

STOCKBRIDGE TRUNK SEWER SANITARY SEWER IMPROVEMENTS YORK COUNTY, SC

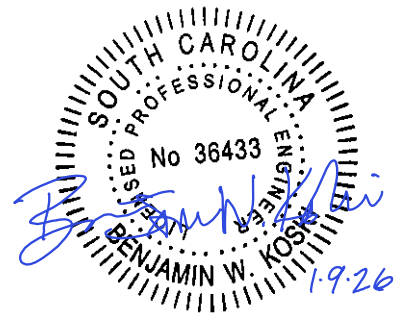
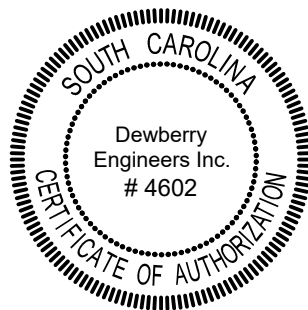


CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS

100% CONSTRUCTION DOCUMENTS

NOT RELEASED FOR CONSTRUCTION

January 2026



SUBMITTED BY:

Dewberry Engineers Inc.
9300 Harris Corners Parkway
Suite 220
Charlotte, NC 28269



Bidding Documents

PROJECT MANUAL FOR: STOCKBRIDGE TRUNK SEWER SANITARY SEWER IMPROVEMENTS

Date: January 2026

County Management

Josh Edwards, County Manager
Kevin Madden, Assistant County Manager
Thomas Couch, Executive Assistant County Manager

County Council

Christi Cox, Chairman
Tom Audette, Vice-Chairman
Andy Litten
Tommy Adkins
William "Bump" Rodney
A. Watts Huckabee, Sr.
Debi Cloninger

York County Engineering Reference No. 15222

Prepared for:

York County Engineering Department
PO Box 148
6 South Congress Street
York, South Carolina 29745
803-684-8571
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Prepared by:

Dewberry Engineers Inc.
9300 Harris Corner Parkway, Suite 220
Charlotte, NC 28269
704-625-5088

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*YCWS – York County South Carolina Water and Sewer Technical Specifications, issued June 2021, approved by DHEC 06/08/2021. These specifications are located on York County’s website and can be found here:

<https://www.yorkcountygov.com/296/Water-Sewer-Details-and-Specifications>

BID FORM

Stockbridge Trunk Sewer Sanitary Sewer Improvements

Submitted: , 20

York County Government
6 South Congress Street
York, SC 29745

Sir or Madam:

The undersigned, as Bidder, hereby declares that the only person or persons interested in the Bid, as principal or principals, is or are named herein and that no other person than herein mentioned has any interest in the Bid of the Contract to which the work pertains; that this Bid is made without connection or arrangement with any other person, company, or parties making a bid or proposal and that the Bid is in all respects fair and made in good faith without collusion or fraud.

The Bidder further declares that he has examined the site of the Work and, through personal knowledge and experience and/or subsurface investigations, has fully satisfied himself in regard to all conditions pertaining to such site and he assumes full responsibility therefore; that he has examined the Drawings and Specifications for the Work and from his own experience or from professional advice that the Drawings and Specifications are sufficient for the Work to be done; that he has examined the other Contract Documents and all addenda relating thereto, and that he has satisfied himself fully, relative to all matters and conditions with respect to the Work to which this Bid pertains.

The Bidder proposes and agrees, if this Proposal is accepted, to contract with York County Government (OWNER) in the form of contract specified, to furnish all necessary materials, equipment, machinery, tools, apparatus, transportation and labor and to perform all work necessary to complete the Work specified in the Bid and other Contract Documents.

The Bidder further proposes and agrees to commence substantial work on this project **within 15 days** of a Notice to Proceed and agrees that the Work will be substantially completed **within 548 calendar days** of the Notice to Proceed and ready for final payment **within 30 calendar days** of Substantial Completion.

The Bidder further agrees that the deductions for liquidated damages, as stated in the Agreement and General Conditions, constitute fixed, agreed, and liquidated damages to reimburse the OWNER for additional costs to the OWNER resulting from the Work not being completed within the time limit stated in the Contract Form. The liquidated damages shall be \$500.00 for each consecutive calendar day thereafter.

The Bidder further agrees to execute a Contract and furnish satisfactory Performance and Indemnity and Payment Bonds, and the required Certificates of Insurance, within ten consecutive calendar days after receipt of Notice of Award of the Contract, and the undersigned agrees that in case of failure on his part to execute the said Contract and Performance and Indemnity and Payment Bonds within the ten (10) consecutive calendar days after the award of the Contract, the Bid guarantee accompanying his Bid and the money payable thereon shall be paid to the OWNER as liquidation of damages sustained by the OWNER; otherwise, the Bid guarantee shall be returned to the undersigned after the Contract is signed and the Performance and Indemnity and Payment Bonds are filed.

Acknowledgement is hereby made of the following Addenda received since issuance of the Bid Documents:

Addendum No.		Dated:	
Addendum No.		Dated:	
Addendum No.		Dated:	

Note:

All work performed by the Contractor as essential to the completion of the intent of the Contract Documents shall be paid in accordance with the Bid Schedule. No direct payment will be made for work performed which is not shown as a separate Bid Item. The undersigned proposes the following unit prices to be utilized on the Work or Extra Work should modifications or variations incorporate these items of work into the Work.

Bid Form

Stockbridge Trunk Sewer Sanitary Sewer Improvements

Base Bid List

(The base bid of this bid document shall include all costs in a Lump Sum Amount for the items described within the plan sheets and as outlined in Specification Section 01 02 50 Measurement and Payment).

NOTE: BIDS shall include sales tax and all other applicable taxes and fees.

Contract Item No.	Description of Work Contract Item No. Unit Price in Words	Bid Item (Type)	Estimated Quantity	Unit Price	Computed Total Price
1	Mobilization _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
2	Construction Allowance _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
3	Furnish, Install, Maintain and Remove Erosion & Sediment Control, Complete _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
4	Temporary Bypass Pumping _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
5	Tree Removal, Storage, Protection and Replacement _____ Dollars and _____ Cents	Each	28	\$ _____	\$ _____
6	Maintenance of Traffic _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
7	8" Gravity Sewer DIP (CL 350) _____ Dollars and _____ Cents	Linear Feet	988	\$ _____	\$ _____
8	12" Gravity Sewer DIP (CL 350) _____ Dollars and _____ Cents	Linear Feet	2,845	\$ _____	\$ _____
9	16" Gravity Sewer DIP (CL 250) _____ Dollars and _____ Cents	Linear Feet	716	\$ _____	\$ _____

Contract Item No.	Description of Work Contract Item No. Unit Price in Words	Bid Item (Type)	Estimated Quantity	Unit Price	Computed Total Price
10	Guaranteed Jack and Bore of 16-inch carrier pipe in 26-inch casing crossing existing pump station (MH-3 to MH-4) _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
11	Guaranteed Jack and Bore of 16-inch carrier pipe in 26-inch casing crossing existing stream (MH-4 to MH-5) _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
12	Guaranteed Jack and Bore of 8-inch carrier pipe in 16-inch casing crossing Blowing Rock Cove (MH-5A to MH-32) _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
13	Guaranteed Jack and Bore of 8-inch carrier pipe in 16-inch casing crossing Hawks Creek Parkway (MH-34 to MH-35) _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
14	4-ft Diameter Manhole _____ Dollars and _____ Cents	Each	35	\$ _____	\$ _____
15	Modification of Ex. Precast Structures _____ Dollars and _____ Cents	Each	4	\$ _____	\$ _____
16	Core Drill Existing Wet Well _____ Dollars and _____ Cents	Each	1	\$ _____	\$ _____
17	Demolition of Ex. Stockbridge Commons Pump Station _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
18	Demolition of Ex. Hawks Creek Pump Station _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
19	Demolition of Ex. Brook Springs Pump Station _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____

Contract Item No.	Description of Work Contract Item No. Unit Price in Words	Bid Item (Type)	Estimated Quantity	Unit Price	Computed Total Price
20	Demolition of Ex. Palmetto West Pump Station _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
21	Asphalt Open-Cut and Repair _____ Dollars and _____ Cents	Square Yards	40	\$ _____	\$ _____
22	Blowing Rock Cove Pavement Restoration _____ Dollars and _____ Cents	Lump Sum	1	\$ _____	\$ _____
23	Concrete Curb and Gutter Repair _____ Dollars and _____ Cents	Linear Feet	100	\$ _____	\$ _____

Contract Item No.	Description of Work Contract Item No. Unit Price in Words	Bid Item (Type)	Estimated Quantity	Unit Price	Computed Total Price
24	Flowable Fill for Abandoned Pipes _____ Dollars and _____ Cents	Cubic Yard	10	\$ _____	\$ _____
25	Unsuitable Soil Replacement _____ Dollars and _____ Cents	CY, Contract Contingent Item	2500	\$ _____	\$ _____
26	Unsuitable Soil Undercut _____ Dollars and _____ Cents	CY, Contract Contingent Item	900	\$ _____	\$ _____
27	Trench Rock Removal _____ Dollars and _____ Cents	CY, Contract Contingent Item	1650	\$ _____	\$ _____
Bid	Sum of Contract Items 1-27 above _____ _____ Dollars and _____ Cents	-	-	\$ _____	

Notes:

1. The Total Prices for these Contingent Contract Items will be removed from the Contract Price by Change order if the Contractor is not directed to perform the Contract Item.

Attached hereto is a cashier's check on the _____
_____ Bank of _____
_____ or Bid Bond for the sum
_____ Dollars (_____), made payable
to _____ (Owner).

_____ L.S.
(Name of Bidder) (Affix Seal)

_____ L.S.
(Signature of Officer)

_____ L.S.
(Title of Officer)

Address:

P.O. Box _____ Street: _____

City: _____ State, Zip Code: _____

Telephone: _____ Fax: _____

Federal ID#: _____

Email address: _____

Contractor License type: _____ Contractor License number: _____

License status: _____ Expiration: _____

Classification: _____

The full names and residences of persons and firms interested in the foregoing bid, as principals, are as follows:

Name of the executive who will give personal attention to the work:

Attach list of subcontractors as required by Article 13.4 of Information to Bidders.

END OF SECTION

BID BOND

STATE OF SOUTH CAROLINA
COUNTY OF YORK

KNOW ALL MEN BY THESE PRESENTS, that _____
as Principal, and _____, as Surety, a
Corporation chartered and existing under the laws of the State of _____
_____, with its principal offices in the City of _____, and authorized to do business
in the State of South Carolina are held and firmly bound unto the OWNER, _____
_____ in the penal Sum of _____
_____ Dollars (\$_____) lawful money of the
United States, for the payment of which sum will and truly to be made, we bind ourselves, our heirs,
executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted to the
OWNER the accompanying bid, dated _____, **20**____, for:

Stockbridge Trunk Sewer Sanitary Sewer Improvements

NOW, THEREFORE,

A. If said Bid shall be rejected, or

B. If the principal shall not withdraw said Bid within twenty-four (24) hours after date of opening of the same, and shall within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the OWNER in accordance with the Bid as accepted, and give bonds with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract, then the above obligations shall be void and of no effect, otherwise to remain in full force and effect.

C. In the event of the withdrawal of said Bid within the period specified, or the failure to enter into such contract and give such bonds within the time specified, if the principal shall pay the OWNER the difference between the amount specified in said bid and the amount for which the OWNER may procure the required work and supplies, if the latter amount be in excess of the former, then the above obligations shall be void and of no effect, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their several seals, this ____ day of _____, A.D., 20____, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESS: (If Sole Ownership or Partnership, two (2) Witnesses required).
(If Corporation, Secretary only will attest and affix seal).

WITNESSES:

PRINCIPAL:

Name of Firm

Signature of Authorized Officer
(Affix Seal)

Title

Business Address

City State

WITNESS:

SURETY:

Corporate Surety

(Affix Attorney-in-Fact Seal)

Business Address

City State

Name of Local Insurance Agency

CERTIFICATES AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the Corporation named as Principal in the within bond; that _____ who signed the said bond on behalf of the principal, was then _____ of said corporation; that I know his signature, and his signature hereto is genuine; and that said bond was duly signed, sealed, and attested for and in behalf of said corporation by authority of its governing body.

(Corporate Secretary Seal)

STATE OF SOUTH CAROLINA
COUNTY OF YORK

Before me, a Notary Public duly commissioned, qualified and acting, personally appeared _____
_____ to me well known, who being by me first duly sworn upon oath, says that he is
the Attorney-in-Fact, for the _____ and that he has been authorized by _____
_____ to execute the foregoing bond on behalf of the Contractor
named therein in favor of the OWNER, the _____.

Subscribed and sworn to before me this ____ day of _____, 20____, A.D.

(Attach Power of Attorney
to original Bid Bond)

Notary Public
State of South Carolina-at-Large

My Commission Expires: _____

END OF SECTION

NOTICE OF AWARDTO: _____ FROM: York County Utilities_____
P.O. Box 148_____
York, SC 29745**PROJECT TITLE: Stockbridge Trunk Sewer Sanitary Sewer Improvements**

PROJECT DESCRIPTION: Major elements of Work include but are not limited to: Complete construction of a new sewage collection system. Construction of new 8-inch (988 LF), 12-inch (2,845 LF) and 16-inch (716 LF) diameter gravity sanitary sewer, 39 manholes, four (4) guaranteed jack and bores, and abandonment of 4 existing pump stations: Stockbridge Commons, Hawks Creek, Brook Springs and Palmetto West. This project will include pavement restoration, traffic control, site work including erosion and sedimentation control measures, site restoration, and demolition.

The Owner has considered the Bid submitted by you for the above described work in response to its Advertisement for Bids dated _____, 20__ and Information for Bidders.

You are hereby notified that your Bid has been accepted for items in the amount of
\$ _____
\$(_____).

You are required by the Information for Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said Bonds within ten (10) days from the date of this Notice, said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your Bid as abandoned and as forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this Notice of Award to the Owner.

Dated this ____ day of _____, 20__.

On behalf of the York County Council

By: _____

Title: Utility Engineer

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged

By: _____

Title: _____

This ____ day of _____, 20__.

AGREEMENT

THIS AGREEMENT, made and entered into this ____ day of _____, 202__ A.D., by and between the York County Government, party of the first part (hereinafter sometimes called the "OWNER"), and _____, party of the second part (hereinafter sometimes called the "CONTRACTOR").

WITNESSETH: That the parties hereto, for the consideration hereinafter set forth, mutually agree as follows:

1. SCOPE OF THE WORK

- 1.1. The CONTRACTOR shall furnish all labor, materials, equipment, machinery, tools, apparatus, and transportation and perform all of the Work shown on the Drawings and described in the Specifications entitled:

Stockbridge Trunk Sewer Sanitary Sewer Improvements

as prepared by York County Engineering Department acting as, and in the Contract Documents entitled the ENGINEER, and shall do everything required by this Contract and the other Contract Documents.

2. THE CONTRACT SUM

- 2.1. The OWNER shall pay to the CONTRACTOR for the faithful performance of the Contract, in lawful money of the United States, and subject to addition and deductions as provided in the Contract Documents, a total sum as follows:

Based upon the prices shown in the Bid heretofore submitted to the OWNER by the CONTRACTOR, a copy of said Proposal being a part of these Contract Documents, the aggregate amount of this Contract (obtained from either the lump sum price, the application of unit prices to the quantities shown in the Bid, or the combination of both) being the sum of

(\$ _____).

3. COMMENCEMENT AND COMPLETION OF WORK

- 3.1. The CONTRACTOR shall commence Work and the Contract Time will commence to run on the date fixed in the Notice to Proceed.
- 3.2. The CONTRACTOR shall prosecute the Work with faithfulness and diligence and shall be Substantially Complete within **548 calendar days** after commencement date fixed in the Notice to Proceed and ready for final payment within **30 Calendar days** after Substantial Completion.

4. CONTRACTOR'S ACCEPTANCE OF CONDITIONS

- 4.1. The CONTRACTOR hereby agrees that, by virtue of submitting a completed Bid including his declarations therein of full satisfaction, knowledge and understanding of the Contract Documents, site conditions (surface and subsurface) and all other conditions affecting the Work, he assumes full responsibility for performance of the Work as required under this Contract. It is expressly agreed that under no circumstances, conditions or situations shall this Contract be more strongly construed against the OWNER than against the CONTRACTOR and his Surety.

- 4.2. It is understood and agreed that the passing, approval and/or acceptance of any part of the Work or material by the OWNER, ENGINEER, or by any agent or representative, as being in compliance with the terms of this Contract and/or of the Contract Documents, shall not operate as a waiver by the OWNER of strict compliance with the terms of this Contract, and/or the Contract Documents covering said Work; and the OWNER may require the CONTRACTOR and/or his surety to repair, replace, restore and/or make to comply strictly and in all things with this Contract and the Contract Documents any and all of said Work and/or materials which within a period of one year from and after the date of the acceptance of any such Work or material, are found to be defective or to fail in any way to comply with this Contract or with the Contract Documents. This provision shall not apply to materials or equipment normally expected to deteriorate or wear out and become subject to normal repair and replacement before their condition is discovered. Failure on the part of the CONTRACTOR and/or his Surety, immediately after notice to either, to repair or replace any such defective materials and workmanship shall entitle the OWNER, if it sees fit, to replace or repair the same and recover the reasonable cost of such replacement and/or repair from the CONTRACTOR and/or his surety, who shall in any event be jointly and severally liable to the OWNER for all damage, loss and expense caused to the OWNER by reason of the CONTRACTOR's breach of this Contract and/or his failure to comply strictly and in all things with this Contract.

5. LIQUIDATED DAMAGES

- 5.1. It is mutually agreed that time is of the essence of this Contract and should the CONTRACTOR fail to complete the work within the specified time, or any authorized extension thereof, there shall be deducted from the compensation otherwise to be paid to the CONTRACTOR, and the OWNER will retain the amount of *Five Hundred Dollars (\$500.00)* per calendar day as fixed, agreed, and liquidated damages for each calendar day elapsing beyond the specified time for substantial completion or any authorized extension thereof, which sum shall represent the actual damages which the OWNER will have sustained by failure of the CONTRACTOR to complete the work within the specified time. After substantial completion, if the CONTRACTOR shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by OWNER, Contractor shall pay OWNER *Five Hundred Dollars (\$500.00)* for each calendar day that expires after the date specified for Final Completion and readiness for final payment until the work is complete and ready for final payment. It being further agreed that said sum is not a penalty, but is the stipulated amount of damages sustained by the OWNER in the event of such default by the CONTRACTOR.
- 5.2. For the purposes of this Article, the day of final acceptance of the Work shall be considered a day of delay, and the scheduled day of completion of the work shall be considered a day scheduled for production.

6. PARTIAL AND FINAL PAYMENTS

- 6.1. In accordance with the provisions fully set forth in the General Conditions, and subject to additions and deductions as provided, the OWNER shall pay the CONTRACTOR as follows:
- 6.1.1. Within 30 days after receipt by the OWNER of the CONTRACTOR's request for partial payment, the OWNER shall make partial payments to the CONTRACTOR, on the basis of the estimate of Work as approved by the ENGINEER, for work performed during the preceding calendar month, less ten percent (10%) of the amount of such estimate which is to be retained by the OWNER until all Work has been performed strictly in accordance with this Agreement and until such Work has been accepted by the OWNER.
- 6.1.2. Upon submission by the CONTRACTOR of evidence satisfactory to the OWNER that all payrolls, material bills and other costs incurred by the CONTRACTOR in connection with the construction of the Work have been paid in full, including all retainage to subcontractors on the project, and also after all guarantees that may be required in the

specifications have been furnished and are found acceptable by the OWNER, final payment on account of this Agreement shall be made within sixty (60) days after completion by the CONTRACTOR of all Work covered by this Agreement and acceptance of such Work by the OWNER.

6.1.3. Retainage will be released in full at Final Completion.

7. ADDITIONAL BOND

7.1. It is further mutually agreed between the parties hereto that if, at any time after the execution of this Agreement and the Performance and Payment Bonds hereto attached for its faithful performance, the OWNER shall deem the surety or sureties upon such bonds to be unsatisfactory, or if, for any reason, such bond(s) ceases to be adequate to cover the performance of the Work, the CONTRACTOR shall, at his expense, and within three days after the receipt of notice from the OWNER to do so, furnish an additional bond or bonds, in such form and amount, and with such sureties as shall be satisfactory to the OWNER. In such event, no further payment to the CONTRACTOR shall be deemed due under this Agreement until such new or additional security for the faithful performance of the Work shall be furnished in manner and form satisfactory to the OWNER.

8. CONTRACT DOCUMENTS

8.1. The Contract Documents, as stated in the Instructions to Bidders, including this Project Manual and General Conditions, and the accompanying Contract Drawings, shall form the Contract and are as fully a part of this Contract as if herein repeated.

IN WITNESS WHEREOF the parties hereto have executed this Agreement on the day and date first above written in three (3) counterparts, each of which shall, without proof or accounting for the other counterparts, be deemed an original Contract.*

Owner

By: _____

[Corporate Seal]

Attest: _____

Address for giving notices:

Contractor

By: _____

[Corporate Seal]

Attest: _____

Address for giving notices:

License No. _____

Agent for service of process: _____

(*) In the event that the CONTRACTOR is a Corporation, a certificate of resolution of the Board of Directors of the Corporation, authorizing the officer who signs the Contract to do so in its behalf shall be completed and submitted with this form.

END OF SECTION

NOTICE TO PROCEED

Date: _____

To: _____

Project:

Stockbridge Trunk Sewer Sanitary Sewer Improvements

You are hereby notified to commence work in accordance with the Agreement dated _____ on or before _____, and you are to complete the work within 548 consecutive calendar days thereafter. The date of completion of all work is therefore _____.

On behalf of the

YORK COUNTY GOVERNMENT

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above Notice to Proceed is hereby acknowledged by _____, this the ____ day of _____, **20**____.

By: _____

Title: _____

PERFORMANCE AND INDEMNITY BOND

STATE OF SOUTH CAROLINA
COUNTY OF YORK

KNOW ALL MEN BY THESE PRESENTS that _____
_____ as Principal, hereinafter called Contractor, and _____
_____ as Surety, hereinafter
called Surety, are held and firmly bound unto the York County Government, as Obligee, hereinafter called
owner, in the amount of _____
_____ Dollars (\$_____) for the payment whereof Contractor and Surety bind
themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by
these presents.

WHEREAS, Contractor has by written agreement dated _____, 20____,
entered into a Contract with Owner for:

Stockbridge Trunk Sewer Sanitary Sewer Improvements

in accordance with Drawings and Specifications prepared by York County Engineering Department,
ENGINEER, which Contract is by reference made a part hereof and is hereinafter referred to as the
Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that, if the
Principal shall in all respects promptly and faithfully perform and comply with the terms and conditions of
said Contract and his obligations thereunder and shall indemnify the OWNER and the ENGINEER and
save either or all of them harmless against and from all costs, expenses and damages arising from the
performance of said Contract or the repair of any work thereunder, then this obligation shall be void;
otherwise, this Bond shall remain in full force and effect, in accordance with the following terms and
conditions:

A. The Principal and Surety jointly and severally agree to pay the OWNER any difference
between the sum to which the said Principal would be entitled on the completion of the Contract, and that
sum which the OWNER may be obliged to pay for the completion of said work by Contract or otherwise,
and any damages, direct or indirect or consequential, which the said OWNER may sustain on account of
such work, or on account of the failure of said CONTRACTOR to properly and in all things, keep and
execute all of the provisions of said Contract.

B. And this Bond shall remain in full force and effect for a period of one (1) year from the
date of final payment of the project by the OWNER and shall provide that the CONTRACTOR guarantees
to repair or replace for said period of one (1) year all work performed and materials and equipment
furnished that were not performed or furnished according to the terms of the Contract, and shall make
good, defects thereof which have become apparent before the expiration of said period of one (1) year. If
any part of the project, in the judgment of the OWNER, for the reasons above stated needs to be
replaced, repaired or made good during that time, the OWNER shall so notify the CONTRACTOR in
writing. If the CONTRACTOR refuses or neglects to do such work within five (5) days from the date of
service of such Notice, the OWNER shall have the work done by others and the cost thereof shall be paid
by the CONTRACTOR or his Surety.

C. And the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive Notice of any change, extension of time, alteration or addition to the terms of the Contract or to the Work or to the Specifications.

D. The surety represents and warrants to the OWNER that they have a minimum Best's Key Rating Guide General Policyholder's Rating of "A-" and Financial Category of "Class VIII".

IN WITNESS WHEREOF, the above bounded parties executed this instrument under their several seals, this ____ day of _____, 20____, A.D., the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESS: (If Sole Ownership or Partnership, two (2) Witnesses required).
(If Corporation, Secretary only will attest and affix seal).

PRINCIPAL:

Signature of Authorized Officer
(Affix Seal)

WITNESSES:

Title

Business Address

City State

SURETY:

WITNESS:

Corporate Surety

Attorney-in-Fact (Affix Seal)

Business Address

City State

Name of Local Insurance Agency

CERTIFICATES AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the Corporation named as Principal in the within bond; that _____ who signed the said bond on behalf of the Principal, was then _____ of said Corporation; that I know his signature, and his signature hereto is genuine; and that said bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

Secretary

Corporate
Seal

STATE OF SOUTH CAROLINA

COUNTY OF YORK

Before me, a Notary Public, duly commissioned, qualified and acting, personally appeared _____ to me well known, who being by me first duly sworn upon oath, says that he is the Attorney-in-Fact, for the _____ and that he has been authorized by _____ to execute the foregoing bond on behalf of the Contractor named therein in favor of the _____.

Subscribed and sworn to before me this _____ day of _____, 20____, A.D.

