signed by John E Reynolds, Professional Engineer, S.C. Registration Number: 11138.

Project Name: **AUGUSTA ROAD WATER MAIN** **County:** Greenville
Location: Augusta Rd. between Donaldson Rd. and Antioch Ch. Rd. & Perimeter Rd. between Ashmore Bridge Rd. and Kitty Hawk Rd.

Project Description: Approximately 8261 LF of 24" DIP water line, 4028 LF of 12" DIP water line, 118 LF of 8" DIP water line, 174 LF of 6" water line, 5 fire hydrants and all associated appurtenances

Service By: Water will be provided by the Greenville Water (System Number: 2310001).

Permit Conditions: All products used for water disinfection must be properly registered for use in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Questions related to the FIFRA registration in labeling in South Carolina must be directed to the Department of Pesticide Regulation administered by the Clemson University Office of Regulatory Services.

Special Conditions:
None

In accepting this permit, the owner agrees to the admission of properly authorized persons at all reasonable hours for the purpose of sampling and inspection.

NOTE: This is a permit for construction only and does not constitute State Department of Health and Environmental Control approval, temporary or otherwise, to place the system in operation. No written approval shall be issued to place a drinking water project into operation until approval is obtained to place any associated wastewater project into operation. An Approval to Place in Operation is required and can be obtained following the completion of construction by contacting the GREENVILLE EQC OFFICE at 864-241-1090. Additional permits may be required prior to construction (e.g., stormwater).

Permit Number: **34937-WS**
Date of Issue: **March 25, 2021**
Expiration Date: Construction must be completed and the Approval to Place in Operation granted prior to **March 25, 2024** or this permit will expire.

Douglas B. Kinard P.E, Director
Drinking Water and Recreational Waters Protection Division

MTH

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SC DHEC Notice of Intent

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Healthy People. Healthy Communities.

May 6, 2021

Nancy Barrett PE
Greenville Water
407 W Broad Street
Greenville, SC 29601

RE: Augusta Road Water Main, Greenville County
NPDES Coverage Number: SCR10Z84H

Dear Nancy Barrett PE:

The Department of Health and Environmental Control (Department or DHEC) has received approval of and the Notice of Intent for the above-referenced project from **GREENVILLE COUNTY**. Based on your submission of this documentation and in accordance with the NPDES General Permit for Stormwater Discharges from Construction Activities SCR100000 (CGP), this project has been granted coverage under the CGP on **May 6, 2021**. This project's general permit coverage number is **SCR10Z84H**. The total disturbed area for this site is **7.4 acres**.

An as-built survey(s), signed and sealed by a S.C. Licensed Land Surveyor or Professional Engineer, should be submitted to **GREENVILLE COUNTY** for all detention structure(s) on this site. The survey(s) should show grades, contours, and depths for all structure(s) and should include the elevations and dimensions of all outlet structures, including but not limited to pipes, orifices, risers, weirs, and emergency spillways. A statement signed by the project's S.C. Registered Engineer indicating that the structure(s) was installed and is operating as shown on approved plans and in approved calculations is required. If the elevations or dimensions of the structures listed above do not match those used in the approved plans, provide a certification statement signed by the project's S.C. Registered Engineer indicating that the structure, as built, will function as shown in approved calculations. A new analysis of the structure (routing) may be necessary. The as-built survey and/ or analysis must be accepted by **GREENVILLE COUNTY** before a Notice of Termination (NOT) can be submitted to the Department.

The CGP can be downloaded at the following website: http://www.scdhec.gov/Environment/docs/CGP-permit.pdf or you may request a copy from us via email (stormwatercgp@dhec.sc.gov). You are responsible for ensuring your contractor(s) complies with the approved SWPPP and the minimum requirements of the CGP. Also, you are responsible for overall compliance with the Storm Water Management and Sediment Reduction Act of 1991 (1991 Act), SC Pollution Control Act, and the Federal Clean Water Act (CWA). Failure to comply with the approved SWPPP or applicable statutes and regulations may result in enforcement actions.

You must notify this DHEC EQC Regional Office prior to starting any land-disturbing activity. The address and telephone number of the EQC office are as follows:

Upstate EA Greenville
200 University Ridge
Greenville, SC 29601
864-372-3273

Inspections of this site must be performed by qualified personnel as described in Section 4.2.E of the CGP.

You should be aware that this approval is only applicable for the Stormwater Pollution Prevention Plan (SWPPP) that was submitted for this project. Any additional construction or land disturbing activity beyond the scope of the approved plans is not authorized. Any future work for this project not shown on the stamped, approved plans will require that you submit another site plan for review and approval. All major modifications require review and approval by **GREENVILLE COUNTY**; the Department must be notified in writing by **GREENVILLE COUNTY** of the approval of major modifications if the disturbed area changes. Minor modifications to the approved SWPPP may be made by the SWPPP preparer and do not require review and approval by the Department; these changes should be signed and dated by the SWPPP preparer. If you have a question about whether a modification is major or minor, contact the Stormwater Permitting Section at (843) 953-4300.

A copy of the stamped, approved SWPPP (including a copy the CGP, contractor certifications, inspection records, rainfall data, etc), NOI, and CGP coverage letter from DHEC must be retained and available at the construction site (or accessible within 30 minutes during normal business hours) from the date of commencement of construction activities to the date of final stabilization. If an on-site location is unavailable to store the SWPPP when no personnel are present, notice of the plan's location must be posted near the main entrance at the construction site.

All contractors who will conduct land-disturbing activities at the site must complete a Contractor Certification Form. You are also responsible for listing all contractors in the SWPPP and for holding a pre-construction conference with each contractor before they can conduct land-disturbing activity at the site.

The Department may conduct periodic inspections of your site. Any violations found during these inspections may result in enforcement action.

This NPDES coverage should be terminated by the permittee when one of the conditions listed in Section 5.1 of the CGP has been met. You must submit a Notice of Termination (NOT) to cancel your NPDES coverage under the CGP. Please see section 5.1 of the CGP for additional information required to be submitted with the NOT.

You are responsible for obtaining any other federal, state, or local permit that may be required for this project. In particular, any permits through the U.S. Army Corps of Engineers for the placement of fill material in Waters of the United States. Please note we have not sent a copy of this letter to any county or city building official. You must send a copy of this letter to these agencies, if necessary.

If material excavated during construction activities leaves the site, a mine operating permit may be needed. You are responsible for contacting the Mining and Reclamation Section to determine if a mining permit is required for the site. The Mining and Reclamation Section can be reached at (803)898-1362 or via e-mail at AskMines@dhec.sc.gov.

Please see the enclosed "Guide to Board Review" document for information about the procedures for appealing this NPDES coverage.

If you have any questions or cannot access the referenced websites, please call me at 803-898-3973.

Sincerely,

Eve Leitzsey

Eve I Leitzsey
Stormwater Permitting Section

CC: John E Reynolds PE, Davis & Floyd Inc
Upstate EA Greenville

South Carolina Board of Health and Environmental Control
Guide to Board Review
Pursuant to S.C. Code Ann. § 44-1-60

The decision of the South Carolina Department of Health and Environmental Control (Department) becomes the final agency decision fifteen (15) calendar days after notice of the decision has been mailed to the applicant, permittee, licensee and affected persons who have requested in writing to be notified, unless a written request for final review accompanied by a filing fee in the amount of $100 is filed with Department by the applicant, permittee, licensee or affected person.

Applicants, permittees, licensees, and affected parties are encouraged to engage in mediation or settlement discussions during the final review process.

If the Board declines in writing to schedule a final review conference, the Department's decision becomes the final agency decision and an applicant, permittee, licensee, or affected person may request a contested case hearing before the Administrative Law Court within thirty (30) calendar days after notice is mailed that the Board declined to hold a final review conference. In matters pertaining to decisions under the South Carolina Mining Act, appeals should be made to the South Carolina Mining Council.

I. Filing of Request for Final Review

1. A written Request for Final Review (RFR) and the required filing fee of one hundred dollars ($100) must be received by Clerk of the Board within fifteen (15) calendar days after notice of the staff decision has been mailed to the applicant, permittee, licensee, or affected persons. If the 15th day occurs on a weekend or State holiday, the RFR must be received by the Clerk on the next working day. RFRs will not be accepted after 5:00 p.m.
2. RFRs shall be in writing and should include, at a minimum, the following information:
   - The grounds for amending, modifying, or rescinding the staff decision;
   - a statement of any significant issues or factors the Board should consider in deciding how to handle the matter;
   - the relief requested;
   - a copy of the decision for which review is requested; and
   - mailing address, email address, if applicable, and phone number(s) at which the requestor can be contacted.
3. RFRs should be filed in person or by mail at the following address:
   South Carolina Board of Health and Environmental Control
   Attention: Clerk of the Board
   2600 Bull Street
   Columbia, South Carolina 29201
   Alternatively, RFR's may be filed with the Clerk by facsimile (803-898-3393) or by electronic mail (boardclerk@dhec.sc.gov).
4. The filing fee may be paid by cash, check or credit card and must be received by the 15th day.
5. If there is any perceived discrepancy in compliance with this RFR filing procedure, the Clerk should consult with the Chairman or, if the Chairman is unavailable, the Vice-Chairman. The Chairman or the Vice-Chairman will determine whether the RFR is timely and properly filed and direct the Clerk to (1) process the RFR for consideration by the Board or (2) return the RFR and filing fee to the requestor with a cover letter explaining why the RFR was not timely or properly filed. Processing an RFR for consideration by the Board shall not be interpreted as a waiver of any claim or defense by the agency in subsequent proceedings concerning the RFR.
6. If the RFR will be processed for Board consideration, the Clerk will send an Acknowledgement of RFR to the Requestor and the applicant, permittee, or licensee, if other than the Requestor. All personal and financial identifying information will be redacted from the RFR and accompanying documentation before the RFR is released to the Board, Department staff or the public.
7. If an RFR pertains to an emergency order, the Clerk will, upon receipt, immediately provide a copy of the RFR to all Board members. The Chairman, or in his or her absence, the Vice-Chairman shall based on the circumstances, decide whether to refer the RFR to the RFR Committee for expedited review or to decline in writing to schedule a Final Review Conference. If the Chairman or Vice-Chairman determines review by the RFR Committee is appropriate, the Clerk will forward a copy of the RFR to Department staff and Office of General Counsel. A Department response and RFR Committee review will be provided on an expedited schedule defined by the Chairman or Vice-Chairman.
8. The Clerk will email the RFR to staff and Office of General Counsel and request a Department Response within eight (8) working days. Upon receipt of the Department Response, the Clerk will forward the RFR and Department Response to all Board members for review, and all Board members will confirm receipt of the RFR to the Clerk by email. If a Board member does not confirm receipt of the RFR within a twenty-four (24) hour period, the Clerk will contact the Board member and confirm receipt. If a Board member believes the RFR should be considered by the RFR Committee, he or she will respond to the Clerk's email within forty-eight (48) hours and will request further review. If no Board member requests further review of the RFR within the forty-eight (48) hour period, the Clerk will send a letter by certified mail to the Requestor, with copy by

regular mail to the applicant, permittee, or licensee, if not the Requestor, stating the Board will not hold a Final Review Conference. Contested case guidance will be included within the letter.
NOTE: If the time periods described above end on a weekend or State holiday, the time is automatically extended to 5:00 p.m. on the next business day.

9. If the RFR is to be considered by the RFR Committee, the Clerk will notify the Presiding Member of the RFR Committee and the Chairman that further review is requested by the Board. RFR Committee meetings are open to the public and will be public noticed at least 24 hours in advance.
10. Following RFR Committee or Board consideration of the RFR, if it is determined no Conference will be held, the Clerk will send a letter by certified mail to the Requestor, with copy by regular mail to the applicant, permittee, or licensee, if not the Requestor, stating the Board will not hold a Conference. Contested case guidance will be included within the letter.

II. Final Review Conference Scheduling

1. If a Conference will be held, the Clerk will send a letter by certified mail to the Requestor, with copy by regular mail to the applicant, permittee, or licensee, if not the Requestor, informing the Requestor of the determination.
2. The Clerk will request Department staff provide the Administrative Record.
3. The Clerk will send Notice of Final Review Conference to the parties at least ten (10) days before the Conference. The Conference will be publically noticed and should:
   - include the place, date and time of the Conference;
   - state the presentation times allowed in the Conference;
   - state evidence may be presented at the Conference;
   - if the conference will be held by committee, include a copy of the Chairman's order appointing the committee; and
   - inform the Requestor of his or her right to request a transcript of the proceedings of the Conference prepared at Requestor's expense.
4. If a party requests a transcript of the proceedings of the Conference and agrees to pay all related costs in writing, including costs for the transcript, the Clerk will schedule a court reporter for the Conference.

III. Final Review Conference and Decision

1. The order of presentation in the Conference will, subject to the presiding officer's discretion, be as follows:
   - Department staff will provide an overview of the staff decision and the applicable law to include [10 minutes]:
     - Type of decision (permit, enforcement, etc.) and description of the program.
     - Parties
     - Description of facility/site
     - Applicable statutes and regulations
     - Decision and materials relied upon in the administrative record to support the staff decision.
   - Requestor(s) will state the reasons for protesting the staff decision and may provide evidence to support amending, modifying, or rescinding the staff decision. [15 minutes] *NOTE: The burden of proof is on the Requestor(s)*
   - Rebuttal by Department staff [15 minutes]
   - Rebuttal by Requestor(s) [10 minutes]

   Note: Times noted in brackets are for information only and are superseded by times stated in the Notice of Final Review Conference or by the presiding officer.
2. Parties may present evidence during the conference; however, the rules of evidence do not apply.
3. At any time during the conference, the officers conducting the Conference may request additional information and may question the Requestor, the staff, and anyone else providing information at the Conference.
4. The presiding officer, in his or her sole discretion, may allow additional time for presentations and may impose time limits on the Conference.
5. All Conferences are open to the public.
6. The officers may deliberate in closed session.
7. The officers may announce the decision at the conclusion of the Conference or it may be reserved for consideration.
8. The Clerk will mail the written final agency decision (FAD) to parties within 30 days after the Conference. The written decision must explain the basis for the decision and inform the parties of their right to request a contested case hearing before the Administrative Law Court or in matters pertaining to decisions under the South Carolina Mining Act, to request a hearing before the South Carolina Mining Council. The FAD will be sent by certified mail, return receipt requested.
9. Communications may also be sent by electronic mail, in addition to the forms stated herein, when electronic mail addresses are provided to the Clerk.

The above information is provided as a courtesy; parties are responsible for complying with all applicable legal requirements.

Greenville County

Greenville County, South Carolina
Stormwater Management / Sediment Control Plan
Land Disturbance Permit Application Form

Usage: ***One (1) Acre or Over and Increasing Flows by One CFS or More and/or Engineered Minimum Projects***
(to be included with SCDHEC's NOI, pages 1 - 3)

RECEIVED DATE:
(for official use only)

DATE: 09/21/2020 PROJECT / SITE NAME: AUGUSTA ROAD WATER MAIN

Primary Tax Map No: 0593.04-01-013.20 Additional Tax Map No's: 0400010101600, 0400010101000, 04000101

Site Address: 7356 AUGUSTA RD, PIEDMONT, 29673

PERMIT #: 2020-0315 PREVIOUS PERMIT NO. *(if previously permitted and / or part of a master plan)*

I. Site Information:

A. Total Site Acreage: 7.40 Disturbed Acreage Amount: 7.40 (disturbed acreage must match all submitted documents)

B. Has Greenville County issued a Notice of Violation to comply for this site or LCP? ☐ Yes ☑ No
If yes, Violation No. _____ Please submit the Unauthorized Land Disturbance Fee and a copy of the Notice of Violation

C. Does this site require Industrial General Permit Coverage? ☐ Yes ☑ No Flood Plain: ☐ Yes ☐ No
If Flood Plain is yes, designate Flood Plain on site plan and provide letter from Flood Plain Manager or municipality with jurisdiction.

D. Jurisdiction: ☑ *Unincorporated or City Limits of:* ☐ Fountain Inn ☐ Mauldin ☐ Simpsonville ☐ Travelers Rest

E. Does this site require a U.S. Army Corps of Engineers (USA COE) Permit? ☐ Yes ☑ No
(If yes, please attach COE Permit with application submittal)

Does this site require a Special Pollutant Abatement Permit (SPA) Permit? ☐ Yes ☑ No
(If yes, please attach SPA Permit with application submittal)

G. Will a Landscape or Tree Protection Plan be filed? ☐ Yes ☑ No *If **yes**, an approval letter must be obtained from Building Codes Planning & Code Compliance Department (commercial), or municipality with jurisdiction, **prior** to Grading Permit Issuance. If **no**, an exemption letter must be obtained from Planning & Code Compliance Department or municipality with jurisdiction, **prior** to Grading Permit issuance.*

II. Signatures and Certifications:

*(Do not sign in **BLACK** ink OR USE Electronic, Scanned, or Copied Signatures)*

A. I hereby certify that all land disturbing construction and associated activity pertaining to this site shall be accomplished pursuant to and in keeping with the terms and conditions of the approved plans. I also certify that a responsible person will be assigned to the project for day-to-day control. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the design system or those directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalities for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I hereby grant authorization to the Department of Health and Environmental Control and/or the local implementing agency the right of access to the site at all times for the purpose of on site inspections during the course of construction and to perform maintenance inspections following the completion of the land disturbing activity.

Nancy Barrett	Nancy Barrett	ENGINEER II	3/18/21
Primary Permittee (Print)	***Signature of Primary Permittee***	***Title / Position***	***Date***

B. Designer Certification - The requested copies of the site plans folded & stapled in sets, all specification and supporting calculations, forms, and reports are herewith submitted and made part of this application. I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of Title 48, Chapter 14 of the Code of Laws of SC, 1976 as amended, and pursuant Regulation 72-300, and County Ordinance: 4698.

Prior to approval, for all permanent stormwater management features, I will submit a statement and an as-built certifying that construction is complete and in accordance with approved plans and specifications. This will be based upon periodic observations of construction and a final inspection for design compliance by me or a representative of my office who is under my supervision. (To be signed by a registered professional responsible for construction)

Check one: X Engineer ____ Tier B, Surveyor ____ Landscape Architect

John Reynolds		11138	2-02-2021
C-SWPPP Preparer (Print)	***Signature of C-SWPPP Preparer***	***S.C. Registration No.***	***Date***

NOTICE OF INTENT (NOI)
For Coverage(s) of Primary Permittees Under South Carolina NPDES General Permit For Stormwater Discharges From Construction Activities SCR100000
(Maintain As Part of On-Site SWPPP)

dhec

For Official Use Only
File Number: ////
Permit Number: SCR10 284H
Submittal Package Complete: _____

Submission of this Notice of Intent constitutes notice that the Applicant identified in Section II intends to be authorized as a Primary Permittee in the state of South Carolina under NPDES General Permit SCR1000000. Fees required for review and NPDES coverage of each application type are as listed on page 2 of the Instructions.

SOUTH CAROLINA
DEPT OF HEALTH AND ENVIRONMENTAL CONTROL
ENVIRONMENTAL QUALITY CONTROL
STORMWATER PERMITTING SECTION
APPROVED - FOR CONSTRUCTION ONLY
DHEC PERMIT #: SCR10284H
FILE #: ////
DATE ISSUED: 5-6-2021
BY: Eric Lindsay

Date: 03/17/2021
Project/Site Name: AUGUSTA ROAD WATER MAIN **County:** GREENVILLE
(Modification or Change of Information Only) **Prior Approved NPDES Permit or File Number:** _____

Do you want this project to be considered for the Expedited Review Program (ERP)? ☐ Yes or ☑ No (See Instructions)

I. Notice of Intent (NOI) Application Type(s)

A. **Project (Application/Review) Type(s)** (Select **ALL** that apply):
- ☑ New Project (Initial Notification) Ongoing Project: ☐ Permitted or ☐ Un-Permitted
- ☐ Late Notification ☐ Low Impact Development (LID) or Project Design Above Regulatory Requirements
- ☐ New Owner/Operator or Company Name Change **(see instructions, attach Form A (Transfer of Ownership))**
- ☐ Major Modification: **(see instructions, attach Form B (Major Modifications))**
- ☑ MS4 Project Review
- ☐ Ocean and Coastal Resource Management (OCRM) Review
- ☐ Change of Information/Other (Specify): _____

B. If Applicable, identify the entity designated as **MS4 Reviewer and MS4 Operator** (i.e., Lexington County, City of Greer, etc.): **MS4 Reviewer** GREENVILLE COUNTY **MS4 Operator** GREENVILLE COUNTY

II. Primary Permittee Information ☐ Change of Information

☐ Person or ☑ Company | If a Company, are you a ☐ Lending Institution or ☑ Government Entity? Company EIN **(if applicable)**: EIN: 57-6000555

A. **Primary Permittee Name:** GREENVILLE WATER
Mailing Address: 407 W. BROAD ST. City: GREENVILLE State: SC Zip: 29601
Phone: 864-241-6132 Fax: _____ Email Address: nbarrett@greenvillewater.com

B. **Contact /ODSA Name** (If different from above OR if owner is a company): Nancy Barrett
Mailing Address: 407 W. BROAD ST. City: GREENVILLE State: SC Zip: 29601
Phone: 864-241-6132 Fax: 864-241-6045 Email Address: nbarrett@greenvillewater.com

C. **Property Owner Name** (If different from above): SOUTH CAROLINA DEPT OF TRANSPORTATION (RIGHT OF WAY)
Mailing Address: 252 S. PLEASANTBURG DR. City: GREENVILLE State: SC Zip: 29607
Phone: 864-241-1024 Fax: _____ Email Address: _____

III. Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) Preparer Information ☐ Change of Information

A, **C-SWPPP Preparer Name:** JOHN E REYNOLDS, PE
B. **Registered Professional** ☑ Engineer ☐ Landscape Architect ☐ Tier B Land Surveyor **S. C. Registration #:** 11138
C. **Company/Firm Name:** DAVIS & FLOYD INC. **S. C. COA # :** C00538
Mailing Address: _____ City: _____ State: SC Zip: _____
Phone: _____ Fax: _____ Email Address: jreynold@davisfloyd.com

IV. Project/Site Information ☐ Change of Information

A. **Type of Construction Activity(ies)** (Select **ALL** that apply):
☐ Commercial ☐ Industrial ☐ Institutional ☐ Mass Grading ☑ Linear ☑ Utility/Infrastructure
☐ Residential: Single-family ☐ Residential: Multi-family ☐ Multi-use (Commercial & Residential)
☐ Site Preparation (No New Impervious Area) ☐ Other (Specify) _____

B. **Site Address/Location** (street address, nearest intersection, etc.) 7356 AUGUSTA RD. - 1451 DONALDSON RD.
City/Town (If in limits): PIEDMONT, SC Zip Code: 29673
Latitude: 34 ° 43 ' 39 " N Longitude: - 82 ° 23 ' 20 " W (Source): ☐ GPS ☑ Web Site: SC DHEC WQ MAP
Tax Map Number (s) (List all): 0593.04-01-013.20, 0400010101600, 0400010101000, 0400010101500

C. Is this site located on **Indian Land?** ☐Yes ☑No

D. **Proposed Start Date:** 4/15/2021 **Proposed Completion Date:** 12/31/2021

E. **Disturbed Area** (nearest tenth of an acre): 7.4 **Total Area** (acres): 7.4

F. **Modification Only:**(nearest tenth of an acre): **Disturbed Area: Current (Approved) Area:** _____
Disturbed Area Change (Increase Only): _____ **Total Disturbed Area (After Change):** _____

G. Is this project part of a **Larger Common Plan for Development or Sale (LCP)?** ☐ Yes ☑ No
LCP/ Overall Development Name: _____ Check here if this is the **First Phase.** ☐

Previous State Permit/File Number: _____ **Previous NPDES Coverage Number:** SCR10 _____

H. Any **Flooding Problems** exist downstream of or adjacent to this site? ☐Yes☑No (If yes, provide detailed description of flooding problems and applicable floodway/flood zone information in the C-SWPPP).

I. Active **S.C. DHEC Warning Notice, Notice to Comply or Notice of Violation** for this site or LCP? ☐Yes ☑No

J. List Relevant **State and Federal Environmental Permits or Approvals** applied for or obtained for this site (e.g., **RCRA, USACOE, Nationwide,** etc.). **If None, list None.**

_____

K. **Any Waiver(s)/Variances/Exceptions Requested for this Project?** (If yes, identify below and include **Waiver Request and Justifications** in the C-SWPPP for each proposed request).

1. Small Construction Activity Waiver(s) From NPDES permitting **(Section 1.4 & Appendix B)?** ☐ Yes ☑ No
If yes, identify requested waiver: ☐ Rainfall Erosivity Waiver ☐ TMDL Waiver ☐ Equivalent Analysis Waiver

2. Detention Waiver **(72-302(B)?** ☐ Yes ☑ No | 3. Other (Specify): _____

V. Waterbody Information (Attach additional sheet(s) as needed) ☐ Change of Information

A. **Receiving Waterbody(s) (RWB) Information** (List the nearest and next nearest receiving waterbodies to which the sites stormwater discharges will drain. If stormwater discharges drain to multiple waterbodies, list all such waterbodies).

1. Name of Receiving Waterbodies (RWB)	2. Distance to RWB (feet)	3. Classification of RWB
a. Nearest: OLD GROVE BRANCH / HUFF CREEK	1,400 LF / 0 LF	FW
b. Next Nearest: GROVE CREEK,	13,200 LF	FW
c. Coastal Zone ONLY: Coastal Receiving Water (CRW): _____		Not Applicable
d. Other Waterbodies: _____		

B. **Waters of the U.S. / State Information** (Attach additional sheet(s) as needed)

Waters of the U.S./ State	1. On the site?	2. Delineated/ Identified?	3. Impacts?	4. Amount of impacts
a. Jurisdictional wetlands	☑Yes ☐No	☑Yes ☐No	☐Yes ☑No	____ Ac
b. Non-jurisdictional wetlands	☐Yes ☑No	☐Yes ☐No	☐Yes ☐No	____ Ac
c. Other Water(s): _____	☐Yes ☑No	☐Yes ☐No	☐Yes ☐No	____ Ac ____ Feet
d. Coastal Zone ONLY: Direct Critical Area	☐Yes ☑No	☐Yes ☐No	☐Yes ☐No	____ Ac ____ Feet

5. If yes for Impacts in B.3, describe each impact and activity, and list all permits (e.g., USACOE Nationwide Permit, DHEC General Permit) and certifications that have been applied for or obtained for each impact:

C. **S.C. Navigable Waters (SCNW) Information (Section 2.6.5)** The Department will address any issues related to State Navigable Waters' Program under SC Regulation 19-450 during the review of the C-SWPPP for activities that will **NOT** require a 404 permit or a 401 certification. (Attach additional sheet(s) as needed).

1. **Are S. C. Navigable Waters (SCNW) on the site:** ☐Yes ☑ No
a. If no, do not complete this question. Proceed to Section D (Impaired Waterbodies).
b. If yes, provide the name of S.C. Navigable Waters (SCNW) on the site: _____

2. If **yes for C.1**, will construction activities cross over or occur in, under, or thru the SCNW? ☐Yes ☐ No
If yes, describe SCNW activities (e.g., road crossing, sub-aqueous utility line, temporary or permanent structures, etc.) and proceed to Section C.3: _____

3. Identify permits providing coverage of SCNW activities proposed for your site. If NONE, list none.

Permits/Certifications	Permit or Certification No.	Corresponding Covered SCNW Activity(ies)
a. DHEC General/ Other DHEC Permit		
b. USACOE 404 Permit or 401 Certification		
c. SCNW Permit If applied for or issued, identify Date applied for or issued: _____		☐ All Activities or ☐ Some Activities (Describe):

d. If a SCNW Permit has NOT been applied for provide an additional plan sheet that shows plan and profile views (drawn to scale) of the SCNW and associated activities. Include a description of all proposed activities on this plan.