(Attach Power of Attorney)

Notary Public
State of South Carolina-at-Large

My Commission Expires:

END OF SECTION

PAYMENT BOND

STATE OF SOUTH CAROLINA
COUNTY OF YORK

KNOW ALL MEN BY THESE PRESENTS that _____
_____ as Principal, hereinafter called CONTRACTOR,
and _____ as Surety, hereinafter called
Surety, are held and firmly bound unto the York County Government, as Obligee, hereinafter
called OWNER, in the amount of _____
_____ Dollars (\$_____) for the
payment whereof CONTRACTOR and Surety bind themselves, their heirs, executors,
administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, CONTRACTOR has by written agreement dated _____, 20__, entered
into a Contract with OWNER for:

Stockbridge Trunk Sewer Sanitary Sewer Improvements

in accordance with Drawings and Specifications prepared by York County Engineering
Department, ENGINEER, which Contract is by reference made a part hereof and is hereinafter
referred to as the Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that, if the
Principal shall promptly make payments to all claimants, as herein below defined, then this
obligation shall be void; otherwise, this Bond shall remain in full force and effect, subject to the
following terms and conditions:

- A. A claimant is defined as any person supplying the Principal with labor, material and
supplies, used directly or indirectly by the said Principal or any subcontractor in the
prosecution of the work provided for in said Contract.
- B. The above named Principal and Surety hereby jointly and severally agree with the
OWNER that every claimant as herein defined, who has not been paid in full before the
expiration of a period of ninety (90) days after performance of the labor or after complete
delivery of materials and supplies by such claimant, may sue on this Bond for the use of
such claimant, prosecute the suit to final judgment for such sum or sums as may be justly
due claimant, and have execution thereon. The OWNER shall not be liable for the
payment of any costs or expenses of any such suit.
- C. No suit or action shall be commenced hereunder by any claimant:
 - 1. Unless claimant, other than one having a direct contract with the Principal, shall
within forty-five (45) days after beginning to furnish labor, materials or supplies
for the prosecution of the work, furnish the Principal with a notice that he intends
to look to this bond for protection.
 - 2. Unless claimant, other than one having a direct contract with the Principal, shall
within ninety (90) days after such claimant's performance of the labor or complete
delivery of materials and supplies, deliver to the Principal written notice of the

performance of such labor or delivery of such material and supplies and the nonpayment therefore.

3. After the expiration of one (1) year from the performance of the labor or completion of delivery of the materials and supplies; it being understood, however, that if any limitation embodied in this Bond is prohibited by any law controlling the construction hereof such limitations shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.
 4. Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.
- D. The Principal and the Surety jointly and severally, shall repay the OWNER any sum which the OWNER may be compelled to pay because of any lien for labor or materials furnished for any work included in or provided by said Contract.
- E. The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration of or addition to the terms of the Contract or to the work to be performed thereunder or the Specifications applicable thereto shall in any way affect its obligations on this Bond, and the Surety hereby waives notice of any such change, extension of time, alterations of or addition to the terms of the Contract, or to the work or to the Specifications.
- F. The Surety represents and warrants to the Owner that they have a minimum Best's Key Rating Guide General Policyholder's rating of "A –" and Financial Category of "Class VIII".

IN WITNESS WHEREOF, the above bounded parties executed this instrument under their several seals, this ____ day of _____ 20____, A.D., the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESS: (If Sole Ownership or Partnership, two (2) Witnesses required).
(If Corporation, Secretary only will attest and affix seal).

PRINCIPAL:

Signature of Authorized Officer
(Affix Seal)

WITNESSES:

Title

Business Address

City

State

WITNESS:

SURETY:

Corporate Surety

Attorney-in-Fact
(Affix Seal)

Business Address

City

State

Name of Local Insurance Agency

CERTIFICATES AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the Corporation named as Principal in the within bond; that _____ who signed the said bond on behalf of the Principal, was then _____ of said Corporation; that I know his signature, and his signature hereto is genuine; and that said bond was duly signed, sealed, and attested for and in behalf of said Corporation by authority of its governing body.

Secretary

Corporate

Seal

STATE OF SOUTH CAROLINA

COUNTY OF YORK

Before me, a Notary Public, duly commissioned, qualified and acting, personally appeared _____ to me well known, who being by me first duly sworn upon oath, says that he is the Attorney-in-Fact, for the _____ and that he has been authorized by _____ to execute the foregoing bond on behalf of the CONTRACTOR named therein in favor of the _____.

Subscribed and sworn to before me this ____ day of _____, 20____, A.D.

(Attach Power of Attorney)

Notary Public
State of South Carolina-at-Large

My Commission Expires: _____

END OF SECTION

CERTIFICATE OF INSURANCE
(May also use applicable Accord form)

THIS IS TO CERTIFY THAT THE _____

Insurance Company

Address _____

Of _____

has issued policies of insurance, as described below and identified by a policy number, to the insured named below; and to certify that such policies are in full force and effect at this time. It is agreed that none of these policies will be cancelled or changed so as to affect the interest(s) of the York County Government (hereinafter sometimes called the OWNER) until thirty (30) days after written notice of such cancellation or change has been delivered to the ENGINEER.

Insured: _____

Address: _____

Status of Insured

_____ Corporation _____ Partnership _____ Individual

Insured: _____

Description of Work: _____

INSURANCE POLICIES IN FORCE

Forms of Coverage

Policy Number

Expiration Date

*Worker's Comp./Employers' Liability

**Comprehensive Auto Liability

***Excess Liability

Other (Please specify type)

POLICY INCLUDES COVERAGE FOR:		YES	NO
1.	Additional Insured: OWNER and ENGINEER	_____	_____
2.	*Liability under the United States Longshore-men's and Harbor Workers' Compensation Act.	_____	_____
3.	**All owned, hired, or nonowned automotive equipment used in connection with work done for the Owner.		
4.	Contractual Liability	_____	_____
5.	Damage caused by explosion, collapse or structural injury, and damage to underground utilities.	_____	_____
6.	Products/Completed Operations	_____	_____
7.	Owners and Contractors Protective Liability	_____	_____
8.	Personal Injury Liability	_____	_____
9.	***Excess Liability applies excess of:		
	(a) Employers' Liability	_____	_____
	(b) Comprehensive General Liability	_____	_____
	(c) Comprehensive Automobile Liability	_____	_____

<u>Types of Coverage</u>	<u>Forms of Coverage</u>	<u>Minimum Limits of Liability</u>	
Workers' Compensation	Bodily Injury	\$ 1,000,000	Statutory
Employers' Liability	Bodily Injury	\$ 500,000	Each Accident
	Disease	\$ 500,000	Each Person
	Disease	\$ 500,000	Policy Limit
Comprehensive Auto Liability	Combined Single Limit BI/PD	\$ 1,000,000	Each Accident
Comprehensive General Liability	Bodily Injury	\$ 1,000,000	Each Occurrence
		\$ 5,000,000	Aggregate

The Insurance Company hereby agrees to deliver, within ten (10) days, two (2) copies of the above policies to the Engineer when so requested.

NOTE: Entries on this certificate are limited to the Authorized Agent or Insurance Company Representative.

Date _____ (SEAL) _____
Insurance Company

Issued at _____
Authorized Representative

Insurance Agent or Company

- Send original and one copy to:

York County Engineering
Post Office Box 148
6 South Congress Street
York, South Carolina 29745

END OF SECTION

APPLICATION FOR PAYMENT No. _____

Date: _____ Contractor: _____

Project: _____ Stockbridge Trunk Sewer Sanitary Sewer Improvements _____ Project Number: 15222

Purchase Order Number: _____ For Period _____ To _____

Total value of work completed to date (see attached sheet) \$ _____

Total value of materials stored for project (see attached sheet) \$ _____

SUB TOTAL \$ _____

LESS _____ %RETAINED \$ _____

TOTAL \$ _____

LESS PREVIOUS PAYMENTS \$ _____

Other Changes, additions, or deductions
(see attached sheet) \$ _____

TOTAL AMOUNT DUE THIS PAYMENT \$ _____

Previous Payments:					
1		6		11	
2		7		12	
3		8		13	
4		9		14	
5		10		15	
				16	
				17	
				18	
				19	
				20	

Submitted By:

I hereby certify to the best of the Contractor's knowledge, information and belief, the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, and that all amounts have been paid by the Contractor for Work which previous Applications for Payment were issued and payments received from the Owner, that current payment shown herein is now due.

Contractor: _____ Notarized: _____

Signed By: _____ My Commission expires: _____

Date: _____ Affix seal: _____

Recommended By:

Architect/Engineer: _____ Date: _____

Certified Amount: \$ _____

The Certified amount is payable only to the Contractor named herein. Issuance, payment, and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

Accepted By:

Owner: _____ Date: _____

CONTRACT CHANGE ORDER

CHANGE ORDER NO: ____

PROJECT: **Stockbridge Trunk Sewer Sanitary Sewer Improvements**

DATE OF ISSUANCE:

DESCRIPTION OF CHANGE:

CONTRACT AMOUNT		CONTRACT TIME (Calendar Days)	
Original	\$ <u>0</u>	Original Durations	<u>0</u> Days
Previous Change Orders (Add/Deduct)	\$ <u>0</u>	Previous Change Order (Add/Deduct)	<u>0</u> Days
This Change Order (Add/Deduct)	\$ <u>0</u>	This Change Order (Add/Deduct)	<u>0</u> Days
Revised Contract Amount	\$ <u>0</u>	Revised Contract Time	<u>0</u> Days
REVISED CONTRACT COMPLETION DATE IS:			

OWNER	CONTRACTOR	ENGINEER

Attest

**RELEASE AND WAIVER OF CLAIM
BY PRIME CONTRACTOR**

Know all men by these presents that the undersigned, _____ of _____
_____ first being duly sworn, states that all payrolls, materials bills, sales tax, privilege
tax or license, old age benefits tax, state and federal unemployment insurance, and other liabilities
incurred for use in the performance of the contract for the **Stockbridge Trunk Sewer Sanitary Sewer
Improvements Project** located in York, South Carolina have been paid in full and waives any and all
claims and releases York County Government (York County, South Carolina) from any rights or claims for
debts due and owing by virtue of the furnishing of any material or supplies or any lien thereon.

(Name of Company)

By: _____

Its: _____

Sworn to before me
this _____ day of _____, 20 _____.

Notary Public for _____

My Commission expires: _____

BUILDER'S RISK INSURANCE

Before commencing the Work, the General Contractor shall obtain and maintain Builder's Risk Policy upon the entire Project for the full cost of replacement at the time of loss, in an amount to include the cost (bid/agreement amount) of work performed under this Agreement, with a deductible not to exceed \$1,000.00. This insurance shall also name the Owner as an Additional Insured (or Additional Named Insured). This insurance shall be written as a Builder's Risk Policy or equivalent form to cover all risks of physical loss except those specifically excluded by the policy, and shall insure at least against the perils of fire, lightning, explosion, windstorm, hail, smoke, aircraft (except aircraft, including helicopter, operated by or on behalf of Owner and vehicles), riot and civil commotion, theft, vandalism, malicious mischief, debris removal, flood, earthquake, earth movement, water damage, wind damage, testing if applicable, collapse however caused, and material or equipment stored offsite, onsite, or in transit. The General Contractor shall be solely responsible for any deductible amounts or coinsurance penalties. This policy shall provide for a waiver of subrogation in favor of the Owner, Subcontractors, Subsubcontractors, Material Suppliers, and Design Professional. This insurance shall remain in effect until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property to be covered by this insurance, whichever is sooner. Partial occupancy or use of the Work shall not commence until the General Contractor has secured the consent of the insurance company or companies providing the coverage required in this subsection. Before commencing the Work, the General Contractor shall provide a copy of the property policy or policies obtained in compliance with this subsection to the Owner.

Additionally, the General Contractor shall indemnify and hold harmless the Owner to the extent of the limits of General Contractor's Commercial General Liability Insurance required herein, against any and all liability, claims, demands, damages, losses, and expenses, including attorneys' fees, in connection with or arising out of any damage or alleged damage to any of the Owner's existing adjacent property that may arise from the performance of the Work, to the extent of the negligent acts or omissions of the General Contractor, Subcontractor, or anyone employed directly or indirectly by any of them or by anyone for whose acts any of them may be liable.

GENERAL CONDITIONS

1. DEFINITIONS

1.1. Whenever used in any of the Contract Documents, the following meanings shall be given to the terms herein defined:

1.1.1. Addendum or *Addenda* - Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the Bidding Requirements or the Contract Documents.

1.1.2. Agreement - The written contract between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

1.1.3. Application *for Payment* - The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

1.1.4. Bid - The offer or proposal of the bidder on the prescribed Bid Form setting forth the prices for the Work to be performed.

1.1.5. Bidder - One who submits a Bid directly to OWNER, as distinct from sub-bidder, who submits a Bid to a Bidder.

1.1.6. Bidding *Documents* - The Invitation for Bids, Information to Bidders, the Bid Form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

1.1.7. Bonds - Performance and Indemnity and Payment Bonds and other instruments of security.

1.1.8. Change *Order* - A document recommended by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

1.1.9. *Contract Documents* - Executed Agreement, Addenda (if any), Invitation for Bids, Information to Bidders, Signed Copy of Bid, Bid Guarantee, Statement of Bidder's Qualifications, Performance and Indemnity Bond, Payment Bond, Certification of Insurance, General Conditions, Supplemental Conditions (if any), Special Conditions (if any), Technical Specifications, and Drawings.

1.1.10. *Contract Price* - The moneys payable by OWNER for completion of the Work in accordance with the Contract Documents.

1.1.11. *Contract Times* - The numbers of days or the dates stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the work so that it is ready for final payment as evidenced by ENGINEER's written records.

1.1.12. CONTRACTOR - The person, firm, or corporation entering into Contract with the OWNER to construct and install the improvements embraced in this Contract.

1.1.13. *Defective* - An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or had been damaged prior to ENGINEER's recommendation or final payment.

1.1.14. Drawings - The construction drawings which graphically show the scope, extent, and character of the Work to be furnished and performed by the CONTRACTOR and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents.

1.1.15. ENGINEER – The person, firm or corporation serving the OWNER with Engineering services, his successors, or any other person or persons, employed by said OWNER for the purpose of directing or having charge of the work embraced in this Contract.

1.1.16. *Laws and Regulations; Laws or Regulations* – Any and all applicable laws, rules, regulations, ordinances codes and orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

1.1.17. Liens - Liens, charges, security interests or encumbrances upon project funds, real property or personal property.

1.1.18. Local *Government* - York County, South Carolina, within which the Project Areas are situated.

1.1.19. Milestone - A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

1.1.20. *Notice of Award* - The written notice by OWNER to the apparent successful Bidder stating that upon compliance by the apparent successful Bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the agreement.

1.1.21. *Notice to Proceed* - A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform, CONTRACTOR's obligations under the Contract Documents.

1.1.22. OWNER - The York County Government, which is authorized to undertake this Contract.

1.1.23. Partial *Utilization* - Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

1.1.24. *Project* - The total construction of which the Work to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

1.1.25. Project *Area* - The area within which are the specified limits of the improvements to be constructed in whole or in part under this Contract.

1.1.26. Project *Manual* – The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

1.1.27. Resident *Project Representative* – The authorized representative of ENGINEER who may be assigned to the Site or any part thereof.

1.1.28. *Samples* - Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

1.1.29. *Site* – Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for the use of the CONTRACTOR.

1.1.30. *Shop Drawings* - All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

1.1.31. *Special Conditions* - The part of the Contract Documents that amends or supplements the Technical Specifications.

1.1.32. *Subcontractor* - An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

1.1.33. *Substantial Completion* - The Work (or specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certification of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended; or if no such certificate is issued, when the Work is complete and ready for final payment as evidenced by ENGINEER's written recommendation of final payment. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

1.1.34. *Successful Bidder* - The lowest, qualified, responsible and responsive Bidder to whom OWNER (on the basis of OWNER's evaluation as hereinafter provided) makes an award.

1.1.35. *Supplier* - A manufacturer, fabricator, supplier, distributor, material man or vendor having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

1.1.36. *Supplemental Conditions* - The part of the Contract Documents that amends or supplements these General Conditions.

1.1.37. *Technical Specifications* - The part of the Contract Documents that describes, outlines, and stipulates: the quality of materials, equipment and systems to be furnished; the quality of workmanship required; and the methods to be used in carrying out the construction work to be performed under this Contract.

1.1.38. *Underground Facilities* - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, sewage and drainage removal, traffic or other control systems, or water.

1.1.39. *Unit Price Work* - Work to be paid for on the basis of unit prices.

1.1.40. *Work* - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. Work includes and is the result of performing or furnishing and incorporating materials and equipment into the construction, and furnishing, installing and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

1.2 Other technical terms not specifically defined within the Contract Documents shall have the meanings given in AIA Document "Glossary of Construction Industry Terms," current edition. Technical terms not defined as above and used to describe items of the Work, and which so applied have a well-known technical or trade meaning, shall be deemed to have such recognized meaning.

2. CONTRACTOR'S OBLIGATIONS

2.1. All work shall be done in strict accordance with the Contract Documents. Observations, construction reviews, tests, recommendations or approvals by the ENGINEER or persons other than the

CONTRACTOR, shall in no way relieve the CONTRACTOR of his obligations to complete all work in accordance with the Contract Documents. All work shall be done under the direct supervision of the CONTRACTOR. The CONTRACTOR shall be responsible for construction means, methods, techniques, and procedures, and for providing a safe place for the performance of the work by the CONTRACTOR, Subcontractors, suppliers, and their employees and for access, use, work, or occupancy by all authorized persons.

3. LANDS BY CONTRACTOR

3.1. OWNER shall furnish the Site. OWNER shall notify CONTRACTOR of any encumbrances or restrictions not of general application, but specifically related to the use of the Site with which the CONTRACTOR must comply in performing work.

3.2. Any land and access thereto not specifically shown to be furnished by the OWNER that may be required for temporary construction facilities or for storage of materials and equipment shall be provided by the CONTRACTOR with no liability to the OWNER. The CONTRACTOR shall confine his apparatus and storage to such additional areas as he may provide at his expense.

3.3. The CONTRACTOR shall not enter upon private property for any purpose without obtaining permission, and he shall be responsible for the preservation of all public property, trees, monuments, structures and improvements, along and adjacent to the street and/or right-of-way, and shall use every precaution necessary to prevent damage or injury thereto. He shall use suitable precautions to prevent damage to pipes, conduits, and other underground structures, and shall protect carefully from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed.

4. SURVEYS BY CONTRACTOR

4.1. Based upon the Construction Documents and any additional information provided by the OWNER, the CONTRACTOR shall develop and make all detailed surveys necessary for construction, including working points, lines and elevations.

5. PUBLIC UTILITIES

5.1. The elevation and location of all public utilities shown on the Drawings were taken from existing public records. It shall be the duty of the CONTRACTOR to make final and exact determination of the location and extent of all utilities and he will be liable for any expense resulting from damage to them.

6. SUPERINTENDENT

6.1. A qualified superintendent, who is acceptable to the OWNER, shall be maintained on the Work and shall give efficient supervision to the Work until its completion. The superintendent shall have full authority to act in behalf of the CONTRACTOR, and all instruction given to the superintendent shall be considered as given to the CONTRACTOR. It shall be the responsibility of this CONTRACTOR's superintendent to coordinate the Work of all the Subcontractors. The superintendent shall be present on the site at all times required to perform adequate supervision and coordination.

7. SUBCONTRACTORS

7.1. At the time set forth in the Contract Documents or when requested by the OWNER, the CONTRACTOR shall submit in writing for review of the OWNER the names of the Subcontractors proposed for the work. Subcontractors may not be changed except at the request or with the approval of the OWNER. The CONTRACTOR is responsible to the OWNER for the acts and deficiencies of his Subcontractors, and of their direct and indirect employees, to the same extent as he is responsible for the acts and deficiencies of his employees. The Contract Documents shall not be construed as creating any

contractual relation between any Subcontractor and the OWNER. The CONTRACTOR shall bind every Subcontractor by the terms of the Contract Documents.

8. ASSIGNMENTS

8.1. The CONTRACTOR shall not assign the whole or any part of this Contract or any moneys due or to become due hereunder without written consent of the OWNER. In case the CONTRACTOR assigns all or any part of any moneys due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any moneys due or to become due to the CONTRACTOR shall be subject to prior claims of all persons, firms, and corporations for services rendered or materials supplied for the performance of the work called for in this Contract.

9. MUTUAL RESPONSIBILITY OF CONTRACTORS

9.1. If through acts of neglect on the part of the CONTRACTOR, any other CONTRACTOR or any Subcontractor shall suffer loss or damage on the work, the CONTRACTOR agrees to settle with such other CONTRACTOR or Subcontractor by agreement or arbitration if such other CONTRACTOR or Subcontractor will so settle. If such other CONTRACTOR or Subcontractor shall assert any claim against the OWNER on account of any damage alleged to have been sustained, the OWNER shall notify the CONTRACTOR, who shall indemnify and save harmless the OWNER against any such claim.

10. ORAL AGREEMENTS

10.1. No oral order, objection, claim or notice by any party to the others shall affect or modify any of the terms or obligations contained in any of the Contract Documents, and none of the provisions of the Contract Documents shall be held to be waived or modified by reason of any act whatsoever, other than by a definitely agreed waiver or modification thereof in writing, and no evidence shall be introduced in any proceeding of any other waiver or modification.

11. MATERIALS, SERVICE AND FACILITIES

11.1. It is understood that except as otherwise specifically stated in the Contract Documents, the CONTRACTOR shall provide and pay for all materials, labor, tools, equipment, water, gas, light, power, transportation, superintendence, taxes, insurance, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.

11.2. Any work necessary to be performed after regular working hours, on Sundays or Legal Holidays, shall be performed without additional expense to the OWNER.

12. MATERIALS AND EQUIPMENT

The materials and equipment installed in the work shall meet the requirements of the Contract Documents and no materials or equipment shall be ordered until reviewed by the ENGINEER. The CONTRACTOR shall furnish all materials and equipment not otherwise specifically indicated or provided by the OWNER. The CONTRACTOR shall guarantee all materials and equipment he provides in accordance with Section 16 of these GENERAL CONDITIONS.

12.1. Substitutions: In order to establish standards of Quality, the ENGINEER has, in the detailed Specifications, referred to certain products by name and catalog number without consideration of possible substitute or "or equal" items. This procedure is not to be construed as eliminating from competition other products of equal or better quality by other manufacturers where fully suitable in design.

12.1.1. Whenever it is indicated in the Drawings or specified in the specifications that a substitute or "or-equal" item of material or equipment may be furnished or used by the CONTRACTOR, application for

such acceptance will not be considered by the ENGINEER until after the Effective Date of the agreement. The CONTRACTOR shall furnish the complete list of proposed desired substitutions, together with such engineering and catalog data as the ENGINEER may require. All proposals for substitutions shall be submitted in writing by the General Contractor and not by individual trades or material suppliers. The ENGINEER will review proposed substitutions and make his recommendations in writing within reasonable time.

12.1.2. The CONTRACTOR shall abide by the ENGINEER's recommendation when proposed substitute materials or items of equipment are not recommended for installation and shall furnish the specified material or item of equipment in such case.

12.2. Space Requirements: It shall be the responsibility of the CONTRACTOR to ensure that materials and equipment to be furnished fit the space available. He shall make necessary field measurements to ascertain space requirements, including those for connections, and shall order such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the Contract Documents.

12.3. Arrangement: Where equipment requiring different arrangement of connections from those shown is approved, it shall be the responsibility of the CONTRACTOR to install the equipment to operate properly, and in harmony with the intent of the work required by such arrangement.

12.4. Unacceptable Materials and Equipment: Materials and equipment which do not conform to the requirements of the Contract Documents, or are not equal to samples reviewed by the ENGINEER, or are in any way unsatisfactory or unsuited to the purpose for which they are intended, shall not be furnished nor installed.

12.5. Storage: Materials and equipment shall be so stored as to ensure the preservation of their quality and fitness for the work. When considered necessary, they shall be placed on wooden platforms or other hard, clean surfaces, and not on the ground and/or they shall be placed under cover. Stored materials and equipment shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written permission of the property owner or leasee. Materials, equipment, construction machinery, fuel, and oils shall not be stored or parked within the drip-line of any trees in or adjacent to the project site or additional off-site easements and right-of-ways.

12.6. Manufacturer's Directions: Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer.

13. INSPECTION AND TESTING OF MATERIALS

13.1. Unless otherwise specifically provided for in the specifications, the inspection and testing of material and finished articles to be incorporated in the work at the site shall be made by third party bureaus, laboratories, or agencies approved by the OWNER. The cost of such inspection and testing shall be paid by the Owner. The Owner's testing agency shall furnish evidence satisfactory to the Contractor that the material and finished articles have passed the required tests prior to the incorporation of such materials and finished articles in the work. The CONTRACTOR shall promptly segregate and remove rejected material and finished articles from the site of the work.

14. SAMPLES

14.1. All samples called for in the Specifications or required by the ENGINEER shall be furnished by the CONTRACTOR and shall be submitted to the ENGINEER for his review. Samples shall be furnished so as not to delay fabrication, allowing the ENGINEER reasonable time for the consideration of the samples submitted.

14.1.1. Samples for Tests: CONTRACTOR shall furnish such samples of material as may be required for examination and test. All samples of materials for tests shall be taken according to standard methods or as provided in the Contract Documents.

14.1.2. CONTRACTOR's Guaranty: All samples shall be submitted by the CONTRACTOR with a covering letter indicating that such samples are recommended by the CONTRACTOR for the service intended and that the CONTRACTOR's Guaranty will fully apply.

14.1.3. All materials, equipment and workmanship shall be in accordance with samples guaranteed by the CONTRACTOR and reviewed by the ENGINEER.

15. SHOP DRAWINGS

15.1. The CONTRACTOR shall provide shop drawings, setting schedules and such other drawings as may be necessary for the prosecution of the work in the shop and in the field as required by the Drawings, Specifications or the ENGINEER's instructions. Deviations from the Drawings and Specifications shall be called to the attention of the ENGINEER at the time of the first submission of shop drawings and other drawings for consideration. The ENGINEER's review of any drawings shall not release the CONTRACTOR from responsibility for such deviations. Shop drawings shall be submitted according to a schedule prepared jointly by the CONTRACTOR and the ENGINEER.

15.1.1. CONTRACTOR's Certification: When submitted for the ENGINEER's review, shop drawings shall bear the CONTRACTOR's certification that he has reviewed, checked and approved the shop drawings, that they are in harmony with the requirements of the Project and with the provisions of the Contract Documents, and that he has verified all field measurements and construction criteria, materials, catalog numbers and similar data. CONTRACTOR shall also certify that the work represented by the shop drawings is recommended by the CONTRACTOR and the CONTRACTOR's Guaranty will fully apply.

16. GUARANTY

16.1. The CONTRACTOR shall guarantee all materials and equipment furnished and work performed for a period of one year from the date of final payment of the work.

16.1.1. The Performance and Indemnity Bond shall remain in full force and effect during the guaranty period.

16.1.2. Correction of faulty work after final payment shall be as provided in Paragraph 41.

17. INSURANCE

17.1. The CONTRACTOR shall not commence any work until he obtains, at his own expense, all required insurance. Such insurance must have the approval of the OWNER as to the limit, form, and amount. The CONTRACTOR will not permit any Subcontractor to commence work on this project until such Subcontractor has complied with the same insurance requirements.

Types: The types of insurance the CONTRACTOR is required to obtain and maintain for the full period of the Contract will be: Workmen's Compensation Insurance, Automobile and Comprehensive General Liability Insurance as detailed in the following portions of this specification.

17.1.2. Evidence: As evidence of specified insurance coverage, the OWNER may, in lieu of actual policies, accept certificates issued by the insurance carrier showing such policies in force for the specified period. Each policy or certificate will bear an endorsement or statement waiving right of cancellation or reduction in coverage within ten days' notice in writing to be delivered by registered mail to the OWNER. Should any policy be cancelled before final payment by the OWNER to the CONTRACTOR and the CONTRACTOR fails immediately to procure other insurance as specified, the OWNER reserves the right to procure such insurance and to deduct the cost thereof from any sum due the CONTRACTOR under this Contract.

17.1.3. Adequacy of Performance: Any insurance bearing on adequacy of performance shall be maintained after completion of the project for the full guaranty period. Should such insurance be cancelled before the end of the guaranty period and the CONTRACTOR fails immediately to procure other insurance as specified, the OWNER reserves the right to procure such insurance and to charge the cost thereof to the CONTRACTOR.

17.1.4. Payment of Damages: Nothing contained in these insurance requirements is to be construed as limiting the extent of the CONTRACTOR's responsibility for payment of damages resulting from his operations under this Contract.

18. WORKMEN'S COMPENSATION INSURANCE

18.1. Before the Agreement between the OWNER and the CONTRACTOR is entered into, the CONTRACTOR shall submit written evidence that he and all Subcontractors have obtained, for the period of the Contract, full Workman's Compensation Insurance coverage for all persons whom they employ or may employ in carrying out the work under this Contract. This insurance shall be in strict accordance with the requirements and statutory limits of the most current and applicable South Carolina Workman's Compensation Insurance Laws.

19. COMPREHENSIVE GENERAL LIABILITY AND AUTOMOBILE INSURANCE

19.1. Before commencement of the work, the CONTRACTOR shall submit written evidence that he and all his Subcontractors have obtained for the period of the Contract, full Comprehensive General Liability Insurance and automobile coverage. This coverage shall provide for both bodily injury and property damage.

19.1.1. Comprehensive General Liability Insurance shall include coverage for bodily injury, sickness or disease, death, or property damage arising directly or indirectly out of or in connection with the performance of work under this Contract, and shall provide for a combined single limit of not less than one million (\$1,000,000) dollars for all damages arising out of bodily injury, sickness or disease, death, or property damage for each occurrence.

19.1.2. Automobile insurance shall include coverage for bodily injury and property damage arising directly or indirectly out of or in connection with the performance of work under this Contract, and shall provide for a combined single limit of not less than one million (\$1,000,000) dollars for all damages arising out of bodily injury or property damage for each occurrence.

19.1.3. Indemnity: Included in such insurance will be contractual coverage sufficiently broad to insure the provisions of Paragraph 20.

20. INDEMNITY

20.1. The CONTRACTOR shall hold harmless, indemnify and defend the OWNER, its successors and assigns, the ENGINEER, their consultants, and each of their officers and employees and agents, from any and all liability claims, losses or damage arising or alleged to arise from the performance of the work described herein, but not including the sole negligence of the OWNER or the ENGINEER.

21. PATENTS AND ROYALTIES

21.1. If any design, device, material or process covered by letters, patent or copyright is used by the CONTRACTOR, he shall provide for such use by legal agreement with the OWNER of the patent or a duly authorized licensee of such OWNER, and shall save harmless the OWNER, and the ENGINEER, from any and all loss or expense on account thereof, including its use by the OWNER.

22. PERMITS

22.1. All permits and licenses necessary for the prosecution of the work shall be secured and paid for by the CONTRACTOR. This shall include all Business Licenses required by the Local Government.

23. LAWS TO BE OBSERVED

23.1. The CONTRACTOR shall give all notices and comply with all Federal, State and local laws, ordinances and regulations in any manner affecting the conduct of the work, and all such orders and decrees as exist, or may be enacted by bodies or tribunals having any jurisdiction or authority over the work, and shall indemnify and save harmless the OWNER its successors and assigns, the ENGINEER, their consultants, and each of their officers and employees and agents against any claim or liability arising from, or based on, the violation of any such law, ordinance, regulation, order or decree, whether by himself or his employees.

24. WARNING SIGNS AND BARRICADES

24.1. The CONTRACTOR shall provide adequate signs, barricades, and watchmen and take all necessary precautions for the protection of the work and the safety of the public.

25. PUBLIC CONVENIENCE

25.1. The CONTRACTOR shall at all times so conduct his work as to ensure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work, and to ensure the protection of persons and property. No road or street shall be closed to the public except with permission of the proper authorities. Fire hydrants on or adjacent to the work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the CONTRACTOR to ensure the use of sidewalks and the proper functioning of all gutters, sewer inlets, drainage ditches, and irrigation ditches, which shall not be obstructed.

26. SAFETY

26.1. The CONTRACTOR shall be solely and completely responsible for the conditions of the job site, including safety of all persons and property affected directly or indirectly by his operation during the performance of the work. This requirement will not be limited to normal working hours but will apply continuously 24 hours per day until written acceptance of the work by the OWNER and shall not be limited to normal working hours.

26.2. The ENGINEER's construction reviews of the CONTRACTOR's performance is not intended to include review of the adequacy of the CONTRACTOR's safety measures in, on, or near the construction site.

27. NOTICE TO PROCEED

27.1. Following the execution of the Contract by the OWNER and the CONTRACTOR, written Notice to Proceed with the work shall be given by the OWNER to the CONTRACTOR. The CONTRACTOR shall begin and shall prosecute the work regularly and uninterruptedly thereafter (except as provided for herein) with such force as to secure the completion of the work within the Contract Time.

28. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

28.1. It is hereby understood and mutually agreed, by and between the CONTRACTOR and the OWNER, that the date of beginning and the time for completion as specified in the Contract of the work to be done hereunder are ESSENTIAL CONDITIONS of this Contract; and it is further mutually understood and agreed that the work embraced in this Contract shall be commenced on a date to be specified in the Notice to Proceed.

28.2. The CONTRACTOR agrees that said work shall proceed regularly, diligently, and uninterruptedly at such rate of progress as will ensure full completion thereof within the time specified. It is expressly understood and agreed, by and between the CONTRACTOR and the OWNER, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

28.3. If said CONTRACTOR shall neglect, fail, or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the OWNER, then the CONTRACTOR does hereby agree, as a part consideration for the awarding of this Contract, to pay to the OWNER the amount specified in the Contract, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every calendar day that the CONTRACTOR shall be in default after the time stipulated in the Contract for completing the work.

28.4. The said amount is fixed and agreed upon by and between the CONTRACTOR and the OWNER because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the OWNER would in such event sustain, and said amount is agreed to be the amount of damages which the OWNER would sustain and said amount shall be retained from time to time by the OWNER from current periodical estimates.

28.5. It is further agreed that time is of the essence of each and every portion of this Contract and of the Specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this Contract. PROVIDED, that the CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due to the following:

28.5.1. Any preference, priority or allocation order duly issued by the Federal or State Government.

28.5.2. Unforeseeable cause beyond the control and without the fault or negligence of the CONTRACTOR, including, but not restricted to, acts of God, or of the public enemy, acts of the OWNER, acts of another CONTRACTOR in the performance of a contract with the OWNER, fires, flood, epidemics, quarantine restrictions, strikes, freight embargoes and unusually severe weather; and

28.5.3. Any delays of Subcontractors or suppliers occasioned by any of the causes specified in subsection 28.5.1. and 28.5.2. of this article:

PROVIDED, FURTHER, that the CONTRACTOR shall, within 10 days from the beginning of such delay, unless the OWNER shall grant a further period of time prior to the date of final settlement of the contract, notify the OWNER, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify the CONTRACTOR within a reasonable time of its decision in the matter, and grant such extension of time as the OWNER shall deem equitable and just.

29. CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

29.1. Immediately after execution and delivery of the contract, and before the first partial payment is made, the CONTRACTOR shall deliver to the OWNER an estimated construction progress schedule in a form satisfactory to the OWNER, showing the proposed dates of commencement and completion of each of the various subdivisions of work required under the Contract Documents.

30. EXTENSION OF CONTRACT TIME

30.1. A delay beyond the CONTRACTOR's control occasioned by an Act of God, by act or omission on the part of the OWNER or by strikes, lockouts, fire, etc., may entitle the CONTRACTOR to any extension of time in which to complete the work as agreed by the OWNER, provided, however, that the CONTRACTOR shall immediately give written notice to the OWNER of the cause of such delay.

30.2. Act of God shall mean an earthquake, flood, cyclone, or other cataclysmic phenomenon. Storms of normal intensity for the locality shall not be construed as an Act of God and no reparation shall be made to the CONTRACTOR for damages to the work resulting there from.

31. EXTRA WORK

31.1. New and unforeseen items of work found to be necessary, and which cannot be covered by any item or combination of items for which there is a Contract price, shall be classed as Extra Work. It shall be the responsibility of the CONTRACTOR to identify necessary work items classed as Extra Work and for which no previous contract price has been arranged and advise the ENGINEER and the OWNER of the need for the aforesaid necessary Extra Work. The CONTRACTOR shall do such Extra Work and furnish such materials as may be required for the proper completion or construction of the whole work contemplated, upon written order from the OWNER as approved by the ENGINEER. In the absence of such written order, no claim for Extra Work shall be considered.

31.2. Extra Work shall be performed in accordance with these Contract Documents where applicable and work not covered by such shall be done in accordance with the best construction practice and in a workmanlike manner.

31.3. Extra Work required in an emergency to protect life and property shall be performed by the CONTRACTOR as required.

32. CLEANING UP

32.1. The CONTRACTOR shall at all times, keep the premises clean and shall remove from the OWNER's property, and from all public and private property, temporary structures, rubbish, waste materials resulting from his operation or caused by his employees, and all surplus materials, leaving the site smooth, clean and true to line and grade and in the same condition as existed prior to the work performed by the CONTRACTOR or his Subcontractors and as approved by the OWNER. Failure to maintain a clean project site or to complete clean-up of the project site at the completion of the work shall be cause for the OWNER to perform the necessary clean-up and the costs thereof shall be charged to the CONTRACTOR.

33. REQUEST FOR PAYMENT

33.1. The CONTRACTOR may submit to the OWNER periodically, but not more than once each month, a Request for Payment for work done and materials delivered to and stored on the site. The CONTRACTOR shall furnish the OWNER all reasonable information required for obtaining the necessary data relative to the progress and execution of the work. Payment for materials stored on the site will be conditioned upon evidence submitted to establish the OWNER's title to such materials. Each Request for Payment shall be computed on the basis of work completed on all items listed in the Detailed Breakdown of Contract (or on unit prices, as the case may be), less 10 percent to be retained until final completion and acceptance of the work and less previous payments.

34. ENGINEER'S ACTION ON REQUEST FOR PAYMENT

34.1. All CONTRACTOR's Requests for Payment shall be referred to the ENGINEER for his review and, within a reasonable period, the ENGINEER shall:

34.1.1. Recommend payment by the OWNER of the Request for Payment as submitted.

34.1.2. Recommend payment by the OWNER of such other amount as the ENGINEER shall consider as due the CONTRACTOR, informing the OWNER and the CONTRACTOR in writing of his reasons for recommending the amended amount.

34.1.3. Recommend to the OWNER that payment of the Request for Payment be withheld, informing the CONTRACTOR and the OWNER in writing of his reasons, for so recommending.

35. OWNER'S ACTION ON REQUEST FOR PAYMENT

35.1. Within thirty days after receipt of a Request for Payment from the CONTRACTOR, the OWNER shall:

35.1.1. Pay the Request for Payment as recommended by the ENGINEER.

35.1.2. Pay such other amount, in accordance with Paragraph 36, as he shall decide is due the CONTRACTOR, informing the CONTRACTOR and the ENGINEER in writing of this reasons for paying the amended amount.

35.1.3. Withhold payment in accordance with Paragraph 36, informing the CONTRACTOR and the ENGINEER of his reasons for withholding payment.

36. OWNER'S RIGHT TO WITHHOLD PAYMENT OF A REQUEST FOR PAYMENT

36.1. The OWNER may withhold payment, in whole or in part, of a Request for Payment to the extent necessary to protect himself from loss on account of any of the following:

36.1.1. Defective work.

36.1.2. Evidence indicating the probable filing of claims by other parties against the CONTRACTOR that may adversely affect the OWNER.

36.1.3. Failure of the CONTRACTOR to make payments due to Subcontractors, material suppliers, or employees.

36.1.4. Damage to another CONTRACTOR.

37. PAYMENT FOR EXTRA WORK

37.1. Written notice of claims for payment for Extra Work shall be given by the CONTRACTOR within ten days after receipt of instructions from the OWNER to proceed with the Extra Work and also before any work is commenced, except in emergency endangering life or property. No claim shall be valid unless so made. In all cases, the CONTRACTOR's itemized estimate sheets showing all labor and material shall be submitted to the OWNER. The OWNER's order for Extra Work shall specify any extension of the Contract Time and one of the following methods of payment:

37.1.1. Unit prices or combination of unit prices which formed the basis of the original Contract.

37.1.2. A lump sum based on the CONTRACTOR's estimate and accepted by the OWNER.

37.1.3. Actual cost plus 10 percent for overhead and profit. Actual costs are defined as follows:

37.1.3.1. Labor costs, including time of foreman while engaged directly upon extra work.

37.1.3.2. Labor insurance and taxes.

37.1.3.3. Materials and supplies actually used on the work.

37.1.3.4. Associated General Contractors of America standard rental rates on each piece of equipment having a value in excess of \$50.00. Equipment and tools of lesser value are considered "small tools" and, as such, are considered to be part of overhead.

38. ACCEPTANCE AND FINAL PAYMENT

38.1. When the CONTRACTOR has completed the work in accordance with the terms of the Contract Documents, he shall certify completion of the work to the OWNER and submit a final Request for Payment, which shall be the Contract Amount plus all approved additions, less all approved deductions and less previous payments made. The CONTRACTOR shall furnish evidence that he has fully paid all debts for labor, materials, and equipment incurred in connection with the work, and upon acceptance by the OWNER, the OWNER will release the CONTRACTOR except as to the conditions of the Performance and Indemnity Bond and the Labor and Material Payment Bond, any legal rights of the OWNER, required guaranties, and Correction of Faulty Work after Final Payment, and will pay the CONTRACTOR's final Request of Payment. The CONTRACTOR shall allow sufficient time between the time of completion of the work and approval of the final Request for Payment for the ENGINEER to assemble and check the necessary data.

38.1.1. Release of Liens: The CONTRACTOR shall deliver to the OWNER a complete release of all liens arising out of this Contract before the retained percentage or before the final Request for Payment is paid. If any liens remains unsatisfied after all payments are made, the CONTRACTOR shall refund to the OWNER such amounts as the OWNER may have been compelled to pay in discharging such liens including all costs and a reasonable attorney's fees.

39. OWNER'S RIGHT TO TERMINATE AGREEMENT

39.1. The OWNER shall have the right to terminate his agreement with the CONTRACTOR after giving ten days' written notice of termination to the CONTRACTOR in the event of any default by the CONTRACTOR.

39.1.1 Default by CONTRACTOR: It shall be considered a default by the CONTRACTOR whenever he shall:

39.1.1.1. Declare bankruptcy, become insolvent, or assign his assets for the benefit of his creditors.

39.1.1.2. Disregard or violate provisions of the Contract Documents or fail to prosecute the work according to the agreed Schedule of Completion, including extensions thereof.

39.1.1.3. Fail to provide a qualified superintendent, competent workmen or Subcontractors, or proper materials, or fail to make prompt payment thereof.

39.1.2. Completion by the OWNER: In the event of termination of the Agreement by the OWNER because of default by the CONTRACTOR, the OWNER may take possession of the work and of all materials and equipment thereon and may finish the work by whatever method and means he may select.

40. TERMINATION OF CONTRACTOR'S RESPONSIBILITY

40.1. The Contract will be considered complete when all work has been finished and the project accepted in writing by the OWNER. The CONTRACTOR's responsibility shall then cease, except as set forth in his Performance and Indemnity Bond, as provided in Paragraph 16, Guaranty, and as provided in Paragraph 41, Correction of Faulty Work after Final Payment.

41 CORRECTION OF FAULTY WORK AFTER FINAL PAYMENT

41.1. The making of the final payment by the OWNER to the CONTRACTOR shall not relieve the CONTRACTOR of responsibility for faulty materials or workmanship. The CONTRACTOR shall promptly replace any such defects, as determined by the ENGINEER, discovered within two years from the date of final payment of the work.

42. INSPECTION

42.1. The authorized representatives of the ENGINEER and OWNER shall be permitted to inspect all materials, workmanship, and other relevant project records and data. Materials and workmanship will be subject to the approval of the OWNER and/or his representative.

43. CORRECTION OF WORK

43.1. All work, all materials, whether incorporated in the work or not, all processes of manufacture, and all methods of construction shall be, at all times and places, subject to the inspection of the ENGINEER who shall be the final judge of the quality and suitability of the work, materials, process of manufacturer, and methods of construction for the purposes for which they are used. Should they fail to meet his approval, they shall be forthwith reconstructed, made good, replaced and/or corrected, as the case may be, by the CONTRACTOR at his own expense. Rejected material shall immediately be removed from the site. If, in the opinion of the ENGINEER, it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the work injured or not performed in accordance with the Contract hereunder shall be reduced by such amount as in the judgment of the ENGINEER shall be equitable.

44. SUBSURFACE CONDITIONS FOUND DIFFERENT

44.1. Should the CONTRACTOR encounter subsurface and/or latent conditions at the site materially differing from those shown on the Plans or indicated in the Specifications, he shall immediately give notice to the ENGINEER of such conditions before they are disturbed. The ENGINEER will thereupon promptly investigate the conditions, and if he finds and so determines that they materially differ from those shown on the Plans or indicated in the Specifications, he will at once make such changes in the Plans and/or Specifications, as he may find necessary. Any increase or decrease of cost resulting from such changes are to be adjusted in the manner provided in Paragraph 37 of the General Conditions.

45. CONTRACT SECURITY

45.1. The CONTRACTOR shall furnish a Performance Indemnity Bond and Payment Bond (forms attached) in an amount at least equal to 100% of the contract prices as security for the faithful performance of this Contract, as the security for the payment of all persons performing labor on the project under this Contract, and furnishing materials in connection with this Contract. The Performance and Indemnity Bond and the Payment Bond may be in one or in separate instruments in accordance with local law. Before final acceptance, each bond must be approved by the OWNER.

46. DISPUTE RESOLUTION

46.1 OWNER and CONTRACTOR agree to negotiate all disputes between them in good faith prior to exercising their rights under law.

46.2 Any claim, dispute or other matter in question arising from or related to this Agreement or the performance or breach thereof, which cannot be resolved through direct discussions between parties shall be subject to mediation as a condition precedent to the institution of legal or equitable proceedings by either party, and only after both parties have completed the mediation process.

46.3 Through mediation, CONTRACTOR and OWNER shall endeavor to resolve claims, disputes, or other matters in question between them by mediation in an informal process in which a third-party

mediator facilitates discussion between the parties. The parties may designate a mediator mutually agreeable to both CONTRACTOR and OWNER to conduct the mediation. If the parties are unable to agree upon a mediator, mediation shall be conducted in accordance with the mediation provision of the South Carolina Circuit Court Alternative Dispute Resolution Rules. The mediation shall be conducted in York County, South Carolina. A request for mediation shall be filed in writing with the other party to this Agreement, and legal or equitable proceedings shall be stayed pending mediation for a period of sixty (60) days from the date of the request for mediation is filed, unless stayed for a longer period of time by agreement of the parties or court order. The cost of a third-party mediator will be shared equally by the parties.

46.4 If the parties reach an agreement during the mediation process, they shall reduce the agreement to writing and sign it with their attorneys, if any. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

46.5 In any action or proceedings to enforce or interpret any provision of this Agreement, or where any provision herein is validity asserted as a defense, each Party shall bear its own attorney fees, costs, and expenses.

END OF SECTION

SECTION 01 00 00
SUMMARY OF WORK

PART 1 - GENERAL

1.1 DEFINITIONS

- A. The following words, considered supplemental to those definitions provided in the General Conditions, will have the defined meanings when used throughout the Drawings and specifications. Where these definitions conflict with the definitions provided in the General Conditions, the definitions provided in the General Conditions shall govern.
1. Drawings - The drawings that show the scope, extent and character of the Work to be furnished and performed by CONTRACTOR and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents. Shop drawings are not Drawings as so defined.
 2. Defective – An adjective which, when modifying the word Work, refers to Work that is unsatisfactory, faulty, or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER/OWNER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion).
 3. Laws and Regulations; Laws or Regulations - Any and all applicable laws, rules, regulations, ordinances, codes and orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.
 4. Samples - Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
 5. Shop Drawings - All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.
 6. Incremental Substantial Completion – Refers to a designated portion of the project that is sufficiently complete, in accordance with the construction contract documents and OWNER approval, so that the OWNER may make use of or occupy the designated portion thereof for the intended purpose.
 7. Substantial Completion - Refers to a stage of a complete project (i.e., not incremental) that is sufficiently complete, in accordance with the construction contract documents and OWNER approval, so that the OWNER may make use thereof for the intended purpose.
 8. Final Completion – Refers to a stage of a complete project, not substantially

SECTION 01 00 00
SUMMARY OF WORK

complete, in accordance with the construction and contract documents and
OWNER approval and ready for final payment.

1.2 PROJECT SUMMARY

- A. General: The Work to be done under this Contract shall be known under the name of York County Sanitary Sewer Improvements: Stockbridge Trunk Sewer. Work will be accomplished within the York County, South Carolina, as described and shown in the contract documents.
- B. Major elements of Work include but are not limited to:
 - 1. Furnishing and installing:
 - a. The work under this contract includes all site work required for the complete construction of a new sewage collection system. The work consists of, but is not limited to construction of new 8-inch (938 LF), 12-inch (3,210 LF) and 16-inch (775 LF) diameter gravity sanitary sewer, 39 manholes, four (4) guaranteed jack and bores, and abandonment of 4 existing pump stations: Stockbridge Commons, Hawks Creek, Brook Springs and Palmetto West.
 - 2. Road pavement and restoration.
 - 3. Traffic Control
 - 4. Site work:
 - a. Erosion and sedimentation control measures.
 - b. Site restoration.
 - c. Demolition
- C. Implied and Normally Required Work:
 - 1. It is the intent of these Specifications to provide the OWNER with complete operable facilities/systems, subsystems and other items of Work.
 - 2. Any part or item of Work which is reasonably implied or normally required to make each installation satisfactorily and completely operable is deemed to be included in the Work and the Contract Amount.
 - 3. All miscellaneous appurtenances and other items of Work incidental to meeting the intent of these Specifications shall be included in the Work and the Contract Amount even though these appurtenances may not be specifically called for in these Specifications.

SECTION 01 00 00
SUMMARY OF WORK

1.3 QUALITY ASSURANCE

- A. Various technical specification sections may include experience and or qualification requirements that shall be satisfied. In some cases, pre-qualified or pre-selected equipment manufacturers may be listed.
- B. When required, provide the services of the pre-qualified or pre-selected manufacturer, or provide the required evidence of experience and obtain the required approvals prior to bidding.

1.4 CONTRACTOR'S USE OF SITE

- A. Limit use of premises for Work and storage. Limit staging area to easement area and existing pump stations.
- B. Coordinate use of premises under direction of ENGINEER/OWNER.
- C. Provide site safety and security for Project site.
- D. Obtain and pay for use of additional storage or work areas required.
- E. Comply with site security and access rules and regulations.

1.5 OWNER OCCUPANCY

- A. OWNER will occupy premises during entire period of construction in order to maintain normal operations.
- B. Cooperate with OWNER's representative in all construction operations to minimize conflict, and to facilitate OWNER usage.