D. Impaired Waterbodies Information (Attach additional sheet(s) as needed)

1. 303(d) Listed Impaired Waterbodies

a. Name of Nearest DHEC Water Quality Monitoring Stations (WQMS)(s) that receives stormwater from your construction site and/or thru an MS4 and the Name of the Corresponding Waterbody?		b. Is this WQMS(s) listed on the most current 303(d) list? If No, proceed to Section 2 of this table. If Yes, complete items c thru f.	c. List the pollutant(s) identified as "CAUSES" of the impairment	d. Will any pollutants causing the impairment be present in your site's construction stormwater discharges?	e. If yes for d, list the "USE SUPPORT" impairment(s) affected by the pollutant(s) identified in c.
Nearest DHEC WQMS(s)	Corresponding Waterbody				
S-774	GROVE CREEK	☑ Yes ☐ No	FECAL	☐ Yes ☑ No	
S-983	HUFF CREEK	☐ Yes ☑ No		☐ Yes ☐ No	
		☐ Yes ☐ No		☐ Yes ☐ No	

f. If yes for d above, will use of the BMPs proposed for your project ensure the site's discharges will NOT contribute to or cause further WQS violations for the impairment(s) listed in c? ☐ Yes ☐ No
(NOTE: If no for f, this site is NOT eligible for coverage under the CGP). See Instructions.

2. TMDL Impaired Waterbodies

a. Name of Nearest DHEC Water Quality Monitoring Stations (WQMS)(s) that receives stormwater from your construction site and/or thru an MS4?	b. Has a TMDL(s) been developed for this WQMS(s)? If No, identify as such below and proceed to Section VI. If Yes, complete items c thru f of this table.	c. If yes for b, what pollutants are listed as "CAUSES" or causing the impairment?	d. If yes for b, has the standard been "ATTAINED" or "Fully Supported" for the impairment(s)?	e. If no for d (Not Attained), will any pollutants causing the impairment be present in your site's construction stormwater discharges?
S-774	☑ Yes ☐ No	FECAL	☐ Yes ☑ No	☐ Yes ☑ No
	☐ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No
	☐ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No

f. If yes for e above, are your discharges consistent with the assumptions and requirements of the TMDL(s)? ☐ Yes ☐ No
(NOTE: If no for f, this site is NOT eligible for coverage under the CGP). See Instructions.

VI. Signatures and Certifications DO NOT SIGN IN BLACK INK!

Read the Certifications below (in entirety). Provide date, printed name, and signatures below. If you are a New Owner/Operator, as Primary Permittee you must also sign and date the applicable Comprehensive SWPPP Acceptance & Compliance Agreement below.

C-SWPPP PREPARER: "One copy of the C-SWPPP, all specifications and supporting calculations, forms, and reports are herewith submitted and made a part of this application. I have placed my signature and seal on the design documents submitted signifying that I accept responsibility for the design of the system. Further, I certify to the best of my knowledge and belief that the design is consistent with the requirements of Title 48, Chapter 14 of the Code of Laws of SC, 1976 as amended, pursuant to Regulation 72-300 et seq. (if applicable), and in accordance with the terms and conditions of SCR100000." **(This should be the person identified in Section III).**

JOHN E. REYNOLDS, PE — **Printed Name of C-SWPPP Preparer**

Signature of C-SWPPP Preparer

11138 — **S. C. Registration #**

PRIMARY PERMITTEE: "I or I (on behalf of my company and its contractors and agents), as the case may be, certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I understand that DHEC enforcement actions may be taken if the terms and conditions of the C-SWPPP are not met and I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

"I or I (on behalf of my company and its contractors and agents), as the case may be, also hereby certify that all land-disturbing construction and associated activity pertaining to this site shall be accomplished pursuant to and in keeping with the terms and conditions of the approved plans and SCR100000. I also certify that a responsible person will be assigned to the project for day-to-day control. I hereby grant authorization to the to S. C. Department of Health and Environmental Control (DHEC) and/or the local implementing agency the right of access to the site at all times for the purpose of on site inspections during the course of construction and to perform maintenance inspections following the completion of the land-disturbing activity." **(See Section 122.22 of S.C. Reg. 61-9 for signatory authority information.)** Having understood the above information, I am signing this certification as Primary Permittee to the aforementioned NPDES general permit."

Nancy Barrett, P.E. — **Printed Name of Primary Permittee**

Signature of Primary Permittee

Engineer II — **Title/Position**

3/17/2021 — **Date Signed**

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Greenville County Land Disturbance Permit

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Greenville County Encroachment Permit

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SCDOT Encroachment Permit

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SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
Encroachment Permit

Permit No : 245226
Permit Decision Date : 5/28/2021
Expiration Date : 5/28/2022

Type Permit : WATER

Location:

District	Work County	Type	Route	Aux	Begin MP	End MP
3	Greenville, SC	US	25	None	19.688	18.105
3	Greenville, SC	S-	83	None	5.054	5.054

Contact Information

Applicant: GREENVILLEWATER Phone:
Contact: Nancy Barrett
Address: 407 WEST BROAD ST.,
City: GREENVILLE State: SC Zip: 29601

Comments

The new water line will be installed on the east side of the road within the right of way starting at the intersection of Augusta Rd and Donaldson Rd (S-23-27) and ending at the intersection of Antioch Church Rd. (S-23-331). The new water line will also cross Harris Rd. (Greenville County E38) and Sterling Grove Rd. (S-23-83). Waterline installation. 8262 LF 24" DIP water line to connect to existing line with blow off and air release valves. Approximately 700 LF will be installed in the right handnorthbound lane of Hwy 25 due to the proximity of an existing business and high bank. The 125 LF will also be in the roadway to line up with the existing pipe.

Special Provisions:

0004 - SCDOT SHALL BE NOTIFIED WHEN WORK DEFINED IN THE PERMIT STARTS AS WELL AS WHEN THE WORK IS COMPLETED. REFERENCE SHALL BE MADE BY PERMIT NUMBER.

0101 - SHOULDER SOD DESTROYED BY THIS INSTALLATION TO BE REPLACED FOR THE ENTIRE AREA. THE AREA SHALL BE RE-SHAPED AND ROLLED TO THE CROSS SECTION EXISTING PRIOR TO THIS WORK.

0102 - BORE PITS SHALL BE CLOSED IMMEDIATELY AFTER INSTALLATION.

0103 - THE PROPOSED ENCROACHMENT SHALL BE TRENCHED TO A MINIMUM DEPTH OF 42" BELOW THE CROSS SECTION AS ORIGINALLY CONSTRUCTED.

0104 - ALL VALVES AND MANHOLES SHALL CONFORM TO THE EXISTING ELEVATION OF THE ROADWAY OR SHOULDER AND CONFORM TO THE ACCEPTED STANDARD. THE VALVES WILL BE LOCATED OUT OF THE

PAVEMENT. THEY SHALL NOT BE PLACED IN A DITCH FLOW LINE.

0105 - ALL EXCAVATED MATERIAL SHALL BE PLACED ON THE SIDE OF THE TRENCH AWAY FROM THE TRAVELED ROADWAY, AND SHALL BE NO CLOSER THAN FIFTEEN (15) FEET TO THE EDGE OF PAVEMENT.

0107 - TRENCH TO BE PROPERLY BACK-FILLED AND THOROUGHLY TAMPED. THE ENTIRE DISTURBED AREA SHALL BE RE-SHAPED AND DRESSED OUT IN A WORKMANSHIP LIKE MANNER.

0108 - FLOWABLE FILL SHALL BE USED AS BACK-FILL MATERIAL.

0109 - THE BORE SHALL BE MADE BY THE DRY BORE METHOD IN SUCH A MANNER AS NOT TO DISTURB THE PAVEMENT. THE BORE PIT MUST NOT BE CLOSER THAN FIVE (5) FEET FROM THE EDGE OF PAVEMENT. THE BORE DEPTH SHALL BE NOT LESS THAN 48" DEEP AT ANY POINT IN THE BORE. NOTICE SHALL BE GIVEN TO THE DEPARTMENT IMMEDIATELY IF THE BORE TURNS AND DAMANGES THE ROAD.

0111 - OPEN CUTS AND/OR BELL HOLES WITHIN THE ROAD PAVEMENT SHALL BE CUT IN NEAT LINES AND REPAIRED.

0112 - ALL WATER METERS, AIR VALVES, ELECTRIC TRANSFORMERS, CATV CONNECTION BOXES, TELEPHONE PEDESTALS, AND/OR OTHER UTILITY/SPLICE BOXES SHALL BE PLACED AT THE RIGHT-OF-WAY LINE.

0115 - WHERE PAVEMENT IS CUT THE WORK SHALL BE DONE IN CLEAR WEATHER WHEN TRAFFIC IS LIGHTEST. THERE SHALL BE NO TRENCH LEFT OPEN IN THE TRAVELED WAY WHEN WORK IS NOT IN PROGRESS.

0116 - PAVEMENT SHALL BE CUT TO NEAT LIES AND THE TRENCH BACK-FILLED USING FLOWABLE MATERIAL AND TAMPED IN 6" LAYERS TO 95% DENSITY.

0117 - OPEN TRENCHES SHALL BE COVERED WITH METAL PLATES WHEN THE PAVEMENT CANNOT BE RESTORED THE SAME DAY. PLATES SHALL BE MONITORED PERIODICALLY TO ENSURE THAT THE TRENCH IS PROPERLY COVERED.

0118 - AN OPEN CUT IS AUTHORIZED ONLY TO THE EXTENT NECESSARY TO MAKE A CONNECTION TO THE EXISTING LINE. DRY BORE UNDER REMAINING ROAD TO THE EXISTING LINE.

0119 - INSTALLATION TO BE MADE BY THE WET OR DRY BORE METHOD IN SUCH A MANNER AS NOT TO DISTURB EXISTING PAVEMENT.

0120 - RESTORATION OF PAVEMENT, SHOULDERS, DITCHES, ETC., TO BE PERFORMED AS SOON AS POSSIBLE AFTER CONSTRUCTION, OR SCHEDULED SO THAT THE CONSTRUCTION IS NO FURTHER THAN 2,000 L.F. AHEAD OF COMPLETE RESTORATION.

0121 - BELL HOLE CUT MUST BE COVERED WITH A STEEL PLATE UNTIL A PERMANENT PATCH HAS BEEN MADE. PLATE SHALL BE MONITORED PERIODICALLY TO ENSURE THAT BELL HOLE IS PROPERLY COVERED.

0123 - ALL WORK PERFORMED IN CONNECTION WITH THIS PERMIT SHALL CONFORM TO THE SCDOT "A POLICY FOR ACCOMODATING UTILITIES ON HIGHWAY RIGHT-OF-WAY" MOST CURRENT EDITION.

0125 - ALL CROSSLINE PIPES ARE TO BE LOCATED AND FLAGGED PRIOR TO BEGINNING OPERATION.

0205 - WORK SHALL BE SCHEDULED SO THAT PERMANENT REPAIR OF THE

ROAD WILL BE COMPLETED WITHIN 24 HOURS.

0209 - DISTURBED VEGETATION SHALL BE RESEEDED ACCORDING TO THE SPECIFICAION FOR HIGHWAY CONSTRUCTION.

0301 - THE DITCHES AND/OR SHOULDERS DISTURBED DURING THE INSTALLATION SHALL BE RE-ESTABLISHED TO PROPER GRADE, ORIGINAL CROSS SECTION, STABILIZED, AND ALL DRAIN PIPES CLEARED.

0302 - NO EXCAVATION SHALL BE LEFT OPEN ALONG HIGHWAY.

0303 - THE ENTIRE DISTURBED AREA SHALL BE TOP-SOILED USING 3" OF SELECTED MATERIAL AND RE-GRASSED TO SCDOT SPECIFICATIONS.

0304 - PAVEMENT MARKINGS ALTERED DURING THIS INSTALLATION SHALL BE RESTORED BY THE APPLICANT.

0305 - FLASHING ARROW BOARDS SHALL BE USED FOR ALL LANE CLOSURES ON PRIMARY ROUTES AND/OR ROADS WITH HIGH TRAFFIC VOLUMES.

0306 - TRAFFIC CONTROL, LIGHTS, SIGNS AND FLAG-MEN WILL BE FURNISHED BY APPLICANT AND WILL CONFORM TO PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

0308 - WORK SHALL NOT BE PERFORMED DURING THE HOURS OF 7-9 AM OR 4-6 PM.

0310 - FIELD CHANGES, IF NECESSARY, MUST BE APPROVED IN WRITING BEFORE ACTUAL CONSTRUCTION OF PROPOSED CHANGES.

0311 - SEDIMENT AND EROSION CONTROL DEVICES SHALL BE USED TO MINIMIZE THE MOVEMENT OF SEDIMENT.

0312 - THE PERMITTEE SHALL HOLD THE DEPARTMENT HARMLESS FOR DAMAGES TO BOTH UPSTREAM AND DOWNSTREAM PROPERTIES.

0316 - ALL NON-PERMITTED OBJECTS ON THE RIGHT-OF-WAY, WHICH MUST BE REMOVED, SHALL NOT BE REPLACED ON THE RIGHT-OF-WAY WITHOUT WRITTEN PERMISSION OF THE DEPARTMENT.

0318 - THE APPLICANT SHALL BE RESPONSIBLE FOR IMMEDIATE REMOVAL OF SUCH TRAFFIC HAZARDS AS MUD, DEBRIS, LOOSE STONE, AND TRASH AS MAY BE WASHED OR SPILLED ON THE TRAVELED ROADWAY AS A RESULT OF THE PROPOSED WORK.

0320 - ALL DEBRIS TO BE CLEARED FROM THE RIGHTS-OF-WAY WITHIN TEN (10) DAYS.

9999 - See Attached for Additional Special Provisions

South Carolina
Department of Transportation

Additional Special Provisions for
Permit # 23-20-245226

1. ***Applicant/contractor is to notify Greenville Maintenance – Permits Department at 864-241-1224 when work is scheduled to begin and when work is completed***
2. **Applicant is to notify Greenville Maintenance** ***prior to any work beginning – Greenville Water is to provide the paving contractor information with a certificate of liability insurance to the Permits Department immediately***
3. This permit does not approve any work outside the SCDOT right-of-way
4. ***No work or traffic control allowed between the hours of 7-9AM and 4-6PM***
5. Traffic control measures shall be installed and maintained by the applicant/contractor according to SCDOT standard drawings
6. Traffic control shall not be left in place when no workers are present
7. ***All disturbed areas shall be restored and re-seeded as needed***
8. ***Flaggers should be properly trained and equipped (radios, stop/slow paddles, vests and cones)***
9. If revisions need to be made to this approved permit, applicant is to contact SCDOT immediately ***before*** proceeding with any road cuts
10. No open excavation left along the roadway pavement
11. The applicant shall fill in/cover the excavation with a steel plate or place barricades around the excavation at the end of each work day if the work is not completed
12. All backfill shall be placed in 6 inch layers and compacted to 95% AASHTO using mechanical tamping equipment
13. Placement of equipment and/or materials shall not block sight distance from driveways and/or intersections
14. ***The applicant shall mill and overlay all roads under this permit according to approved plans submitted***
15. If after initial restoration applicant has 3 or more perpendicular cuts are made within 200 LF SCDOT will require applicant to mill and overlay starting 10 feet before the start of the trench and 10 feet past the end of the trench for the full lane of travel
16. Final repair to the roadway must be squared up with the center line of the road and the edge of pavement. No irregular cuts are allowed
17. ***No pavement cuts other than those approved within this permit shall be allowed. Any additional cuts to the pavement shall be considered illegal and will result in the permittee being required to resurface the roadway according to the attached drawing***
18. ***Minimum cover of 48 inches under the roadway pavement***
19. Minimum 2 foot offset from any drainage structure and/or guardrail installation
20. Valves shall be placed at the right-of-way line and not interfere with the normal maintenance of the right-of-way
21. Valves shall conform to the existing elevation of the shoulder, sidewalk, or travel lane
22. Dirt, debris and concrete shall be removed from the shoulder of the road immediately
23. The bore shall be made by the ***dry bore*** method only (No liquids including water)
24. ***Bore pits shall be a minimum of 5 feet from the edge of pavement and closed immediately***

Greenville Maintenance
13 Saluda Dam Road
Greenville, South Carolina 29611

Phone: (864) 241-1224
Fax: (864) 295-8347

25. Notify this office if the bore damages the roadway or shoulders
26. Meters, valves, etc. shall conform to the existing elevation of the shoulder and/or travel lane
27. Meters, valves, etc. shall be placed at the right-of-way line and not interfere with maintenance of the right-of-way
28. Backflow preventers, plumbing connections for irrigation, etc. shall be off the right-of-way (only the perpendicular run of service line allowed in the right-of-way except for fire hydrant)
29. Saw cut all materials to be removed to minimize damage to surrounding materials
30. The road cut shall be maintained for 2 years but SCDOT shall not be responsible for any claims or damage arising out of the utility cut indefinitely or until the road is resurfaced
31. Road shall be repaired within 48 hours of completing work within pavement limits
32. The applicant shall try to make the cut so that the edge of the patch is located outside the wheel path of traffic
33. Road cut may not be filled with gravel and the lane reopened to traffic without placing a steel plate over the road cut to be repaired
34. Refer to Appendix B, Figure 4 "Open Cut Repair For High Volume Asphalt Pavement" detail of the Utilities Accommodations Manual (2019 edition) to repair the road cut
35. Steel plates shall be used to cover any excavation or road cut that has not been repaired
36. Steel plates shall be a minimum of three-quarters of an inch in thickness
37. Secure steel plates to avoid movement due to traffic
38. ***Encase the carrier pipe to the right-of-way***
39. ***Encasement pipe shall be sealed on both ends***
40. ***Remove steel plates from the road once materials have properly cured (Steel plates shall not remain in the road for more than 48 hours)***
41. Schedule work so that steel plate is not left in the road over the weekend or holiday (If steel plate has to be left over the weekend/holiday, the contractor shall monitor and reposition the steel plate if it shifts as needed over the weekend/holiday)
42. Restore damaged/removed pavement markings per SCDOT standards (thermoplastic)
43. Shoulders and ditches disturbed by this work shall be returned to proper grade, all ditches and pipes cleared of any debris and all disturbed vegetation shall be reseeded

Application for Encroachment Permit

Application Number: 200089223 **Permit Number: 23-20-245226**

S.C. Department of Transportation

Form 637 (Rev 09/2015)

Contact Information

Applicant:	GREENVILLE WATER
Street:	407 WEST BROAD ST.
City:	GREENVILLE
State:	SC **Zip Code:** 29601
Phone:	(864)241-6000 **Fax:**
Email:	nbarrett@greenvillewater.com
Contact:	Nancy Barrett

Project Location

Primary County: **Greenville**

County	Road Name
Greenville	**Augusta Rd (US 25)**

1. Type of Encroachment: WATER

Utility: Water line installation.
8262 lf of 24" DIP water line to connect to existing line with blow off and air release valves. Approximately 700 LF will be installed in the right hand northbound lane of Hwy 25 due to the proximity of an existing business and high bank. The 125LF will also be in the roadway to line up with the existing pipe(CONTINUED ON ADDENDUM)

2. Description of Location:

The new water line will be in stalled on the east side of the road within the right of-way starting at the intersection of Augusta Rd and Donaldson Rd (S-23-27) and ending at the intersection of Augusta Rd and Antioch Church Rd. (S-23-331). The new water line will also cross Harris Rd.(Greenville County E 38) and Sterling Grove Rd. (S-23-83)(CONTINUED ON ADDENDUM)

(Attach sketch indicating roadway features such as: pavement width, shoulder width, sidewalk and curb and gutter location, significant drainage structure, north arrow, right of way width, and location of the proposed encroachment with respect to the roadway centerline and the nearest intersecting road on the State system.)

Customer Agreement

3. **The undersigned applicant hereby requests the SCDOT to permit encroachment on th right of way as described herein. It is expressly understood that the encroachment, if a constructed, shall be installed in accordance with the sketch attached hereto and ma hereof. The applicant agrees to comply with and be bound by the SCDOT's "A P Accommodating Utilities on Highways Rights of way", "Standard Specifications for Construction", the "General Provisions" and "Special Provisions", attached hereto o part hereof by reference, during the installation, operation and maintenance encroachment within the SCDOT's Right of Way. DISCHARGES OF STORM WAT NON-STORM WATER: Work within State Highway right-of-way shall be cond compliance with all applicable requirements of the National Pollutant Discharge El System (NPDES) permit(s) issued to the Department of Transportation (Department), the discharge of storm water and non-storm water from its properties. Work shall a compliance with all other applicable Federal, State and Local laws and regulations, and Department's Encroachment Permits Manual and encroachment permit. The encr permit will not be issued until the applicant has received an NPDES construction per SC Department of Health and Environmental Control.**

The applicant agrees to comply with all current SCDOT Standards Specifica Highway Construction including all Supplemental Technical Specificatio applicant hereby further agrees, and binds his/her/its heirs, personal represe successors, assigns, to assume any and all liability for accidents or injuries to or damage to property, including the highway, that may be caused construction, maintenance, use, moving or removing of the physical appur contemplated herein.

Applicant's Name: Greenville Water NANCY BARRETT **Date:** 12/23/2020

(Please print or type)

Applicant's Sig: Nancy Barrett **Title:** ENGINEER II

For Office Use Only

For Office Use Only

In accordance with your request and subject to all the provisions, terms, conditions, and stated in the application and the general and special provisions attached hereto, the SCDOT hereb your application for an encroachment permit. This permit shall become null and void unless contemplated herein shall have been completed prior to: 5/28/2022.

☐ **See Attached Special Provision and/or Permit Requirements**

NPDES Permit Nbr:

(Date received by res. Maint. Engr.) **(SCDOT Approval)**

Application for Encroachment Permit
General Provisions

1. **DEFINITIONS: The word "Permittee" used herein shall mean the nam person, firm, or corporation to whom this permit is addressed, his, her, it personal representatives, successors and assigns. The word "DEPARTMEN mean the South Carolina Department of Transportation.**
2. **NOTICE PRIOR TO STARTING WORK: Before starting the work conte herein within the limits of the highway right of way, the Department's Maintenance Engineer in the county in which the proposed work is located notified 24 hours in advance so that he may be present while the work is under**
3. **PERMIT SUBJECT TO INSPECTION: This permit shall be kept at the si work at all times while said work is under way and must be shown representative of the Department or law enforcement officer on demand.**
4. **PROTECTION OF HIGHWAY TRAFFIC: The applicant shall be responsibl protection of the highway traffic at all times during the construction, main removing or moving of the encroachment permitted herein. Detours, ba warning signs and flagmen, as necessary,**
   shall be provided by and at the expense of the Permittee and shall be in acc with the "Manual on Uniform Traffic Control Devices" (MUTCD). The work planned and carried out so that there will be the least possible inconvenien motoring public. The Permittee agrees to observe all rules and regulation Department while carrying on the work contemplated herein and take a precautions that circumstances warrant.
5. **STANDARDS OF CONSTRUCTION: All work shall conform to the Depa standards of construction and shall be performed in a workman-like man applicant shall make adequate provisions for maintaining the proper drainag highway as it may be affected by the encroachment permitted herein. All wo be subject to the supervision and satisfaction of the Department.**
6. **FUTURE MOVING OF PHYSICAL APPURTENANCES: If, in the opinio State Highway Engineer, it should ever become necessary to move or ren physical appurtenances, or any part thereof contemplated herein, on acc change in location of the highway, widening of the highway, or for any other s reason, such moving shall be done on demand of the Department at the expen Permittee, unless the Permittee has prior rights.**
7. **RESTORATION OF HIGHWAY FACILITIES UPON MOVING OR REM OF PHYSICAL APPURTENANCES: If, and when, the physical appur contemplated herein shall be moved or removed, either on the demand Department or at the option of the Permittee, the highway and faciliti immediately be restored to their original condition at the expense of the Pe unless the Permittee has prior rights, if any.**
8. **COSTS: All work in connection with the construction, maintenance, mo removing of the physical appurtenances contemplated herein shall be done b the expense of the Permittee.**
9. **ADDITIONAL PERMISSIONS:**

(a) It is distinctly understood that this permit does not in any way grant or rel rights lawfully possessed by the abutting property owners. The Permittee sha any such rights, as necessary, from said abutting property owners.

(b) The Permittee shall be responsible for obtaining all other approvals or necessary for installation of the encroachment from other government entities.

(c) There shall be no excavation of soil nearer than two feet to any public utilit appurtenant facility except with the consent of the owner thereof, or exce special permission of this Department after
an opportunity to be heard is given the owner of such line or appurtenant facil

10. ADDITIONAL WORK PERFORMANCE:
(a) All crossings over the highway shall be constructed in accordan "Specifications for Overhead Crossings of Light and Power Transmission Li Telegraph Lines over each other and over Highway Rights of Way in South Ca as approved by the Public Service Commission of South Carolina and effect date of this permit.
(b) All tunneling, boring, or jacking shall be done in such a way as not to dis highway surfacing.
(c) No pavement shall be cut unless specifically authorized herein.
(d) No excavation shall be nearer than three feet to the edge of pavemen specifically authorized herein.
(e) Underground facilities will be located at minimum depths as defined in the Accommodations Manual" for the transmittant, generally as follows: 4 feet m for hazardous or dangerous transmittant, 3 feet minimum for other lin Department may approve shallower depths if adequate protection is provide approval must be obtained in writing.
(f) Service and other small diameter pipes shall be jacked, driven, or otherwis underneath the pavements on any surfaced road without disturbing the pa The section under the highway
pavement and within a distance of three (3) feet on either side shall be con without joints.

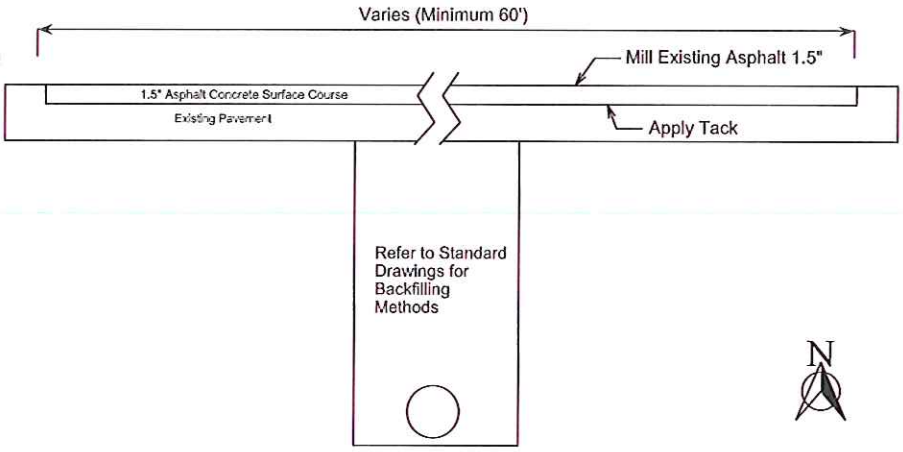
11. ACCESS:
(a) Permittee is responsible for maintaining reasonable access to private dr during construction.
(b) It is expressly provided that, with respect to any limited access highv Permittee shall not have or gain access from the main traveled way of the hig the on or off ramps to such facility, except upon approval by the Department.

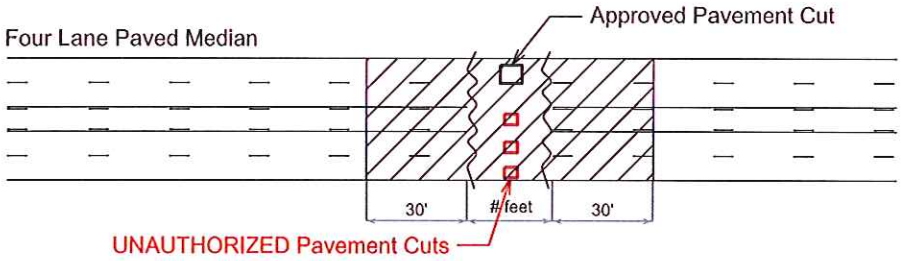
12. DRIVEWAYS:
(a) The existing crown of the highway shall be continued to the outside shou of the highway.
(b) If the driveway or approach is concrete pavement, the pavement s constructed at least 6 inches thick and with a minimum of class 2500 concret shall be a bituminous expansion joint, not less than 3/4 inches in thickness between the highway paving and the paving of the approach for the full widt approach.

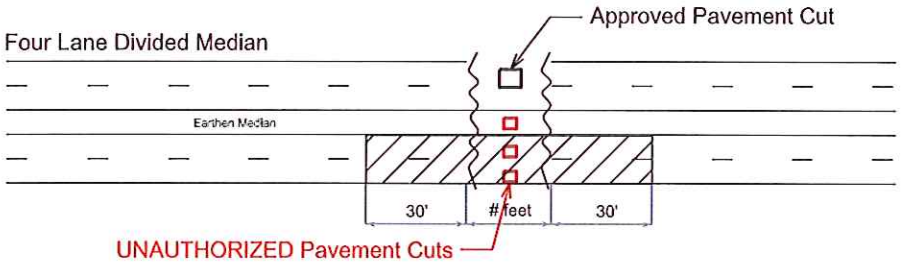
13. BEAUTIFICATION:
(a) All trees, plants, flowers, etc. shall be placed in accordance with the pr specifically stipulated herein.
(b) All trees, plants, flowers, etc. shall be maintained by, and at the expens Permittee and the provisions of this permit shall become null and void, if ar said Permittee ceases to maintain aid trees, plants, flowers, etc.

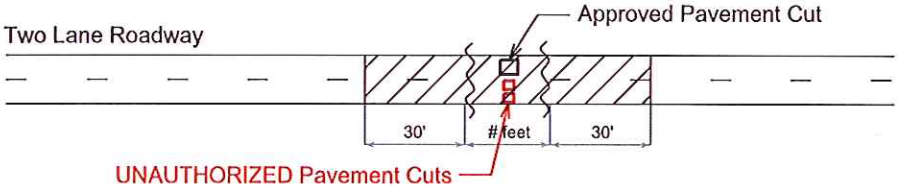
14. AS-BUILT PLANS:

(a) The applicant shall provide the Department with survey-quality as-built accordance with the requirements set forth in the Department's "A Po Accommodating Utilities on Highway Rights of Way".









NOTES:

* Approved pavement cuts will be shown in approved permit;
* Unapproved pavement cuts are any cut greater than 4 inches not shown in permit;
* When one or more unapproved pavement cuts are discovered, permittee will be required to resurface entire roadway as shown;
* Resurfacing will consist of 1.5 inches asphalt surface course with tack, 1.5 inches of asphalt planing prior to asphalt placement.
*Potholes for locating other utilities will not be allowed without a permit. These are considered unauthorized pavement cuts.

SCDOT

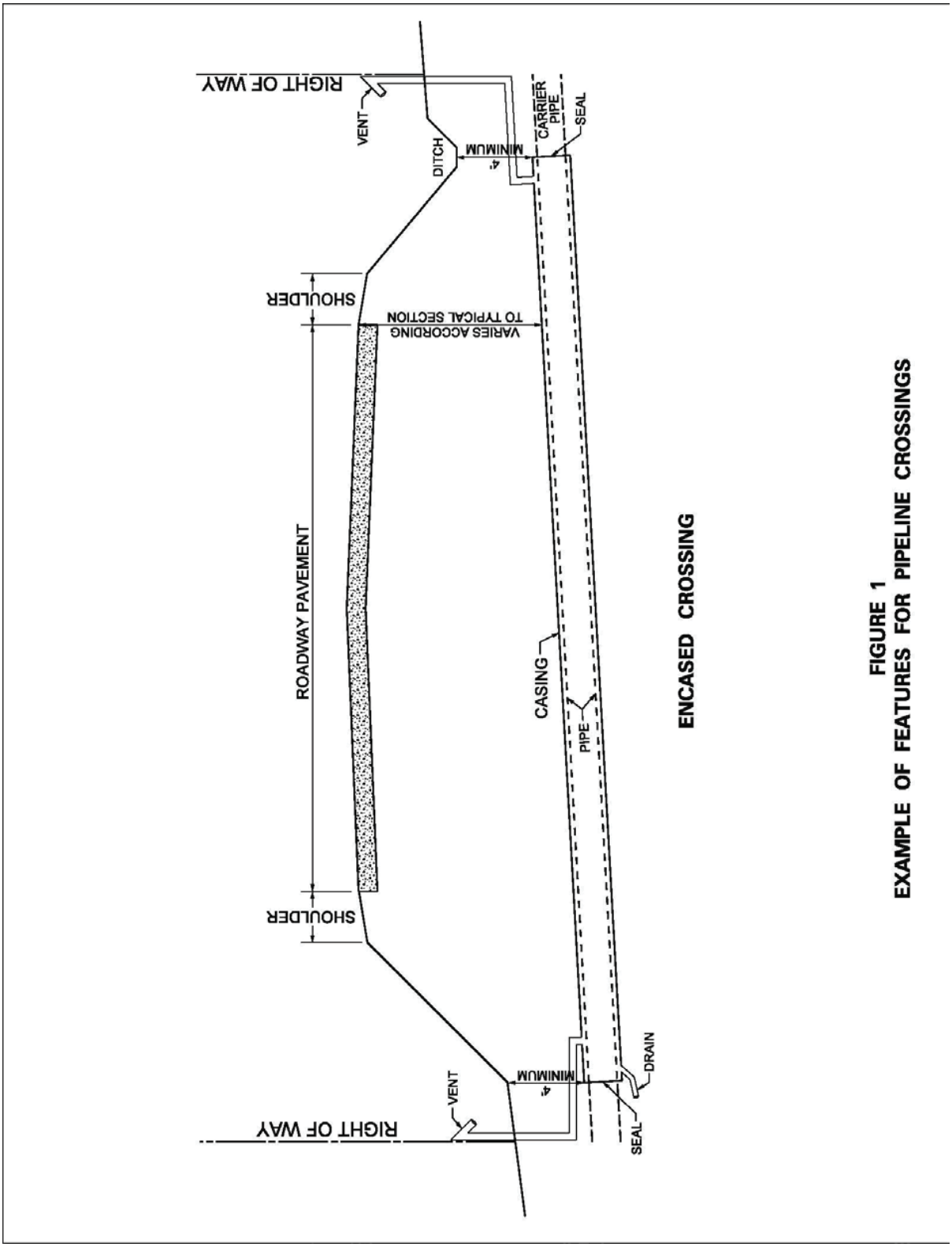
South Carolina Department of Transportation
252 South Pleasantburg Drive
Greenville, South Carolina 29607

Pavement Cuts Requirement
Standard Drawings

SCALE	DATE	INTERSECTION ID	INDEX NO.

Appendix B: Pipelines

Figure 1 – Example of Features for Encased Pipeline Crossings



Appendix B: Pipelines

Figure 5 - Detail for Boring Pit Location

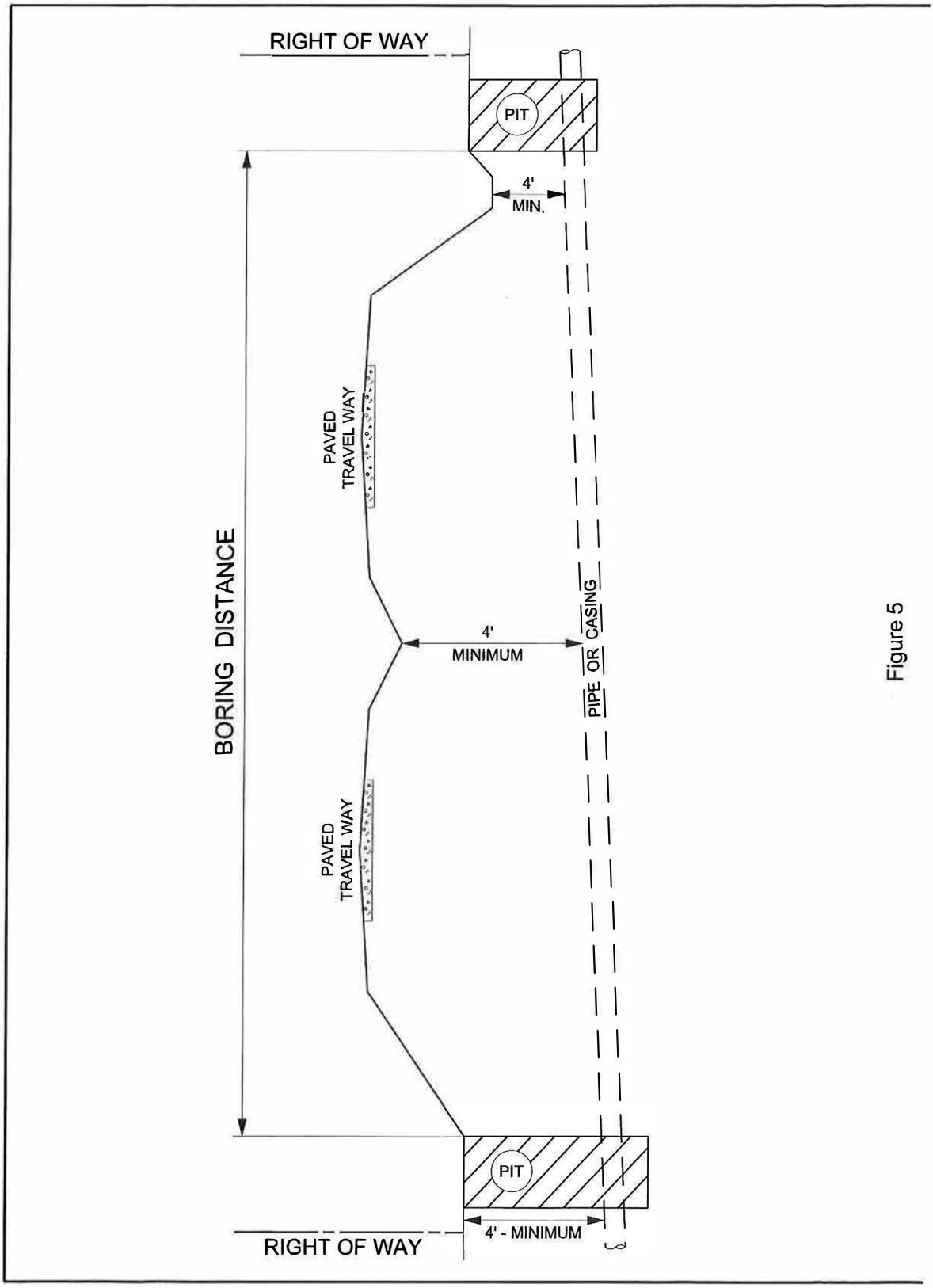


Figure 5

Organize into SCDOT Permit No.

	Name	Date modified	Type	Size
3	9999 Addl Special Provisions (2).doc	6/1/2021 2:03 PM	Microsoft Word 97 - 2003 Docu...	74 KB
4	Application.pdf	6/1/2021 2:04 PM	Adobe Acrobat Document	3,329 KB
	Asphalt cuts-SCDOT Standard Dwg.pdf	6/1/2021 2:05 PM	Adobe Acrobat Document	215 KB
	BoringdetailENCASEDdwg.pdf	6/1/2021 2:06 PM	Adobe Acrobat Document	111 KB
	BoringPitLocation.pdf	6/1/2021 2:07 PM	Adobe Acrobat Document	101 KB
	Flagging (Intersections on side rds).pdf	6/1/2021 2:07 PM	Adobe Acrobat Document	730 KB
2	General Special Provisions.pdf	6/1/2021 2:08 PM	Adobe Acrobat Document	91 KB
	Lane Closure Daytime Multilane Primary.pdf	6/1/2021 2:09 PM	Adobe Acrobat Document	188 KB
	Longitudinal Installation of Utilities in Roadway Shoulders.pdf	6/1/2021 2:10 PM	Adobe Acrobat Document	131 KB
1	Permit -245226.pdf	6/1/2021 1:52 PM	Adobe Acrobat Document	69 KB
	PvmtRepairs-NoLowVolume.pdf	6/1/2021 2:10 PM	Adobe Acrobat Document	129 KB
	R-W-revised.pdf	6/1/2021 2:11 PM	Adobe Acrobat Document	8,809 KB
	SCDOT Lane Restrictions.pdf	6/1/2021 2:12 PM	Adobe Acrobat Document	89 KB
	Seeding.pdf	6/1/2021 2:13 PM	Adobe Acrobat Document	170 KB
	Temp Erosion Sed Ctrl.pdf	6/1/2021 2:13 PM	Adobe Acrobat Document	1,757 KB

1-4 per above; remaining in logical sequesntial order based on review of permit or best

REFERENCES

WORK ZONE TRAFFIC CONTROL ENGINEER

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER NO. 24242 WILLIE E. McCONNELL, JR.

SIGNATURE

7/27/15

DATE

#	DATE	CHK	DESCRIPTION
6			
5			
4			
3			
2			
1			
0	1-14-15	JCS	NEW DRAWING

SCDOT

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING

FLAGGING OPERATIONS TWO-LANE TWO-WAY PRIMARY & SECONDARY ROUTES

610-005-00

EFFECTIVE LETTING DATE: JAN 2016

FLAGGING OPERATIONS GENERAL NOTES

(ALL NOTES, SPECIFICATIONS AND REQUIREMENTS ON THIS STANDARD DRAWING APPLY TO ALL SUBSEQUENT STANDARD DRAWINGS REGARDING FLAGGING OPERATIONS UNLESS OTHERWISE NOTED)

FLAGGING OPERATIONS -

1. KEY FEATURES RELEVANT TO FLAGGING OPERATIONS:

   APPROACH TAPER - THIS IS A ONE-LANE TWO-WAY TAPER PLACED IN THE TRAVEL LANE WHERE THE WORK ACTIVITY TAKES PLACE. THIS TAPER PRECEDES THE BUFFER SPACE AND THE WORK ACTIVITY AREA. THE LENGTH OF THIS TAPER MAY VARY FROM 50 FEET TO 100 FEET. INSTALL AND MAINTAIN NO LESS THAN FIVE (5) TRAFFIC CONTROL DEVICES EQUALLY SPACED AT 10' TO 25' INTERVALS AS NECESSARY TO CORRESPOND WITH THE LENGTH OF THE TAPER.

   DOWNSTREAM TAPER - THIS TAPER, PLACED IN THE TRAVEL LANE WHERE THE WORK ACTIVITY TAKES PLACE, FOLLOWS THE WORK ACTIVITY AREA AND SERVES AS THE TERMINATION AREA FOR THE CLOSURE OF THE TRAVEL LANE. THE LENGTH OF THIS TAPER MAY VARY FROM 50 FEET TO 100 FEET. INSTALL AND MAINTAIN NO LESS THAN FIVE (5) TRAFFIC CONTROL DEVICES IN THIS TAPER.

   FLAGGER STATION - THIS IS THE SPECIFIC LOCATION OF THE FLAGGER.

   CLOSED LANE FLAGGER - THIS FLAGGER IS STATIONED ADJACENT TO THE FIRST TRAFFIC CONTROL DEVICE IN THE APPROACH TAPER WHO CONTROLS THE TRAFFIC THAT REQUIRES RELOCATION FROM THE TRAVEL LANE BEING CLOSED TO TRAFFIC.

   OPEN LANE FLAGGER - THIS FLAGGER IS STATIONED 100 FEET BEYOND THE LAST TRAFFIC CONTROL DEVICE IN THE DOWNSTREAM TAPER WHO CONTROLS THE TRAFFIC OPERATING IN THE TRAVEL LANE REMAINING OPEN TO TRAFFIC.

   BUFFER SPACE - THIS AREA IS LOCATED BETWEEN THE DOWNSTREAM END OF THE APPROACH TAPER AND THE NEAREST LIMITS OF THE WORK ACTIVITY AREA AND MAY PROVIDE SOME RECOVERY SPACE FOR AN ERRANT VEHICLE. THE PRESENCE OF PERSONNEL, TOOLS, MATERIALS, EQUIPMENT, WORK VEHICLES, ETC. WITHIN THE LIMITS OF THE BUFFER SPACE IS PROHIBITED. HOWEVER, WHEN THE MINIMUM DISTANCE REQUIREMENTS FOR THE BUFFER SPACE ARE UNAVAILABLE, A TRUCK MOUNTED ATTENUATOR MAY TEMPORARILY ENCROACH UPON THE BUFFER SPACE IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN THE SECTION BELOW ENTITLED, "BUFFER SPACE", WHEN APPROVED BY THE ENGINEER.

   WORK ACTIVITY AREA - PERSONNEL, MATERIALS, EQUIPMENT, WORK VEHICLES, ETC. ARE PRESENT WITHIN THIS AREA TO CONDUCT THE WORK.

   LIMITS of the WORK ACTIVITY AREA - THIS IS THE BOUNDARY OF THE WORK ACTIVITY AREA FIRST ENCOUNTERED, FROM EITHER DIRECTION, BY MOTORISTS PASSING BY THE WORK ACTIVITY AREA IN THE ADJACENT TRAVEL LANE OPEN TO TRAFFIC AND CONTROLLED BY THE FLAGGERS.

   APPROACH LANE - TRAFFIC APPROACHES AN INTERSECTION OR A SPECIFIC LOCATION IN THIS TRAVEL LANE.

   DEPARTURE LANE - TRAFFIC DEPARTS FROM AN INTERSECTION OR A SPECIFIC LOCATION IN THIS TRAVEL LANE.

   MAINLINE APPROACH - THIS IS AN APPROACH TO THE WORK ACTIVITY AREA ON THE ROADWAY WHERE THE WORK ACTIVITY AREA IS LOCATED.

   SIDE ROADS - THESE ROADS INTERSECT THE ROADWAY ON WHICH THE WORK ACTIVITY AREA IS LOCATED.

   LIMITS of the INTERSECTION - THE LIMITS OF OR THE PHYSICAL AREA WITHIN AN INTERSECTION IS DEFINED BY THE LOCATION OF STOP BARS WHEN PRESENT. WHEN STOP BARS ARE ABSENT, THE LIMITS OF OR THE PHYSICAL AREA WITHIN AN INTERSECTION IS DEFINED BY THE LOCATION POINTS WHERE THE CORNER RADII BETWEEN ADJACENT ROADWAY APPROACHES TIE TO THE EDGE OF PAVEMENT OR THE EDGE OF TRAVEL LANE ADJACENT TO THE EDGE OF PAVEMENT OF EACH ROADWAY.

2. INSTALL, CONDUCT AND MAINTAIN FLAGGING OPERATIONS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, THE STANDARD DRAWINGS, THE MUTCD AND THE "SOUTH CAROLINA FLAGGER'S HANDBOOK" UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT. INSTALL ALL SIGNS RELATIVE TO A FLAGGING OPERATION PRIOR TO INITIATION OF THE OPERATION AND REMOVE OR COVER ALL SIGNS IMMEDIATELY UPON TERMINATION OF THE OPERATION. EQUIP EACH FLAGGER WITH A 24" x 24" STOP/SLOW PADDLE MOUNTED ON A RIGID HANDLE WITH A MINIMUM LENGTH OF 7 FEET. THE DEPARTMENT PROHIBITS THE USE OF FLAGS EXCEPT DURING EMERGENCY SITUATIONS.
3. LANE CLOSURES FOR FLAGGING OPERATIONS ARE RESTRICTED TO A MAXIMUM DISTANCE OF 2 MILES UNLESS OTHERWISE APPROVED BY THE ENGINEER. THE WORK LIMITS WILL COMPLY WITH THE CONTRACT AND SHALL REQUIRE THE ENGINEER'S APPROVAL PRIOR TO BEGINNING THE WORK.
4. INSTALL AND MAINTAIN THE PROPER ARRAY OF ADVANCE WARNING SIGNS FOR EACH "MAINLINE APPROACH" WHEN A FLAGGING OPERATION IS IN PLACE AND ACTIVE. WHEN NECESSARY TO RELOCATE THE "FLAGGER STATION" WHILE ACTIVELY MAINTAINING THE FLAGGING OPERATION, INSTALL AN ADDITIONAL ARRAY OF ADVANCE WARNING SIGNS AT THE LOCATION RELATIVE TO THE NEW "FLAGGER STATION" AND REMOVE THE ORIGINAL ARRAY OF ADVANCE WARNING SIGNS IMMEDIATELY UPON COMPLETION OF THE RELOCATION OF THE FLAGGER TO THE NEW "FLAGGER STATION".
5. INSTALL ALL ADVANCE WARNING SIGNS IMMEDIATELY PRIOR TO INITIATING A FLAGGING OPERATION AND REMOVE OR COVER ALL SIGNS IMMEDIATELY UPON TERMINATION OF THE OPERATION.
6. MAINTAIN TWO-WAY RADIO COMMUNICATIONS BETWEEN ALL FLAGGERS.

NIGHTTIME FLAGGING OPERATIONS -

1. EACH FLAGGER SHALL WEAR SAFETY APPAREL IN COMPLIANCE WITH THE REQUIREMENTS OF ANSI / ISEA 107 STANDARD PERFORMANCE FOR CLASS 3 RISK EXPOSURE, LATEST REVISION, WHEN CONDUCTING NIGHTTIME FLAGGING OPERATIONS.
2. ILLUMINATE EACH "FLAGGER STATION" WITH ANY COMBINATION OF PORTABLE LIGHTS, STANDARD ELECTRIC LIGHTS, EXISTING STREET LIGHTS, ETC. THAT WILL PROVIDE A MINIMUM ILLUMINATION LEVEL OF 108 Lx OR 10 fc WHEN CONDUCTING NIGHTTIME FLAGGING OPERATIONS.
3. SUPPLEMENT EACH ARRAY OF ADVANCE WARNING SIGNS ON EACH "MAINLINE APPROACH" WITH A TRAILER MOUNTED CHANGEABLE MESSAGE SIGN. THESE CHANGEABLE MESSAGE SIGNS ARE NOT REQUIRED ON THE "SIDE ROADS" INTERSECTING THE ROADWAY WHERE THE "WORK ACTIVITY AREA" IS LOCATED. ALSO, THESE CHANGEABLE MESSAGE SIGNS ARE NOT REQUIRED DURING DAYTIME FLAGGING OPERATIONS UNLESS OTHERWISE DIRECTED BY THE STANDARD DRAWINGS. INSTALL THE CHANGEABLE MESSAGE SIGNS IN ADVANCE OF THE ADVANCE WARNING SIGN ARRAYS. THE MESSAGES SHOULD BE "PREPARE TO STOP", "FLAGGER AHEAD". A TRUCK MOUNTED CHANGEABLE MESSAGE SIGN IS NOT AN ACCEPTABLE ALTERNATIVE TO A TRAILER MOUNTED CHANGEABLE MESSAGE SIGN DURING NIGHTTIME FLAGGING OPERATIONS.
4. UTILIZE PORTABLE PLASTIC DRUMS OR 42" OVERSIZED TRAFFIC CONES IN PLACE OF 36" STANDARD TRAFFIC CONES DURING NIGHTTIME FLAGGING OPERATIONS.

BUFFER SPACE -

1. THE MINIMUM DISTANCE REQUIREMENTS FOR THE "BUFFER SPACE" ARE BASED UPON THE LEGAL POSTED REGULATORY SPEED LIMIT OF THE ROADWAY PRIOR TO BEGINNING THE WORK.

SPEED LIMIT	DISTANCES
LOW SPEED ≤ 35 MPH	200 FEET
INTERMEDIATE SPEED 40 - 50 MPH	300 FEET
HIGH SPEED 55 MPH	400 FEET

2. THE PRESENCE OF PERSONNEL, TOOLS, MATERIALS, EQUIPMENT, WORK VEHICLES, ETC. WITHIN THE LIMITS OF THE "BUFFER SPACE" IS PROHIBITED. A TRUCK MOUNTED ATTENUATOR IS THE ONLY WORK VEHICLE THAT MAY TEMPORARILY ENCROACH UPON THE "BUFFER SPACE" IN ACCORDANCE WITH THE CONDITIONS SPECIFIED IN THE FOLLOWING NOTE WHEN APPROVED BY THE ENGINEER. SEE NOTE NO. 3.
3. WHEN THE MINIMUM DISTANCE REQUIREMENTS FOR THE "BUFFER SPACE" ARE UNAVAILABLE DUE TO FIELD CONDITIONS, IT MAY BE NECESSARY FOR A TRUCK MOUNTED ATTENUATOR TO TEMPORARILY ENCROACH UPON THE "BUFFER SPACE" WHEN APPROVED BY THE ENGINEER. A TRUCK MOUNTED ATTENUATOR IS THE ONLY VEHICLE PERMITTED TO TEMPORARILY ENCROACH UPON THE "BUFFER SPACE" AND THIS ENCROACHMENT IS ONLY PERMITTED WHEN ALL REASONABLE OPTIONS TO AVOID DOING SO HAVE BEEN EXHAUSTED. WHEN ENCROACHMENT UPON THE "BUFFER SPACE" IS APPROVED BY THE ENGINEER, MINIMIZE THE TIME DURATION OF THE ENCROACHMENT BY REMOVAL OF THE TRUCK MOUNTED ATTENUATOR FROM THE "BUFFER SPACE" AT THE FIRST OPPORTUNITY THE MINIMUM DISTANCE REQUIREMENTS FOR THE "BUFFER SPACE" BECOME AVAILABLE.