1.8 COMMUNITY IMPACT

- A. The project site is located behind and through Palmetto West and Hawkscreek developments, which are sensitive to noise, odor, safety concerns, and traffic control. To minimize the construction impact on the communities, the Contractor shall coordinate closely with the various concerned parties including, but not limited to Subcontractors, OWNER, ENGINEER, residents and homeowner associations, York County, South Carolina Department of Transportation, and other agencies.

SECTION 01 00 00
SUMMARY OF WORK

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 01 90
CONTRACT CONSIDERATIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Application for Payment.
- B. Change procedures.

1.2 RELATED SECTIONS

- A. General Provisions
- B. Section 01 60 00 - MATERIAL AND EQUIPMENT

1.3 APPLICATIONS FOR PAYMENT

- A. Submit three copies of each application on forms furnished by Owner.
- B. Content and Format - Approved Unit Prices will be used to list items in Application for Payment. Certification by Contractor must accompany each application.
- C. Payment Period - Monthly.
- D. Attach required documents and Contractor's back-up data, including updated schedule and all invoices for stored materials.
- E. Contractor must have all as-builts/record drawings current and up to date prior to submitting Application for Payment.

1.4 CHANGE PROCEDURES

- A. The Owner will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Times by issuing supplemental instructions in a Field Order, as provided in the General Conditions.
- B. The Owner may issue a Proposal Request or Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit an estimate within 15 days.

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CONTRACT CONSIDERATIONS

- C. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Price and Contract Time with full documentation.
- D. Lump Sum/Price Change Order - Based on Proposal Request or Notice of Change and Contractor's fixed or estimated price quotation.
- E. Unit Price Change Order - For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. Changes in Contract Price or Contract Time will be computed as specified for Time and Material Change Order.
- F. Time and Material Change Order - Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Engineer will determine the change allowable in Contract Price and Contract Time as provided in the Contract Documents.
- G. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- H. Change Order Forms
- I. Execution of Change Orders - Owner will issue Change Orders for signatures of parties in the following order: Engineer, Contractor, Owner.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 02 50
MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 GENERAL:

- A. The CONTRACTOR shall receive and accept the compensation provided in the BID and the CONTRACT as full payment for furnishing all materials, labor, tools and equipment, for performing all operations necessary to complete the work under the CONTRACT, and also in full payment for all loss or damages arising from the nature of the work, or from any discrepancy between the actual quantities of work and quantities herein estimated by the ENGINEER, or from the action of the elements or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the OWNER.
- B. The prices stated in the BID include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the Drawings and specified herein. The basis of payment for an item at the unit price shown in the BID shall be in accordance with the description of that item in this Section.
- C. The CONTRACTOR's attention is called to the fact that the quotations for the various items of work are intended to establish a total price for completing the work in its entirety. Should the CONTRACTOR feel that the cost for any item of work has not been established by the BID Form or Payment Items, the CONTRACTOR shall include the cost for that work in some other applicable bid item, so that CONTRACTOR's BID for the project does reflect his total price for completing the work in its entirety.

1.2 MEASUREMENT

- A. The quantities for payment under this CONTRACT shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the OWNER, in accordance with the applicable method of measurement therefor contained herein. A representative of the CONTRACTOR shall witness all field measurements.

1.3 PAYMENT ITEMS

- A. Payment items herein correspond to the Bid Item Number as indicated in the BID Form.
 - 1. **Mobilization** (Not to exceed 5% of the Total Amount of the Base Bid)
 - a. Measurement: The work included in Mobilization, shall consist of all materials and operations necessary for assembling and setting up for the project, including, but not limited to, the following:
 - a. Initial movement of equipment and personnel to the site.
 - b. Construction of staging and parking areas.

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- c. Field Office facility.
- d. Providing sanitary, posting, and other facilities required by the specifications and/or State, Federal, local or safety regulations.
- e. Moving on and off site all tools and other items required to complete the work.
- f. All other work, initial expenses, payment of bonds, insurance premiums, and operations, which must be performed before beginning the work.
- g. All temporary utilities required for the construction activities.
- h. All costs related to safety and security.

The lump sum (LS) bid price for Mobilization is limited to a maximum of 5 percent (5%) of the total amount of the base bid.

- b. Payment: Payment for the lump sum price bid, in the Form of Bid, for Item 1 will be 50% payable on the first monthly estimate subsequent to the Contractor's moving in of all necessary facilities as listed above. The next increment of 25% may be paid on the next subsequent Request for Partial Payment, but not sooner than 30 days. The remaining 25% will be payable upon completion of demobilization. Payment will be full compensation for all labor, materials, equipment, tools, fees, and the lump sum price for "Mobilization" will not be made more than once regardless of the fact that the Contractor may have, for any reasons, to shut down his work on the project or move equipment away from the project and then back again.
- 2. Construction Allowance** (Not to exceed 10% of the Total Amount of the Base Bid)
- a. Measurement shall not be made for this item.
 - b. Allowance will be for additional services and will only be used if necessary for additional services performed by the Bidder during the Project, only after written instructions to do so are received from Owner.
 - c. The lump sum (LS) bid price for Construction Allowance is limited to a maximum of 10 percent (10%) of the total amount of the base bid.
- 3. Furnish, Install, Maintain and Remove Erosion Control, Complete:**
- a. Lump Sum price to provide all labor, materials, equipment, tools and management to furnish, install, maintain and remove Erosion Control Devices at the locations and per the details shown on the plans and in accordance with these specifications shall include, but not be limited to: clearing and grubbing, excavation; stockpiling of materials; furnishing, installing and removing silt fence; handling, placing and removing tree protection; tree removal and stump grinding; handling, placing and removing inlet protection; backfill and compaction; removal and disposal of waste materials; clean-up; additional erosion control measures as

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MEASUREMENT AND PAYMENT

required by the County Inspector; and any other incidental items required for proper operation of the Erosion Control.

- b. Contractor may apply for up to 60% of the Lump Sum total to furnish, install, maintain and remove Erosion Control Devices after approved installation of the erosion control devices. Contractor may apply for up to 20% of the Lump Sum total during construction to cover cleaning and maintenance of erosion control devices. Contractor may apply for the remaining 20% of the Lump Sum total after removal of the erosion control devices.
- 4. Temporary Bypass Pumping:**
- a. Measurement: Lump Sum price to provide all labor, materials, equipment, tools and management to provide temporary bypass pumping during construction of the gravity sewer.
 - b. Payment for Temporary Bypass Pumping shall be made Lump Sum (LS) upon completion and acceptance of the gravity sewer.
- 5. Tree Removal, Storage, Protection and Replacement:**
- a. Measurement: This item shall include all items necessary to furnish all material, equipment and labor necessary for removal, storage, protection and replacement of trees indicated on the plans.
 - b. Payment: Tree removal, storage, protection and replacement will be paid for at the contract unit price per each (EA) and shall include all material, equipment, and labor for the removal, storage, protection and replacement of trees. No additional compensation will be made for removal and storage of trees.”
- 6. Maintenance of Traffic**
- a. Measurement: This work shall include all items necessary to maintain safe access for both vehicular and pedestrian traffic at all times throughout the project work zone. In addition to the items of work as listed in Section I.G of the York County Government Sewer Specifications & Standard Details.
 - b. Payment: Payment for maintenance of traffic will be made on a Lump Sum (LS) basis and will include all items of work as outlined above.
- 7. 8” Gravity Sewer DIP (CL 350)**
- a. Measurement and payment for the 8” Ductile Iron (CL 350) Pipe, except as otherwise specified, will be based on the laying length of the pipe in linear feet (LF) actually placed as measured along the centerline of the completed pipe, including the length of fittings and specials measured along their centerlines.
 - b. Payment for gravity sewer will be made at the contract unit price bid per linear foot per size installed and shall include, but is not limited to: all labor, materials, and equipment, including fittings, appurtenances, special coatings and linings, specials and locator wire, marking tape, marker posts, excavation, demolition and removal of existing gravity sewer, dewatering,

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MEASUREMENT AND PAYMENT

backfilling with suitable material (including bringing in suitable material from off-site if necessary), backfill compaction, surface restoration, testing of the gravity main, existing utility locator services, temporary storage, pavement restoration and all other work incidental to the complete installation of the 8" Gravity Sewer in accordance with the Drawings and Specifications.

8. 12" Gravity Sewer DIP (CL 350)

- a. Measurement and payment for the 12" Ductile Iron (CL 350) Pipe, except as otherwise specified, will be based on the laying length of the pipe in linear feet (LF) actually placed as measured along the centerline of the completed pipe, including the length of fittings and specials measured along their centerlines.
- b. Payment for gravity sewer will be made at the contract unit price bid per linear foot per size installed and shall include, but is not limited to: all labor, materials, and equipment, including fittings, appurtenances, special coatings and linings, specials and locator wire, marking tape, marker posts, excavation, demolition and removal of existing gravity sewer, dewatering, backfilling with suitable material (including bringing in suitable material from off-site if necessary), backfill compaction, surface restoration, testing of the gravity main, existing utility locator services, temporary storage, pavement restoration and all other work incidental to the complete installation of the 12" Gravity Sewer in accordance with the Drawings and Specifications.

9. 16" Gravity Sewer DIP (CL 250)

- a. Measurement and payment for the 16" Ductile Iron (CL 250) Pipe, except as otherwise specified, will be based on the laying length of the pipe in linear feet (LF) actually placed as measured along the centerline of the completed pipe, including the length of fittings and specials measured along their centerlines.
- b. Payment for gravity sewer will be made at the contract unit price bid per linear foot per size installed and shall include, but is not limited to: all labor, materials, and equipment, including fittings, appurtenances, special coatings and linings, specials and locator wire, marking tape, marker posts, excavation, demolition and removal of existing gravity sewer, dewatering, backfilling with suitable material (including bringing in suitable material from off-site if necessary), backfill compaction, surface restoration, testing of the gravity main, existing utility locator services, temporary storage, and all other work incidental to the complete installation of the 16" Gravity Sewer in accordance with the Drawings and Specifications.

10. Guaranteed Jack and Bore of 16-inch carrier pipe in 26-inch casing crossing existing pump station (MH-3 to MH-4)

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MEASUREMENT AND PAYMENT

- a. Measurement: Guaranteed jack and bore sewer pipe of the type and diameter specified will be measured by lump sum for the complete installation by the boring and jacking method.
 - a. Payment: Bored and jacked sewer pipe will be paid for as lump sum and shall include the casing pipe, carrier pipe, spacers and any and all excavation, including the boring pit, any backfill, dewatering, etc., guaranteed complete in place. However, the bore shall be paid one time and no extra compensation will be paid for failures and subsequent withdrawal and re-jacking attempts.
- 11. Guaranteed Jack and Bore of 16-inch carrier pipe in 26-inch casing crossing existing stream (MH-4 to MH-5)**
- a. Measurement: Guaranteed jack and bore sewer pipe of the type and diameter specified will be measured by lump sum for the complete installation by the boring and jacking method.
 - b. Payment: Bored and jacked sewer pipe will be paid for as lump sum and shall include the casing pipe, carrier pipe, spacers and any and all excavation, including the boring pit, any backfill, dewatering, etc., guaranteed complete in place. However, the bore shall be paid one time and no extra compensation will be paid for failures and subsequent withdrawal and re-jacking attempts.
- 12. Guaranteed Jack and Bore of 8-inch carrier pipe in 16-inch casing crossing Blowing Rock Cove (MH-5A to MH-32)**
- a. Measurement: Guaranteed jack and bore sewer pipe of the type and diameter specified will be measured by lump sum for the complete installation by the boring and jacking method.
 - b. Payment: Bored and jacked sewer pipe will be paid for as lump sum and shall include the casing pipe, carrier pipe, spacers and any and all excavation, including the boring pit, any backfill, dewatering, etc., guaranteed complete in place. However, the bore shall be paid one time and no extra compensation will be paid for failures and subsequent withdrawal and re-jacking attempts.
- 13. Guaranteed Jack and Bore of 8-inch carrier pipe in 16-inch casing crossing Hawks Creek Parkway (MH-34 to MH-35)**
- a. Measurement: Guaranteed jack and bore sewer pipe of the type and diameter specified will be measured by lump sum for the complete installation by the boring and jacking method.
 - b. Payment: Bored and jacked sewer pipe will be paid for as lump sum and shall include the casing pipe, carrier pipe, spacers and any and all excavation, including the boring pit, any backfill, dewatering, etc., guaranteed complete in place. However, the bore shall be paid one time and no extra compensation will be paid for failures and subsequent

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withdrawal and re-jacking attempts.

14. 4-foot Diameter Manhole:

- a. Measurement: This item shall include all material, equipment and labor necessary for the installation of a precast 4-foot Diameter Manhole of the type and depth required by each specific bid item, complete and ready for use in accordance with the Contract Drawings and Documents, and as outline below.
- b. Payment: Standard manholes will be made at the Contract Unit Price Bid (EA) per installed complete unit and shall include, but is not limited to: all labor, materials, and equipment necessary for demolition and removal of existing sanitary sewer manholes, furnishing and installing manhole, and appurtenances, including, washed stone/bedding, and concrete footings including excavation, backfilling with suitable material (bringing in suitable material from off-site if necessary), compaction of backfill, invert pouring and forming of concrete bench in accordance with the standards and drawings, interior and exterior coatings, flexible boots, surface restoration, temporary storage, adjusting rings, frames, covers, and concrete riser rings and all other work and materials incidental to the complete installation of the manhole in accordance with the Drawings and Specifications.

15. Modification of Ex. Precast Structures:

- a. Measurement: This item shall include all material, equipment and labor necessary for the modification of a precast wetwell and/or precast manhole to a gravity sewer manhole with a new sump/invert elevation, complete and ready for use in accordance with the Contract Drawings and Documents, and as outlined below.
- b. Payment: Modification of Ex. Precast Structures will be made at the Contract Unit Price Bid (EA) per installed complete unit and shall include, but is not limited to: all labor, materials, and equipment necessary for demolition, filling with concrete, testing, invert pouring and forming of concrete bench in accordance with the standards and drawings, interior and exterior coatings, flexible boots, surface restoration, temporary storage, adjusting rings, frames, covers, and concrete riser rings and all other work and materials incidental to the complete installation of the modified wetwell and/or manhole in accordance with the Drawings and Specifications.

16. Core Drill Existing Wet Well

- a. Measurement: Core drill existing wetwell for 12-inch sewer pipe connection. Measurement for this work will be on a per each (EA) unit basis cored.
- b. Payment: Payment for the core drill existing wetwell for 12-inch sewer pipe connection shall be full compensation for all work necessary for the proper connection to the existing sanitary sewer manhole to include verifying the elevation, excavation, dewatering, shoring, core drilling, installation of flexible boot, grout, re-shaping of the manhole invert to accommodate the

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new pipe, backfilling/compaction, labor, materials and equipment necessary for an acceptable core for 12-inch connection. This work shall be constructed as per Section II.B of the York County Government Sewer Specifications & Standard Details.

17. Demolition of Ex. Stockbridge Commons Pump Station:

- a. Measurement: Lump sum price to provide all labor, materials, equipment, tools and management to demolish complete the existing pump station per the details shown on the plans and in accordance with these specifications shall include, but is not limited to: termination of existing electrical supply and disconnection from electric supply system at source tie-in point; removal of interior pumps, piping, electrical and accessories; removal of underground piping; removal of the above grade control panels, control boxes, control enclosures and associated support systems; removal of existing fencing; backfilling compacted area to surrounding grade with soil; removal of waste materials; clean-up and any other incidental items required for proper demolition of existing pump station.
- b. Payment for Demolition of Existing Pump Station shall be made Lump Sum (LS) upon completion and acceptance of demolition.

18. Demolition of Ex. Hawks Creek Pump Station:

- a. Measurement: Lump sum price to provide all labor, materials, equipment, tools and management to demolish complete the existing pump station per the details shown on the plans and in accordance with these specifications shall include, but is not limited to: termination of existing electrical supply and disconnection from electric supply system at source tie-in point; removal of interior pumps, piping, electrical and accessories; removal of underground piping; removal of the above grade control panels, control boxes, control enclosures and associated support systems; removal of existing fencing; backfilling compacted area to surrounding grade with soil; removal of waste materials; clean-up and any other incidental items required for proper demolition of existing pump station.
- b. Payment for Demolition of Existing Pump Station shall be made Lump Sum (LS) upon completion and acceptance of demolition.

19. Demolition of Ex. Brook Springs Pump Station:

- a. Measurement: Lump sum price to provide all labor, materials, equipment, tools and management to demolish complete the existing pump station per the details shown on the plans and in accordance with these specifications shall include, but is not limited to: termination of existing electrical supply and disconnection from electric supply system at source tie-in point; removal of interior pumps, piping, electrical and accessories; removal of underground piping; removal of the above grade control panels, control boxes, control enclosures and associated support systems; removal of existing fencing; backfilling compacted area to surrounding grade with soil;

SECTION 01 02 50

MEASUREMENT AND PAYMENT

removal of waste materials; clean-up and any other incidental items required for proper demolition of existing pump station.

- b. Payment for Demolition of Existing Pump Station shall be made Lump Sum (LS) upon completion and acceptance of demolition.

20. Demolition of Ex. Palmetto West Pump Station:

- a. Measurement: Lump sum price to provide all labor, materials, equipment, tools and management to demolish complete the existing pump station per the details shown on the plans and in accordance with these specifications shall include, but is not limited to: termination of existing electrical supply and disconnection from electric supply system at source tie-in point; removal of interior pumps, piping, electrical and accessories; removal of underground piping; removal of the above grade control panels, control boxes, control enclosures and associated support systems; removal of existing fencing; backfilling compacted area to surrounding grade with soil; removal of waste materials; clean-up and any other incidental items required for proper demolition of existing pump station.
- b. Payment for Demolition of Existing Pump Station shall be made Lump Sum (LS) upon completion and acceptance of demolition.

21. Asphalt Open-Cut and Repair (York County Standard 15.19):

- a. Measurement: by the square yard (SY) as follows for the various types and compacted depth of material installed.
 - 1. Up to a maximum width of 4 feet centered over the lateral.
 - 2. Up to a maximum width of 6 feet centered over the sewer main.
 - 3. Up to a maximum width of 10 feet by 10 feet centered over a manhole.
- b. Work shall include, but not be limited to (unless specifically noted otherwise on the Bid Form and this specification Section), the following: Saw cutting to required offsets, excavation, removal and disposal of excess material, cleaning the roadway surface, producing, transporting, placing and compacting, grading, furnishing material, furnishing and applying tack coat, maintaining each course, and any additional work necessary to remove and repair pavement in the area of manholes, valves, curb and gutter and other obstructions, treatments, pavement markings, adjustments to manholes, valves, inlet structures and all obstructions and making any repairs or corrections to the material that may become necessary. Compliance with SCDOT and York County Standards. All labor, materials and equipment necessary for a complete installation.
- c. Payment
 - 1. Payment shall be made at the contract unit price bid per square yard installed and field verified.
 - 2. Payment shall not be made for repair required due to excessive open cut caused by Contractor. Loss of material due to inadequate backfill compaction shall be replaced at no additional cost to the Owner.

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MEASUREMENT AND PAYMENT

22. Blowing Rock Cove Pavement Restoration (Sheet C-401):

- a. Measurement: Lump sum price to provide all labor, materials, equipment, tools and management to restore Blowing Rock Cove per the details shown on the plans and in accordance with these specifications.
- b. Payment for Blowing Rock Cove Pavement Restoration shall be made Lump Sum (LS) upon completion and acceptance.

23. Concrete Curb and Gutter Replacement:

- a. Measurement: by the linear feet (LF):
- b. Work shall include, but not be limited to (unless specifically noted otherwise on the Bid Form and this specification Section), the following:
 - 1. Excavation, removal and disposal of excess material, backfilling, saw cutting, concrete curb cuts for driveway or handicap ramp access, construction joints, aggregate base, joint sealers and sealants.
 - 2. Compliance with York County and SCDOT Standards for concrete curb.
 - 3. All labor, materials and equipment necessary for a complete installation.
- c. Payment:
 - 1. Payment shall be made at the contract unit price per linear foot installed and field verified.
 - 2. Payment shall not be made for repair required due to excessive open cut caused by Contractor. Loss of material due to inadequate backfill compaction shall be replaced at no additional cost to the Owner.

24. Flowable Fill for Abandoned Pipes:

- a. Measurement: Flowable fill shall be paid for as noted and as specified in the Contract Documents to include, but not limited to, all fees and costs to provide all equipment, materials, and manpower to fill existing pipes with flowable fill in accordance with Contract Documents.
- b. Payment: Flowable fill will be paid for a contract unit price bid per cubic yard (CY).

25. Unsuitable Soil Undercut:

- a. Measurement: Unsuitable Soil Undercut shall be paid for as noted and as specified in the Contract Documents to include, but not limited to, all fees and costs to provide all equipment, materials, and manpower to excavate, dispose of legally, backfill with acceptable material below the limits of excavation, compact, and test the soil in the project limits.
- b. Payment: Unsuitable Soil Undercut will be paid for a contract unit price bid per cubic yard (CY) if required during construction.

26. Trench Rock Removal:

- a. Measurement: Trench rock excavation will be measured by the City

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MEASUREMENT AND PAYMENT

Engineer or their representative in its original position, after which the rock shall be excavated to the depth specified by the County or Engineer and then measured by the cubic yard. Refer to York County Government Sewer Specifications for allowable width of rock removal in trench. Rock excavation shall consist of the removal and satisfactory disposal of all materials, which in the opinion of the Engineer, cannot be excavated except by drilling, blasting, "jack hammering or hoe ramming." No payment shall be made for rock removal by ripping. It shall consist of undecomposed stone, hard enough to ring under hammer. All boulders containing a volume of more than one-half cubic yard will be classified as rock.

- b. Payment: Trench rock excavation will be paid for at the contract unit price per cubic yard for rock excavation and shall include all labor, materials, and equipment to excavate and dispose of rock off site.

END OF SECTION

SECTION 01 03 90
COORDINATION AND MEETINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Coordination.
- B. Field engineering.
- C. Preconstruction conference.
- D. Progress meetings.
- E. Preinstallation conferences.
- F. Cutting and Patching

1.2 RELATED SECTIONS

- A. General Provisions

1.3 COORDINATION

- A. Coordinate scheduled work sequences and related operations beforehand with appropriate local, county, or state officials and agencies including affected property owners, when project is to be located in, or adjacent to, the public right-of-way.
- B. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.
- C. Verify that utility requirement 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.
- D. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. 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.
- E. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

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COORDINATION AND MEETINGS

- F. 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.
- G. 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.

1.4 FIELD ENGINEERING

- A. Control points are provided on Drawings.
- B. CAD files will be provided upon receipt of a release form.
- C. Owner reserves right to inspect or check results of field engineering services provided under paragraph D for conformance with Contract Documents.
- D. Contractor shall provide field engineering services as follows:
 - 1) Employ a land surveyor licensed in the State of South Carolina and acceptable to Owner.
 - 2) Protect all control and reference points. Accurately replace any such point which is damaged or moved.
 - 3) Provide correct lines, grades, locations and elevations for construction of all Project components.
 - 4) Provide correct information for preparation of Project record documents.
 - 5) Submit a copy of registered site drawing and certificate signed by the land surveyor who provided field engineering services that the locations and elevations of the Work are in conformance with the Contract Documents.

1.5 PRECONSTRUCTION CONFERENCE

- A. Engineer will schedule a conference after the Effective Date of Agreement.
- B. Attendance Required - Owner, Engineer, Contractor, Contractor's Superintendent, and major Subcontractors.
- C. Agenda
 - 1) Distribution of extra sets of Contract Documents by Owner to General Contractor.

SECTION 01 03 90
COORDINATION AND MEETINGS

- 2) Submission of list of subcontractors, list of products, Schedule of Values, and progress schedule.
 - 3) Designation of personnel representing the parties in Contract and the Owner.
 - 4) Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, change orders and contract closeout procedures.
 - 5) Scheduling.
 - 6) Requirements of regulatory agencies.
 - 7) Use of premises by Owner and Contractor.
 - 8) Temporary facilities to be provided by Owner; and by Contractor.
 - 9) Procedures for testing.
 - 10) Procedures for maintaining record documents.
 - 11) Periodic cleanup of site.
 - 12) Notification of utilities' owners.
 - 13) Owner's Requirements.
 - 14) Survey.
 - 15) Security and housekeeping.
 - 16) Requirements for Start-up of equipment.
 - 17) Inspection and acceptance of equipment put into service during construction period.
 - 18) Requirements of regulatory agencies.
- D. Owner will record minutes and distribute copies within five days after meeting to participants, and to those affected by decisions made.

1.6 PROGRESS MEETINGS

- A. Engineer will schedule and administer meetings throughout progress of the Work at maximum monthly intervals.

SECTION 01 03 90
COORDINATION AND MEETINGS

- B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within five days to participants, and those affected by decisions made.
- C. Attendance Required - Owner, Engineer, Job superintendent, major Subcontractors and suppliers, 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.

1.7 PREINSTALLATION CONFERENCES

- A. When required in individual specification Section, Contractor shall convene a preinstallation conference 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 Engineer four days in advance of meeting date.
- D. Prepare agenda, preside at conference, record minutes, and distribute copies within two days after conference.

SECTION 01 03 90
COORDINATION AND MEETINGS

- E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 CUTTING AND PATCHING

- A. Employ skilled and experienced installer 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 cutting, fitting, and patching to complete Work, and to:
 - 1) Fit the several parts together, to integrate with other Work.
 - 2) Uncover Work to install or correct ill-timed Work.
 - 3) Remove and replace defective and non-conforming Work.
 - 4) Remove samples of installed Work for testing.
 - 5) Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.

SECTION 01 03 90
COORDINATION AND MEETINGS

- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- J. Identify any hazardous substance or condition exposed during the Work to the Engineer in writing for decision or remedy.