SIGNS AND TRAFFIC CONTROL DEVICES -

1. MEASURE THE ADVANCE WARNING SIGN LOCATIONS FOR EACH APPROACH FROM THE "FLAGGER STATION" LOCATED ON THAT APPROACH.
2. INSTALL THE ADVANCE WARNING SIGNS AT SPACING INTERVALS BASED UPON THE POSTED REGULATORY SPEED LIMIT OF THE ROADWAY PRIOR TO BEGINNING ANY WORK. THE ADVANCE WARNING SIGN SPACING INTERVALS INDICATED ARE FOR NORMAL CONDITIONS. ADJUSTMENTS TO THESE DISTANCES MAY BE NECESSARY DUE TO EXISTING SIGNS, INTERSECTING ROADWAYS, HORIZONTAL AND/OR VERTICAL ALIGNMENTS OR OTHER SIGHT DISTANCE RESTRICTIONS. SEE TABLE A.
3. INSTALL ADVANCE WARNING SIGNS MOUNTED ON PORTABLE SIGN SUPPORTS NO LESS THAN 4 FEET FROM THE NEAR EDGE OF THE SIGN TO THE NEAR EDGE OF AN ADJACENT TRAVEL LANE ON ROADWAYS WITH EARTH SHOULDERS AND NO LESS THAN 6 FEET FROM THE NEAR EDGE OF THE SIGN TO THE NEAR EDGE OF AN ADJACENT TRAVEL LANE ON ROADWAYS WITH PAVED SHOULDERS. WHEN CURB & GUTTER IS PRESENT, INSTALL THE SIGN NO LESS THAN 2 FEET FROM THE NEAR EDGE OF THE SIGN TO THE FACE OF THE CURB.
4. ALL SIGNS MOUNTED ON PORTABLE SIGN SUPPORTS SHALL HAVE A MINIMUM MOUNTING HEIGHT OF 5 FEET FROM THE GROUND TO THE BOTTOM OF THE SIGN. ALL SIGNS MOUNTED ON GROUND MOUNTED U-CHANNEL OR SQUARE STEEL TUBE POSTS SHALL HAVE A MINIMUM MOUNTING HEIGHT OF 7 FEET FROM THE GRADE ELEVATION OF THE NEAR EDGE OF THE ADJACENT TRAVEL LANE TO THE BOTTOM OF THE SIGN UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT. MOUNT ALL SIGNS STRAIGHT AND LEVEL AND WITH THE FACE OF THE SIGNS PERPENDICULAR TO THE SURFACE OF THE ROADWAY.
5. REFLECTORIZE ORANGE ADVANCE WARNING SIGNS AND ANY ORANGE AREAS OF A MULTI-COLORED ADVANCE WARNING SIGN WITH A FLUORESCENT ORANGE COLORED PRISMATIC RETROREFLECTIVE SHEETING. REFLECTORIZE WHITE REGULATORY SIGNS AND ANY WHITE AREAS OF A MULTI-COLORED ADVANCE WARNING SIGN WITH A WHITE COLORED PRISMATIC RETROREFLECTIVE SHEETING.
6. ALL TRAFFIC CONTROL DEVICES SHALL COMPLY WITH THE REQUIREMENTS OF NCHRP REPORT 350 OR THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWARE (MASH) AND SHALL REQUIRE APPROVAL BY THE DEPARTMENT. ONLY THOSE TRAFFIC CONTROL DEVICES INCLUDED ON THE "APPROVED PRODUCTS LIST FOR TRAFFIC CONTROL DEVICES IN WORK ZONES" ARE CONSIDERED ACCEPTABLE FOR USE. THIS LIST MAY BE ACCESSED ON THE DEPARTMENT'S WEB SITE AT: www.scdot.org .
7. REFLECTORIZATION OF 36" TRAFFIC CONES USED DURING DAYLIGHT HOURS IS NOT REQUIRED IN THE EVENT A DAYTIME FLAGGING OPERATION EXTENDS INTO THE NIGHTTIME HOURS, REPLACE ALL 36" TRAFFIC CONES WITH EITHER PORTABLE PLASTIC DRUMS OR 42" OVERSIZED TRAFFIC CONES. REFLECTORIZE ALL PORTABLE PLASTIC DRUMS AND 42" OVERSIZED TRAFFIC CONES WITH TYPE III OR GREATER FLEXIBLE MICROPRISMATIC RETROREFLECTIVE SHEETING UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT.
8. DELINEATE THE TANGENT AREA OF THE LANE CLOSURE WITH THE NECESSARY TRAFFIC CONTROL DEVICES TO MINIMIZE ENCROACHMENT BY MOTORISTS INTO THE CLOSED TRAVEL LANE UNLESS OTHERWISE DIRECTED BY THE ENGINEER. ON ROADWAYS WITH POSTED REGULATORY SPEED LIMITS OF 35 MPH OR LESS, INSTALL THE TRAFFIC CONTROL DEVICES AT SPACING INTERVALS OF 25 FEET. ON ROADWAYS WITH POSTED REGULATORY SPEED LIMITS OF 40 MPH OR GREATER, INSTALL THE TRAFFIC CONTROL DEVICES AT SPACING INTERVALS OF 50 FEET. SEE TABLE B.

ADVANCE WARNING ARROW PANEL -

1. DURING FLAGGING OPERATIONS, AN ADVANCE WARNING ARROW PANEL SHALL OPERATE IN THE "FOUR CORNERS" CAUTION MODE WHEN LOCATED WITHIN OR IN BETWEEN THE LIMITS OF THE ADVANCE WARNING SIGN ARRAYS SPECIFIC TO A FLAGGING OPERATION. OPERATION OF AN ADVANCE WARNING ARROW PANEL IN AN ARROW, CHEVRON OR ANY OTHER TYPE OF CAUTION MODE OTHER THAN THE "FOUR CORNERS" CAUTION MODE WHEN LOCATED WITHIN OR IN BETWEEN THE LIMITS OF THE ADVANCE WARNING SIGN ARRAYS AS SPECIFIED HEREINBEFORE IS PROHIBITED.
2. ALL ADVANCE WARNING ARROW PANELS SHALL COMPLY WITH THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, LATEST EDITION. THE SPECIFIC LOCATION OF AN ADVANCE WARNING ARROW PANEL MAY REQUIRE ADJUSTMENTS DUE TO HORIZONTAL AND/OR VERTICAL ALIGNMENT OR OTHER SIGHT DISTANCE RESTRICTIONS.

TRUCK MOUNTED ATTENUATOR -

1. A TRUCK MOUNTED ATTENUATOR IS OPTIONAL. UTILIZATION OF A TRUCK MOUNTED ATTENUATOR SHOULD BE CONSIDERED WHEN THE MINIMUM DISTANCE REQUIREMENTS FOR THE "BUFFER SPACE" ARE UNAVAILABLE DUE TO FIELD CONDITIONS. HOWEVER, A TRAILER MOUNTED ADVANCE WARNING ARROW PANEL MAY BE UTILIZED IN PLACE OF A TRUCK MOUNTED ATTENUATOR DURING TRAFFIC CONTROL SETUPS FOR WORK ACTIVITIES SUCH AS ASPHALT CONCRETE PLACEMENT OPERATIONS WHEN APPROVED BY THE ENGINEER.
2. WHEN UTILIZING A TRUCK MOUNTED ATTENUATOR, ENSURE THE TRUCK HAS THE CORRECT GROSS VEHICULAR WEIGHT (GVW) REQUIRED FOR THE TYPE OF TRUCK MOUNTED ATTENUATOR BEING UTILIZED. A DIRECT TRUCK MOUNTED TRUCK MOUNTED ATTENUATOR, A UNIT MOUNTED AND ATTACHED TO BRACKETS OR SIMILAR DEVICES CONNECTED TO THE FRAME OF THE TRUCK, REQUIRES A TRUCK WITH A MINIMUM GVW OF 15,000 POUNDS (ACTUAL WEIGHT) UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT. A TRAILER TOWED TRUCK MOUNTED ATTENUATOR, A TRAILER TYPE UNIT TOWED FROM BEHIND AND ATTACHED TO THE FRAME OF THE TRUCK VIA A PINTLE HOOK / HITCH, REQUIRES A TRUCK WITH A MINIMUM GVW OF 10,000 POUNDS (ACTUAL WEIGHT) UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT. IF THE ADDITION OF SUPPLEMENTAL WEIGHT TO THE VEHICLE AS BALLAST IS NECESSARY, CONTAIN THE MATERIAL WITHIN A STRUCTURE CONSTRUCTED OF STEEL. CONSTRUCT THIS STEEL STRUCTURE TO HAVE A MINIMUM OF FOUR (4) SIDES AND A BOTTOM. A TOP IS OPTIONAL. BOLT THIS STRUCTURE TO THE FRAME OF THE TRUCK. UTILIZE A SUFFICIENT NUMBER OF FASTENERS FOR ATTACHMENT OF THE STEEL STRUCTURE TO THE FRAME OF THE TRUCK TO ENSURE THE STRUCTURE WILL NOT SEPARATE FROM THE FRAME OF THE TRUCK DURING AN IMPACT UPON THE TRUCK MOUNTED ATTENUATOR. UTILIZE EITHER DRY LOOSE SAND OR STEEL REINFORCED CONCRETE FOR BALLAST MATERIAL WITHIN THE STEEL STRUCTURE TO ACHIEVE THE NECESSARY WEIGHT. THE BALLAST MATERIAL SHALL REMAIN CONTAINED WITHIN THE CONFINES OF THE STEEL STRUCTURE IN ITS ENTIRETY AND SHALL NOT PROTRUDE FROM THE STEEL STRUCTURE IN ANY MANNER.
3. LOCATE THE TRUCK MOUNTED ATTENUATOR APPROXIMATELY 100 FEET IN ADVANCE OF THE "WORK ACTIVITY AREA" UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
4. PROVIDE, INSTALL AND MAINTAIN THE TRUCK MOUNTED ATTENUATOR AS SPECIFIED BY THE STANDARD SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER.

GENERAL -

1. CONDUCT THE WORK IN SUCH A MANNER SO AS NOT TO ENCROACH ONTO THE ADJACENT TRAVEL LANE OPEN TO TRAFFIC. INSTALL, MAINTAIN AND ADJUST THE TRAFFIC CONTROL DEVICES AS NECESSARY TO ENSURE PROPER DELINEATION OF THE WORK AREA.
2. IF WORK IS BEING CONDUCTED AT TWO DIFFERENT LOCATIONS AT THE SAME TIME, SEPARATE THE TWO LOCATIONS BY NO LESS THAN 2 MILES FROM THE LAST TRAFFIC CONTROL DEVICE IN THE "DOWNSTREAM TAPER" OF THE FIRST LANE CLOSURE TO THE FIRST TRAFFIC CONTROL DEVICE IN THE "APPROACH TAPER" OF THE SECOND LANE CLOSURE ENCOUNTERED BY A MOTORIST UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. THE DEPARTMENT RESERVES THE RIGHT TO RESTRICT WORK OPERATIONS AND/OR WITHHOLD THE MONTHLY ESTIMATE IF THE TRAFFIC CONTROL IS NOT PROPERLY INSTALLED AND MAINTAINED AS DIRECTED BY THE STANDARD SPECIFICATIONS, THE SPECIAL PROVISIONS, THE STANDARD DRAWINGS, THE PLANS AND/OR THE ENGINEER.

TABLE A

SIGN PLACEMENT INTERVALS	
SPEED LIMIT	*
# ≤ 35 MPH LOW SPEED	200
# 40 - 50 MPH INTERMEDIATE SPEED	350
# 55 MPH HIGH SPEED	500

REGULATORY POSTED SPEED LIMIT PRIOR TO BEGINNING WORK

TABLE B

TRAFFIC CONTROL DEVICE SPACING INTERVALS WORK ACTIVITY / BUFFER SPACE AREAS	
SPEED LIMIT	SPACING INTERVALS
≤ 35 MPH	25 FEET
40 - 55 MPH	50 FEET

THIS DRAWING IS NOT TO SCALE

DRAWING 610-005-10 NOTES

1. SEE STANDARD DRAWING NO. 610-005-00 FOR ALL GENERAL NOTES AND REQUIREMENTS.

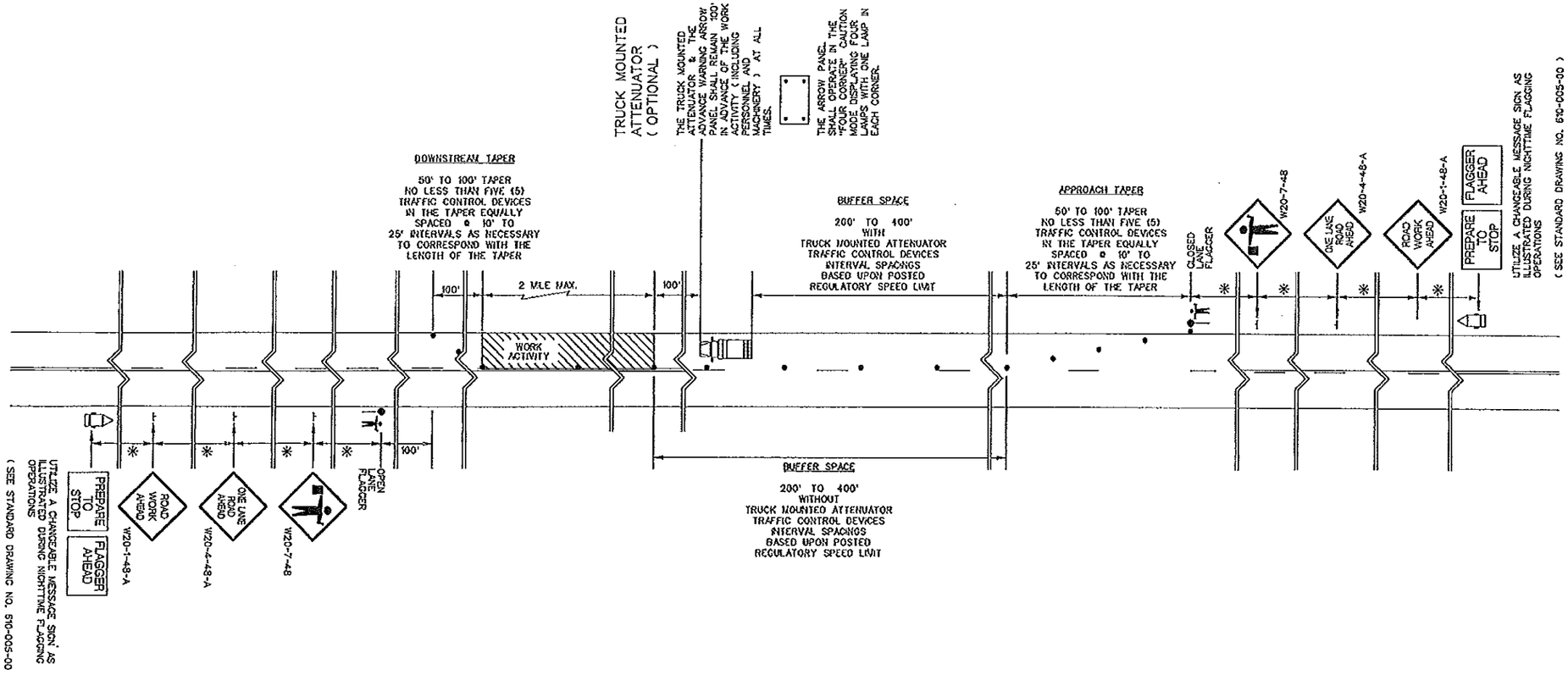


TABLE A

SIGN PLACEMENT INTERVALS	
SPEED LIMIT	*
# ≤ 35 MPH LOW SPEED	200
# 40 - 50 MPH INTERMEDIATE SPEED	350
# 55 MPH HIGH SPEED	500

REGULATORY POSTED SPEED LIMIT PRIOR TO BEGINNING WORK

TABLE B

TRAFFIC CONTROL DEVICE SPACING INTERVALS WORK ACTIVITY / BUFFER SPACE AREAS	
SPEED LIMIT	SPACING INTERVALS
≤ 35 MPH	25 FEET
40 - 55 MPH	50 FEET

THIS DRAWING IS NOT TO SCALE

REFERENCES

WORK ZONE TRAFFIC CONTROL ENGINEER

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER NO. 24242 WILLIE E. McCONNELL, JR

SIGNATURE

7/27/15
DATE

#	DATE	CHK	DESCRIPTION
6			
5			
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2			
1			
0	1-15-15	JCS	NEW DRAWING

SCDOT

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING

FLAGGING OPERATIONS TWO-LANE TWO-WAY ROADWAYS WITHOUT INTERSECTIONS

610-005-10

EFFECTIVE LETTING DATE | JAN 2016

REFERENCES

WORK ZONE TRAFFIC CONTROL ENGINEER

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER NO. 24242 WILLIE E. McCONNELL, JR

SIGNATURE

7/27/15
DATE

#	DATE	CHK	DESCRIPTION
6			
5			
4			
3			
2			
1			
0	1-15-15	JCS	NEW DRAWING

SCDOT

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING

FLAGGING OPERATIONS WORK ZONES CONTINUING THROUGH STOP SIGN CONTROLLED SIDE ROADS

610-005-20

EFFECTIVE LETTING DATE | JAN 2016

THIS DRAWING IS NOT TO SCALE

DRAWING 610-005-20 NOTES

1. SEE STANDARD DRAWING NO. 610-005-00 FOR ALL GENERAL NOTES AND REQUIREMENTS. THE FOLLOWING NOTES ARE SPECIFIC REQUIREMENTS FOR THIS STANDARD DRAWING.
2. WHEN THE WORK ZONE PROCEEDS THROUGH OR MUST ENCROACH UPON THE "LIMITS OF THE INTERSECTION", DO NOT ALLOW THE "APPROACH TAPER" OR THE "DOWNSTREAM TAPER" OF THE LANE CLOSURE TO ENCROACH UPON THE "LIMITS OF THE INTERSECTION". ONLY THE "BUFFER SPACE" OR THE "WORK ACTIVITY AREA" OF THE LANE CLOSURE MAY ENCROACH UPON THE "LIMITS OF THE INTERSECTION".
3. WHEN THE WORK ZONE PROCEEDS THROUGH OR MUST ENCROACH UPON THE "LIMITS OF THE INTERSECTION" WITH "STOP SIGN CONTROLLED" "SIDE ROADS", UTILIZE FLAGGERS TO CONTROL THE TRAFFIC FROM THE INTERSECTING "SIDE ROADS" UNLESS OTHERWISE DIRECTED BY THE ENGINEER. MAINTAIN THESE FLAGGERS IN PLACE FOR THE DURATION THAT ANY PORTION OF THE "BUFFER SPACE" OR THE "WORK ACTIVITY AREA" MAY ENCROACH UPON THE "LIMITS OF THE INTERSECTION".
4. WHEN THE WORK ZONE PROCEEDS THROUGH OR MUST ENCROACH UPON THE "LIMITS OF THE INTERSECTION" WITH "STOP SIGN CONTROLLED" "SIDE ROADS", THE CONTRACTOR SHOULD CONTINUE THE WORK OPERATIONS THROUGH THE INTERSECTION TO A LOCATION POINT BEYOND THE "LIMITS OF THE INTERSECTION" THAT WILL PERMIT THE WORK TRAIN TO CLEAR THE INTERSECTION AND THE LOCATION OF THE SUBSEQUENT "FLAGGER STATION" BE NO LESS THAN 200' PAST THE "LIMITS OF THE INTERSECTION" UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
5. MAINTAIN THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES FOR STOPPED TRAFFIC ON THE ROADWAY WHERE THE WORK ACTIVITY IS LOCATED AND BEING CONDUCTED UNLESS OTHERWISE DIRECTED BY THE ENGINEER. WHEN ANY PORTION OF THE "WORK ACTIVITY AREA" ENCROACHES UPON THE "LIMITS OF THE INTERSECTION", VARIOUS TYPES OF WORK MAY REQUIRE TRAFFIC TO AND FROM THE "SIDE ROADS" BE STOPPED FOR TIME DURATIONS GREATER THAN THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES. ONLY WHEN APPROVED BY THE ENGINEER MAY THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES FOR STOPPED TRAFFIC FOR THE SIDE ROAD TRAFFIC BE EXCEEDED. IN THE EVENT THE TYPE OF WORK REQUIRES THE SIDE ROAD TRAFFIC BE STOPPED FOR TIME DURATIONS GREATER THAN 5 TO 7½ MINUTES, THE SIDE ROAD TRAFFIC MAY BE STOPPED FOR TIME PERIODS UP TO 20 MINUTES IF APPROVED BY THE ENGINEER. IF THE SIDE ROAD TRAFFIC MUST BE STOPPED FOR TIME PERIODS GREATER THAN 20 MINUTES, CLOSURE OF THE "SIDE ROADS" MAY BE CONSIDERED IF APPROVED BY THE ENGINEER. IN THE EVENT CLOSURE OF THE "SIDE ROADS" IS APPROVED, CLOSE THE "SIDE ROADS" TO TRAFFIC IN ACCORDANCE WITH THE REQUIREMENTS OF STANDARD DRAWING NO. 610-510-00. INSTALL AND MAINTAIN APPROPRIATE DETOURS WHEN NECESSARY AND AS DIRECTED BY THE ENGINEER.

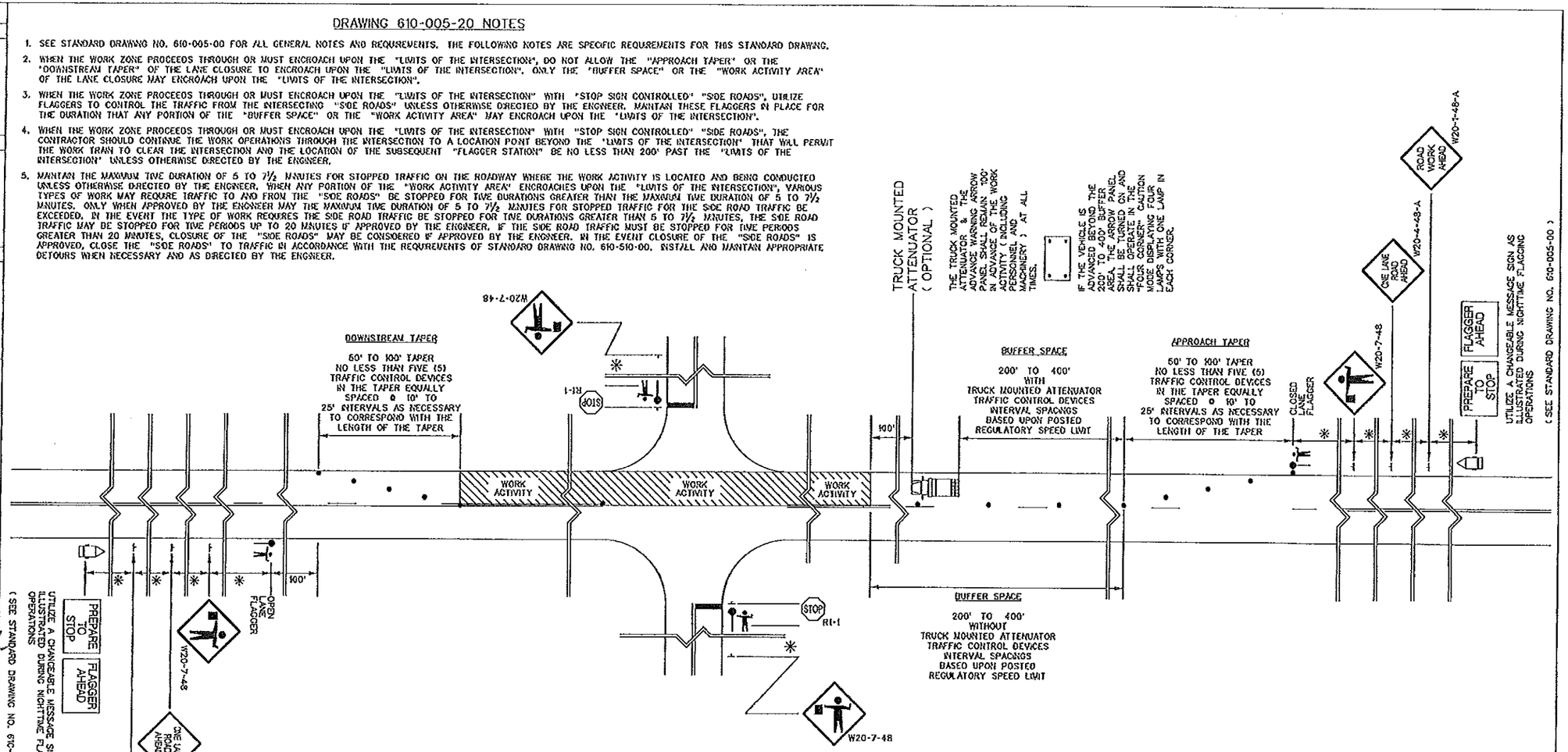


TABLE A

SIGN PLACEMENT INTERVALS	
SPEED LIMIT	*
# ≤ 35 MPH LOW SPEED	200
# 40 - 50 MPH INTERMEDIATE SPEED	350
# 55 MPH HIGH SPEED	500

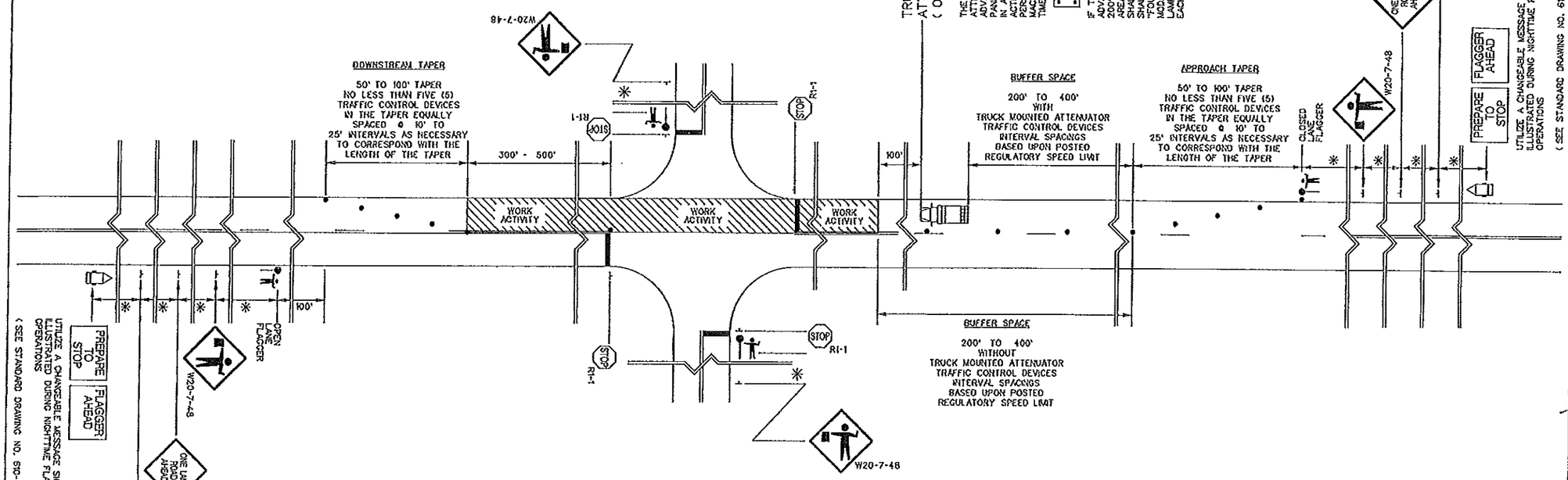
REGULATORY POSTED SPEED LIMIT PRIOR TO BEGINNING WORK

TABLE B

TRAFFIC CONTROL DEVICE SPACING INTERVALS WORK ACTIVITY / BUFFER SPACE AREAS	
SPEED LIMIT	SPACING INTERVALS
≤ 35 MPH	25 FEET
40 - 55 MPH	50 FEET

DRAWING 610-005-30 NOTES

1. SEE STANDARD DRAWING NO. 610-005-00 FOR ALL GENERAL NOTES AND REQUIREMENTS. THE FOLLOWING NOTES ARE SPECIFIC REQUIREMENTS FOR THIS STANDARD DRAWING.
2. WHEN THE WORK ZONE PROCEEDS THROUGH OR MUST ENCROACH UPON THE "LIMITS OF THE INTERSECTION", DO NOT ALLOW THE "APPROACH TAPER" OR THE "DOWNSTREAM TAPER" OF THE LANE CLOSURE TO ENCROACH UPON THE "LIMITS OF THE INTERSECTION". ONLY THE "BUFFER SPACE" OR THE "WORK ACTIVITY AREA" OF THE LANE CLOSURE MAY ENCROACH UPON THE "LIMITS OF THE INTERSECTION".
3. WHEN THE WORK ZONE PROCEEDS THROUGH OR MUST ENCROACH UPON THE "LIMITS OF THE INTERSECTION" WITH "STOP SIGN CONTROLLED" "SIDE ROADS", UTILIZE FLAGGERS TO CONTROL THE TRAFFIC FROM THE INTERSECTING "SIDE ROADS" UNLESS OTHERWISE DIRECTED BY THE ENGINEER. MAINTAIN THESE FLAGGERS IN PLACE FOR THE DURATION THAT ANY PORTION OF THE "BUFFER SPACE" OR THE "WORK ACTIVITY AREA" MAY ENCROACH UPON THE "LIMITS OF THE INTERSECTION".
4. WHEN THE WORK ZONE PROCEEDS THROUGH AN INTERSECTION VIA A "STOP SIGN CONTROLLED" "APPROACH LANE", THE CONTRACTOR SHOULD CONTINUE THE WORK OPERATIONS THROUGH THE INTERSECTION TO A LOCATION POINT WITHIN THE "DEPARTURE LANE" BEYOND THE "LIMITS OF THE INTERSECTION" THAT WILL PERMIT THE WORK TRAIN TO CLEAR THE INTERSECTION AND THE LOCATION OF THE SUBSEQUENT "FLAGGER STATION" BE NO LESS THAN 200' PAST THE "LIMITS OF THE INTERSECTION" UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
5. MAINTAIN THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES FOR STOPPED TRAFFIC ON THE ROADWAY WHERE THE WORK ACTIVITY IS LOCATED AND BEING CONDUCTED UNLESS OTHERWISE DIRECTED BY THE ENGINEER. WHEN ANY PORTION OF THE "WORK ACTIVITY AREA" ENCROACHES UPON THE "LIMITS OF THE INTERSECTION", VARIOUS TYPES OF WORK MAY REQUIRE TRAFFIC TO AND FROM THE "SIDE ROADS" BE STOPPED FOR TIME DURATIONS GREATER THAN THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES. ONLY WHEN APPROVED BY THE ENGINEER MAY THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES FOR STOPPED TRAFFIC FOR THE SIDE ROAD TRAFFIC BE EXCEEDED. THE PRESENCE OF "STOP SIGN CONTROLLED" "SIDE ROADS" ON ALL APPROACHES TO THE INTERSECTION INDICATES HIGH TRAFFIC VOLUMES ON THE "SIDE ROADS", THEREFORE, MINIMIZE EXCEEDING THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES FOR STOPPED TRAFFIC ON THE "SIDE ROADS". THE CONTRACTOR AND THE ENGINEER SHALL DISCUSS THE TIME REQUIREMENTS FOR CONDUCTING THE WORK AND SHALL DETERMINE A MAXIMUM TIME DURATION FOR STOPPING THE SIDE ROAD TRAFFIC PRIOR TO ANY PORTION OF THE LANE CLOSURE OR THE "WORK ACTIVITY AREA" ENCROACHING UPON THE "LIMITS OF THE INTERSECTION".



THIS DRAWING IS NOT TO SCALE

TABLE A

SIGN PLACEMENT INTERVALS	
SPEED LIMIT	*
# ≤ 35 MPH LOW SPEED	200
# 40 - 50 MPH INTERMEDIATE SPEED	350
# 55 MPH HIGH SPEED	500

REGULATORY POSTED SPEED LIMIT PRIOR TO BEGINNING WORK

TABLE B

TRAFFIC CONTROL DEVICE SPACING INTERVALS WORK ACTIVITY / BUFFER SPACE AREAS	
SPEED LIMIT	SPACING INTERVALS
≤ 35 MPH	25 FEET
40 - 55 MPH	50 FEET

REFERENCES

WORK ZONE TRAFFIC CONTROL ENGINEER

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER NO. 24242 WILLIE E. McCONNELL, JR

SIGNATURE

7/27/15
DATE

#	DATE	CHK	DESCRIPTION
6			
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0	8-12-14	JCS	NEW DRAWING

SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING

FLAGGING OPERATIONS
WORK ZONES
CONTINUING THROUGH
STOP SIGN
CONTROLLED
INTERSECTIONS
ALL APPROACHES

610-005-30

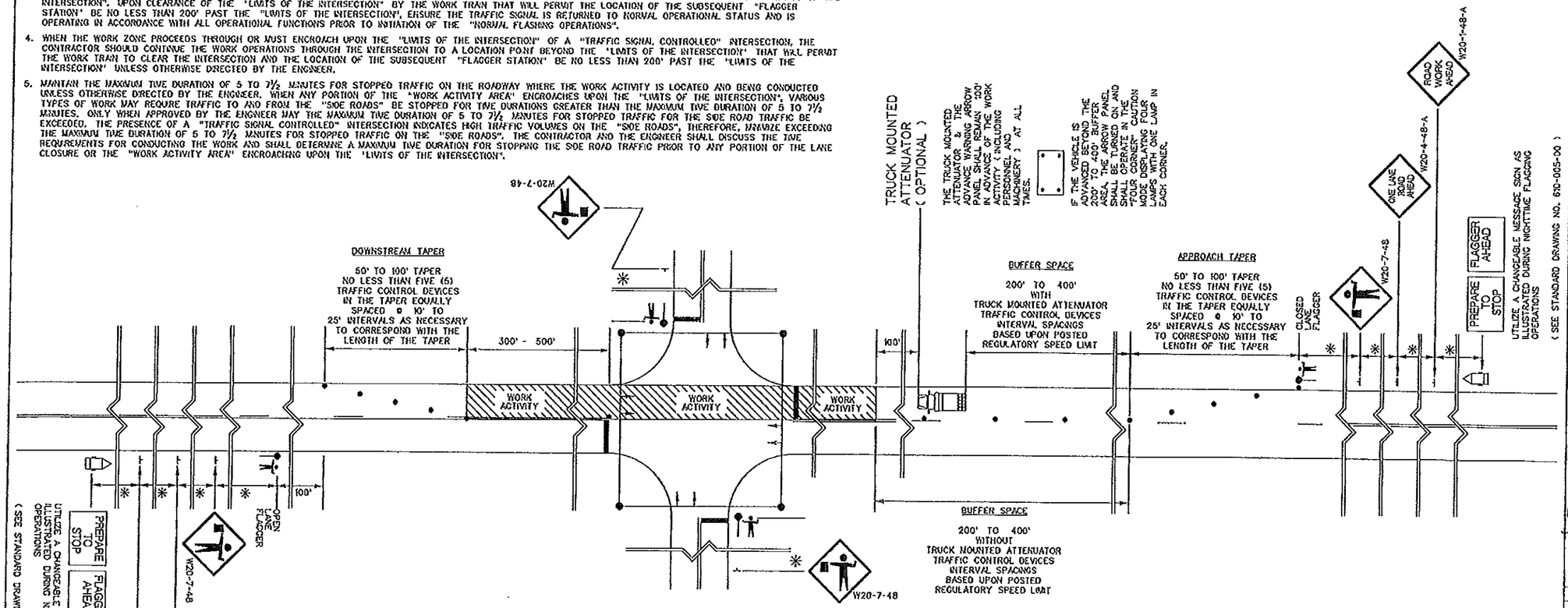
EFFECTIVE LETTING DATE: JAN 2015

DRAWING 610-005-50 NOTES

1. SEE STANDARD DRAWING NO. 610-005-00 FOR ALL GENERAL NOTES AND REQUIREMENTS. THE FOLLOWING NOTES ARE SPECIFIC REQUIREMENTS FOR THIS STANDARD DRAWING.
2. WHEN THE WORK ZONE PROCEEDS THROUGH OR MUST ENCROACH UPON THE "LIMITS OF THE INTERSECTION", DO NOT ALLOW THE "APPROACH TAPER" OR THE "DOWNSTREAM TAPER" OF THE LANE CLOSURE TO ENCROACH UPON THE "LIMITS OF THE INTERSECTION". ONLY THE "BUFFER SPACE" OR THE "WORK ACTIVITY AREA" OF THE LANE CLOSURE MAY ENCROACH UPON THE "LIMITS OF THE INTERSECTION".
3. WHEN THE WORK ZONE PROCEEDS THROUGH OR MUST ENCROACH UPON THE "LIMITS OF THE INTERSECTION" OF A "TRAFFIC SIGNAL CONTROLLED" INTERSECTION, THE CONTRACTOR SHALL HAVE THE TRAFFIC SIGNAL PLACED ON "NORMAL FLASHING OPERATIONS". THE CONTRACTOR SHALL UTILIZE FLAGGERS TO CONTROL AND DIRECT ALL TRAFFIC ENTERING AND PASSING THROUGH THE INTERSECTION UNLESS OTHERWISE DIRECTED BY THE ENGINEER. CLEAR COMMUNICATIONS BY RADIO OR OTHER EFFECTIVE METHOD BETWEEN ALL FLAGGERS IS REQUIRED TO ENSURE SAFE AND EFFICIENT CONTROL OF ALL TRAFFIC APPROACHING AND PASSING THROUGH THE INTERSECTION. MAINTAIN THESE FLAGGERS IN PLACE FOR THE DURATION THAT ANY PORTION OF THE "BUFFER SPACE" OR THE "WORK ACTIVITY AREA" MAY ENCROACH UPON THE "LIMITS OF THE INTERSECTION". UPON CLEARANCE OF THE "LIMITS OF THE INTERSECTION" BY THE WORK TRAIN THAT WILL PERMIT THE LOCATION OF THE SUBSEQUENT "FLAGGER STATION" BE NO LESS THAN 200' PAST THE "LIMITS OF THE INTERSECTION", ENSURE THE TRAFFIC SIGNAL IS RETURNED TO NORMAL OPERATIONAL STATUS AND IS OPERATING IN ACCORDANCE WITH ALL OPERATIONAL FUNCTIONS PRIOR TO INITIATION OF THE "NORMAL FLASHING OPERATIONS".
4. WHEN THE WORK ZONE PROCEEDS THROUGH OR MUST ENCROACH UPON THE "LIMITS OF THE INTERSECTION" OF A "TRAFFIC SIGNAL CONTROLLED" INTERSECTION, THE CONTRACTOR SHOULD CONTINUE THE WORK OPERATIONS THROUGH THE INTERSECTION TO A LOCATION POINT BEYOND THE "LIMITS OF THE INTERSECTION" THAT WILL PERMIT THE WORK TRAIN TO CLEAR THE INTERSECTION AND THE LOCATION OF THE SUBSEQUENT "FLAGGER STATION" BE NO LESS THAN 200' PAST THE "LIMITS OF THE INTERSECTION" UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
5. MAINTAIN THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES FOR STOPPED TRAFFIC ON THE ROADWAY WHERE THE WORK ACTIVITY IS LOCATED AND BEING CONDUCTED UNLESS OTHERWISE DIRECTED BY THE ENGINEER. WHEN ANY PORTION OF THE "WORK ACTIVITY AREA" ENCROACHES UPON THE "LIMITS OF THE INTERSECTION", VARIOUS TYPES OF WORK MAY REQUIRE TRAFFIC TO AND FROM THE "SIDE ROADS" BE STOPPED FOR TIME DURATIONS GREATER THAN THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES. ONLY WHEN APPROVED BY THE ENGINEER MAY THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES FOR STOPPED TRAFFIC FOR THE SIDE ROAD TRAFFIC BE EXCEEDED. THE PRESENCE OF A "TRAFFIC SIGNAL CONTROLLED" INTERSECTION INDICATES HIGH TRAFFIC VOLUMES ON THE "SIDE ROADS", THEREFORE, MINIMIZE EXCEEDING THE MAXIMUM TIME DURATION OF 5 TO 7½ MINUTES FOR STOPPED TRAFFIC ON THE "SIDE ROADS". THE CONTRACTOR AND THE ENGINEER SHALL DISCUSS THE TIME REQUIREMENTS FOR CONDUCTING THE WORK AND SHALL DETERMINE A MAXIMUM TIME DURATION FOR STOPPING THE SIDE ROAD TRAFFIC PRIOR TO ANY PORTION OF THE LANE CLOSURE OR THE "WORK ACTIVITY AREA" ENCROACHING UPON THE "LIMITS OF THE INTERSECTION".

INTERSECTION TRAFFIC CONTROLLED BY FLAGGERS

TRAFFIC SIGNAL OPERATIONAL STATUS	RESPONSIBLE ENTITY FOR INITIATING FLASHING OPERATIONS		
FLASHING OPERATIONS	DISTRICT TRAFFIC SIGNAL TECHNICIAN	TRAFFIC SIGNAL SUB-CONTRACTOR	SCDOT INSPECTOR / SCDOT DESIGNATED REPRESENTATIVE



TRAFFIC SIGNAL OPERATIONS NOTE

ONLY WHEN THE "LIMITS OF THE INTERSECTION" OF 2 (TWO) ADJACENT "TRAFFIC SIGNAL CONTROLLED" INTERSECTIONS ARE WITHIN 500 FEET OR LESS OF EACH OTHER AND WITHOUT THE PRESENCE OF AN UNSIGNALIZED INTERSECTION IN BETWEEN, MAY THE TRAFFIC SIGNALS AT MORE THAN 1 (ONE) "TRAFFIC SIGNAL CONTROLLED" INTERSECTION BE SIMULTANEOUSLY PLACED ON "NORMAL FLASHING OPERATIONS". AT NO TIME WILL IT BE PERMISSIBLE TO SIMULTANEOUSLY PLACE THE TRAFFIC SIGNALS AT MORE THAN 2 (TWO) ADJACENT "TRAFFIC SIGNAL CONTROLLED" INTERSECTIONS ON "NORMAL FLASHING OPERATIONS".

TABLE A

SIGN PLACEMENT INTERVALS	
SPEED LIMIT	*
# ≤ 35 MPH LOW SPEED	200
# 40 - 50 MPH INTERMEDIATE SPEED	350
# 55 MPH HIGH SPEED	500

REGULATORY POSTED SPEED LIMIT PRIOR TO BEGINNING WORK

TABLE B

TRAFFIC CONTROL DEVICE SPACING INTERVALS WORK ACTIVITY / BUFFER SPACE AREAS	
SPEED LIMIT	SPACING INTERVALS
≤ 35 MPH	25 FEET
40 - 55 MPH	50 FEET

THIS DRAWING IS NOT TO SCALE

REFERENCES

WORK ZONE TRAFFIC CONTROL ENGINEER

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER NO. 24242 WILLIE E. McCONNELL, JR

SIGNATURE

7/27/15
DATE

#	DATE	CHK	DESCRIPTION
6			
5			
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3			
2			
1			
0	8-12-14	JCS	NEW DRAWING

SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING

FLAGGING OPERATIONS WORK ZONES CONTINUING THROUGH TRAFFIC SIGNAL CONTROLLED INTERSECTIONS with FLAGGERS

610-005-50

EFFECTIVE LETTING DATE | JAN 2016

South Carolina
Department of Transportation

SPECIAL PROVISIONS FOR GREENVILLE COUNTY

1. Failure to comply with all the permit requirements will result in a stop work order until these issues are in compliance.
2. The Permittee shall be responsible for any and all damages that occur as a result of this installation.
3. The Permittee shall notify SCDOT-Greenville Maintenance at (864) 241-1224 when the work is started as well as completed.
4. Revisions to this permit must be requested in writing along with a revised plan. No changes shall be performed until written permission is received by the Permittee.
5. Where applicable, this permit shall conform to the standards of the SCDOT "A Policy For Accommodating Utilities on Highway Rights-of-Way" (current edition).
6. Where applicable, this permit shall conform to the standards of the SCDOT Access and Roadside Management Standards (ARMS) Manual (current edition).
7. Where applicable, this permit shall conform to the standards of the SCDOT Standard Specifications For Highway Construction and Supplemental Specifications (current edition).
8. Where applicable, this permit shall conform to the SCDOT Standard Drawings (current edition).
9. Where applicable, this permit shall conform to the standards of the Americans with Disabilities Act.
10. The Permittee shall install and maintain traffic control that conforms to SCDOT Standard Drawings.
11. Traffic control shall not be set up in poor or hazardous weather conditions (including but not limited to light/heavy rain, high winds, fog, sleet, snow, etc.)
12. All persons on foot or on or within work equipment whose duties place them on highway right-of-way and expose them to potential risks of moving roadway traffic or construction equipment shall wear high visibility safety apparel meeting the requirements of ISEA "American National Safety Standard for High-Visibility Safety Apparel," also referred to as ANSI / ISEA 107-2004, standard performance for Class 2 or 3 risk exposure (current edition). (For daytime operations, these garments shall be fabricated with a fluorescent red-orange background material.)
13. SCDOT does not authorize any work outside the right-of-way without obtaining written permission from the property owner.
14. Locate utilities and drainage structures in the project area prior to starting work.
15. This permit shall not increase storm water runoff to the SCDOT right-of-way.
16. Install and maintain erosion prevention and sediment control barriers to minimize damage to undisturbed areas.
17. Install and maintain a proper construction entrance with a mud mat.
18. The Permittee shall be responsible for the immediate removal and proper disposal of traffic hazards including but not limited to mud, debris, stone, and trash that may be washed or tracked in the travel lane as result of this permit.
19. Ditches and/or shoulders disturbed under this permit shall be restored to the original grade and cross section to ensure positive drainage.
20. Reseed as needed all disturbed areas void of vegetation until grass is sufficient to stop erosion.
21. Monitor restored areas through and after construction including but not limited to grassing, ditches, and drainage structures until final stabilization is achieved.

REFERENCES

WORK ZONE TRAFFIC CONTROL ENGINEER

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER NO. 24242 WILLIE E. McCONNELL, JR.

SIGNATURE

8/2/12
DATE

#	DATE	CHK	DESCRIPTION
6			
5			
4			
3			
2			
1	2-15-11	JCS	GENERAL UPDATE
0	8-22-07	JCS	DRAWING NO. UPDATE

SCDOT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

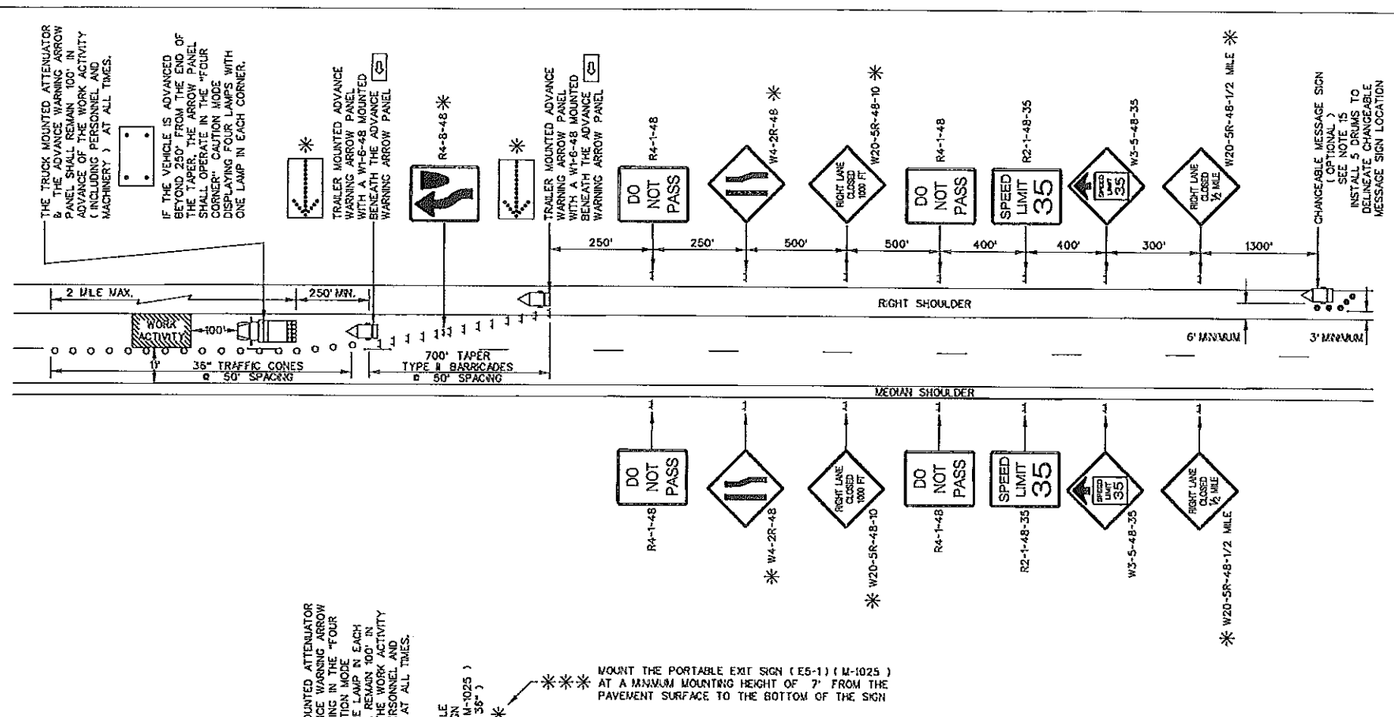
STANDARD DRAWING

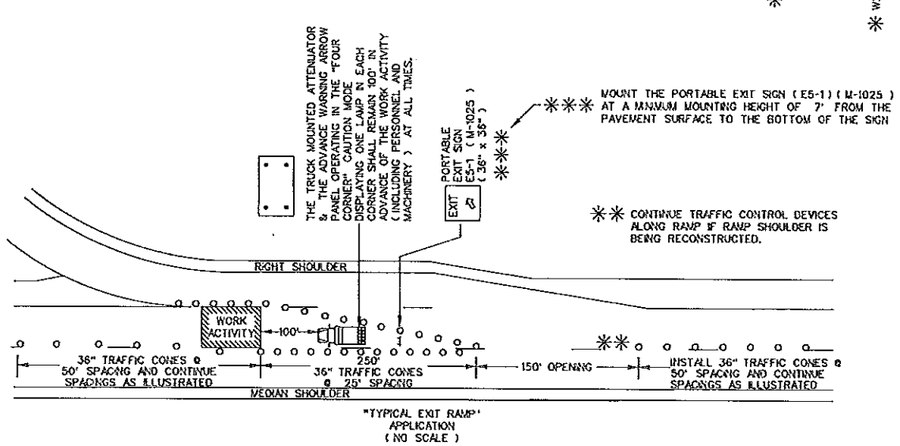
LANE CLOSURE DAYTIME MULTILANE PRIMARY ROUTES

610-025-00

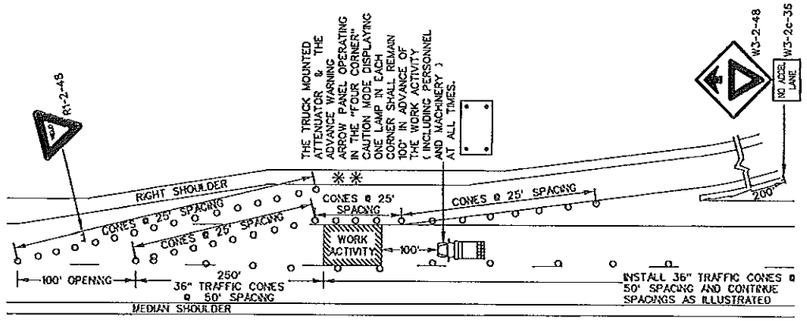
EFFECTIVE LETTING DATE: JAN. 2013

THIS DRAWING IS NOT TO SCALE





"TYPICAL EXIT RAMP" APPLICATION (NO SCALE)



"TYPICAL ENTRANCE RAMP" APPLICATION (NO SCALE)

GENERAL NOTES

1. ALL SIGN LOCATIONS ARE TO BE MEASURED FROM THE WORK AREA. WORK LIMITS FOR THE PROJECT WILL BE DETERMINED BY THE ENGINEER AND AS INDICATED IN THE CONTRACT.
2. INSTALL ADVANCE WARNING SIGNS MOUNTED ON PORTABLE SIGN SUPPORTS NO LESS THAN 4 FEET FROM THE NEAR EDGE OF THE SIGN TO THE NEAR EDGE OF AN ADJACENT TRAVEL LANE ON ROADWAYS WITH EARTH SHOULDERS AND NO LESS THAN 6 FEET FROM THE NEAR EDGE OF THE SIGN TO THE NEAR EDGE OF AN ADJACENT TRAVEL LANE ON ROADWAYS WITH PAVED SHOULDERS. WHEN CURB & GUTTER IS PRESENT, INSTALL THE SIGN NO LESS THAN 2 FEET FROM THE NEAR EDGE OF THE SIGN TO THE FACE OF THE CURB.
3. SPACINGS INDICATED ARE FOR NORMAL CONDITIONS; ADJUSTMENTS MAY BE REQUIRED DUE TO HORIZONTAL AND/OR VERTICAL ALIGNMENTS OR OTHER SIGHT DISTANCE RESTRICTIONS.
4. ALL SIGNS MOUNTED ON PORTABLE SIGN SUPPORTS SHALL HAVE A MINIMUM MOUNTING HEIGHT OF 5 FEET FROM THE GROUND TO THE BOTTOM OF THE SIGN. ALL SIGNS MOUNTED ON GROUND MOUNTED U-CHANNEL POSTS OR SQUARE STEEL TUBE POSTS SHALL HAVE A MINIMUM MOUNTING HEIGHT OF 7 FEET FROM THE GRADE ELEVATION OF THE NEAR EDGE OF THE ADJACENT TRAVEL LANE TO THE BOTTOM OF THE SIGN UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT. MOUNT ALL SIGNS STRAIGHT AND LEVEL AND WITH THE FACE OF THE SIGNS PERPENDICULAR TO THE SURFACE OF THE ROADWAY.
5. REFLECTORIZE ORANGE ADVANCE WARNING SIGNS AND ANY ORANGE AREAS OF A MULTI-COLORED ADVANCE WARNING SIGN WITH A FLUORESCENT ORANGE COLORED PRISMATIC RETROREFLECTIVE SHEETING. REFLECTORIZE WHITE REGULATORY SIGNS AND ANY WHITE AREAS OF A MULTI-COLORED ADVANCE WARNING SIGN WITH A WHITE COLORED PRISMATIC RETROREFLECTIVE SHEETING.
6. ALL TRAFFIC CONTROL DEVICES SHALL COMPLY WITH ALL NCHRP REPORT 350 REQUIREMENTS AND SHALL REQUIRE APPROVAL BY THE DEPARTMENT. ONLY THOSE TRAFFIC CONTROL DEVICES INCLUDED ON THE "APPROVED PRODUCTS LIST FOR TRAFFIC CONTROL DEVICES IN WORK ZONES" ARE CONSIDERED ACCEPTABLE FOR USE. THIS LIST MAY BE ACCESSED ON THE DEPARTMENT'S WEB SITE AT: www.scdot.org .
7. THE CONTRACTOR SHALL PROVIDE AND UTILIZE ANY SPECIAL SIGN MOUNTING ASSEMBLIES AND HARDWARE THAT MAY BE NECESSARY FOR INSTALLING AND MOUNTING SIGNS IN AREAS OF CONCRETE MEDIAN BARRIER, BRIDGE PARAPET WALLS OR DOUBLEFACED GUARDRAIL.
8. REFLECTORIZATION OF 36" TRAFFIC CONES USED DURING DAYLIGHT HOURS IS NOT REQUIRED. IF THIS TRAFFIC CONTROL SETUP EXTENDS INTO THE NIGHTTIME HOURS, REPLACE ALL 36" TRAFFIC CONES WITH EITHER PORTABLE PLASTIC DRUMS OR 42" OVERSIZED TRAFFIC CONES. REFLECTORIZE ALL PORTABLE PLASTIC DRUMS AND 42" OVERSIZED TRAFFIC CONES WITH TYPE III FLEXIBLE PRISMATIC RETROREFLECTIVE SHEETING UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT.
9. REFLECTORIZE ALL BARRICADES WITH A TYPE VII OR IX PRISMATIC RETROREFLECTIVE SHEETING ON ALL PROJECTS LET TO CONTRACT AFTER MAY 1, 2012 UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT.
10. TYPE II BARRICADES SHALL HAVE A MINIMUM WIDTH OF 3 FEET UNLESS OTHERWISE DIRECTED BY THE DEPARTMENT.
11. CONDUCT THE WORK IN SUCH A MANNER THAT WILL MINIMIZE ENCROACHMENT OF TRAFFIC CONTROL DEVICES, EQUIPMENT, PERSONNEL, MATERIALS OR ANY WORK RELATED VEHICLES ONTO AN ADJACENT TRAVEL LANE OPEN TO TRAFFIC. INSTALL, MAINTAIN AND ADJUST THE TRAFFIC CONTROL DEVICES AS NECESSARY TO ENSURE PROPER DELINEATION OF THE WORK AREA.
12. LANE CLOSURES ARE RESTRICTED TO MAXIMUM LENGTHS OF 2 MILES UNLESS OTHERWISE DIRECTED BY THE SPECIAL PROVISIONS AND/OR THE DEPARTMENT.
13. IF WORK IS BEING CONDUCTED SIMULTANEOUSLY AT TWO DIFFERENT LOCATIONS WITHIN THE SAME TRAVEL LANE UNDER TWO SEPARATE LANE CLOSURES ON A PRIMARY ROADWAY WITH A POSTED REGULATORY SPEED LIMIT OF 40 MPH OR GREATER, SEPARATE THE TWO LANE CLOSURES BY NO LESS THAN 2 MILES FROM THE END OF THE FIRST CLOSURE THAT A MOTORIST WILL ENCOUNTER TO THE BEGINNING OF THE TAPER OF THE SECOND CLOSURE.
14. IF WORK IS BEING CONDUCTED SIMULTANEOUSLY AT TWO DIFFERENT LOCATIONS IN THE SAME DIRECTION BUT WITHIN DIFFERENT TRAVEL LANES UNDER TWO SEPARATE LANE CLOSURES ON A PRIMARY ROADWAY WITH A POSTED REGULATORY SPEED LIMIT OF 40 MPH OR GREATER, SEPARATE THE TWO LANE CLOSURES BY NO LESS THAN 4 MILES FROM THE END OF THE FIRST CLOSURE THAT A MOTORIST WILL ENCOUNTER TO THE BEGINNING OF THE TAPER OF THE SECOND CLOSURE.
15. UTILIZATION OF A CHANGEABLE MESSAGE SIGN IS OPTIONAL WITH THIS TRAFFIC CONTROL SETUP. HOWEVER, WHEN A CHANGEABLE MESSAGE SIGN IS UTILIZED, INSTALL THE SIGN AS ILLUSTRATED ON THIS STANDARD DRAWING UNLESS OTHERWISE DIRECTED BY THE SPECIAL PROVISIONS, THE PLANS AND/OR THE ENGINEER. INSTALL THE CHANGEABLE MESSAGE SIGN NO LESS THAN 6 FEET FROM THE NEAR EDGE OF THE ADJACENT TRAVEL LANE AND SUPPLEMENT THE SIGN LOCATION WITH NO LESS THAN 5 PORTABLE PLASTIC DRUMS FOR DELINEATION AS ILLUSTRATED. 36" STANDARD TRAFFIC CONES OR 42" OVERSIZED TRAFFIC CONES ARE PROHIBITED AS SUBSTITUTES FOR THE PORTABLE PLASTIC DRUMS IN THIS APPLICATION. DURING A RIGHT LANE CLOSURE, THE SIGN SHOULD FLASH ALTERNATELY TO READ "RIGHT LANE CLOSED", "MERGE LEFT" AT A RATE THAT WILL PERMIT MOTORISTS TO READ BOTH MESSAGES AT LEAST ONCE.
16. THE DEPARTMENT RESERVES THE RIGHT TO RESTRICT WORK OPERATIONS AND/OR WITHHOLD THE MONTHLY ESTIMATE IF THE TRAFFIC CONTROL IS NOT PROPERLY INSTALLED AND MAINTAINED AS DIRECTED BY THE STANDARD SPECIFICATIONS, THE SPECIAL PROVISIONS, THE STANDARD DRAWINGS, THE PLANS AND/OR THE ENGINEER.
17. THIS TYPICAL TRAFFIC CONTROL SETUP APPLIES TO THE INSTALLATION OF A LANE CLOSURE ON A PRIMARY ROADWAY WITH A POSTED REGULATORY SPEED LIMIT OF 40 MPH OR GREATER.