END OF SECTION

SECTION 01 10 00
MOBILIZATION

PART 1 - GENERAL

1.1 GENERAL

A. Description

- 1) Mobilization shall include, but not necessarily be limited to, the performance of preparatory construction operations, including the movement of personnel and equipment to the project site; application, fee payment, temporary sanitary facilities, and acquisition for all necessary permits and the establishment of the Contractor's facilities necessary to begin work. The cost of required insurance and bonds shall be included in this item.
- 2) Demobilization – removal of mobilized facilities and contract closeout procedures.

- B. Submittals - The Contractor shall furnish proof of carriage of insurance as specified in the General Conditions.

1.2 MATERIALS
Not applicable.

1.3 EXECUTION

- A. All work performed in providing the facilities and services shall be done in a safe and workmanlike manner.

1.4 BASIS OF PAYMENT

- A. Mobilization for this Contract shall be per the approved Schedule of Values and shall not be greater than five percent of the total Bid price. Payment for the lump sum price bid will be 50% payable on the first monthly estimate subsequent to the Contractor's moving in of all necessary facilities as listed above. The next increment of 25% may be paid on the next subsequent Request for Partial Payment, but not sooner than 30 days. The remaining 25% will be payable upon completion of demobilization. Payment will be full compensation for all labor, materials, equipment, tools, fees, and the lump sum price for "Mobilization" will not be made more than once regardless of the fact that the Contractor may have, for any reasons, to shut down his work on the project or move equipment away from the project and then back again.

SECTION 01 10 00
MOBILIZATION

- B. Payment of the lump sum price bid will not be made more than once, regardless of the fact that the Contractor may have for any reason shut work down on the project, moved equipment away from the project site, and then back again. However if the Owner specifically requests a shutdown requiring complete equipment removal from project and then back to the site, a price for Mobilization /Demobilization shall be established via change order.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 20 00
PRODUCT HANDLING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Protect products scheduled for use in the work by means including, but not necessarily limited to, those described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, pertinent Sections of these Specifications, and York County Water and Sewer Specifications.
 - 2. Additional procedures also may be prescribed in other Sections of these specifications.
- C. In the event this Specification differs from York County Water and Sewer Specifications, the York County Water and Sewer Specifications shall be used.

1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURER'S RECOMMENDATIONS

- A. Except as otherwise approved by the ENGINEER, determine and comply with manufacturer's recommendations on product handling, storage and protection.

1.4 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. Promptly remove damaged material and unsuitable items from the job site and promptly replace with material meeting the specified requirements, at no additional cost to the OWNER.
- B. The ENGINEER may reject as non-complying such material and products that do not bear identification satisfactory to the ENGINEER as to manufacturer, grade, quality and other pertinent information.

SECTION 01 20 00
PRODUCT HANDLING

1.5 PROTECTION OF MATERIAL AND WORK

- A. General
 - 1. Carefully and properly protect all materials of every description, both before and after being used in the Work.
 - 2. Provide any enclosing or special protection from weather deemed necessary by the ENGINEER at no additional cost to the OWNER.
- B. Partial payments under the Contract will not relieve the Contractor from responsibility.
 - 1. When materials and work at the site which have been partially paid for are not adequately protected by the Contractor, such materials will be protected by the OWNER at the expense of the Contractor and no further partial payment thereon will be made.
- C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the OWNER.

1.6 STORAGE

- A. Store all items of equipment, component parts, etc. in accordance with the manufacturers' recommendations or as may otherwise be necessary to prevent damage or deterioration of any sort.

1.7 REPAIRS AND REPLACEMENTS

- A. In the event of damage, promptly make replacements and repairs to the approval of the ENGINEER and at no additional cost to the OWNER.
- B. Additional time required to secure replacements and to make repairs will not be considered by the ENGINEER to justify an extension in the contract time of completion.

END OF SECTION

SECTION 01 26 38
WEATHER DELAYS

PART 1 GENERAL

1.01 EXTENSIONS OF CONTRACT TIME:

- A. If the basis exists for an extension of time, in accordance with the General Conditions and Provisions, an extension of time on the basis of weather may be granted only for the number of Weather Delay Days in excess of the number of days listed as the Standard Baseline for the entire construction duration of each phase as a whole.

1.02 STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE:

- A. Weather data available from the National Oceanic and Atmospheric Administration (NOAA) has been reviewed and a Standard Baseline of average climatic range has been determined.
- B. Standard Baseline shall be regarded as the normal and anticipatory number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of precipitation in excess of one-tenth inch (0.10") liquid measure. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is included in the Work and is not eligible for extension of Contract Time.
- C. Standard Baseline (based upon precipitation in excess of one-tenth inch (0.10") liquid measure) established for this contract is as follows:

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
6	5	5	5	5	8	9	9	7	5	4	6

1.03 ADVERSE WEATHER AND WEATHER DELAY DAYS:

- A. Adverse Weather is defined as the occurrence of one or more of the conditions below which prevents exterior construction activity or access to the site within twenty-four (24) hours including a weekend day or holiday provided that the Contractor has scheduled construction activities that day. Scheduled construction activities are defined as those activities that are detailed and planned in the Contractor's weekly construction progress meetings. No consideration for an adverse weather day will be granted for which no construction activities are scheduled.
1. precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10") liquid measure;
 2. temperatures which do not rise above 32 degrees F by 10:00 a.m.;
 3. temperatures which do not rise above that specified for the day's construction activity by 10:00 a.m., if any is specified;
 4. sustained wind in excess of twenty-five (25) m.p.h.;
 5. standing snow in excess of one inch (1.00");
 6. any day that the Owner has requested no work to be performed.

SECTION 01 26 38

WEATHER DELAYS

- B. A Weather Delay Day may be counted if adverse weather prevents work on the project for fifty percent (50%) or more of the Contractor's scheduled workday, including a weekend day or holiday provided that the Contractor has scheduled construction activity that day. No consideration for a weather delay day will be granted for which no construction activities are scheduled.

Adverse Weather may include “dry-out” or “mud” days, as determined by the Engineer such as:

1. For rain days above the standard baseline.
 2. Only if there is a hindrance to site access or sitework, such as excavation, embankment, backfill, footings, etc. (see 4. & 5. below).
 3. At a rate no greater than one (1) make-up day for each day or consecutive days of rain beyond the standard baseline that total 0.1 inch or more, liquid measure, if no substantial work is possible (see 4. & 5. below), unless specifically recommended otherwise by the Engineer.
 4. If the Contractor's activity is limited to approximately 50% of the Contractor's activity before the Adverse Weather occurrence, then one half (1/2) a weather delay day will be counted. For example, if the Contractor is disking excavation and embankment areas to dry in situ moisture in the soils or hauling and placing unclassified excavation or borrow material to the embankment before an Adverse Weather occurrence but is able to continue disking excavation and embankment areas or placing unclassified excavation or borrow material, one half (1/2) a Weather Delay Day will be allowed.
 5. If the Contractor's activity is limited to only minor activity when compared to the Contractor's activity before the Adverse Weather occurrence, then one (1) weather delay day will be counted. For example, if the Contractor is disking excavation and embankment areas to dry in situ soils, hauling borrow material to embankment before an Adverse Weather occurrence but is only able to disk excavation and embankment areas to dry them due to the Adverse Weather occurrence, one (1) Weather Delay Day will be allowed.
- C. If the Contractor is able to only perform disking operations to dry excavation and embankment areas due to in situ moisture conditions in the soil, this is not considered an Adverse Weather occurrence or a Weather Delay Day and is considered to be a part of normal construction activities whether any other work can be performed or not.
- D. The Engineer will compile monthly weather data from the Local National Weather Station located at Airport's Air Traffic Control Tower.

WEATHER DELAYS

The determination of Contractor's entitlement for any Adverse Weather and Weather Delay days, as defined hereinabove, will be based on the entire construction duration of the phase in lieu of a month-by-month consideration. The entitlements will consider those months that conditions are better or worse than the Standard Baseline established for this contract. For example:

1. Assume that the total number of standard baseline days for a hypothetical Phase is forty-one (41) days and there are thirty-six (36) days with precipitation in excess of one tenth inch (0.10") liquid measure and ten (10) weather delay days. Four (4) of the thirty-six (36) days with precipitation in excess of one tenth inch (0.10") occurred on Sundays and the Contractor did not plan to work on the Sundays. The summation of the number of adverse weather plus weather delay days granted would be forty-two (42). This is determined by taking the 36 adverse weather days and subtracting the 4 adverse weather days that occurred on Sundays when the contractor planned no work and then adding the 10 weather delay days (on which the contractor had planned work activities) which sums to a total of forty-two (42) adverse weather plus weather delay days. This would amount to one (1) day in excess of the total baseline days for that hypothetical Phase. One (1) additional day will be added to the time for that Phase.
2. If the total standard baseline for a Phase is forty-one (41) days and there are twenty (28) days with precipitation in excess of one tenth inch (0.10") liquid measure and nine (9) weather delay days, giving a total of thirty-seven (37) rain and weather delay days. This would amount to four (4) days better than the total baseline days for that Phase. Four (4) days will be deducted from the time for that Phase.

Baseline days will be prorated when partial months are a part of a phase/stage or the overall contract time. For example:

1. If the contract or a phase begins on April 11, including April 11, there are twenty (20) calendar days remaining in April. Twenty (20) remaining calendar days divided by thirty (30) total calendar days in April equals 0.6667. Six (6) total baseline days established for April multiplied times 0.6667 equals four (4) baseline days for the remaining twenty calendar days in April.

Section 012638, Weather Delays establishes an anticipated number of days of lost construction time for each month.

1. To calculate any liquidated damages the number of baseline days will be calculated from the standard baseline.
2. The number of weather delay days for the actual total construction time will be calculated.
3. The difference in weather delay days and baseline days will then be calculated. Months that have less weather delays than baseline days will not result in a

SECTION 01 26 38
WEATHER DELAYS

negative number.

4. The resulting difference will then be added to the contract time.
5. The difference in the actual total construction time and the contract time plus weather delay days in excess of the baseline for that phase/stage will determine if and what the actual amount of liquidated damages for that phase/stage will be.

The following is an example of calculating weather delay time. This example assumes that all adverse weather + weather delay days occurred on days that the contractor had planned work activities. Using a hypothetical project with a total number of 60 consecutive calendar days of contract time and a Notice-to-Proceed date of July 10, 2003 and a hypothetical number of actual weather delay days as follows:

FROM	TO	HISTORICAL BASELINE DAYS	ADVERSE WEATHER + WEATHER DELAY DAYS	NUMBER OF DAYS IN EXCESS OF BASELINE
July 10, 2004	July 31, 2004	5	3	0
Aug. 1, 2004	Aug. 31, 2004	7	11	+4
Sept. 1, 2004	Sept. 8, 2004	1	4	+3
		13	18	+7
Contract Time				60
Contract Time + Number Of Weather Delay Days In Excess Of Baseline				67
Actual Construction Time				69
~~Days Of Liquidated Damages				2

Throughout the duration of the contract, the Contractor and the Resident Project Representative shall reconcile impacts due to weather on a monthly basis. The Contractor shall submit monthly with each pay request an itemized list of days impacted by the weather, scheduled activity that was impacted and the particular impact which caused the delay (temperature, rain, mud, snow, etc.).

END OF SECTION

SECTION 01 30 00

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Make submittals required by the Contract Documents and revise and resubmit as necessary to establish compliance with the specified requirements.
- B. Individual requirements for submittals also may be described in pertinent sections of these specifications.
- C. Work not included:
 - 1. Un-required submittals will not be reviewed by the Engineer.
 - 2. The Contractor may require his subcontractors to provide drawings, settings diagrams, and similar information to help coordinate the work, but such data shall remain between the Contractor and its subcontractors and will not be reviewed by the Engineer.
- D. In the event this Specification differs from York County Water and Sewer Specifications, the York County Water and Sewer Specifications shall be used.

1.2 QUALITY ASSURANCE

- A. Coordination of submittals:
 - 1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
 - 2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
 - 3. By affixing the Contractor's signature to each submittal, certify that this coordination has been performed.
 - 4. The Engineer will return submittals without processing if they do not contain the Construction Manager/General Contractor's stamp, if they are not initialed or signed by an authorized person, if they are not dated, or if it becomes evident that they have not been properly reviewed. Resultant delays are the responsibility of the Construction Manager/General Contractor.
- B. The following products do not require further approval except for interface within the work:
 - 1. Products specified by reference to standard specifications such as ASTM, AWWA, and similar standards.
 - 2. Products specified by manufacturer's name and catalog model number.
 - 3. "Or equal":
 - a. Where the phrase "or equal" occurs in the Contract Documents, do not assume that the materials, equipment or methods will be considered as equal unless the item has been specifically so approved for this Work by the Engineer. The decision of the Engineer shall be final.

SECTION 01 30 00

SUBMITTALS

1.3 SUBMITTALS

- A. Within 15 calendar days after the Contractor has received the Owner's notice to proceed, submit:
 - 1. Schedule for submittals including specification section, type of submittal and submittal date.
 - 2. Construction Schedule.
 - 3. Schedule of partial payment requests.
- B. Make submittals of shop drawings, samples, substitution requests and other items in accordance with the provisions of this Section.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

- A. Scale and measurements: Make shop drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
- B. Large prints (11" X 17" or larger):
 - 1. Submit five (3) copies of all shop drawings.
 - 2. Blueprints will be acceptable.
 - 3. Review comments of the Engineer will be shown on the copies returned to the Contractor. The Contractor may make and distribute such copies as are required for his purposes.
- C. Manufacturer's literature:
 - 1. Where contents of submitted literature from manufacturers include data not pertinent to the submittal, clearly show which portions of the contents are being submitted for review.
 - 2. Submit the number of copies which are required to be returned, plus three copies which will be retained by the Engineer.
- D. Do not begin fabrication of equipment or materials prior to Engineer's approval of shop drawings.
- E. Project Information: Each shop drawing shall be dated and shall contain the following: (1) Project Name, (2) Contract Number, (3) Submittal Number, (4) Project Identification, (5) Drawing Title, (6) Reference to Contract Drawing Number and specification section and paragraph, (7) Contractor's certification statement, (8) names of equipment or materials, and (9) the locations at which the equipment or materials are to be installed in the Work. The Engineer may decline to consider any shop drawing that does not contain complete data on the Work and full information on related matters.
- F. Requirements: Shop drawings shall present, where applicable, engineering data and descriptive information in sufficient detail to show the kind, size, arrangement, and

SECTION 01 30 00

SUBMITTALS

operation of component materials and devices; the external connections, anchorages, and supports required; performance characteristics; and dimensions needed for installation and correlation with other materials and equipment.

1. Numbering and Additional Considerations: Shop drawings shall be numbered consecutively and shall accurately and distinctly present the following:
 - a. All working and erection dimensions
 - b. Arrangement and sectional views
 - c. Necessary details, including complete information for making connections between Work under this Contract and work under other contracts
 - d. Types of materials and finishes
 - e. A list and description of parts

2.2 SAMPLES

- A. Provide sample or samples identical to the precise article proposed to be provided. Identify as described under "Identification of submittals" below.
- B. By prearrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the work at a location agreed upon by the Engineer.
 1. Unless otherwise specified, submit samples in the quantity which is required to be returned, plus two which will be retained by the Engineer.
 2. By prearrangement in specific cases, a single sample may be submitted for review and, when approved, be installed in the work at a location agreed upon by the Engineer.

2.3 COLORS AND PATTERNS

- A. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Engineer for selection.

2.4 PRODUCT DATA

- A. General: Submit Manufacturer's standard product data when special fabrication is not required.
 1. Products proposed for use in the Work shall be clearly designated in order for submittal to be considered for approval.
 2. Manufacturer's product data shall provide sufficient information for thorough review.
 - a. Attach supplemental information to detail how the product will be installed in the Work.
 3. Line through extraneous information.

SECTION 01 30 00

SUBMITTALS

PART 3 - EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

- A. Consecutively number all submittals.
 - 1. When material is submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
 - 2. On resubmittals, cite the original submittal number for reference.
- B. Accompany each submittal with a letter of transmittal showing the following information:
 - 1. Submittal number: Number submittals sequentially.
 - 2. Identification of the Contractor, subcontractor or supplier.
 - 3. Project title, project number and division, and contract number.
 - 4. Specification Section number, Section submittal number and suffix.
 - 5. Drawing sheet, and detail number as appropriate.
 - 6. Contractor's stamp or certification the products have been reviewed and are in accordance with the requirements of the Work and the Contract Documents.
 - 7. Listing of variations from Contract Documents and any limitations which may be detrimental to the Work.
- C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- D. Maintain an accurate submittal log for the duration of the work, showing current status of all submittals at all times. Make the submittal log available to the Engineer for his review upon request.

3.2 GROUPING OF SUBMITTALS

- A. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
 - 1. Partial submittals may be rejected as not complying with the provisions of the Contract.
 - 2. The Contract may be held liable for delays so occasioned.

3.3 TIMING OF SUBMITTALS

- A. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
- B. In scheduling, allow at least fourteen working days for review by the Engineer following his receipt of the submittal.

SECTION 01 30 00

SUBMITTALS

3.4 RESUBMITTAL SCHEDULE

- A. For submittals marked “Revise and Resubmit”, or “Rejected”, resubmittal shall be within thirty (30) days of the review date shown on the Engineer’s shop drawing review stamp.

3.5 ENGINEER’S REVIEW

- A. Review by the Engineer does not relieve the Contractor from responsibility for errors which may exist in the submitted data.
- B. Revisions
 - 1. Make revisions required by the Engineer.
 - 2. If the Contractor considers any required revision to be a change, he shall so notify the Engineer as provided for in the General Conditions.
 - 3. Make only those revisions directed or approved by the Engineer.
 - 4. Submittals which have been reviewed and returned to the Contractor marked “Revise and Resubmit” or “Rejected” and which are resubmitted and not in an approvable state, will not be reviewed a third time unless payment for the third and any subsequent review is by the Contractor. The Engineering costs for review shall be equal to the Engineer’s charges to the Owner under the terms of the Engineering Agreement with the Owner.
- C. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action as follows:
 - 1. Final Unrestricted Release: Work may proceed, provided it complies with Contract Documents, when submittal is returned with the following marking:
“No Exceptions Taken”
 - 2. Final-But-Restricted Release: Work may proceed, provided it complies with notations and corrections on submittal and with Contract Documents, when submittal is returned with the following marking:
“Make Changes Noted”
 - 3. Returned for Resubmittal: Do not proceed with work. Revise submittal in accordance with notations thereon, and resubmit without delay to obtain a different action marking. Do not allow submittals with the following marking (or unmarked submittals where a marking is required) to be used in connection with performance of the work:
“Revise and Resubmit”
 - 4. Returned for Non-Compliance: Do not proceed with work. Product submitted does not comply with Contract Documents. Resubmit for product complying with the requirements of the Contract Documents. Do not allow submittals with the following marking to be used in connection with performance of the work:
“Rejected”

SECTION 01 30 00

SUBMITTALS

3.6 RESUBMITTALS

- A. When the drawings and data are returned and marked "Revised and Resubmit" or "Rejected," the corrections shall be made as noted thereon and as instructed by the Engineer, and corrected copies shall be resubmitted in accordance with Paragraph 3.1.B of this Article. When corrected copies are resubmitted, the Contractor shall in writing direct specific attention to all revisions and shall list separately any revisions other than those called for by the Engineer on previous submittals. A marked copy of the original submittal shall also accompany the resubmittal.
1. Resubmittals shall be given an alphabetic suffix to the Section submittal number of the original submittal to indicate which resubmittal it is (i.e.; #a indicates first resubmittal, #b indicates second and so forth).
 2. Letter of Resubmittal: Contractor's letter of resubmittal shall list the date of his original submittal letter, the date of the Engineer's letter returning the submittal, and the dates of submission and return of any previous resubmittals.

END OF SECTION

SECTION 01 40 00
QUALITY CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. References and standards.
- C. Tolerances.
- D. Inspection and testing services.
- E. Testing by Contractor.
- F. Manufacturers' field services and reports.

1.2 RELATED SECTIONS

- A. General Provisions
- B. Section 01 30 00 - SUBMITTALS: Manufacturers' instructions and certificates.
- C. Section 01 60 00 - MATERIALS AND EQUIPMENT

1.3 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 fully with manufacturers' instructions, including each step-in sequence.
- C. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- D. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- E. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- F. Perform work by persons qualified to produce workmanship of specified quality.

SECTION 01 40 00
QUALITY CONTROL

- G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 REFERENCES AND STANDARDS

- A. Conform to reference standard by date of issue current on date for receiving bids, except where a specific date is established by code.
- B. 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.
- C. Should specified reference standards conflict with Contract Documents, request clarification from Owner before proceeding.

1.5 TOLERANCES

- A. Monitor fabrication and installation tolerance control of 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.

1.6 INSPECTION AND TESTING BY LABORATORY SERVICES

- A. Owner shall employ and pay for the services of an independent testing laboratory, to perform tests and inspections required by the Contract Documents.
- B. Independent testing laboratory shall:
 - 1) Perform inspections, tests, and other services specified in the individual specification sections and as required by Engineer.
 - 2) Perform inspecting, testing, and source quality control which may occur on or off project site, as required by the Specifications.
 - 3) Prepare and submit reports to the Owner, in duplicate indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents. Owner will forward copy of report(s) to Engineer.

- C. Contractor shall:

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QUALITY CONTROL

- 1) Coordinate with independent firm; furnish samples of materials; furnish design mix, equipment, tools, storage and assistance as requested.
 - 2) Notify Engineer and independent firm 24 hours prior to expected time for operations requiring services.
 - 3) Make arrangements with independent firm and pay for additional samples and tests required for Contractor's own use.
- D. Retesting required because of non-conformance to specified requirements shall be performed, on instructions by the Owner, by the same independent firm which performed the initial tests and inspections.
- E. Payment for retesting will be the Contractor's cost with no change in the contract price.

1.7 TESTING BY CONTRACTOR

- A. Contractor shall furnish required labor, facilities, tools, equipment, compressed air, water and electric power for tests, and:
- 1) Conduct hydrostatic and/or pressure tests on installed utilities, process piping, valves, air piping, tanks, structures, in accordance with individual Sections of the Specifications.
 - 2) Pay all costs associated with such tests.

1.8 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, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations, site conditions, or instructions given to applicators or installers, that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report in duplicate within 10 days of observation to Owner for review.

PART 2 - PRODUCTS

Not used.

SECTION 01 40 00
QUALITY CONTROL

PART 3 - EXECUTION
Not used.

END OF SECTION

SECTION 01 50 00
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities – electricity, water and sanitary facilities.
- B. Temporary Controls - enclosures and fencing, protection of the Work, water control and Pollution Controls.
- C. Construction Facilities - progress cleaning.

1.2 RELATED SECTIONS

- A. General Provisions
- B. Section 01 01 90 - CONTRACT CONSIDERATIONS
- C. Section 01 70 00 - CONTRACT CLOSEOUT: Final cleaning.

1.3 TEMPORARY ELECTRICITY

- A. Contractor shall provide and pay for temporary power service required from utility source. For its operations and those of other contractors, including equipment, etc.
- B. Electrical equipment or material shall be UL approved for the application for which it will be subjected.

1.4 TEMPORARY WATER

- A. Contractor shall provide and pay for temporary potable water service required from utility source. For its operations and those of other contractors, including equipment, etc.

1.5 TEMPORARY SANITARY FACILITIES

- A. Contractor shall provide and maintain required sanitary facilities and enclosures for use by all persons employed at the site. Provide at time of mobilization.
 - 1. At least one sanitary facility for each 20 workers if toilets of chemically treated type are used.

SECTION 01 50 00
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

- B. Contractor shall remove facilities from site at end of construction.
- C. Facilities shall be maintained in conformance with applicable State Regulations and Local ordinances.
- D. Contents shall be removed and disposed of in satisfactory manner as occasion requires.
- E. Contractor shall enforce sanitary regulations amongst employees and take precautions against infectious diseases as deemed necessary. Isolate infected employee(s) and arrange for immediate removal of such person(s) from site.

1.6 PROTECTION OF INSTALLED WORK

- A. Protect his installed Work from damage and deterioration due to floods, driving rain, wind, snow storms or freezing temperatures; provide special protection where specified in individual Specification Sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic over landscaped areas.
- G. Owner reserves right to order that additional protective measures be taken beyond those proposed by Contractor, to safeguard the Work.

1.7 SECURITY

- A. Provide facilities to protect the Work, including existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.8 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

SECTION 01 50 00
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

- B. Store unused tools and equipment at yard or base of operations.
- C. Keep paved surfaces clean of construction operations by regularly sweeping paved surfaces.

1.9 POLLUTION CONTROLS

- A. Erosion and Sediment Control
 - 1) Contractor shall plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas.
 - 2) Minimize amount of bare soil exposed at one time.
 - 3) Provide temporary measures such as berms, dikes, and drains, to regulate water flow and prevent soil erosion.
 - 4) Periodically inspect earthwork in disturbed areas to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- B. Noise Control
 - 1) All construction equipment and tools exhibiting potential noise nuisance shall be provided with noise muffling devices.
 - 2) Confine use of such equipment and tools between the hours of 7:30 a.m. and 5:00 p.m.
- C. Pollutants Control - Provide methods, means and facilities to prevent contamination of soil, water and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, controls, materials, immediately after Substantial Completion.
- B. Remove temporary devices in concert with completion of those segments of Work that no longer require such measures.
- C. Remove temporary underground installations to a minimum depth of 2 feet.
- D. Clean and repair damage caused by installation or use of temporary work.
- E. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

SECTION 01 50 00
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION

SECTION 01 56 40
EROSION CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Installation of sedimentation and erosion control barriers.
- B. Inspection of all erosion measures after each rainfall and at least daily during prolonged rainfall.
- C. Repairing immediately any failed sedimentation and erosion control barrier.
- D. Removing and disposing sediment deposits in a manner that does not result in additional erosion or pollution.
- E. Removal of sedimentation barriers after permanent stabilization and completion of construction.