* LEFT LANE CLOSURE

1. SIGNS ILLUSTRATED ARE FOR A RIGHT LANE CLOSURE.
2. WHEN CLOSING THE LEFT TRAVEL LANE, USE THE FOLLOWING:
   2 - W20-5L-48-10 2 - W20-5L-48-1/2 MILE
   2 - W4-2L-48 1 - R4-7-48
3. THE STRIPES ON THE BARRICADES TO THE LEFT OF TRAFFIC SHALL SLOPE DOWNWARD FROM THE UPPER LEFT TO THE LOWER RIGHT.
4. THE FLASHING ARROW AND THE "LARGE ARROW" SIGN (W1-6-48) SHALL POINT TO THE RIGHT.
5. THE CHANGEABLE MESSAGE SIGN SHALL FLASH ALTERNATELY TO READ "LEFT LANE CLOSED", "MERGE RIGHT".

PORTABLE TRUCK MOUNTED ATTENUATOR

1. UTILIZE A TRUCK MOUNTED ATTENUATOR ATTACHED TO THE REAR OF A TRUCK WITH A MINIMUM GROSS VEHICULAR WEIGHT (GVW) OF 15,000 POUNDS (ACTUAL WEIGHT). IF THE ADDITION OF SUPPLEMENTAL WEIGHT TO THE VEHICLE AS BALLAST IS NECESSARY, CONTAIN THE MATERIAL WITHIN A STRUCTURE CONSTRUCTED OF STEEL. CONSTRUCT THIS STEEL STRUCTURE TO HAVE A MINIMUM OF FOUR SIDES AND A BOTTOM. A TOP IS OPTIONAL. BOLT THIS STRUCTURE TO THE FRAME OF THE TRUCK. UTILIZE A SUFFICIENT NUMBER OF FASTENERS FOR ATTACHMENT OF THE STEEL STRUCTURE TO THE FRAME OF THE TRUCK TO ENSURE THE STRUCTURE WILL NOT SEPARATE FROM THE FRAME OF THE TRUCK DURING AN IMPACT UPON THE ATTACHED TRUCK MOUNTED ATTENUATOR. UTILIZE EITHER DRY LOOSE SAND OR STEEL REINFORCED CONCRETE FOR BALLAST MATERIAL WITHIN THE STEEL STRUCTURE TO ACHIEVE THE NECESSARY WEIGHT. THE BALLAST MATERIAL SHALL REMAIN CONTAINED WITHIN THE CONFINES OF THE STEEL STRUCTURE AND SHALL NOT PROTRUDE FROM THE STEEL STRUCTURE IN ANY MANNER.
2. LOCATE THE TRUCK MOUNTED ATTENUATOR 100 FEET IN ADVANCE OF THE WORK AREA UNLESS OTHERWISE SPECIFIED.
3. PROVIDE, INSTALL AND MAINTAIN THE TRUCK MOUNTED ATTENUATOR AS SPECIFIED BY THE STANDARD SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER.
4. DUE TO THE WEIGHT OF A TRUCK MOUNTED ATTENUATOR, THE TRUCK MOUNTED ATTENUATOR SUPPLEMENTED WITH AN ADVANCE WARNING ARROW PANEL MAY BE REPLACED WITH A TRAILER MOUNTED ADVANCE WARNING ARROW PANEL WHEN THIS TRAFFIC CONTROL SETUP IS UTILIZED FOR ASPHALT CONCRETE PAVEMENT OPERATIONS. REPLACEMENT WITH A TRAILER MOUNTED ADVANCE WARNING ARROW PANEL SHALL REQUIRE THE ENGINEER'S APPROVAL.

ADVANCE WARNING ARROW PANEL

ALL ADVANCE WARNING ARROW PANELS SHALL BE 48" x 96" WITH A MINIMUM LEGIBILITY DISTANCE OF 1 MILE. PLACEMENT OF AN ADVANCE WARNING ARROW PANEL MAY REQUIRE ADJUSTMENTS DUE TO HORIZONTAL AND/OR VERTICAL ALIGNMENT OR OTHER SIGHT DISTANCE RESTRICTIONS. THE PANEL FACE SHALL BE NONREFLECTIVE BLACK. ALL ADVANCE WARNING ARROW PANELS SHALL COMPLY WITH THE STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, LATEST EDITION.

WHEN AN ADVANCE WARNING ARROW PANEL IS REQUIRED TO OPERATE IN THE CAUTION MODE, THE ADVANCE WARNING ARROW PANEL SHALL DISPLAY THE "FOUR CORNERS" CAUTION MODE, WITH ONE LAMP IN EACH CORNER. DISPLAY OF ANY OTHER TYPE OF CAUTION MODE OTHER THAN THE "FOUR CORNERS" CAUTION MODE SUCH AS THE "FLASHING BAR" OR THE "ALTERNATING DIAMOND" CAUTION MODES ARE UNACCEPTABLE AND PROHIBITED.

LEGEND

o 36" TRAFFIC CONES

Appendix B: Pipelines

Figure 6 – Longitudinal Installation of Utilities in Roadway Shoulders

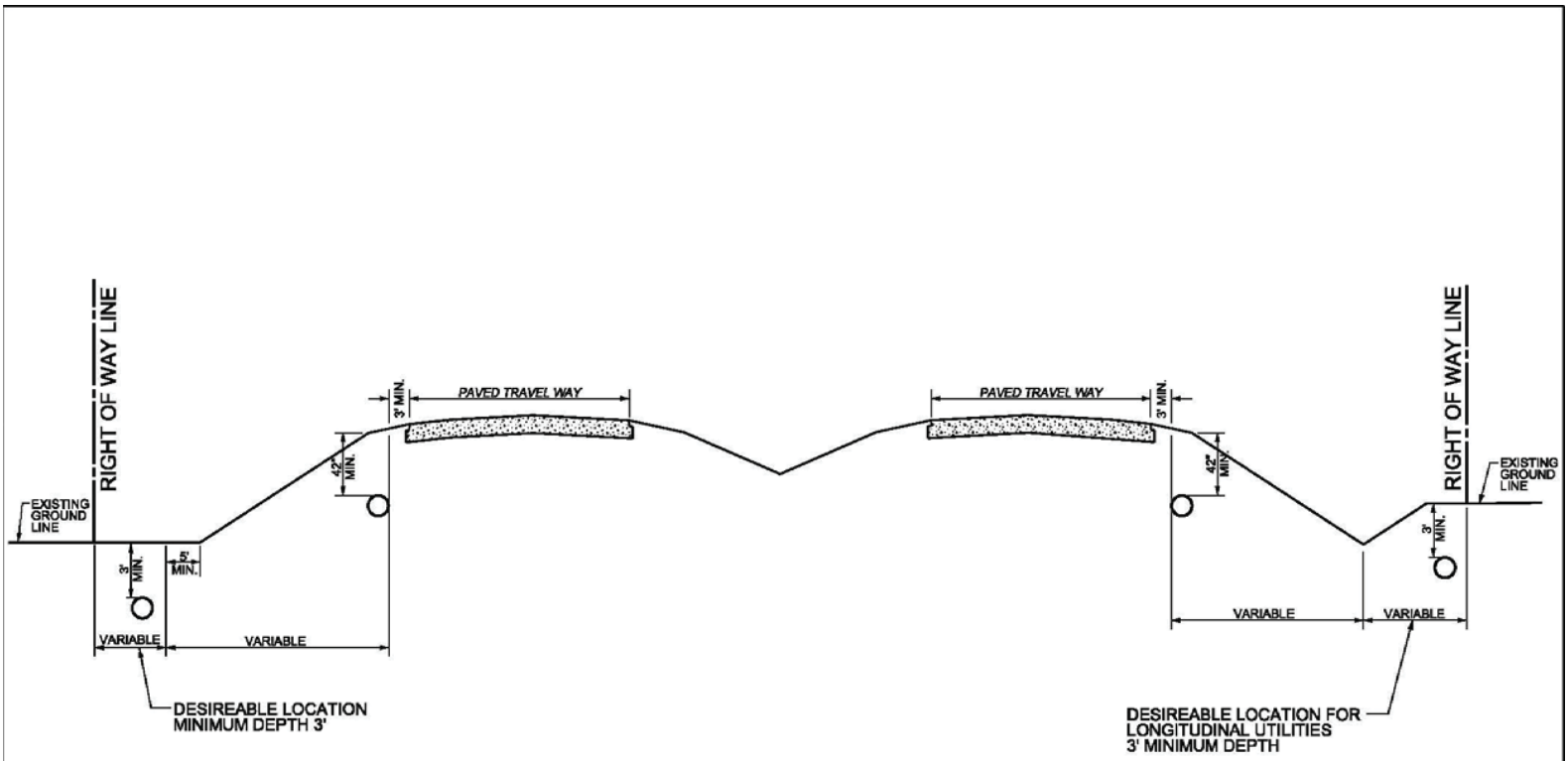


FIGURE 6
CROSS SECTION SHOWING LONGITUDINAL INSTALLATION OF UTILITIES IN ROADWAY SHOULDERS

Appendix B: Pipelines
Figure 4 – Pavement Repairs

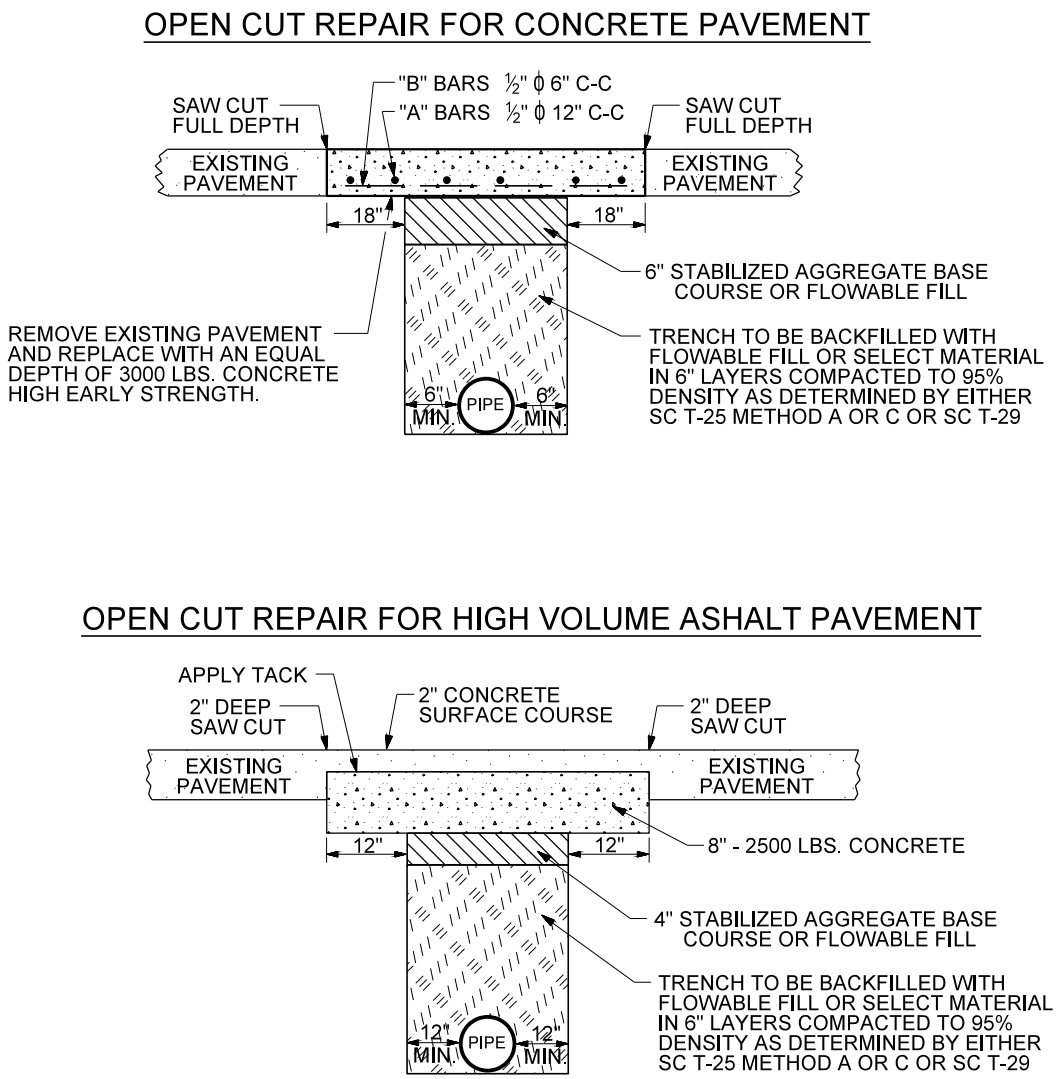
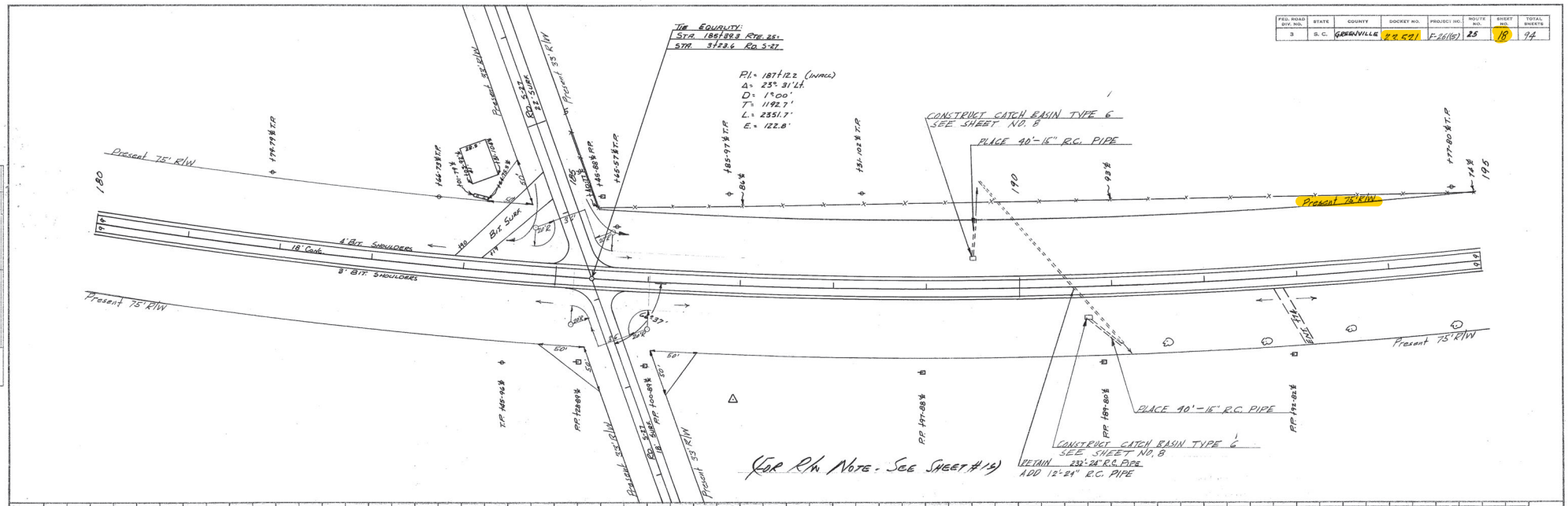


FIGURE 4
PAVEMENT REPAIRS

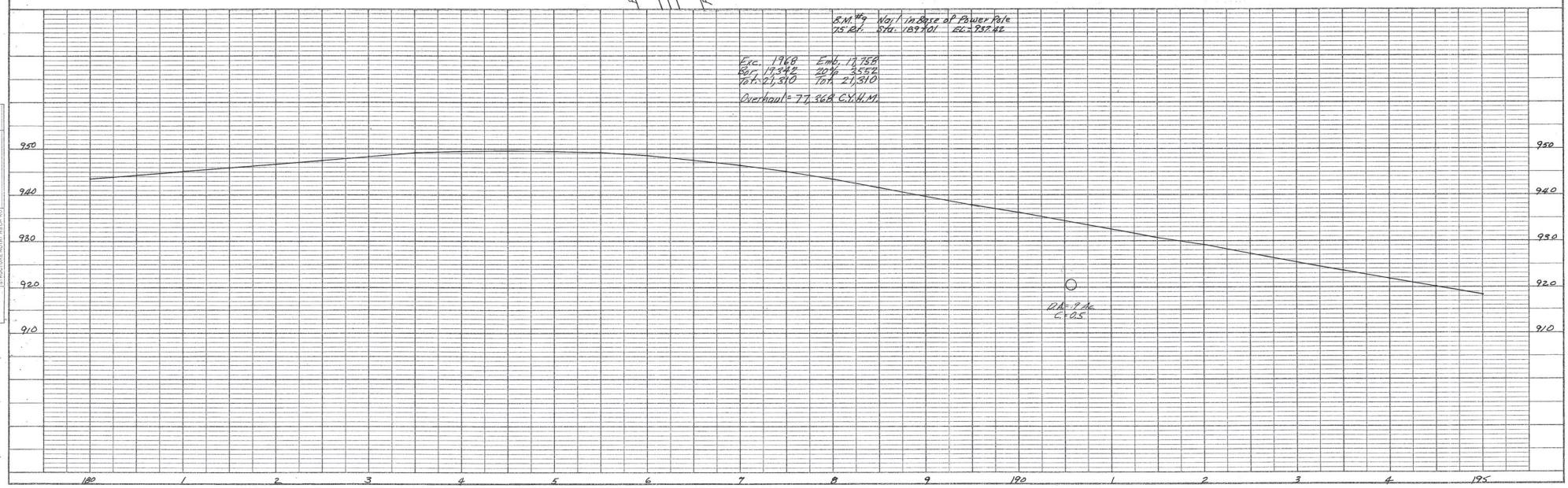
FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	GREENVILLE	72 591	F-26(15)	25	18	94



B.M. #9 Wal in Base of Power Pole
15 Rt. Sta. 189+01 El.= 937.42

Exc.	1968	Emb. 17,758
Bor.	19,342	Adj. 3552
Tot.	21,310	Tot. 21,310

Overhaul = 77,368 C.Y.H.M.



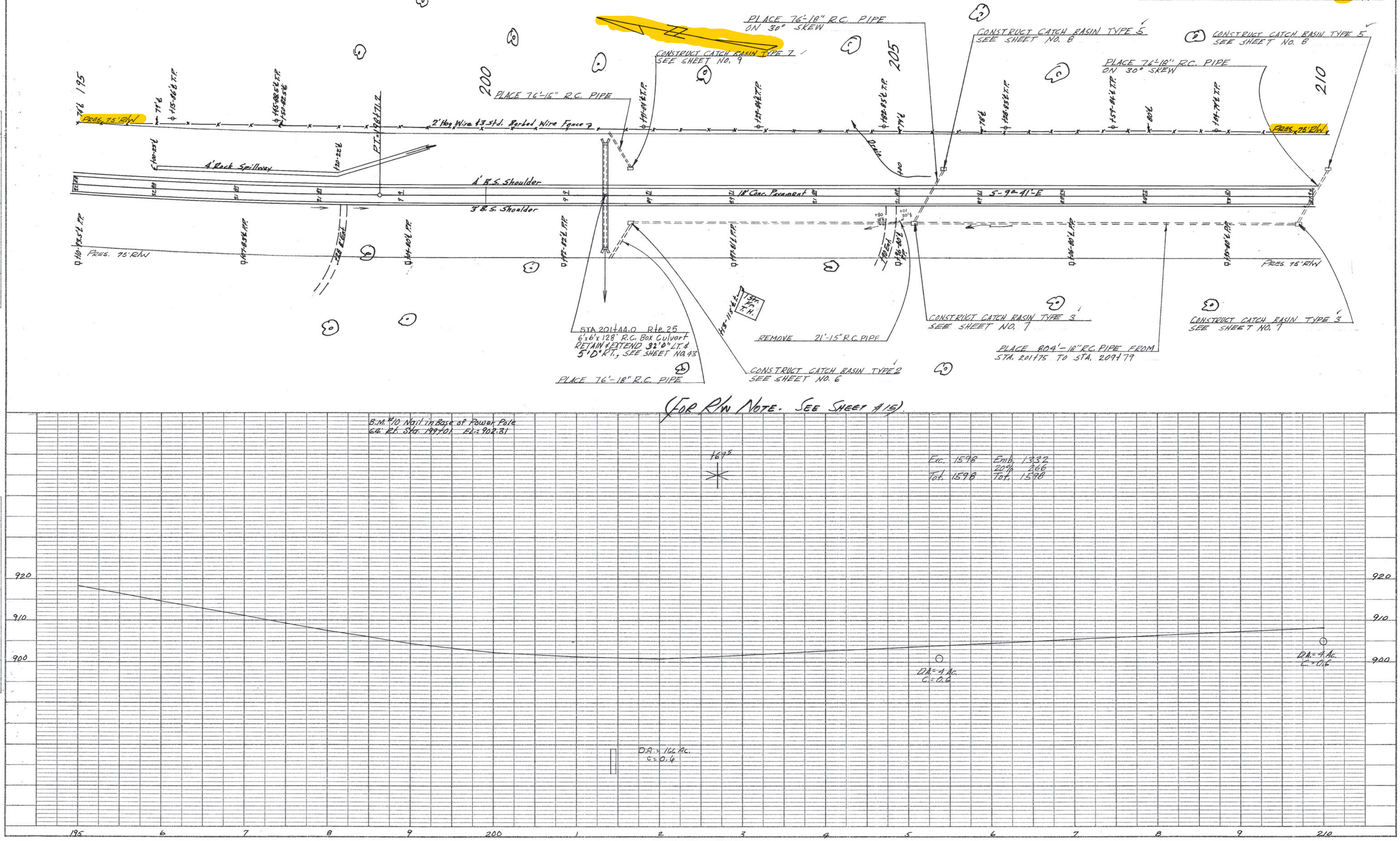
PLAN — SURVEYED, PLOTTED, CHECKED, RT. OF WAY CHECKED, NOTE BOOK, NO., BY, DATE 5/5/62

PROFILE — SURVEYED, PLOTTED, CHECKED, BENCH NOTED, NO., STRUCTURE NOTATIONS CHKD.

GREENVILLE CO.
Rt. 25

K-E PLATE 1, PLAN-PROFILE
KEUFFEL & ESSER CO.

FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	GREENVILLE	23.521	F-261(5)	25	19	94

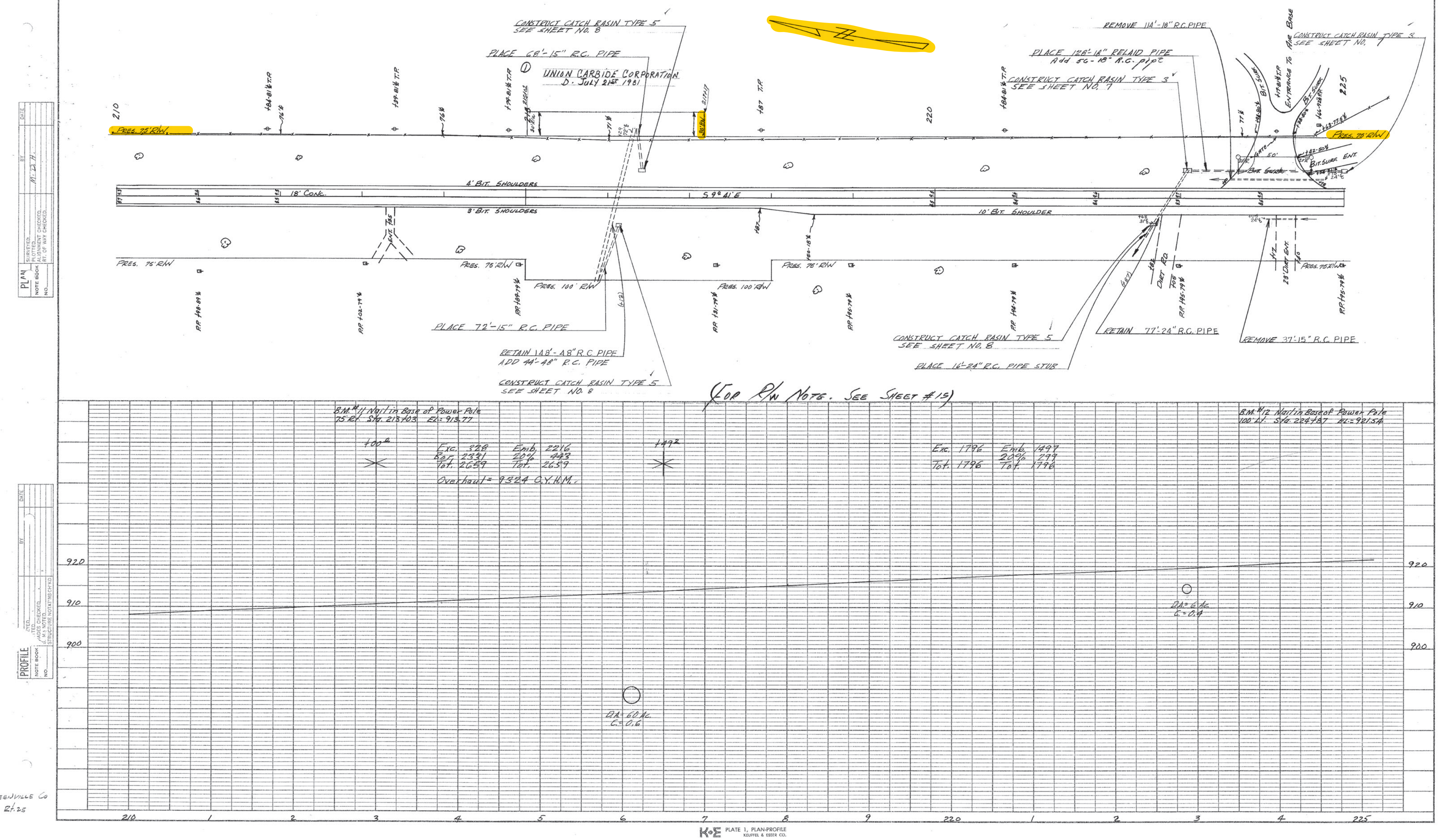


PLACE 76'-18" R.C. PIPE ON 30° SKEW
CONSTRUCT CATCH BASIN TYPE 7 SEE SHEET NO. 9
CONSTRUCT CATCH BASIN TYPE 5 SEE SHEET NO. 8
CONSTRUCT CATCH BASIN TYPE 5 SEE SHEET NO. 8
PLACE 76'-18" R.C. PIPE ON 30° SKEW
PLACE 76'-15" R.C. PIPE
PRES. 75' R/W
2' Hog Wire & 3 Std. Barbed Wire Fence
4' Rock Spillway
4' B.S. Shoulder
18' Conc. Pavement
S-9°-41'-E
3' B.S. Shoulder
PRES. 75' R/W
STA 201+44.0 Rte.25 6'x6'x128' R.C. Box Culvert RETAIN & EXTEND 32'0" LT. & 5'0" RT., SEE SHEET NO. 43
PLACE 76'-18" R.C. PIPE
REMOVE 21'-15" R.C. PIPE
CONSTRUCT CATCH BASIN TYPE 2 SEE SHEET NO. 6
CONSTRUCT CATCH BASIN TYPE 3 SEE SHEET NO. 7
PLACE 804'-12" R.C. PIPE FROM STA. 201+75 TO STA. 209+79
CONSTRUCT CATCH BASIN TYPE 3 SEE SHEET NO. 7
(FOR R/W NOTE. SEE SHEET #15)
B.M. #10 Nail in Base of Power Pole 64' Rt. Sta. 199+01 El.=902.31
Exc. 1598 Emb. 1332 20% 266 Tot. 1598 Tot. 1598
DA = 166 Ac. C = 0.6
DA = 4 Ac. C = 0.6
DA = 4 Ac. C = 0.6
920 910 900
195 6 7 8 9 200 1 2 3 4 5 6 7 8 9 210
PLAN
PROFILE

K+E PLATE 1, PLAN-PROFILE KEUFFEL & ESSER CO.

GREENVILLE Co Rt. 25

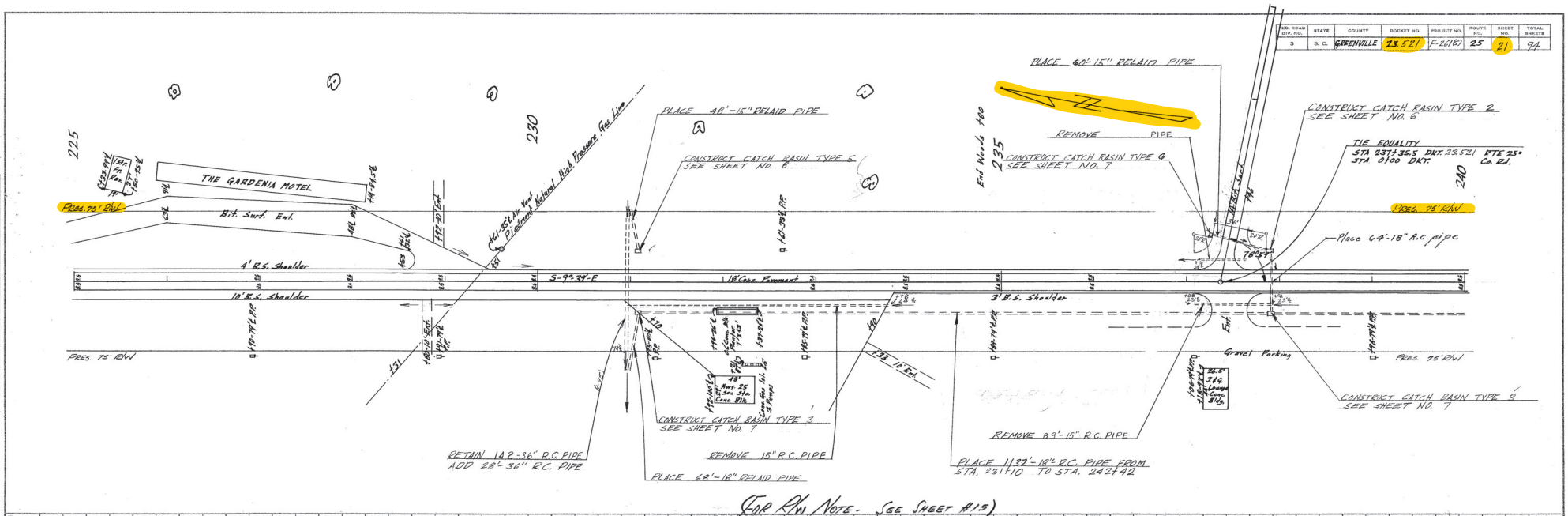
FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	GREENVILLE	23.521	F-261(5)	25	20	94



CONSTRUCT CATCH BASIN TYPE 5
SEE SHEET NO. 8
PLACE 68'-15" R.C. PIPE
UNION CARBIDE CORPORATION
D. JULY 21st 1981
REMOVE 114'-18" R.C.PIPE
PLACE 128'-18" RELAID PIPE
Add 56-18" R.C. pipe
CONSTRUCT CATCH BASIN TYPE 3
SEE SHEET NO. 7
CONSTRUCT CATCH BASIN TYPE 3
SEE SHEET NO. 7
Air Base
Entrance to Air Base
210
220
225
PRES. 75' R/W
4' BIT. SHOULDERS
18' CONC.
S 9° 41' E
8' BIT. SHOULDERS
10' BIT. SHOULDER
PRES. 100' R/W
Bit. Surf. Ent.
Dirt Rd
23' Dirt Ent.
PLACE 72'-15" R.C. PIPE
RETAIN 148'-48" R.C. PIPE
ADD 44'-48" R.C. PIPE
CONSTRUCT CATCH BASIN TYPE 5
SEE SHEET NO. 8
RETAIN 77'-24" R.C. PIPE
REMOVE 37'-15" R.C. PIPE
CONSTRUCT CATCH BASIN TYPE 5
SEE SHEET NO. 8
PLACE 16'-24" R.C. PIPE STUB
(FOR R/W NOTE. SEE SHEET #19)
B.M. #11 Nail in Base of Power Pole
75' Rt. Sta. 213+03 El.=913.77
B.M. #12 Nail in Base of Power Pole
100' Lt. Sta. 224+87 El.=921.54
Exc. 329 Emb. 2216
Bor. 2331 20% 443
Tot. 2659 Tot. 2659
Overhaul = 9324 C.Y.H.M.
Exc. 1796 Emb. 1497
20% 299
Tot. 1796 Tot. 1796
D.A. 60 Ac.
C.=0.6
D.A. 6 Ac.
C.=0.4
920
910
900
210 1 2 3 4 5 6 7 8 9 220 1 2 3 4 225
PLAN
PROFILE
SURVEYED
PLOTTED
ALIGNMENT CHECKED
RT. OF WAY CHECKED
NOTE BOOK
GRADES CHECKED
STRUCTURE NOTATIONS CH'KD
DATE
BY
M.D.H.
K+E PLATE 1, PLAN-PROFILE
KEUFFEL & ESSER CO.

Greenville Co
21.25

FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	GREENVILLE	23.521	F-2618)	25	21	94



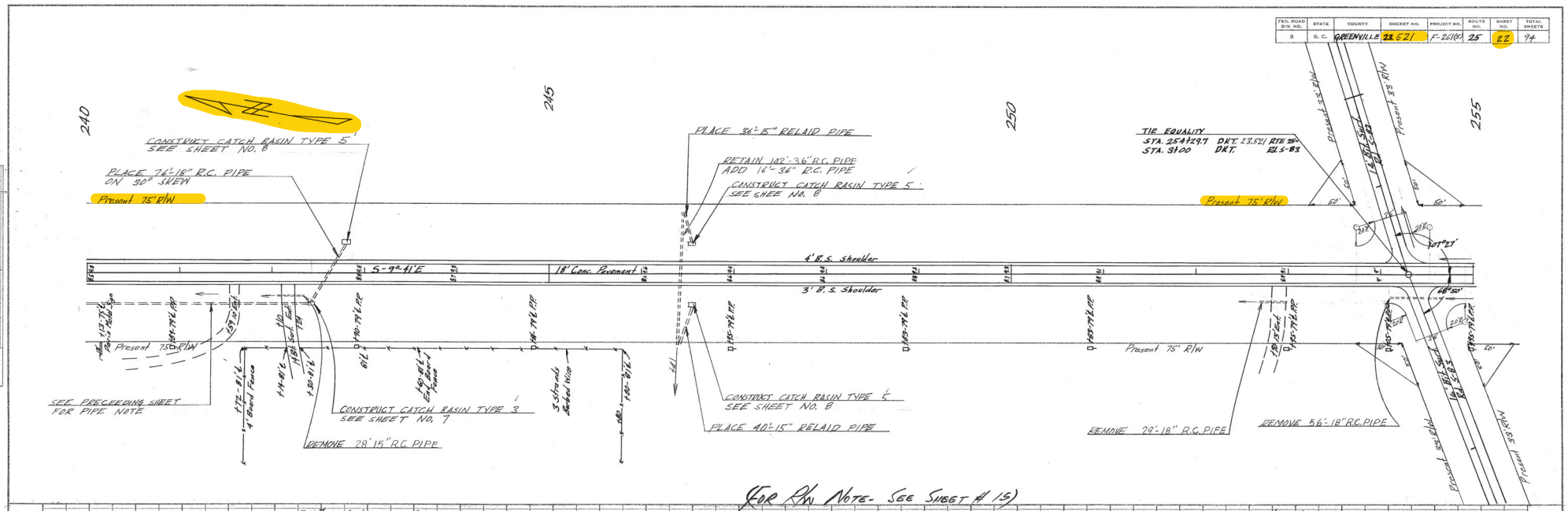
PLAN — SURVEYED, PLOTTED, NOTE BOOK, NO., ALIGNMENT CHECKED, AS TO WAY CHECKED, BY, DATE

PROFILE — SURVEYED, PLOTTED, GRADES CHECKED, NOTE BOOK, NO., STRUCTURE NOTATIONS CHKD, BY, DATE

Greenville Co. Rt. 25

PLATE 1, PLAN-PROFILE
KOUFFEL & ESSER CO.

FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	GREENVILLE	23521	F-2616(1)	25	22	94



(FOR R/W NOTE- SEE SHEET # 15)

B.M. #14 Nail in Base of Power Pole
15 Rt. Sta. 243+04 El.: 936.62

Exc. 809 Emb. 674
Sh'k. 135
Tot. 809 Tot. 809

Exc. 433 Emb. 1481
Bor. 4948 Sh'k. 896
Tot. 5381 Tot. 5377

Overhaul = 19,776 C.Y.M.

B.M. #15 Nail in Base of Power Pole
15 Rt. Sta. 253+07 El.: 946.12

DA = 9 Ac.
C = .66

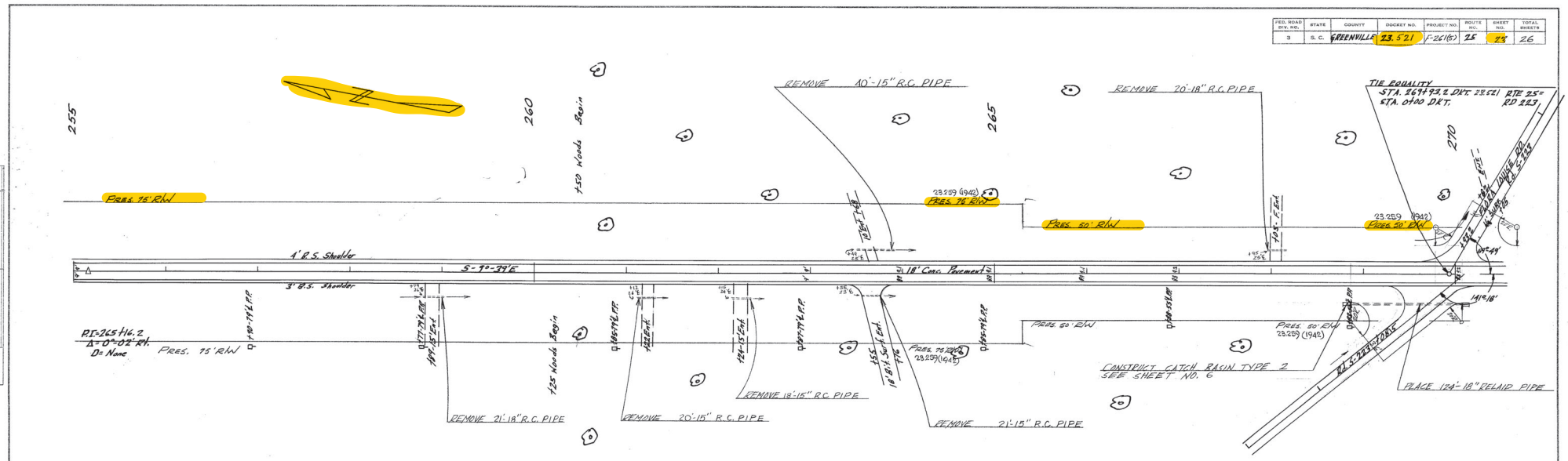
DA = 24 Ac.
C = .0.6

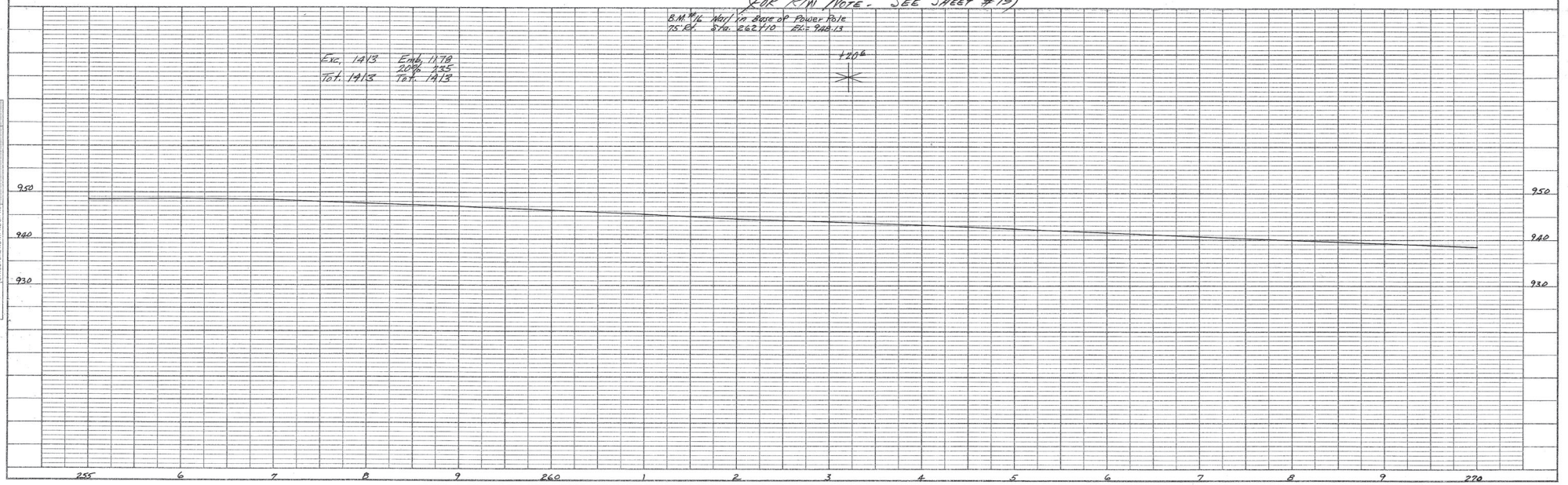
950
940
930

240 1 2 3 4 5 6 7 8 9 250 1 2 3 4 255

Greenville Co
Rt 26

FED. ROAD DIV. NO.	STATE	COUNTY	DOCKET NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S. C.	GREENVILLE	23.521	F-26(8)	25	25	26





PLAN — SURVEYED, PLOTTED, TRACED, CHECKED, NOTE BOOK, NO., BY, DATE

PROFILE — SURVEYED, PLOTTED, TRACED, CHECKED, NOTE BOOK, NO., BY, DATE

GREENVILLE Co
RT 25

FED. ROAD DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	Rd. NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	Greenville	23.116A	C-116A	S-331	10	44

ASHMORE BRIDGE RD.

PRESENT R/W NOTES

U.S. Rte. 25 – Present 100' R/W Obtained as File: 23.521

Rd. S-331 – Present 66' R/W Obtained as File: 23.696 (Sta. 0+00 Bk. to Sta. 1+00 Ah.)

Rd. S-448 – Present 75' R/W Obtained as File: 23.595

Rd. S-737 – Present 66' R/W Obtained as File: 23.680

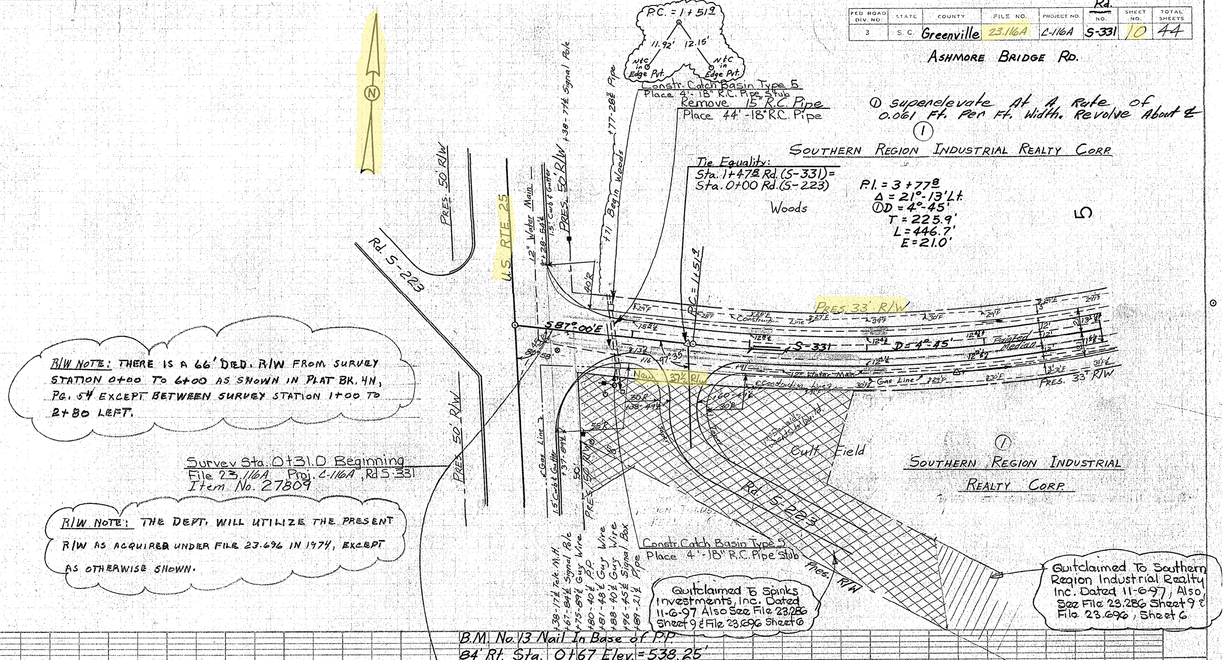
UNABLE TO VERIFY R/W

Rd. S-223 — Mackenzie Dr.

Rd. S-70 — ~~Parkston Ave.~~

Harris Rd. — ~~Rd. S-50~~

Idlewilde Ave.



B.M. No. 13 Nail In Base of P.P.
84' Rt. Sta. 0+67 Elev. = 538.25'

GENERAL CONSTRUCTION NOTES:

Changes involving increased cost of project or changes in alignment must be specifically authorized by the State Highway Engineer. District Engineer may authorize minor alterations not in conflict with the Standard Practices of the Department and not involving increases in cost. Forward information on any change in alignment to the Columbia Office as soon as the revision is completed.

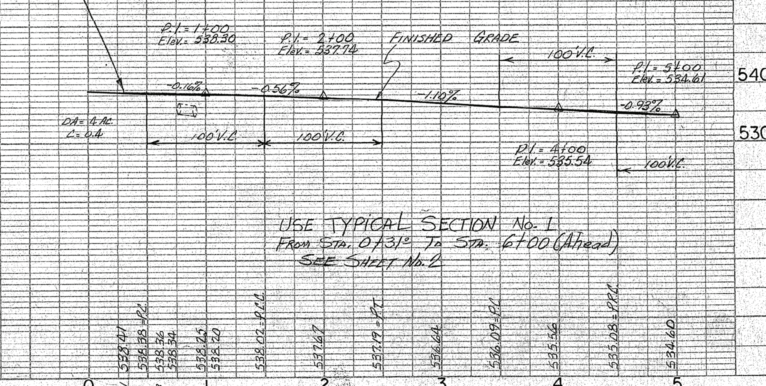
All curves are to be superelevated by revolving about centerline for a design speed of 45 M.P.H. using the 0.08 table. See sheet no.

The following quantities are not shown in detail on the plans, but are included in the Summary of Estimated quantities and may be varied during construction as directed by the Engineer:

Item	Quantity	Unit	Remarks
Clearing & Grubbing Material Pits	2.50	Ac.	For Outfall Ditches
~~Removal of Existing Pavement~~		S.Y.	Where Directed by Engineer
Removal of Existing Curb	181	L.F.	Where Directed by Engineer
Aggregate CR-14	149	Ton	For Maintaining Drives During Construction
Asphalt Concrete Surface Course	153	Ton	For Drives
Asphalt Cement In Paving Mixture	9	Ton	For Drives
Concrete Curb (9" x 15")	175	L.F.	Where Directed by Engineer
4" Perforated Pipe Underdrain	300	L.F.	Where Directed by Engineer
Hand Placed Riprap	60	Ton	Where Directed by Engineer
~~Reset Fence~~		L.F.	~~Where Directed by Engineer~~
Reset Chain Link Fence	620	L.F.	Where Directed by Engineer
Seeding (UNMulched)	19.213	M.S.Y.	Where Directed by Engineer (All Disturbed Areas)
Fertilizer (10-10-10)	1.38	Ton	Where Directed by Engineer (All Disturbed Areas)
Lime	3.5	Ton	Where Directed by Engineer (All Disturbed Areas)
Nitrogen	170	Lbs.	Where Directed by Engineer (All Disturbed Areas)

DRIVEWAY NOTE:

Driveways shall consist of 300 lbs. per S.Y. of asphaltic concrete surface course. For maintaining drives during construction use aggregate CR-14 300 lbs. per S.Y.



USE TYPICAL SECTION No. 1
From Sta. 0+31.0 To Sta. 6+00 (Ahead)
SEE SHEET No. 2

Greenville Co.
Rd. S-331
① of ⑥

July 1, 2019

HOURLY RESTRICTIONS FOR LANE CLOSURES
On
MULTILANE PRIMARY and SECONDARY ROUTES

The Department prohibits the installation of lane closures, flagging operations, road closures, shoulder closures, pacing operations or any operations that will impact the efficient flow of traffic or hinder normal traffic operations on the roads of the South Carolina state highway system during those times listed below, peak travel hours, holidays, holiday weekends, extended holiday periods, weekends, special events or any time traffic volumes are high.

Do not close travel lanes on high volume highways during peak traffic periods or any time traffic volumes exceed the numerical values determined to be acceptable by the Department. Do not close travel lanes or roads with high volume commuter traffic during peak traffic periods. The Department reserves the right to modify these restrictions as listed as conditions warrant and as directed by the Engineer.

In accordance with **Engineering Directive Number 32, Hourly Restrictions for Lane Closures on Interstate and Primary Routes**, all Department forces and all entities contracted by the Department will not install lane closures or interfere with or impact normal traffic operations on primary and secondary routes during those times of the day when traffic volumes in the travel lanes remaining open to traffic exceed 800 vehicles per hour per lane per direction.

In addition to the multilane primary and secondary routes included in this list, ALL multilane primary and secondary routes with traffic volumes that exceed 800 vehicles per hour per lane per direction are subject to hourly lane closure restrictions.

For questions regarding these restrictions, contact the District Traffic Engineer in that engineering district unless otherwise directed.