1.2 RELATED SECTIONS

1.3 PERFORMANCE REQUIREMENTS

- A. Observe government policy established by United States Environmental Protection Agency (US EPA) Memorandum 78-1.
- B. Observe requirements set forth by the Federal Highway Administration Task Force 25.
- C. Conform all erosion and sedimentation control measures of the South Carolina Department of Health and Environmental Control and the conditions of the York County Environmental permit.
- D. Temporary erosion and sediment control measures shall be installed as the first step in construction and shall not be removed until permanent cover is completely established and stabilized.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Refer to the Drawings.

SECTION 01 56 40
EROSION CONTROL

- B. Geotextile fabrics used in the construction of silt fence shall resist deterioration from ultraviolet exposure. The fabric shall contain sufficient amounts of ultraviolet ray inhibitors and stabilizers to provide a minimum of 12 months of expected usable construction life at a temperature range of 0 to 120 degrees F.
- C. Erosion Control Fabric - North American Green Type S75 or equal shall be used.

2.2 PRODUCTS

- A. Sediment Barriers - Sediment barriers shall be stone, silt fences or other approved materials that will prevent migration of silts and sediment to receiving waters.
- B. Mulch and Seeding - Mulch and seeding shall be in accordance with the South Carolina ground cover requirements for Soil Erosion and Sediment Control.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. General drawings do not show all of the necessary control measures to prevent erosion and sedimentation.
 - 1) The Drawing(s) only show several techniques such as: silt fence details. There are a number of control techniques discussed in this Section.
 - 2) It is the Contractor's responsibility to design, implement and maintain erosion and sedimentation control measures which effectively prevent accelerated erosion and sedimentation.
 - 3) The erosion and sedimentation control measures described herein are interpreted as a general guide for the Contractor. It is the Contractor's responsibility to provide any and all work necessary to prevent erosion of soil from the construction site and to provide silt fences or other control measures as need arises during construction at no additional cost to the Owner.
- B. Earthmoving activities shall be conducted in such a manner as to prevent accelerated erosion and sedimentation.
- C. All erosion and sedimentation control measures shall be inspected by the Contractor daily and immediately after periods of rainfall.
 - 1) Repair and/or maintenance of sedimentation and erosion control measures will be made as soon as needed.

SECTION 01 56 40
EROSION CONTROL

- 2) The Contractor will be held responsible for the implementation and maintenance of all control measures on this site.
- D. Land disturbance shall be kept to a minimum.
 - 1) Restabilization will be scheduled immediately after any disturbance.
- E. Silt fence should be used with, caution in areas of rocky soils that may prevent trenching.
- F. Silt fence should be placed on or parallel to contours. Downslope from the silt fence should be undisturbed ground. Silt fences shall be installed along the toe of all critical cut and fill slopes.
- G. Design of silt fences must conform to that shown in the Contract Drawings.
- H. Erosion and sedimentation control measures will be installed prior to all construction activities.
- I. Sediment removal from control structures shall be the responsibility of the Contractor.
 - 1) Sediment shall be disposed of in a manner which is consistent with overall intent of plan and which does not result in additional erosion.
- J. The erosion and sedimentation control measures described herein are intended as a general guide for the Contractor
 - 1) It is the Contractor's responsibility to provide any and all work necessary to prevent erosion of soil from the construction site and to provide silt fences, hay bales or other control measures as the need arises during construction at no additional cost to the Owner.
- K. Remove all sedimentation and erosion control barriers after completion of construction and permanent stabilization of erosion.
- L. Failure to obtain required permits shall not be a basis for authorized delay or extra payment.
- M. The Contractor shall be responsible for the protection of all existing inlets from sediment runoff. Approved sediment control measures shall be utilized, as necessary, for all inlets in the vicinity of the proposed construction. The failure of plans to indicate required measures shall not relieve the Contractor of this responsibility. In the event sediment is carried into existing inlets, the Contractor shall be responsible for cleaning and restoring the entire drainage system affected at his own expense.
- N. In case of repeated failures on the part of the Contractor to control erosion or siltation, the Owner reserves the right to employ outside assistance or to use his own forces to

SECTION 01 56 40
EROSION CONTROL

provide the necessary corrective measures. Such incurred direct costs plus project engineering cost will be charged to the Contractor and appropriate deductions made from the Contractor's monthly invoice.

3.2 SEDIMENT BARRIERS

- A. Sediment barriers shall be used at storm drain inlets; across minor swales and ditches; and at other applications where the structure is of a temporary nature and structural strength is not required.
 - 1) Sediment barriers are temporary berms, diversions, or other barriers that are constructed to retain sediment on-site by retarding and filtering storm runoff.

3.3 MULCH

- A. Used alone or in conjunction with other structural or vegetative erosion control measure, mulch is applied on any disturbed area which is subject to erosion, for protection of disturbed soil or newly reseeded areas.

3.4 SPECIAL CONDITIONS

- A. Prohibited Construction Practices - Prohibited construction practices include but shall not be limited to the following:
 - 1) Dumping of spoil material into any stream corridor, any wetlands, any surface waters or at unspecified locations, even with permission of the property owner.
 - 2) Indiscriminate, arbitrary or capricious operation of equipment in any stream corridors, any wetlands or any surface waters.
 - 3) Pumping of silt-laden water from trenches or other excavations into any surface waters, any stream corridors or any wetlands.
 - 4) Damaging vegetation adjacent to or outside of the access road or the right-of-way.
 - 5) Disposal of trees, brush and other debris in any stream corridors, any wetlands, any surface water or at unspecified locations.
 - 6) Permanent or unspecified alteration of the flow line of the stream.
 - 7) Open burning of construction project debris.
- B. Defective Devices - Any erosion and sediment control devices which become damaged, clogged or otherwise non- functional shall be immediately replaced by the Contractor, without additional compensation.

SECTION 01 56 40
EROSION CONTROL

C. Adjustment

- 1) If the planned measures do not result in effective control of erosion and sediment runoff to the satisfaction of the regulatory agencies having jurisdiction over the project, the Contractor shall immediately adjust his program and/or institute additional measures so as to eliminate excessive erosion and sediment-runoff.
- 2) If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor.

END OF SECTION

SECTION 01 60 00
MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Substitutions.

1.2 RELATED SECTIONS

- A. General Provisions
- B. Section 01 40 00 - QUALITY CONTROL: Product quality monitoring.

1.3 PRODUCTS

- A. Products - Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. No product shall be unloaded, stored, or used at the site without approval of the shop drawing submittal by the Owner.

1.4 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of Products in accordance with construction progress schedules. Allow time for inspection prior to installation.
- B. Coordinate deliveries to avoid conflict with work, conditions at site, and availability of personnel and handling equipment.
- C. Transport Products by methods to avoid Product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry, with identifying labels intact and legible.

SECTION 01 60 00
MATERIAL AND EQUIPMENT

- D. Provide equipment and personnel to handle Products by methods to prevent soiling or damage. Protect sensitive equipment and finishes against impact, abrasion and other damage.
- E. Promptly inspect shipments to assure that Products comply with requirements, quantities are correct, and Products are undamaged.

1.5 STORAGE AND PROTECTION

- A. Store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive Products in weather-tight, climate-controlled enclosures in an environment favorable to Product.
- B. For exterior storage of fabricated Products, place on sloped supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of Products to permit access for inspection. Periodically inspect to assure Products are undamaged and are maintained in acceptable condition.

1.6 SUBSTITUTIONS

- A. Owner will consider requests for Substitute items after the Effective Date of the Owner-Contractor Agreement, and then only within the time constraints stipulated in the General Conditions.
- B. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor. Furnish evidence that Product is unavailable.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that the Contractor:
 - 1) Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

SECTION 01 60 00
MATERIAL AND EQUIPMENT

- 2) Will provide the same warranty for the Substitution as for the specified Product.
 - 3) Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4) Waives claims for additional costs or time extension which may subsequently become apparent.
 - 5) Will reimburse Owner the costs incurred by Owner for review and any subsequent redesign services by Engineer, including Engineer's revisions to the Contract Documents, and Engineer's assistance in connection with review by authorities when re-approval is required, if Engineer determines that the item of material or equipment proposed by Contractor is a substitute item.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or Product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure
- 1) Submit three copies for Substitution for consideration. Limit each request to one proposed Substitution.
 - 2) Submit shop drawings, Product data, and certified test results attesting to the proposed Product equivalence.
 - 3) The Owner will notify Contractor, in writing, of decision to accept or reject request.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 64 00
EQUIPMENT - GENERAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Performance affidavit.
- B. Shop drawings.
- C. Equipment design.
- D. Spare parts.
- E. Equipment identification.
- F. Anchors and supports.
- G. Shop tests.
- H. Installation of equipment.
- I. Field tests.
- J. Services of manufacturer's representative.
- K. Operation and maintenance instructions.
- L. Lubrication schedule.
- M. Failure of equipment to perform.
- N. Guarantee.
- O. Schedule of Equipment Testing and Manufacturer's Services.

1.2 PERFORMANCE AFFIDAVITS

- A. Provide performance affidavits for products listed in the Schedule of Equipment Testing and Manufacturer's Services, included at the end of this Section, and as required in the individual technical sections.
- B. Submit performance affidavits in conformance with Section 01 30 00.
- C. By these affidavits, each manufacturer must certify to the Contractor and the Owner, jointly, that he has examined the Contract Documents and that the equipment,

SECTION 01 64 00
EQUIPMENT - GENERAL

apparatus, process or system he offers to furnish will meet in every way the performance requirements set forth in the Contract Documents. Equipment design, manufacturing and assembly specifications are an integral part of the performance requirements.

- D. Shop drawings will not be reviewed prior to receipt by the Owner of an acceptable performance affidavit.
- E. The performance affidavit must be signed by an officer (vice president or higher) of the basic corporation, partnership or company manufacturing the equipment, and witnessed by a notary public.
- F. The performance affidavits shall be in the following format:

Addressed to: _____ (Contractor) _____ and _____ (Owner)

Reference: Contract No.

 (Project)

Text: “(manufacturer’s name) has examined the Contract Documents and verified that the _____ (product) _____ meets in every way the performance requirements and design specifications set forth in Section(s) _____ of the Contract Documents.”

Signature: Corporate officers shall be vice president or higher (unless statement authorizing signature is attached).

Notary: Signature(s) must be notarized.

1.3 SHOP DRAWINGS

- A. Provide shop drawing submittals as specified in Section 01 30 00.
- B. Shop drawing submittals shall include all descriptive data, performance characteristics, material specifications, spare parts list, drawings, piping diagrams, wiring schematics, and shall be complete and accurate to indicate item-by-item compliance with the Contract Documents.
- C. All catalog cuts, manufacturer’s specifications, drawings, and verbal descriptions shall be clearly marked to allow identification of the specific products used.
- D. If the submittal deviates from the requirements of the Specifications in any way, it shall be clearly marked in the submittal with the justifying reason stated for evaluation by the Owner.

SECTION 01 64 00
EQUIPMENT - GENERAL

- E. Electrical and control submittals shall include a verbal description of the functions, metering equipment, alarm points, alarm sequences, and any other specific features provided.
- F. All electrical equipment submittals shall be in accordance with applicable Specifications.

1.4 EQUIPMENT DESIGN

- A. Equipment and appurtenances shall be designed in conformity with ANSI, AWWA, ASME, IEEE, NEMA and other generally accepted applicable standards.
- B. Equipment and appurtenances shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, all conditions of operation, or as required by Specifications.
- C. All bearings and moving parts shall be adequately protected by bushings or other approved means against wear, and provision shall be made for adequate lubrication by readily accessible devices.
- D. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers, etc., shall be finished in appearance. All exposed welds on machinery shall be ground smooth and the corners of structural shapes shall be rounded or chamfered.
- E. Machinery parts shall conform within allowable tolerances to the dimensions shown on the working drawings. The corresponding parts of identical machines shall be made interchangeable.
- F. All machinery and equipment shall be safeguarded in accordance with the safety codes of the ANSI and OSHA and the State Industrial Code. All rotating shafts, couplings or other moving pieces of equipment shall be provided with suitable protective guards of sheet metal or wire mesh neatly and rigidly supported. Guards shall be removable as necessary to provide access for repairs.
- G. Details promoting maintenance, ease of replacing parts, and lubrication shall be a prime consideration in design.
- H. Products shall be designed for corrosion resistance and shall not be constructed of materials which may prohibit ease of maintenance due to corrosion. All fasteners on areas requiring access for maintenance and lubrication shall be Type 316 stainless steel unless otherwise specified. Zinc or cadmium plated fasteners for these areas shall not be used.

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EQUIPMENT - GENERAL

1.5 SPARE PARTS

- A. Provide spare parts as required by individual Specification Sections.
- B. Provide spare parts that are identical and interchangeable with original parts.
- C. For each part (or group of small parts), provide a tag which shall carry the following information: Identity of the equipment the part is for; identity or name of the part itself; date and manufacturer's name and identification number of the part.

1.6 EQUIPMENT IDENTIFICATION

- A. Each piece of equipment shall be provided with a substantial brass or stainless-steel nameplate, securely fastened in a conspicuous place and clearly inscribed with the manufacturer's name, year of manufacture, serial number and principal rating data.

1.7 ANCHORS AND SUPPORTS

- A. Obtain and install all necessary guides, bearing plates, anchor and attachment bolts, working drawings for installation, templates and all other appurtenances necessary for the installation of the equipment specified.
- B. Anchor bolts shall be of size and strength suitable for purpose intended and shall be in accordance with the individual specification sections.
- C. Pipe sleeves or other means of adjusting anchor bolts shall be provided where indicated or needed. Equipment shall be leveled by first using sitting nuts on the anchor bolts and then filling the space between the equipment base and concrete pedestal with grout. Where equipment bases (i.e., pumps) are installed with grout holes, subsequent to field testing, those bases shall be totally filled with grout.
- D. Provide grout as required.
- E. Provide concrete equipment pads or 4-inch high housekeeping pads for all mechanical, heating and ventilating, plumbing and electrical equipment. Coordinate with other contractors before pad placement to confirm dimensions, location and anchor requirements where not indicated on the Drawings.

1.8 SHOP TESTS

- A. Arrange shop tests of the equipment indicated in the Schedule of Equipment Testing and Manufacturer's Services and individual equipment specification sections.
- B. Arrange for the Owner to witness performance tests in the manufacturer's shop, if required by the individual specification section.

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EQUIPMENT - GENERAL

- C. Pump shop tests shall be conducted and reported in accordance with the Standards established by the Hydraulic Institute. Pump tolerances shall be within limits acceptable by these standards.
- D. Demonstrate by the tests that the equipment characteristics, including any specified pressure, duty, capacity, rating, efficiency, performance, function or other special requirements, comply fully with the requirements of the Contract Documents and that it will operate in the manner specified.
- E. Submit certified copies of the manufacturer's test data and interpreted results as required by Section 01 30 00.

1.9 INSTALLATION OF EQUIPMENT

- A. Install all equipment strictly in accordance with recommendations of the manufacturer.
- B. Submit all installation instructions as required by Section 01 30 00.
- C. Install pumps in accordance with Specifications
- D. Install equipment on the foundations as specified in this Section and at the locations and elevations shown on the Contract Drawings.

1.10 FIELD TESTS

- A. Perform field tests as specified in this Section and in the individual specification sections.
- B. Preliminary field tests - Furnish all labor, materials and instruments to perform all preliminary field tests of equipment. Make all changes, adjustments and replacements required to comply with the requirements of the Contract Documents. Demonstrate that:
 - 1) Equipment is installed in the location and orientation specified in Project Manual or shown on the Drawings.
 - 2) Equipment is prepared for operation in strict accordance with the Contract Documents and with manufacturer's recommendations.
- C. Final Acceptance Tests - Perform final tests prior to startup. Provide services of the manufacturer's representative if required by the Schedule of Equipment Testing and Manufacturer's Services. Furnish labor, fuel, lubricants, energy, water and all other materials, equipment and instruments necessary for all acceptance tests. Schedule final acceptance test to consist of the following checks as a minimum:
 - 1) That the equipment is properly lubricated, adjusted and aligned.

SECTION 01 64 00
EQUIPMENT - GENERAL

- 2) That the equipment meets the specified performance requirements in every detail and performs its intended function without any unusual vibration, noise or other signs of possible malfunction.
- 3) Where equipment is capable of operation in more than one mode or equipment performs more than one function, each operational mode or function shall be checked for proper performance.
- 4) All controls, both mechanical and electrical, shall be checked individually for proper connection and operation.
- 5) Perform motor field tests as specified in related Specification Sections.

1.11 SERVICE OF MANUFACTURER'S REPRESENTATIVE

- A. Arrange for the equipment manufacturer to furnish the services of a qualified representative. The time period for the supervision and instructions is stated in the Schedule of Equipment Testing and Manufacturer's Services. Where no specific duration of visit is listed, the length of time shall be such to allow the equipment representative ample time to follow the requirements outlined in this Section and the individual technical section covering the particular equipment item.
- B. The Contractor shall be responsible for any additional time required for the manufacturer's representative to resolve equipment installation and/or operation problems due to a lack of coordination between the supplied equipment and the Contract Documents such as, but not limited to, dimensions, electrical problems or performance.
- C. Arrange for the equipment representative to visit the plant on occasions after initial start-up and during the first year of operation if required by the individual Specification Sections. The purpose of these visits shall be to review equipment operation, assist the operators in correcting operational problems and basic inspection of the equipment.
- D. Installation Service - Certify installation, recommend or make adjustments and supervise field testing of equipment.
- E. Instructions - Instruct the Owner's operating personnel in operation and maintenance of equipment. A written report by the representative covering instructions given shall be sent to the Owner and Contractor.
- F. Certification of Equipment Compliance - Submit written certification jointly to the Owner and the Contractor that the equipment supplied or manufactured by their organization has been installed and tested to their satisfaction, and that all final adjustments thereto have been made. Certification shall include date of final acceptance field test, as well as a listing of all persons present during tests.

SECTION 01 64 00
EQUIPMENT - GENERAL

1.12 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Submit operation and maintenance instructions as required by the Schedule of Equipment Testing and Manufacturer's Services, including those instructions required by the applicable technical sections, in accordance with Section 01 30 00.
- B. The Operations and Maintenance manual shall also be provided in Adobe PDF format on CD/DVD. Provide 3 copies. The PDF files shall be organized in a similar format to the paper bound version of the manual as listed below.
- C. The manual shall include all Division 21, 22, 23, 25, 26, 27, 28, 33, 40, 41, 42, 43, 45, 48 equipment.
- D. Organize the instructions as follows:
- E. All instructions shall be bound into a series of identical heavy-duty, three-ring binders. Information shall be organized by section, each section covering a specific equipment item. Section shall be listed in a Table of Contents at the front of each volume. Each section shall contain the following as a minimum:
 - 1) Section Table of Contents.
 - 2) Written instructions, including technical bulletins and diagrams.
 - 3) Complete parts lists and parts diagrams for all equipment, including motors and drive units, showing manufacturer's identification numbers for each part.
 - 4) Copies of shop drawings, where required, to adequately describe interrelation of components within a system.
 - 5) Complete electrical and control schematics with labeled terminations.
 - 6) List of special tools required for operation and maintenance.
 - 7) List of spare parts supplied with the equipment, identified by manufacturer's part numbers.
 - 8) Source of replacement parts and address and telephone number of the manufacturer's service representative.

Separate sections shall be clearly marked with dividers. Folded drawings or small items shall be provided in heavy-duty, three-ring plastic pockets.

Information not applicable to a specific piece of equipment installed on this project shall be removed from or crossed off on the submission.

SECTION 01 64 00
EQUIPMENT - GENERAL

At the end of each section, the Contractor shall include a detailed maintenance and lubrication schedule for equipment covered in the section. Schedule shall include the following, as a minimum, for each equipment item:

- 1) List and frequency of maintenance activities, other than lubrication.
- 2) Lubrication frequency and application points.
- 3) Lubricant type (weight or grade and recommended manufacturers) and method of application.

Motors and drive units furnished as part of the equipment shall be included in the schedule. Schedule forms will be provided by the Owner.

1.13 FAILURE OF EQUIPMENT TO PERFORM

- A. Promptly correct by replacement or otherwise any defects in the equipment, or failure to meet the guarantees or performance requirements.
- B. If Contractor fails to make these correction, or if the improved equipment again fails to meet the guarantees or specified requirements, the Owner, notwithstanding his having made partial payment for work and materials which have entered into the manufacture of said equipment, may reject said equipment and order the Contractor to remove it from the premises at the Contractor's expense.

1.14 GUARANTEE

- A. Provide equipment guarantees in accordance with the General Conditions. Guarantee requirements may be added to or modified in the individual Specification Sections.
- B. By supplying a product under the contract, the manufacturer and Contractor jointly agree that all manufacturer's warranties, expressed or implied, pass through the Contractor to Owner. This warranty obligation starts on the date of the substantial completion and survives any inspection by, delivery to, acceptance by or payment by the Owner or Contractor for the goods furnished by the manufacturer. Further, this warrants that the equipment designed, manufactured and/or used meets all applicable federal, state and local laws, rules and regulations, including applicable OSHA standards. This requirement does not change or limit the requirements for performance affidavits.

SECTION 01 64 00
EQUIPMENT - GENERAL

PART 2 - PRODUCTS
Not used.

PART 3 - EXECUTION
Not used.

END OF SECTION

SECTION 01 70 00
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Warranties and bonds.
- G. Spare parts and maintenance materials.

1.2 RELATED SECTIONS

- A. General Provisions
- B. Section 01 00 00 - SUMMARY OF WORK
- C. Section 01 50 00 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS: Removal of Utilities, Facilities & Controls.
- D. Section 01 65 00 - STARTING OF SYSTEMS: System startup, testing, adjusting, and balancing.

1.3 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Owner's inspection.
- B. Correct or replace defective work.
- C. Provide submittals to Owner that are required by governing or other authorities and Contract Documents. Before the Certificate of Substantial Completion is issued, submit to the Owner the following:

SECTION 01 70 00

CONTRACT CLOSEOUT

- 1) Test results of project components.
 - 2) Performance affidavits for equipment.
 - 3) Certification of equipment or materials in compliance with Contract Documents.
- D. Conform to procedures established by Owner, in concert with requirements of General conditions and Supplementary Conditions, for final payment application, certificate of substantial completion, final inspection, release of liens, and other related documentations or conditions required by Contract Documents.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- C. Clean debris from roofs, gutters, downspouts, and drainage systems.
- D. Clean site; sweep paved areas, rake clean landscaped surfaces.
- E. Remove waste and surplus materials, rubbish, sheds, tools and construction facilities from the site.

1.5 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

- B. Maintain on site, one set of the following record documents; record actual revisions to the Work:
 - 1) Contract Drawings.
 - 2) Specifications.
 - 3) Addenda.
 - 4) Change orders and other modifications to the contract.
 - 5) Approved shop drawings, product data.

SECTION 01 70 00

CONTRACT CLOSEOUT

- C. Store Record Documents separate from documents used for construction.
- D. Record information concurrent with construction progress; make available for periodic examination by Owner.
- E. Ensure that entries are complete and accurate, enabling future reference by Owner.
- F. Contract Drawings and Shop Drawings - Legibly mark in red ink or pencil to show all changes in, or directly associated with, the work of this contract. Keep entire set of drawings current on day-to-day basis. Examples of types of changes which could occur and are to be recorded:
 - 1) Change in location or elevation of structures.
 - 2) Change in dimensions of structures.
 - 3) Elimination of structures.
 - 4) Unforeseen modifications to existing structures made necessary by work requirements.
 - 5) Relocation of equipment.
 - 6) Additions to or expansion of structures.
 - 7) Changes in mechanical trades components; (electrical, heating, ventilating, plumbing).
 - 8) Measured location of internal utilities or mechanical trade items, which are to be concealed from view, referenced to visible and accessible features of the structure.
 - 9) Change in location or elevations of underground utilities installed under this Contract (sewer, water, industrial process piping).
 - 10) Change in materials, such as pipe materials.
 - 11) Relocation of existing underground utilities made necessary because of interference with work under this contract.
 - 12) Change in topographical contours of finished earth and paved surfaces.
 - 13) Change in elevations of finished surfaces along route of installed underground utilities (sewer, water).

SECTION 01 70 00

CONTRACT CLOSEOUT

- G. Affix Contractor's identification stamp, together with the label "Record Documents," as follows:
 - 1) On each Contract Drawing, just above the Engineer's title block.
 - 2) On each shop drawing, just above the preparer's title block.
 - 3) On the front cover or front page of all other documents.
- H. Submit documents to Owner with final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

- A. Hard Copy
 - 1) Submit three sets prior to final inspection, bound in 8-1/2-inch by 11-inch text pages, three D-side ring capacity expansion binders with durable plastic covers.
 - 2) Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of project.
 - 3) Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
 - 4) Contents - Prepare a Table of Contents for each volume, with each Product or system description identified, type on 24-pound white paper.
 - 5) Part 1 - Project Number, Directory, listing names, addresses, and telephone numbers of Contractor, Subcontractors, and major equipment suppliers.
 - 6) Part 2 - Operation and maintenance instructions, arranged and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a) Significant design criteria.
 - b) List of equipment.
 - c) Parts list for each component.
 - d) Operating instructions.
 - e) Maintenance instructions for equipment and systems.

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- f) Maintenance instructions for finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
- g) List of spare parts, lubricants and other items delivered to Owner.
- h) Performance Curves.
- i) Troubleshooting guidelines.
- j) Assembling and disassembling diagrams and instructions.
- 7) Part 3 - Project documents and certificates, including the following:
 - a) Shop drawings and product data. Wiring diagrams
 - b) Air and water balance reports. Certificates.
 - c) Testing Results Photocopies of warranties.
- 8) Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with Owner comments. Revise content of documents as required prior to final submittal.
- 9) Submit final volumes revised, within 10 days after final inspection.
- 10) Provide folded drawings in a reinforced pocket.
- 11) Contractor shall provide three copies of the manual for review and comment with the project is 50-percent complete.
- 12) Contractor shall submit the final draft manual when project is 80-percent complete.
- 13) Contractor shall submit 10 copies of the final manual prior to the final acceptance inspection.

B. Electronic Version

- 1) In addition to the printed operations and maintenance materials specified above, the Contractor shall furnish all specified operations and maintenance materials in electronic format prior to Substantial Completion. Electronic equipment manual files shall be submitted in Adobe Acrobat Reader (.PDF) format.
- 2) Electronic files shall be submitted on one or more CDs or DVDs. Two sets of CDs/DVDs shall be provided, one for Owner and one for Engineer. CDs/DVDs

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and covers shall be labeled with the project name, supplier, equipment identification and specification section. CDs/DVDs shall be provided in individual hard plastic cases.

1.8 WARRANTIES AND BONDS

- A. Provide duplicate notarized copies of certifications for those items with extended transferable warranties beyond one year. Prepare separate submittal for each item.
- 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. Submit prior to final Application for Payment.
- E. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.9 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. Deliver to project site; obtain receipt prior to final payment.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 71 00
FINAL CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.
- B. Related Work: In addition to standards described in this Section comply with the requirements for cleaning as described in pertinent other Sections of these specifications.

1.2 QUALITY ASSURANCE

- A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of government agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.
- B. Use only cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

- A. General
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
 - 2. Do not allow accumulation of scraps, debris, waste material, and other items not required for construction of this work.
 - 3. At least once per day, and more often if necessary, completely remove all scraps, debris, and waste materials from the job site.
 - 4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection, and protection of the ecology.

SECTION 01 71 00
FINAL CLEANING

B. Site

1. Daily, and more often if necessary, inspect the site adjacent to the project and pick up all scraps, debris, and waste material created by the ongoing construction within the project structure. Remove such items to the place designated for their storage.
2. Maintain the site in a neat and orderly condition at all times.

C. Structures

1. Daily, and more, often if necessary, inspect the structure and pick up all scraps, debris and waste material. Remove such items to the place designated for their storage.
2. Daily, and more often if necessary, sweep interior spaces clean in the area of work.
 - a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by the use reasonable effort.
3. As required preparatory to installation of succeeding materials, clean the structure or pertinent portions thereof the degree of cleanliness recommended by the manufacturer of the seceding material, using equipment and materials required to achieve the necessary cleanliness.

3.2 FINAL CLEANING

A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scraps, debris, and waste. Conduct final progress cleaning as described in Article 3.1 above.

C. Site

1. Unless otherwise specifically directed by the Engineer broom clean paved areas on the site and public paved areas adjacent to the site. Maintain wash rack at construction entrance.
2. Completely remove resultant debris.

D. Structures

1. Exterior
 - a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed materials from adjacent surfaces.
 - c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.

SECTION 01 71 00
FINAL CLEANING

- d. In the event of stubborn stains not removable with water, the Engineer require light sand-blasting or other cleaning at no additional cost to the Owner.
- 2. Interior
 - a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed materials from adjacent surfaces.
 - c. Remove paint droppings, spots, stains, and dirt from all finished surfaces.

END OF SECTION

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 - GENERAL

- 1.1 Furnish all labor, materials, tools, equipment and services for all coordination and field engineering to meet all regulatory requirements in accordance with applicable codes and contract provisions.
- 1.2 Where work is not specifically indicated, the CONTRACTOR is to furnish and install all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure, and complete installation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DESCRIPTION

- A. Install work in such a manner and sequence as to preclude or minimize cutting and patching of new work.
 - 1. Execute cutting (including excavation) fitting or patching of work, required to:
 - a. Make several parts fit properly
 - b. Uncover work to provide for installation of ill-timed work
 - c. Remove and replace defective work
 - d. Remove and replace non-conforming work
 - e. Remove samples of installed work for testing
 - 2. In addition to contract requirements, upon written instructions of ENGINEER:
 - a. Uncover work to provide for ENGINEER's observation of covered work in accord with Contract Documents
 - b. Remove samples of installed materials for testing in accord with Contract Documents
 - c. Remove work to provide for alteration of work in place
 - 3. Do not endanger any work of other CONTRACTORS, by cutting, excavating, or otherwise altering any work except with written consent of ENGINEER.
 - 4. Do not cut into or cut away any structural concrete or other structural members, any other concrete or dig under any foundations or into walls or other parts, or in any case allow same to be done without full knowledge and written consent of ENGINEER.

SECTION 01 73 29
CUTTING AND PATCHING

The CONTRACTOR will be responsible for damage resulting from violation of these provisions.

5. Use only firms or individual trades qualified to perform work required under this Section.

3.2 SUBMITTALS

- A. Prior to cutting which affects structural safety of project or work of another CONTRACTOR, submit written notice to OWNER/ENGINEER, requesting consent to proceed with cutting, including:
 1. Identification of project
 2. Description of affected work
 3. Necessity for cutting
 4. Affect on other work, on structural integrity of project
 5. Description of proposed work. Designate:
 - a. Scope of cutting and patching.
 - b. CONTRACTOR and trades to execute work.
 - c. Products proposed to be used.
 - d. Extent of refinishing.
 6. Alternatives to cutting and patching
 7. Designation of party responsible for cost of cutting and patching
- B. Submit cost estimate prior to cutting and patching on instructions of OWNER/ENGINEER.
- C. Should conditions of work, or schedule, indicate change of materials or methods, submit written recommendation to OWNER/ENGINEER, including:
 1. Conditions indicating change.
 2. Recommendations for alternative materials or methods.
 3. Submittals as required for substitutions.

SECTION 01 73 29
CUTTING AND PATCHING

- D. Submit written notice to OWNER/ENGINEER designating time work will be uncovered or provide for observation.
- E. Shop drawings: Submit to OWNER/ENGINEER when items of matching and repairing require drawings for clarification of intent.

3.3 JOB CONDITIONS

- A. Perform preliminary investigations as required to ascertain extent of work. Conditions which would be apparent by such investigation will not be allowed as cause for claims for extra costs.
- B. Before start of work, obtain and pay for all permits required by all authorities having jurisdiction and notify the OWNER/ENGINEER and any applicable utilities companies.
- C. Obtain approval of authorities having jurisdiction for work which affects existing access to, or exit from, areas.
 - 1. Review with and obtain approval of authorities for any temporary construction which affects such areas.
 - 2. Obtain approval of fire authorities.

3.4 PAYMENT FOR COSTS

- A. Payment of costs caused by ill timed or defective work, or work not conforming to Contract Documents, will be by CONTRACTOR responsible for ill timed, rejected or non-conforming work.
- B. Cost for work done on instructions of OWNER/ENGINEER, other than defective or non-conforming work, will be paid by CONTRACTOR unless authorized in writing by the OWNER/ ENGINEER.

3.5 MATERIALS

- A. For patching of work provide matching items. Where applicable, comply with specifications for type of work to be done.

3.6 INSPECTION

- A. Inspect existing conditions of work, including elements subject to movement or damage during:
 - 1. Cutting and patching.

SECTION 01 73 29
CUTTING AND PATCHING

2. Excavating and backfilling.

B. After uncovering work, inspect conditions affecting installation of new products.

3.7 PREPARATION PRIOR TO CUTTING

Provide shoring, bracing and support as required to maintain structural integrity of project. Provide protection for other portions of project which may be affected.

3.8 CUTTING AND REMOVAL GENERAL

A. Execute fitting and adjustment to provide finished installation to comply with specified tolerances and finishes.

B. Execute cutting by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs to new work.

C. Perform backfilling as specified in applicable sections.

D. Neatly cut and remove materials, and prepare all openings to receive new work.

E. Remove masonry or concrete in small sections.

F. Provide shoring, bracing, and other supports to prevent movement, settlement or collapse of remaining or adjacent wall areas, structures, or facilities. Arrange shoring, bracing, and supports to prevent overloading of structure.

G. Take all precautions necessary to prevent damage to existing remaining work or to adjacent facilities. Execute work using methods which will prevent interference with use of remaining and adjacent facilities by OWNER.

H. Remove existing work indicated to be removed, or as necessary for installation of new work.

3.9 CUTTING IN CONCRETE CONSTRUCTION

A. Do not cut into or core drill any beams, joists and columns.

B. Do not install sleeves in beams, joists and columns without prior written approval of OWNER/ENGINEER. When written approval is obtained, also comply with any additional requirements and instructions of OWNER/ENGINEER.

SECTION 01 73 29
CUTTING AND PATCHING

- C. Where an opening larger than ten (10) inches in any dimension is required and is not shown on architectural or structural drawings, obtain prior written approval of OWNER/ENGINEER. When written approval is obtained, also comply with any additional requirements and instructions of OWNER/ENGINEER. CONTRACTOR is to arrange for, provide, and pay for any additional reinforcing required around such openings at no additional cost to the OWNER.

3.10 CUTTING IN STEEL FRAME AND METAL DECK CONSTRUCTION

- A. Do not cut nor drill holes in webs and flanges of columns, beams, purlins, and joists without prior written approval of the OWNER/ENGINEER. When such approval is obtained, comply with requirements and instructions of the OWNER/ENGINEER and provide reinforcing at such locations when required.
- B. When openings are cut into metal decks having cast-in-place concrete slab over the metal deck:
1. No reinforcing of holes is required for circular openings or sleeves up to six (6) inches diameter and for rectangular openings having no side dimension greater than six (6) inches.
 2. Reinforce openings greater than six (6) inches. Obtain prior written approval of OWNER/ENGINEER for openings not shown on architectural or structural drawings. Comply with any additional requirements and instructions of OWNER/ENGINEER.
- C. When openings are cut into metal roof decks that have no concrete cast-in-place (except lightweight insulating cementations roof fill) over the deck:
1. No reinforcing of holes is required for circular openings less than six (6) inches diameter and for rectangular openings having no side dimension greater than six (6) inches.
 2. Reinforce openings between six (6) inches and twelve (12) inches, with 20 gauge flat steel sheet twelve (12) inches greater in dimension than opening; fusion weld to top surface of deck at each corner and on each side midway between corners.
 3. Do not cut openings greater than twelve (12) inches without prior written approval of OWNER/ENGINEER. Comply with any additional requirements and instruction of OWNER/ENGINEER.

3.11 PATCHING STATE-OWNED FACILITIES

SECTION 01 73 29
CUTTING AND PATCHING

- A. State-owned structure, facilities, streets, curbs, walks, etc., that are damaged or removed due to required excavations or other construction work, shall be patched, repaired, or replaced, and left in their original state of repair by the General CONTRACTOR, to satisfaction of the OWNER/ENGINEER and of authorities having jurisdiction thereover. Any corrective work required by state or local authorities will be performed at no additional cost to the OWNER/ENGINEER.

3.12 CLEAN UP

- A. Remove all debris, rubbish, and materials resulting from cutting and patching operations. Transport materials and legally dispose of offsite.

END OF SECTION

SECTION 01 85 00
TEMPORARY BYPASS PUMPING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish all labor, materials, transportation, and equipment necessary to maintain sanitary sewer conveyance at all times throughout construction. The Contractor shall provide a bypass pumping system approved by the Engineer and Owner within existing sewer easement areas near the pump stations as necessary to construct the sanitary sewer as shown on the Drawings. Sanitary sewer service shall also be maintained at all times for all County sewer customers affected by the connection of the new sewer piping to the existing Pump Station influent sewer piping.
- B. The Contractor shall provide at least 72 hours (or three working days) notice to the Owner and the Engineer prior to beginning construction work that could impact sewer service to a customer. Such notice shall include the time, day and date of construction, emergency contact and length of time to complete the work and shall include a statement that “the Contractor has on-site all materials and equipment needed to complete the proposed work”. The existing pump stations shall not be taken out of service without the written prior approval of the Owner. The Contractor shall be fully responsible for control of all sanitary sewers directly or indirectly affected by the proposed construction, for any reason during the contract time including but not limited to, the construction, accidental surge, or rain.
- C. No overflow, overland flow or discharge from a sanitary sewer will be permitted. The Contractor shall be fully responsible for any sewage, fuel, etc. spill or overflow and shall have full responsibility for reporting the spill or overflow to the Owner and the Owner will report to the South Carolina Department of Health and Environmental Control (SCDHEC). The Contractor shall clean up and mitigate any spill to the satisfaction of the Owner and SCDHEC.

1.2 SUBMITTALS

- A. The Contractor shall submit a written description and drawings showing the methods and equipment to be used for sewage bypass pumping systems for approval prior to the start of work. The description and drawings must be approved by the Engineer and prior to obtaining components and implementation.

1.3 SEQUENCING AND SCHEDULING

- A. The Contractor shall assume total responsibility for sequencing and scheduling. Sequence and schedule work to maintain sewer service.

SECTION 01 85 00
TEMPORARY BYPASS PUMPING SYSTEM

PART 2 – PRODUCTS

2.1 Temporary bypass pumping equipment shall be by Godwin Pumps or approved equal.

PART 3 – EXECUTION

3.1 SANITARY SEWER BYPASSING WITH PUMP AND TEMPORARY PIPING

- A. The Contractor shall provide a bypass pumping system including sewage pumps, hose, piping, fittings, and accessories to continuously convey sewage flows as necessary to complete the proposed work shown on the plans. The pumping equipment shall be suitable for pumping raw unscreened sewage over an indefinite construction period without clogging or requiring shutdown for maintenance. The pumping equipment shall be sized to pump not less than 480 gpm unless otherwise approved by the Owner.
 - a. Provide continuous bypass pumping during the entire length of time that the existing sewer piping is modified until the connection to the new sewer is accomplished.
 - b. The Contractor shall provide at least one (1) additional backup pump on site.
 - c. Pumps shall be sound attenuated units, housed in special enclosures engineered to keep operating noise to a minimum including critical grade silenced mufflers and silenced priming exhausts to further reduce noise levels.
 - d. The complete bypass pumping system including pumps, piping and accessories shall be designed, furnished, supplied and maintained by Godwin Pumps of America, Inc. or approved equal.
 - e. The Contractor shall assume total responsibility for the hydraulic design of the bypass pumping arrangements.
 - f. The Contractor shall have qualified staff on-site employed at all times that the bypass pumping system is in operation 24 hours a day, seven days a week so that in the event of a problem appropriate corrective action can be immediately implemented to prevent a sewage overflow. The Contractor shall not leave the bypass pumping system unattended at any length of time for any reason while it is in operation.
 - g. The Contractor is responsible for any emergency repairs needed to keep the system in operation to prevent a sewage overflow and the Contractor shall prepare a written response plan indicating qualified staff from Godwin Pumps of America, Inc. or approved equal can arrive at the site and make necessary repairs to prevent sewage overflow.

SECTION 01 85 00
TEMPORARY BYPASS PUMPING SYSTEM

- h. The pumps and piping shall be tested with clean water and demonstrated to be watertight prior to bypassing sewage. The Contractor shall furnish and install rubber pipe plugs by Cherne or equal at manholes as necessary to isolate sewer segments and bypass flows.
- B. The Contractor shall not pump or otherwise direct the flow of sanitary sewage into storm sewers, streams or other open channels or onto streets or alleys at any time during the course of work. The Contractor shall furnish all labor, materials, and equipment required for storage/bypass of sewage flow around the working area to an acceptable point of discharge.
- C. The Contractor shall provide on-site an emergency bypass piping repair kit prior to bypassing flows. The 24-hour on-site staff shall be trained to immediately shut off the pumps and repair or replace the piping in the event of a piping failure to return the pumping equipment back into service prior to sewer manhole overflow.
- D. It is anticipated that the Contractor will be required to perform work continuously during the time when the existing sewer is out of service and temporary pumping is required, and the Contractor's lump sum bid shall include all overtime pay, lighting equipment, and other costs associated with nighttime work.

END OF SECTION

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified and required for demolition, removal, and disposal Work.
2. The Work under this Section includes, but is not necessarily limited to:
 - a. Demolition and removal of existing materials and equipment as shown or indicated in the Contract Documents. The Work includes demolition of piping, paving, curbs, sidewalks, gutters, fencing and similar existing facilities.
 - b. For pump station Work, this may also include demolition of structural concrete, foundations, walls, doors, windows, structural steel, metals, roofs, masonry, attachments, appurtenances, electrical and mechanical systems and equipment, demolition and removal of all Underground Facilities underneath, and above-grade piping and utilities in, the building(s) and structures shown or indicated for demolition, unless the Underground Facilities or above-grade facilities are shown or indicated as to remain.
3. Demolitions and removals specified under other Sections shall comply with requirements of this Section.
4. Perform demolition Work within areas shown or indicated.
5. Pay all costs associated with transporting and, as applicable, disposing of materials and equipment resulting from demolition.

B. Coordination:

1. Comply with Section 01 14 16, Coordination with Owner's Operations.
2. Review procedures under this and other Sections and coordinate the Work that will be performed with or before demolition and removals.

C. Related Sections:

1. Section 01 73 29, Cutting and Patching.
2. Section 31 11 00, Clearing and Grubbing.
3. Section 31 23 16.26, Rock Removal.

1.2 QUALITY ASSURANCE

A. Qualifications:

1. Electrical Removals: Entity and personnel performing electrical removals shall be electrician legally qualified to perform electrical construction and electrical work in the jurisdiction where the Site is located.
2. Plumbing Removals: Entity and personnel performing plumbing removals shall be plumber legally qualified to perform plumbing construction and plumbing work in the jurisdiction where the Site is located.

B. Regulatory Requirements:

1. Demolition, removal, and disposal Work shall be in accordance with 29 CFR 1926.850 through 29 CFR 1926.860 (Subpart T - Demolition), and all other Laws and Regulations.
2. Comply with requirements of authorities having jurisdiction.

1.3 SUBMITTALS

A. Informational Submittals: Submit the following:

1. Procedure Submittals:
 - a. Demolition and Removal Plan: Not less than ten days prior to starting demolition Work, submit acceptable plan for demolition and removal Work, including:
 - 1) Plan for coordinating shut-offs, capping, temporary services, and continuing utility services.
 - 2) Other proposed procedures as applicable.
 - 3) Equipment proposed for use in demolition operations.
 - 4) Recycling/disposal facility(ies) proposed, including facility owner, facility name, location, and processes. Include copy of appropriate permits and licenses, and compliance status.
 - 5) Planned demolition operating sequences.
 - 6) Detailed schedule of demolition Work in accordance with the accepted Process Schedule.
2. Qualifications Statements:
 - a. Name and qualifications of entity performing electrical removals, including copy of licenses required by authorities having jurisdiction.
 - b. Name and qualifications of entity performing plumbing removals, including copy of licenses required by authorities having jurisdiction.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PREPARATION

A. Protection of Surrounding Areas and Facilities:

1. Perform demolition and removal Work in manner that prevents damage and injury to property, structures, occupants, the public, and facilities. Do not interfere with use of, and free and safe access to and from, structures and properties.
2. Closing or obstructing of roads, drives, sidewalks, and passageways adjacent to the Work is not allowed unless indicated otherwise in the Contract Documents. Conduct the Work with minimum interference to vehicular and pedestrian traffic.
3. Provide temporary barriers, lighting, sidewalk sheds, and other necessary protection.
4. Repair damage to facilities that are to remain.

B. Existing Utilities: In addition to requirements of the General Conditions and Division 01 Specifications, do the following:

1. Should uncharted or incorrectly charted Underground Facilities be encountered, CONTRACTOR responsibilities shall be in accordance with the General Conditions. Cooperate with utility owners in keeping adjacent services and facilities in operation.
2. Sanitary Sewer: Before proceeding with demolition, locate and cap all sewer lines and service laterals discharging from the building or structure being demolished.
3. Storm Water: Existing storm water system shall remain in place until demolitions of existing building or structure is completed. Upon completing demolition, cut and cap storm sewer laterals at locations shown on the Drawings. Remove existing storm water piping and related structures between points of cutting, and backfill, restore to grade, and stabilize the area over the removed facilities.
4. Water Piping: Before proceeding with demolition, locate and cap all potable and non-potable waterlines and service laterals serving the building or structure being demolished.
5. Other Utilities: Before proceeding with demolition, locate and cap as required all other utilities, such as fuel and gas; heating, ventilating, and air conditioning; electric; and communications; and service laterals serving the building or structure being demolished.
6. Shutdown of utility services shall be coordinated by CONTRACTOR, assisted by OWNER as required relative to contacting utility owners.

C. Remediation:

1. Prior to performing demolition Work that disturbs Asbestos, remove and dispose of Asbestos in accordance with Section 01 74 19, Construction and Demolition Waste Management.
2. Prior to performing demolition Work involving lead-based paint, remediate lead in accordance with Section 01 74 19, Construction and Demolition Waste Management.

3.2 DEMOLITION – GENERAL

- A. Locate construction equipment used for demolition Work and remove demolished materials and equipment to avoid imposing excessive loading on adjacent facilities, and Underground Facilities.
- B. Pollution Controls:
 1. Use water sprinkling, temporary enclosures, and other suitable methods to limit emissions of dust and dirt to lowest practical level. Comply with Section 01 57 19, Temporary Environmental Controls, and Laws and Regulations.
 2. Do not use water when water may create hazardous or objectionable conditions such as icing, flooding, or pollution.
 3. Clean adjacent structures, facilities, properties, and improvements of dust, dirt, and debris caused by demolition Work, in accordance with the General Conditions.
- C. Comply with Section 01 73 29, Cutting and Patching.
- D. Building or Structure Demolition:
 1. Unless otherwise approved by ENGINEER, proceed with demolition from top of building or structure to the ground. Complete demolition Work above each floor or tier before disturbing supporting members of lower levels.
 2. Demolish concrete and masonry in small sections.
 3. Remove structural framing members and lower to ground using hoists, cranes, or other suitable methods. Do not throw or drop to the ground.

4. Break up and remove foundations and slabs-on-grade unless otherwise shown or indicated as remaining in place.
- E. Demolition of Site Improvements:
1. Pavement, Sidewalks, Curbs, and Gutters: Demolition of asphalt or concrete pavement, sidewalks, curbs, and gutters, as applicable, shall terminate at cut edges. Edges shall be linear and have a vertical cut face.
 2. Fencing, Guardrails, and Bollards: Remove to the limits shown or indicated on the Drawings. Completely remove below-grade posts and concrete.
 3. Manholes, Vaults, Chambers, and Handholes: Remove to the limits shown or indicated on the Drawings and in accordance with Part 3 of this Section.
 4. Underground Facilities Other than Manholes, Vaults, Chambers, and Handholes: Remove to the extent shown or indicated on the Drawings. Unless otherwise shown or indicated, cap ends of piping to remain in place in accordance with the "Mechanical Removals" Article in this Section.
 5. Landscaping: Comply with Section 31 11 00, Clearing and Grubbing.
- F. Salvage and Ownership:
1. Refer to Section 01 11 13, Summary of Work, for requirements on salvage, ownership, and handling of equipment and materials removed during demolition and removal Work.
 2. Materials and equipment to remain OWNER's property shall be carefully removed and appropriately handled by CONTRACTOR to avoid damage and invalidation of warranties in effect, and shall be cleaned and stored at the Site (or other site specified in the Contract Documents) at place designated by ENGINEER or OWNER.
- G. Finishing of Surfaces Exposed by Removals: Unless otherwise shown or indicated in the Contract Documents, surfaces exposed by removals, and that will remain as finished surfaces, shall be repaired and re-finished with materials that match existing adjacent surface, or as otherwise approved by ENGINEER.

3.3 ABANDONMENT OF EXISTING MANHOLES

- A. Plug both influent and effluent lines inside the manhole with watertight masonry.
- B. Fill manhole with non-compressible material (#67 stone or as approved), to a point three feet (3'-0") below the finish grade.
- C. Remove remainder of manhole.
- D. Fill excavation to finish grade with suitable soil compact in place.

3.4 ABANDONMENT OF MAINS AT MANHOLES WHICH REMAIN IN SERVICE

- A. Completely disconnect main to be abandoned from the manhole by cutting the pipe outside the manhole and then plugging the abandoned main and the manhole wall with watertight masonry.
- B. Rebuild the invert to conform with the standard details.

3.5 ABANDONMENT OF EXPOSED PIPE

- A. Remove exposed sections of abandoned mains to a point not less than 5 feet into the adjacent banks.
- B. Plug the remaining ends of the pipe with watertight masonry.
- C. Remove completely concrete piers and collars in the creek channel.
- D. Remove concrete piers, steel piers and collars not located in the creek channel to a point three feet (3'-0") below the finish grade.

3.6 ABANDONMENT OF EXISTING PUMP STATIONS

- A. Salvage and transport pumps, motors, controls, etc. to the sewer maintenance yard in New Heritage.
- B. Plug all influent and effluent pipes with watertight masonry.
- C. Fill the pipe chamber and wetwell (if abandoned) with noncompressible material (#67 stone or as approved), to a point three feet (3'-0") below the finish grade.
- D. Remove the remainder of the structure and fill the excavation to finish grade with suitable soil compacted in place.
- E. Remove all above ground structures associated with the pump station, including fencing and the access road, and restore the area.