DISTRICT NUMBER 3

GREENVILLE COUNTY

ROAD NUMBER	TERMINI FROM	TERMINI TO	HOURLY LANE CLOSURE PROHIBITIONS
US 25	SC 86 (Bessie Rd)	Road S-1912 (White Horse Rd Ext)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
US 25	Road S-1912 (White Horse Rd Ext)	Road S-199 (Old White Horse Rd)	MON-FRI: 7AM – 8PM SAT: ---------- SUN: ----------
US 25	Road S-199 (Old White Horse Rd)	Road S-177 (Beaver Dam Rd)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
US 25	Road S-177 (Beaver Dam Rd)	NC State Line	MON-FRI: 7AM – 8PM SAT: 7AM – 8PM SUN: 7AM – 8PM
US 29	I-185	Spartanburg County Line	MON-FRI: 7AM – 8PM SAT: ---------- SUN: ----------
US 123	Pickens County Line	US 385 Spur (E North St) & S-924 (Williams St)	MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
US 276	Road S-88 (Roe Ford Rd)	I-385 (Exit 30) Mauldin	MON-FRI: 7AM – 8 PM SAT: ---------- SUN: ----------
US 385 (E North St)	US 29 (Church St)	I-385 S	MON-FRI: 7AM – 8PM SAT: ---------- SUN: ----------
SC 14 (Main Street)	SC 418 (Fountain Inn)	Road S-340 (Belue Mill Rd)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
SC 20	SC 86 (Bessie Rd)	Road S-201 (Augusta St)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------

DISTRICT 3 (continued)

GREENVILLE COUNTY (continued)

ROAD NUMBER	TERMINI FROM	TERMINI TO	HOURLY LANE CLOSURE PROHIBITIONS
SC 20	Road S-201 (Augusta St)	Road S-664 (River St)	MON-FRI: 7AM – 8PM SAT: ---------- SUN: ----------
SC 80	Spartanburg County Line	SC 14	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
SC 101	Spartanburg County Line (S Line St)	SC 290 (Locust Hill Road)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
SC 146 (Woodruff Road)	US 276 (Laurens Road)	Spartanburg County Line	MON-FRI: 7AM - 8PM SAT: 10AM – 8PM SUN: 10AM – 8PM
SC 183	US 123 (N Academy St)	US 276 (Rutherford St)	MON-FRI: 7AM – 8PM SAT: ---------- SUN: ----------
SC 183	Pickens County Line	US 29 (Church St)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
SC 253	SC 124	Road S-344 (State Park Rd)	MON-FRI: 7AM – 8PM SAT: ---------- SUN: ----------
SC 290 (Locust Hill Road)	Road S-173	SC 101	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
SC 291 (Pleasantburg Drive)	Road S-201 (Augusta Rd)	US 276 (Poinsett Hwy)	MON-FRI: 7AM – 8PM SAT: ---------- SUN: ----------
SC 417	US 276	SC 146	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
Road S-21 (Rutherford Rd)	US 276 (Poinsett Hwy)	US 29 (Wade Hampton Blvd)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------

DISTRICT 3 (continued)

GREENVILLE COUNTY (continued)

ROAD NUMBER	TERMINI FROM	TERMINI TO	HOURLY LANE CLOSURE PROHIBITIONS
Road S-55 (Fairview Road)	SC 14 (SE Main St Simpsonville)	L-1458 (Fairview Lake Way)	MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
Road S-75 (E Washington St)	Road S-1077 (E Washington St)	US 276 (Laurens Rd)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------
Road S-94	US 276 (Stone Ave)	SC 14 (S Main St – Greer)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------
Road S-107 (East & West Butler Road)	SC 146	Road S-221 (Conestee Rd)	MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
Road S-107 (Mauldin Rd)	Road S-221 (Conestee Rd)	Road S-218 (Parkins Mill Rd)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------
Road S-107 (Mauldin Rd)	Road S-218 (Parkins Mill Rd)	Road S-201 (Augusta St)	MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
Road S-136 (South Buncombe Road)	SC 14	US 29	MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
Road S-149 (N & S Washington Ave)	US 25 (Whitehorse Road)	Road S-5 (Allen St)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------
Road S-149 (E & W Faris Road)	Road S-5 (Allen St)	SC 291 (N Pleasantburg Dr)	MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
Road S-164 (Batesville Rd)	SC 14	SC 146 (Woodruff Rd)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------

DISTRICT 3 (continued)

GREENVILLE COUNTY (continued)

ROAD NUMBER	TERMINI FROM	TERMINI TO	HOURLY LANE CLOSURE PROHIBITIONS
Road S-183 (Roper Mountain Road)	Road S-548 (Roper Mountain Road)	SC 146 (Woodruff Rd)	MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
Road S-200	SC 183 (Buncombe St)	US 276 (W Stone Ave)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------
Road S-201 (Augusta Street)	SC 291 (S Pleasantburg Dr)	SC 20 (Grove Rd)	MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
Road S-272 (W Georgia Rd)	Road S-299 (N Maple St)	Road S-541 (W. Georgia Rd)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------
Road S-273 (Haywood Road / Howell Rd)	Imperial Drive (County Road)	US 276 (Laurens Road)	MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
Road S-312 (S Batesville Road)	Road S-94 (Old Spartanburg Rd)	Road S-492 (Pelham Rd)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
Road S-333 (Verdin Rd)	Road S-107 (E Butler Rd)	SC 146 (Woodruff Rd)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
Road S-347 (Hudson Rd)	Road S-492 (Pelham Rd)	Road S-94 (Old Spartanburg Rd)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------
Road S-453 (Rocky Slope/ Harrison Bridge Rd)	Road S-272 (W Georgia Rd)	SC 14 (Fountain Inn)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------

DISTRICT 3 (continued)

GREENVILLE COUNTY (continued)

ROAD NUMBER	TERMINI FROM	TERMINI TO	HOURLY LANE CLOSURE PROHIBITIONS
Road S-492 (Pelham Road)	Road S-164	Road S-94 (East North Street)	**No Daytime Lane Closures within I-85 Interchange Area** **Contact Resident Maintenance Engineer for Specific Information - 864-241-1224** ---------- **All Specified Areas of Road S-492 Excluding the I-85 Interchange Area are as Follows:** MON-FRI: 7AM - 8PM SAT: ---------- SUN: ----------
Road S-548 (Roper Mountain Road)	Road S-183 (Roper Mountain Road)	S-164 (Batesville Rd)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
Road S-564	SC 146 (Woodruff Rd)	S-492 (Pelham Rd)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------
Road S-1025 (The Parkway)	Road S-492 (Pelham Road)	Road S-312 (Batesville Road)	MON-FRI: 7AM - 9AM 4PM - 6PM SAT: ---------- SUN: ----------
Road S-1077 (E & W Washington St)	Road S-75	Road S-147 (W Washington St)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------
Road S-1155 (E Standing Springs)	Road S-566 (Old Stage Rd)	Road S-587 (Neely Ferry Rd)	MON-FRI: 7AM - 9AM 4PM – 6PM SAT: ---------- SUN: ----------

FIGURE 1: UPPER AND LOWER STATE MAP

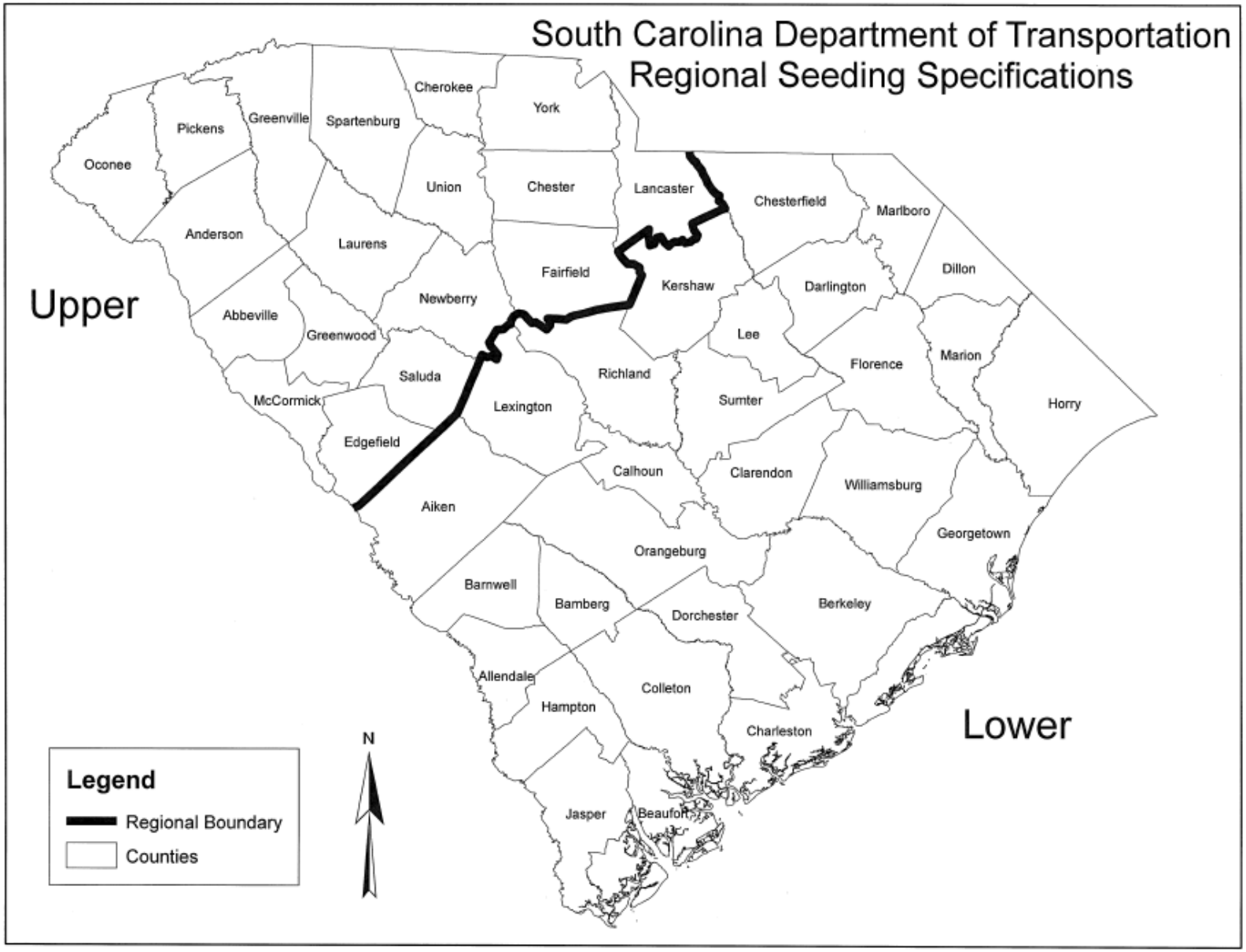


TABLE 1: PERRENIALS

**** Months shaded in gray represent applicable planting dates.***

COMMON NAME[6]	BOTANICAL NAME	APPROVED SITE(S)	PLANTING RATE (lbs/acre)	PLANTING LOCATION	Planting Dates*											
					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TURF-TYPE GRASSES (SELECT ONE)																
Bahiagrass[1]	Paspalum notatum	Shoulders, Slopes, or Medians	30	Upper State												
				Lower State												
Common Bermudagrass[2] (hulled = hull absent)	Cynodon dactylon	Shoulders, Slopes, or Medians	50	Upper State												
				Lower State												
Common Bermudagrass[2] (unhulled = hull present)	Cynodon dactylon	Shoulders, Slopes, or Medians	60	Upper State												
				Lower State												
Carpet Grass / Centipedegrass Combo	Axonopus affinis Eremochloa ophiuroides	Shoulders, Slopes or Medians	15 10	Upper State												
				Lower State												
Tall Fescue (KY-31)[3]	Festuca arundinacea	Shoulders, Slopes, or Medians	75	Upper State												
				Lower State												
GRASSES																
Weeping Lovegrass	Erograstis curvula	Slopes	10	Upper State												
				Lower State												
Indiangrass	Sorghastrum nutans	Slopes	10	Upper State												
				Lower State												
Little Bluestem	Andropogon scoparius	Slopes	10	Upper State												
				Lower State												
Coastal Panicgrass	Panicum amarum	Slopes	20	Upper State												
				Lower State												
Switchgrass	Panicum virgatum	Slopes	10	Upper State												
				Lower State												
Perennial Rye Grass[4]	Lolium perrene	Shoulders, Slopes, or Medians	15	Upper State												
				Lower State												
Virginia Wild Rye	Elymus virginicus	Shoulders, Slopes, or Medians	6	Upper State												
				Lower State												
LEGUMES[4]																
White Clover	Trifolium repens	Shoulders, Slopes, or Medians	5	Upper State												
				Lower State												
Crownvetch	Coronilla varia	Slopes	25	Upper State												
				Lower State												
Sericea Lespedeza (Scarified seed)	Lespedeza cuneata	Slopes	50	Upper State												
				Lower State												
Sericea Lespedeza (Unscarified seed)	Lespedeza cuneata	Slopes	80	Upper State												
				Lower State												

[1]**Bahiagrass:** Use at discretion of RCE based on project location.
[2]**Common Bermudagrass:** *Do not use Giant Bermudagrass (NK-37).*
[3]**Tall Fescue (KY-31):** *Do not use Tall Fescue (Lolium arundinacea).*
[4]**Perennial Rye Grass:** *Do not use Annual Italian Rye grass (Lolium multiforum).*

**** Months shaded in gray represent applicable planting dates***.
[5]Only use pre-inoculated legumes or use an appropriate inoculant with the seed at plant
[6]If Common Name of seed is not available, use seed with the listed Botanical Name.

TABLE 2: ANNUALS

**** Months shaded in gray represent applicable planting dates.***

COMMON NAME [5]	BOTANICAL NAME	APPROVED SITE(S)	NURSE CROP RATE (lbs/acre)	TEMP COVER RATE (lbs/acre)	PLANTING LOCATION	Planting Dates*											
						JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Crimson Clover[1]	Trifolium incarnatum	Shoulders, Slopes, or Medians	20	20	Upper State	■	■	■					■	■	■	■	■
					Lower State	■	■	■						■	■	■	■
Lespedeza[1] Kobe / Korean	Lespedeza striata / stipulacea	Shoulders, Slopes	15	60	Upper State			■	■	■	■	■					
					Lower State			■	■	■	■	■					
Browntop Millet[2]	Panicum ramosum	Shoulders, Slopes, or Medians	10	40	Upper State				■	■	■	■	■				
					Lower State			■	■	■	■	■	■				
German Millet[2] (Foxtail Millet)	Setaria italica	Shoulders, Slopes, or Medians	10	40	Upper State					■	■	■	■				
					Lower State				■	■	■	■	■				
Japanese Millet[2]	Echinochloa crusgalli	Slopes	10	50	Upper State				■	■	■	■	■				
					Lower State			■	■	■	■	■	■				
Oats	Avena sativa	Slopes	40	110	Upper State								■	■	■	■	
					Lower State									■	■	■	
Hairy Vetch[1]	Vicia villosa	Slopes	15	50	Upper State	■	■	■	■					■	■	■	■
					Lower State	■	■	■	■					■	■	■	■
Pearl Millet	Pennisetum glaucum	Slopes	15	50	Upper State				■	■	■	■	■				
					Lower State			■	■	■	■	■	■				
Sudangrass	Sorghum bicolor	Slopes, Buffers	20	60	Upper State				■	■	■	■	■				
					Lower State			■	■	■	■	■	■				
Barley	Hordeum vulgare	Slopes	55	110	Upper State									■	■	■	
					Lower State									■	■	■	
Wheat[4]	Triticum spp.	Slopes, Buffers	35	110	Upper State	■	■	■	■				■	■	■	■	■
					Lower State								■	■	■	■	■
Rye Grain[3,4]	Secale cereale	Shoulders, Slopes, or Medians	40	110	Upper State	■	■	■	■				■	■	■	■	■
					Lower State	■	■	■					■	■	■	■	■

[1] Only use pre-inoculated legumes or an appropriate inoculant with the seed at planting.

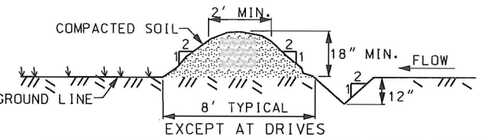
**** Months shaded in gray represent applicable planting dates.***

[2] **Mow Millet (*no lower than 3 inches*) once it reaches a height of 18 - 24 inches or at the discretion of the RCE** to reduce competitiveness with permanent vegetation.

[3] **Rye Grain:** *Do not use Annual Italian Rye Grass (Lolium multiforum).*

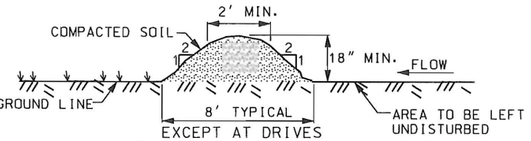
[4] **Mow Wheat and Rye Grain (*no lower than 3 inches*) once they reach a height of 18 - 24 inches or at the discretion of the RCE** to reduce competitiveness with permanent vegetation.

[5] If the Common Name of the seed listed is not available, use seed with the listed Botanical Name. Do not use Wild Bird, Wild Animal, or Domestic Feed Seed.



TEMPORARY DIVERSION DIKE WITH DITCH

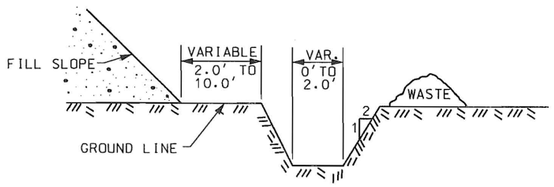
THE PAY ITEM SHALL BE TEMPORARY DIVERSION DIKE WITH DITCH_____L.F.



TEMPORARY DIVERSION DIKE

NOTES

1. THIS ITEM IS FOR DIVERTING CLEAN WATER AROUND A CONSTRUCTION AREA.
2. CLEAR AND GRUB ALL TREES, BRUSH, STUMPS AND OTHER OBJECTIONABLE MATERIAL.
3. ENSURE THAT THE MINIMUM CONSTRUCTED CROSS SECTION MEETS ALL DIMENSIONS SHOWN.
4. IMMEDIATELY AFTER CONSTRUCTION ESTABLISH VEGETATION, PLACING TEMPORARY EROSION CONTROL BLANKET ON THE DIKE. (AS APPLICABLE).
5. PAYMENT FOR TEMPORARY DIVERSION DIKE INCLUDES ALL MATERIALS IN PLACE. REMOVAL AND DISPOSAL OF MATERIALS AND RESHAPING DIKE TO DRAIN. SEEDING TO BE PAID FOR SEPARATELY.
6. THE PAY ITEM SHALL BE: TEMPORARY DIVERSION DIKE_____L.F.

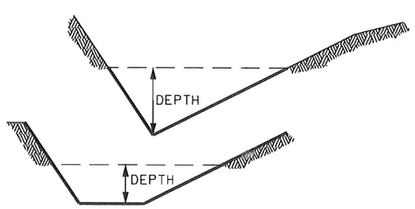


TEMPORARY SILT DITCH

NOTES

1. THIS ITEM IS TO MOVE SEDIMENT LADEN WATER FROM A CONSTRUCTION SITE TO A SEDIMENT CONTROL STRUCTURE.
2. SEED DITCH AND WASTE AREA WITH TEMPORARY SEEDING IMMEDIATELY AFTER CONSTRUCTION.
3. IMMEDIATELY AFTER CONSTRUCTION ESTABLISH VEGETATION, PLACING TEMPORARY EROSION CONTROL BLANKET ON THE DITCH (AS APPLICABLE).
4. THE PAY ITEM SHALL BE: SILT DITCHES_____C.Y.

ROLLED EROSION CONTROL PRODUCT



NOTES

1. THE DEPTH OF THE EROSION CONTROL PRODUCTS ARE TO BE DETERMINED BY DESIGN AND PLACED ON PLAN SHEETS.
2. INSTALL IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
3. COST OF INSTALLATION AND MATERIALS SHALL BE INCLUDED IN THE PAY ITEM FOR ROLLED EROSION CONTROL PRODUCT.
4. PAY ITEMS:
TEMPORARY EROSION CONTROL BLANKET _____SY
PERMANENT TURF REINFORCEMENT MAT_____SY

THIS DRAWING IS NOT TO SCALE

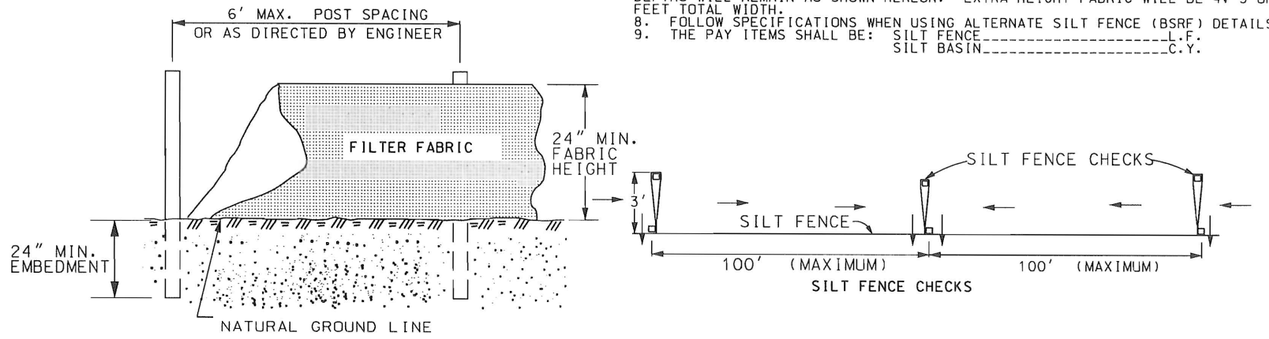
SILT FENCE

HEIGHT OF FILL (y) IN FEET	FILL SLOPE	MINIMUM SILT FENCE OFFSET FROM TOE OF SLOPE (x) IN FEET	MINIMUM RIGHT OF WAY OFFSET FROM TOE OF SLOPE (NPDES LINE) (z) IN FEET	CHECK LENGTH IN FEET**
<6	2:1 4:1 6:1	2	3	2
6-10	2:1	12*	13*	5
	4:1 6:1	3	4	3
>10	2:1	12*	13*	5
	4:1 6:1	4	5	4

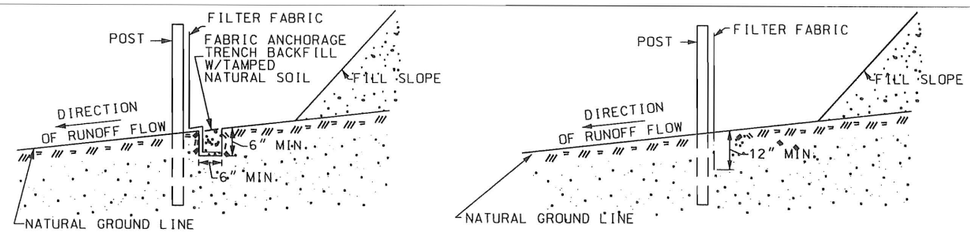
*THESE MINIMUM OFFSETS MAY BE REDUCED WHEN CURB AND GUTTER OR SOME OTHER FEATURE REDUCES THE FLOW OF WATER DOWN THE SLOPE. THE SMALL OFFSETS OF EACH GROUP OF HEIGHT OF FILL CANNOT BE REDUCED.

**SILT FENCE CHECKS WILL HAVE A MAXIMUM LENGTH OF FIVE (5) FEET OR UNTIL THEY TIE BACK INTO THE SLOPE.

NOTES
1. SILT FENCE CHECKS MUST BE LOCATED EVERY 100 FT. MAXIMUM AND AT LOW POINTS. FILTER FABRICS SHALL CONFORM TO SCDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (LATEST EDITION).
2. USE POSTS CONFORMING TO SCDOT STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS. POSTS SHALL BE A MINIMUM OF 5 FEET LONG AND INSTALLED TO A MINIMUM DEPTH OF 24 INCHES WITH NO MORE THAN 3 FEET OF THE POST ABOVE GROUND. AT LEAST 1 TO 2 INCHES OF THE POSTS SHALL EXTEND ABOVE THE TOP OF THE FABRIC. POST SPACING WILL BE A MAXIMUM OF 6 FEET ON CENTER.
3. POSTS SHALL HAVE PROJECTIONS FOR FASTENING THE FABRIC TO THE POST. POSTS SHALL ALSO HAVE A SOIL PLATE NEAR THE BOTTOM OF THE POST, EXCEPT WHEN HEAVY CLAY SOILS ARE PRESENT ON-SITE.
4. ATTACH FABRIC TO POSTS USING HEAVY-DUTY PLASTIC TIES THAT ARE EVENLY SPACED AND PLACED IN A MANNER TO PREVENT SAGGING OR TEARING OF THE FABRIC. IN ALL CASES, TIES SHOULD BE AFFIXED IN NO LESS THAN 4 PLACES.
5. SILT SHALL BE REMOVED AND DISPOSED OF WHEN SILT ACCUMULATES TO 1/3 THE HEIGHT OF THE FENCE. TRAPPED SEDIMENT SHALL BE REMOVED OR STABILIZED ON-SITE. MAINTENANCE OF SILT FENCE WILL BE MEASURED AND PAID FOR BY THE ITEM OF SILT BASIN.
6. TYPICAL SILT FENCE APPLICATIONS REQUIRE 24 INCHES OF THE FABRIC TO BE ABOVE GROUND. WHEN NEEDED, THE HEIGHT OF SILT FENCE FABRIC ABOVE THE GROUND MAY BE GREATER THAN 24". SEE PLANS FOR APPLICATION OF HIGHER SILT FENCE, PAY ITEMS AND INSTALLATION METHODS.
7. IN TIDAL AREAS, EXTRA SILT FENCE HEIGHT MAY BE REQUIRED. THE LENGTH OF POST WILL BE TWICE THE EXPOSED POST HEIGHT. POST SPACING AND BURIED DEPTHS WILL REMAIN AS SHOWN HEREON. EXTRA HEIGHT FABRIC WILL BE 4, 5 OR 6 FEET TOTAL WIDTH.
8. FOLLOW SPECIFICATIONS WHEN USING ALTERNATE SILT FENCE (BSRF) DETAILS.
9. THE PAY ITEMS SHALL BE: SILT FENCE_____L.F.
SILT BASIN_____C.Y.



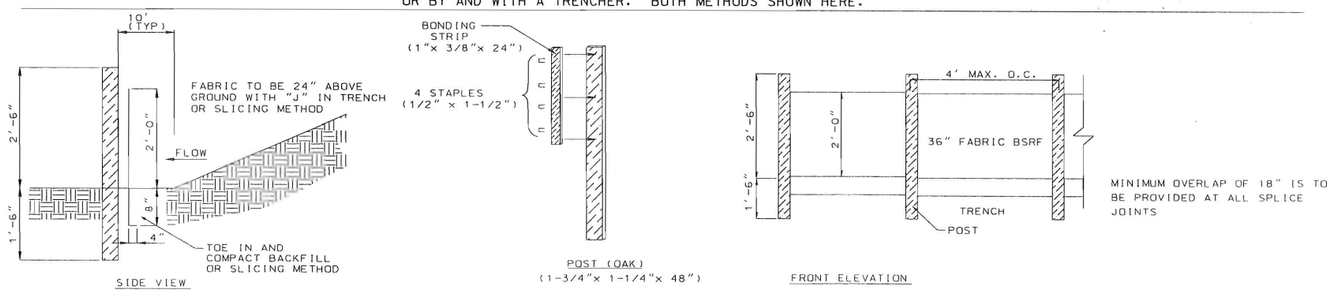
STANDARD SILT FENCE



TRENCH METHOD

PNEUMATIC METHOD

12 INCHES OF THE FABRIC SHALL BE BURIED REGARDLESS, IF PLACED PNEUMATICALLY OR BY AND WITH A TRENCHER. BOTH METHODS SHOWN HERE.



ALTERNATE SILT FENCE - BELTED SILT RETENTION FENCE (BSRF)

REFERENCES

NATIONAL DOCUMENTS

SCDOT DOCUMENTS

SC-M-815-2, SC-M-815-9

RELATED DRAWINGS & KEYWORDS

PRECONSTRUCTION SUPPORT ENGINEER

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 21242 JAMES W. KENDALL, JR.

SIGNATURE

AUGUST 23, 2012
DATE

#	DATE	CHK	DESCRIPTION
4			
3			
2			
1	8/2012	KNB	ADDED SCDOT DOCUMENTS, REMOVED STEEL, CHANGED NOTES
0	3/2008	DSO	GENERAL REVISIONS

SCDOT

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
DESIGN STANDARDS OFFICE
955 PARK STREET
ROOM 405
COLUMBIA, SC 29201

STANDARD DRAWING

TEMPORARY EROSION & SEDIMENTATION CONTROL

815-605-00

EFFECTIVE LETTING DATE | JAN., 2013