3.7 STRUCTURAL REMOVALS

- A. Remove structures to lines and grades shown or indicated, unless otherwise directed by ENGINEER. Where limits are not shown or indicated, limits shall be four inches outside item to be installed. Removals beyond limits shown or indicated shall be at CONTRACTOR's expense and such excess removals shall be reconstructed to satisfaction of ENGINEER without additional cost to OWNER.
- B. Recycling and Reuse of Demolition Materials:
 - 1. All concrete, brick, tile, masonry, roofing materials, reinforcing steel, structural metals, miscellaneous metals, plaster, wire mesh, and other items contained in or upon building or structure to be demolished shall be removed, transported, and disposed of away from the Site, unless otherwise approved by ENGINEER.
 - 2. Do not use demolished materials as fill or backfill adjacent to structures, in pipeline trenches, or as subbase under structures or pavement.
- C. After removing concrete and masonry walls or portions thereof, slabs, and similar construction that ties into the Work or to existing construction, neatly repair the junction point to leave exposed only finished edges and finished surfaces.
- D. Where equipment or material anchored to concrete or masonry are removed and anchors are not to be re-used, remove the anchors to not less than 1.5 inches beneath surface of concrete or masonry member. Repair the resulting hole, using repair mortar for concrete and grout for masonry, to be flush with the surface. Alternately, when the anchor is stainless

steel, the anchor may be cut flush with the surface of the concrete or masonry, when so approved by ENGINEER.

- E. Where anchoring materials, including bolts, nuts, hangers, welds, and reinforcing steel, are required to attach the Work to existing construction, provide such materials under this Section, unless specified elsewhere in the Contract Documents.

3.8 MECHANICAL REMOVALS

- A. Mechanical demolition and removal Work includes dismantling and removing existing piping, ductwork, pumps, equipment, tanks, and appurtenances as shown, indicated, and required for completion of the Work. Mechanical removals include cutting and capping as required, except that cutting of existing piping and ductwork to make connections is included under Section 01 14 16, Coordination with Owner's Operations; Section 01 73 29, Cutting and Patching; and applicable Sections of Division 40, Process Integration.
- B. Demolition and Removals of Piping, Ductwork, and Similar Items:
 - 1. Purge piping and tanks (as applicable) of chemicals or fuel (as applicable) and make safe for removal and capping. Remove to the extent shown or indicated existing process, water, waste and vent, chemical, gas, fuel, and other piping. Remove piping to the nearest solid piping support, and provide caps on ends of remaining piping. Where piping to be demolished passes through existing walls to remain, cut off and cap pipe on each side of the wall.
 - 2. Caps, Closures, Blind Flanges, and Plugs:
 - a. Provide closure pieces, such as blind flanges and caps, where shown or required to complete the Work.
 - b. Where used in this Section, the term "cap" means the appropriate type closure for the piping or ductwork being closed, including caps, blind flanges, and other closures.
 - c. Caps shall be compatible with the piping or ductwork to which the cap is attached, fluid-tight and gastight, and appropriate for the fluid or gas conveyed in the pipe or duct.
 - d. Unless otherwise shown or indicated, caps shall be mechanically fastened, fused, or welded to pipe or duct. Plug piping with means other than specified in this Section only when so shown or indicated in the Contractor Documents or when allowed by ENGINEER.
 - 3. When Underground Facilities are altered or removed, properly cut and cap piping left in place, unless otherwise shown or indicated.
 - 4. Remove waste and vent piping, and ductwork to extent shown and cap as required. Where demolished vent piping, stacks, and ductwork passes through existing roofing, patch the roof with the same or similar materials. Completed patch shall be watertight and comply with roofing manufacturer's recommendations.
 - 5. Modifications to potable water piping and other plumbing and heating system work shall comply with Laws and Regulations. All portions of potable water system that have been modified or opened shall be hydrostatically tested and disinfected in accordance with the Contract Documents, and Laws and Regulations. Hydrostatically test other, normally-pressurized, plumbing piping and heating piping.
- C. Equipment Demolition and Removals:

1. To the extent shown or indicated, remove existing process equipment; pumps; storage tanks; hoisting and conveying equipment; heating, ventilating, and air conditioning equipment; generators; and other equipment.
2. Where required, disassemble equipment to avoid imposing excessive loading on supporting walls, floors, framing, facilities, and Underground Facilities. Disassemble equipment as required for access through and egress from building or structure. Disassembly shall comply with Laws and Regulations. Provide required means to remove equipment from building or structure.
3. Remove control panels, operator stations, and instruments associated with equipment being removed, unless shown or indicated otherwise.
4. Remove fuel appurtenances as applicable, including fuel storage tanks. Dispose of tank contents in accordance with Laws and Regulations.
5. Remove equipment supports as applicable, anchorages, base, grout, and piping. Remove anchorage systems in accordance with the "Structural Removals" Article in this Section. Remove small-diameter piping back to header unless otherwise indicated.
6. Remove access platforms, ladders, and stairs related to equipment being removed, unless otherwise shown or indicated.
7. Equipment Salvage: The following entities may be interested in salvaging equipment to be removed under the Contract:
 - a. Project Development Services, The Woodlands, Texas.

3.9 ELECTRICAL REMOVALS

- A. Electrical demolition Work includes removing existing transformers, distribution switchboards, control panels, motors, starters, conduit and raceways, cabling, poles and overhead cabling, panelboards, lighting fixtures, switches, and miscellaneous electrical equipment, as shown, specified, or required.
- B. Remove existing electrical equipment and fixtures to avoid damaging systems to remain, to keep existing systems in operation, and to maintain integrity of grounding systems.
- C. Remove or modify motor control centers and switchgear as shown or indicated. Modified openings shall be cut square and dressed smooth to dimensions required for installation of equipment.
- D. Disconnect and remove motors, control panels, and other electrical gear where shown or indicated. Motors, microprocessors and electronics, other electrical gear to be reused shall be stored in accordance with Section 01 66 00, Product Storage and Handling Requirements.
- E. Cables in conduits to be removed shall be removed back to the power source or control panel, unless otherwise shown or indicated. Verify the function of each cable before disconnecting and removing.
- F. Conduits, raceways, and cabling shall be removed where shown or indicated. Abandoned conduits concealed in floor, ceiling slabs, or in walls shall be cut flush with the slab or wall (as applicable) at point of entrance, suitably capped, and the area repaired in a flush, smooth manner acceptable to ENGINEER. Exposed conduits, junction boxes, other electrical appurtenances, and their supports shall be disassembled and removed. Repair all areas of the Work to prevent rusting on exposed surfaces.

- G. Conduits in Underground Facilities not scheduled for reuse shall be suitably capped watertight where each enters building or structure to remain.
- H. Where shown or indicated, remove direct burial cable. Openings in buildings for entrance of direct burial cable shall be patched with repair mortar or other material approved by ENGINEER for this purpose and made watertight.
- I. Existing poles and overhead cables shall be removed or abandoned as shown and specified. Existing substation(s) and poles owned by electric utility will be removed by the electric utility. Completely remove from the Site poles not owned by electric utility and shown or indicated for removal. Make necessary arrangements with electric utility for removal of utility company's transformers and metering equipment after new electrical system has been installed and energized.
- J. Lighting fixtures, wall switches, receptacles, starters, and other miscellaneous electrical equipment, not designated as remaining as OWNER's property, shall be removed and properly disposed off-Site as required.

3.10 DISPOSAL OF DEMOLITION DEBRIS

- A. Remove from the Site all debris, waste, rubbish, and material resulting from demolition operations and equipment used in demolition Work. Comply with the General Conditions and Section 01 74 19, Construction and Demolition Waste Management.
- B. Transportation and Disposal:
 - 1. Non-hazardous Material: Properly transport and dispose of non-hazardous demolition debris at appropriate landfill or other suitable location, in accordance with Laws and Regulations. Non-hazardous material does not contain Asbestos, PCBs, Petroleum, Hazardous Waste, Radioactive Material, or other material designated as hazardous in Laws and Regulations.
 - 2. Hazardous Material: When handling and disposal of hazardous materials is included in the Work, properly transport and dispose of hazardous materials in accordance with the Contract Documents and Laws and Regulations.
- C. Submit to ENGINEER information required in this Section on proposed facility(ies) where demolition material will be recycled. Upon request, ENGINEER or OWNER, shall be allowed to visit recycling facility(ies) to verify adequacy and compliance status. During such visits, recycling facility operator shall cooperate and assist ENGINEER and OWNER.

END OF SECTION

SECTION 02 80 00
DEMOLITION OF EXISTING PUMP STATIONS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This section includes provisions for demolition, dismantling, modification, removal, and disposal of four (4) existing pump stations (Stockbridge Commons, Hawks Creek, Brook Springs, and Palmetto West) as shown on the plans and described herein. The pump stations shall remain in service until the new sewers and pump station are accepted as ready to receive sewage by the Owner.
- B. The Contractor shall include all costs for transporting of these items and related construction debris in the lump sum bid including the costs associated with dismantling equipment, loading onto trucks, transportation and unloading and disposal. Prior to the start of demolition the Owner shall identify any equipment or other items to be salvaged and the Contractor shall transport these materials at no additional cost to the Owner.
- C. The entire existing above and below ground structures shall be removed. The pump station site shall be rendered permanently safe environmentally, structurally and physically. Decommissioning shall include, but shall not be limited to:
 - 1. Termination of existing electric supply and disconnection from electric supply system at source tie-in point.
 - 2. Removal of interior pumps, piping, control panels, electrical and accessories.
 - 3. Removing the underground structure.
 - 4. Removing and disposing of above grade control boxes and control enclosures and associated support systems.
 - 5. Backfilling compacted area to surrounding grade with soil, spreading topsoil and establishing grass growth.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 SECURITY

- A. During the construction of the improvements, the existing pump station shall remain secure and safe from unauthorized entry. The Owner shall have access to the pump station at all times while it is in operation.

3.2 PROTECTION TO PERSONS AND PROPERTY

- A. Protection to persons and property shall be provided throughout the progress of the work. The work shall proceed in such manner as to minimize the spread of dust and flying particles and to provide safe working conditions for personnel.

SECTION 02 80 00
DEMOLITION OF EXISTING PUMP STATIONS

3.3 COVERS FOR OPENINGS

- A. Holes and other hazardous openings, resulting from dismantling and demolition operations shall be adequately covered with steel plates or other approved covers when work is not in progress.

3.4 CLEANUP

- A. Maintain premises and public properties free from accumulation of waste, debris, and rubbish, caused by operations. Cleanup, acceptable to the Owner, is required on a daily basis.
- B. At completion of work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for Owner's use.
- C. Store volatile waste in covered metal containers and remove from premise daily. Prevent accumulation of wastes which create hazardous conditions. Provide adequate ventilation during use of volatile or noxious substances.
- D. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on the project site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains, streams or waterways.
 - 3. Do not dispose of wastes of any description into streams or waterways.
- E. Provide on-site dump containers for collection of waste materials, debris and rubbish or remove off-site.
- F. Remove waste materials, equipment, debris and rubbish from site and legally dispose of at public or private dumping areas.

END OF SECTION

SECTION 02 85 00
MAINTENANCE OF EXISTING SURFACES

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances and materials; and in performing all operations in connection with the removal, restoration and maintenance of the existing surface area during all phases of construction, complete and in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the contract.
- B. Unless specified or directed otherwise, all property and structures within the limits of work shall be cleaned up and restored to a condition of at least equal to that existing prior to construction and to the satisfaction of the Owner and Engineer. All property and structures outside the limits of work and items within the limits of work which are not to be disturbed shall be adequately protected to prevent damage during construction. Any damage resulting from construction shall be repaired by the Contractor at his own expense.

1.2 PROTECTION OF EXISTING SURFACE

- A. Power and Telephone Poles and Wires
 - 1. Protection measures shall include, but not be limited to guying and bracing as required.
 - 2. Relocations, which in the opinion of the engineer are necessary after excavation has begun or is completed, will be performed by the owning utility. All costs shall be paid by the contractor.
 - 3. Damage to poles and wires will be repaired by the owning utility at the contractor's expense.
 - 4. When an accidentally damaged utility is considered, in the opinion of the owning utility, of an importance to require 24 hours per day work, provide necessary labor and equipment as required by these contract documents at no additional expense to the owner.
- B. Trees, Shrubs and Sod
 - 1. Protect trees, shrubs, sod and other vegetation by conducting construction operations with care.

SECTION 02 85 00
MAINTENANCE OF EXISTING SURFACES

2. Trim or prune trees to obtain working space in lieu of complete removal when possible. Work shall be done by experienced personnel in accordance with good horticultural practice, and in a manner to preserve natural shape and character. Treat cuts with an approved tree paint.
3. Protect trees and shrubs against damage to trunks from operation of heavy equipment during trimming and pruning operation and from stored or stockpiled materials.
4. Remove damaged items when survival appears doubtful and replace in kind.
5. Remove, protect, store and replace the trees indicated on the plan sheets.
6. The Contractor is responsible for replacing protected or stored trees indicated on the plans if they do not survive a one year warranty period.

C. Storm Sewers, Water Mains and Underground Pipes and Structures

1. All known storm sewers, water mains and underground pipes shown on the drawings are from available records and must be considered approximate and shall be protected by all reasonable measures.
2. Necessary removal and replacement or relocation will be performed at the contractor's expense. Replacement will be with new materials.
3. Repair or replace all damaged pipe and structures as directed by the Owner.

D. Underground Cables

1. Underground power, telephone and other cable shall be protected with all reasonable measures.
2. Accidental damage will be repaired by the owning utility or the contractor, at contractor's expense.
3. The owning utility may, at their option, provide protective measures for their respective ducts and cables during any part of the construction operation.
4. Ducts and cables that conflict, in the opinion of the owner, will be relocated by the owning utility. The Contractor shall pay all costs thereof.

SECTION 02 85 00
MAINTENANCE OF EXISTING SURFACES

1.3. METHODS OF RESTORATION

A. Miscellaneous Structures

1. Restore all driveways, sidewalks, curbs and any other structures damaged during construction operation to their original condition.
2. Replace with new materials where necessary.

1.4 CLEANUP AND RESTORATION

- A. Return construction area to a condition at least equal to its condition before start of the work as directed by the Engineer.

END OF SECTION

SECTION 03 00 05

CONCRETE

PART 1 GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install concrete, reinforcing, and related materials.
 - 2. The Work includes:
 - a. Providing concrete consisting of portland cement, fine and coarse aggregates, water, and approved admixtures; combined, mixed, transported, placed, finished, and cured.
 - b. Fabricating and placing reinforcing, including ties and supports.
 - c. Design, erection, and removal of formwork.
 - d. Building into the concrete all sleeves, frames, anchorage devices, inserts, and other items required to be embedded in concrete.
- B. Coordination:
 - 1. Review installation procedures under other Sections and coordinate installation of items to be installed in the concrete Work.
- C. Classifications of Concrete:
 - 1. Class "A" concrete shall be steel-reinforced and includes all concrete unless otherwise shown or indicated, and includes the following:
 - a. Structural concrete for load bearing walls.
 - b. Columns.
 - c. Beams.
 - d. Elevated floor slabs.
 - e. Unlined or uncoated water/liquid containment structures.
 - 2. Class "B" concrete shall be placed without forms or with simple forms, with little or no reinforcing and includes the following:
 - a. Concrete fill.
 - b. Duct banks.
 - c. Unreinforced encasements.
 - d. Curbs and gutters.
 - e. Sidewalks.
 - f. Thrust blocks.

1.2 REFERENCES

- A. Standards referenced in this Section are:
 - 1. ACI 224R, Control of Cracking in Concrete Structures.
 - 2. ACI 301, Specifications for Structural Concrete for Buildings.
 - 3. ACI 304R, Guide for Measuring, Mixing, Transporting and Placing Concrete.
 - 4. ACI 305R, Specification for Hot Weather Concreting.
 - 5. ACI 306R, Cold Weather Concreting.
 - 6. ACI 309R, Guide for Consolidation of Concrete.
 - 7. ACI 318, Building Code Requirements for Structural Concrete and Commentary.

8. ACI 347, Guide to Formwork for Concrete.
9. ACI SP-66, ACI Detailing Manual.
10. ASTM A82/A82M, Specification for Steel Wire, Plain, for Concrete Reinforcement.
11. ASTM A185/A185M, Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
12. ASTM A615/A615M, Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
13. ASTM C31/C31M, Practice for Making and Curing Concrete Test Specimens in the Field.
14. ASTM C33/C33M, Specification for Concrete Aggregates.
15. ASTM C39/C39M, Test Method for Compressive Strength of Cylindrical Concrete Specimens.
16. ASTM C42/C42M, Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
17. ASTM C94/C94M, Specification for Ready-Mixed Concrete.
18. ASTM C138/C138M, Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
19. ASTM C143/C143M, Test Method for Slump of Hydraulic-Cement Concrete.
20. ASTM C150/C150M, Specification for Portland Cement.
21. ASTM C172, Practice for Sampling Freshly Mixed Concrete.
22. ASTM C231, Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
23. ASTM C260, Specification for Air-Entraining Admixtures for Concrete.
24. ASTM C309, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
25. ASTM C494/C494M, Specification for Chemical Admixtures for Concrete.
26. ASTM C579, Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
27. ASTM C881/C881M, Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
28. ASTM C1064/C1064M, Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
29. ASTM D1752, Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
30. ASTM E96/E96M, Test Methods for Water Vapor Transmission of Materials
31. ASTM E154, Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
32. CRD-C 572, U. S. Army Corps of Engineers Specification for Polyvinylchloride Waterstops.
33. CRSI 1MSP, Manual of Standard Practice.

1.3 QUALITY ASSURANCE

A. Laboratory Trial Batch:

1. Employ independent testing laboratory currently certified by the Cement and Concrete Reference Laboratory and experienced in design and testing of concrete materials and mixes to perform material evaluation tests and to design concrete mixes.
2. Each concrete mix design specified shall be verified by laboratory trial batch, unless indicated otherwise.
3. Laboratory personnel shall be ACI-certified.
4. Perform the following testing on each trial batch:
 - a. Aggregate gradation for fine and coarse aggregates.
 - b. Slump.
 - c. Air content.

- d. Compressive strength based on three cylinders each tested at seven days and at 28 days.
- 5. Submit for each trial batch the following information:
 - a. Project identification name and number (if applicable).
 - b. Date of test report.
 - c. Complete identification of aggregate source of supply.
 - d. Tests of aggregates for compliance with the Contract Documents.
 - e. Scale weight of each aggregate.
 - f. Absorbed water in each aggregate.
 - g. Brand, type, and composition of cementitious materials.
 - h. Brand, type, and amount of each admixture.
 - i. Amounts of water used in trial mixes.
 - j. Proportions of each material per cubic yard.
 - k. Gross weight and yield per cubic yard of trial mixtures.
 - l. Measured slump.
 - m. Measured air content.
 - n. Compressive strength developed at seven days and 28 days, from not less than three test cylinders cast for each seven day and 28-day test, and for each design mix.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Shop Drawings:
 - a. List of concrete materials and concrete mix designs proposed for use. Include results of tests performed to qualify the materials and to establish the mix designs. Do not start laboratory trial batch testing until this submittal is approved by ENGINEER.
 - b. Laboratory Trial Batch Reports: Submit laboratory test reports for concrete cylinders, materials, and mix design tests.
 - c. Concrete placement drawings showing the location and type of all joints.
 - d. Drawings for fabricating, bending, and placing concrete reinforcing. Comply with ACI SP-66. For walls and masonry construction, provide elevations to a minimum scale of 1/4-inch to one foot. Show bar schedules, stirrup spacing, adhesive dowels, splice lengths, diagrams of bent bars, arrangements, and assemblies, as required for fabricating and placing concrete reinforcing.
 - 2. Product Data:
 - a. Manufacturer's specifications with application and installation instructions for proprietary materials and items, including admixtures and bonding agents.
 - 3. Samples:
 - a. Samples: Submit samples of materials as specified and as otherwise requested by ENGINEER, including names, sources, and descriptions.
- B. Informational Submittals: Submit the following:
 - 1. Site Quality Control Submittals:
 - a. Report of testing results for testing of field concrete cylinders for each required time period. Submit within 24 hours after completion of associated test. Test report shall include results of all testing required at time of sampling.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Transportation, Delivery, and Handling:

1. Deliver concrete reinforcing products to Site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings on approved Shop Drawings.
 2. Materials used for concrete shall be clean and free from foreign matter during transportation and handling, and kept separate until measured and placed into concrete mixer.
 3. Implement suitable measures during hauling, piling, and handling to ensure that segregation of coarse and fine aggregate particles does not occur and grading is not affected.
 4. Deliver grout materials from manufacturers in unopened containers that bear intact manufacturer labeling.
 5. Comply with Section 01 65 00, Product Delivery Requirements.
- B. Storage:
1. Store formwork materials above ground on framework or blocking. Cover wood for forms and other accessory materials with protective, waterproof covering. Provide for adequate air circulation or ventilation under cover.
 2. Store concrete reinforcing materials to prevent damage and accumulation of dirt and excessive rust. Store on heavy wood blocking so that reinforcing does not come into contact with the ground. Space framework or blocking supports to prevent excessive deformation of stored materials.
 3. Store concrete joint materials on platforms or in enclosures or covered to prevent contact with ground and exposure to weather and direct sunlight.
 4. For storage of concrete materials, provide bins or platforms with hard, clean surfaces.
 5. Comply with Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

- A. Portland Cement: Provide the type of cement required by the environmental conditions and exposures defined by ASTM C150/C150M:
1. Type I/ Type IA: Normal/ Normal, air-entraining.
 2. Type II/ Type IIA: Moderate sulfate resistance/ Moderate sulfate resistance, air-entraining.
- B. Aggregates: ASTM C33/C33M.
1. Fine Aggregate: Clean, sharp, natural sand, manufactured sand or a combination thereof free of loam, clay, lumps, and other deleterious substances. Dune sand and bank run sand are unacceptable.
 - a. Shall conform to the sieve analysis in accordance with ACI Standards with the following exceptions:
 - 1) The percent passing a No. 50 sieve shall not exceed 6%.
 - 2) The percent passing a No. 100 sieve shall be 0%.
 2. Coarse Aggregate:
 - a. Clean, uncoated, processed, uniformly and evenly graded aggregate containing no clay, mud, loam, or foreign matter.
 - b. Coarse aggregate shall comply with the following:
 - 1) Sound, crushed, angular granitic stone.

- 2) Washed gravel, either natural or crushed. Slag, pit gravel, bank-run gravel, smooth or rounded stone are not allowed.
- c. Coarse Aggregate Size:
 - 1) Reinforced Concrete: ASTM C33/C33M, Nos. 57 or 67, unless otherwise approved by ENGINEER.
 - 2) Unreinforced Slabs or Pavement: ASTM C33/ C33M, No. 467.
- C. Water: Clean, potable.
- D. Admixtures:
 1. Air-Entraining Admixture: ASTM C260.
 2. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 3. Water Reducing and Set-Adjusting Admixtures: ASTM C494/C494M, Types D and E.
 4. High Range Water-Reducing Admixture: ASTM C494/C494M, Type F/G.
 5. Use only admixtures that have been tested and approved in the mix designs.
 6. Do not use calcium chloride in excess of 1% by cement weight. If concrete is used with reinforcing steel, no calcium chloride shall be used.
 7. Do not use other admixtures containing chloride ions.

2.2 CONCRETE MIX

- A. General:
 1. Normal weight: 145 pounds per cubic foot.
 2. Use air-entraining admixture in all concrete unless restricted by the manufacturer for floor hardness treatments or coating systems if specified. Provide not less than four percent, nor more than six percent, entrained air for concrete.
- B. Proportioning and Design of Class "A" Concrete Mix:
 1. Minimum compressive strength at 28 days: 4,500 psi.
 2. Maximum water-cement ratio by weight: 0.42.
 3. Minimum cement content: 564 pounds per cubic yard.
- C. Proportioning and Design of Class "B" Concrete Mix:
 1. Minimum compressive strength at 28 days: 3,500 psi.
 2. Maximum water-cement ratio by weight: 0.50.
 3. Minimum cement content: 517 pounds per cubic yard.
- D. Slump Limits:
 1. Proportion and design mixes to result in concrete slump at point of placement of not less than three inches and not more than five inches.
 2. When using high-range water reducers, slump prior to addition of admixture shall not exceed three inches. Slump after adding admixture shall not exceed eight inches at point of placement.
- E. Adjustment of Concrete Mixes:
 1. Concrete mix design adjustments may be requested by CONTRACTOR when warranted by characteristics of materials, Site conditions, weather, test results, or other, similar circumstances.
 2. Submit for ENGINEER's approval laboratory test data for adjusted concrete mix designs, including compressive strength test results.
 3. Implement adjusted mix designs only after ENGINEER's approval.

4. Adjustments to concrete mix designs shall not result in additional costs to OWNER.

2.3 FORM MATERIALS

- A. Provide form materials of wood, plywood, metal or material approved by Engineer with sufficient stability to withstand pressure of placed concrete without bow or deflection. CONTRACTOR shall be responsible for designing the formwork system to resist all applied loads including the pressures from fluid concrete and construction loads, including vibration during placement and rate of speed at which forms are to be filled.
- B. Smooth Form Surfaces: Acceptable panel-type to provide continuous, straight, smooth, as-cast surfaces in accordance with ACI 301.
- C. Unexposed Concrete Surfaces: Material to suit project conditions.
- D. Provide 3/4-inch chamfer at all external corners. Chamfer is not required at re-entrant corners unless otherwise shown or indicated.
- E. Form Ties:
 1. Provide factory-fabricated, removable, or snap-off metal form ties, that prevent form deflection and prevent spalling of concrete surfaces upon removal. Materials used for tying forms are subject to approval of ENGINEER.
 2. Unless otherwise shown or indicated, provide ties so that portion remaining within concrete after removal of exterior parts is at least 1.5 inches from outer surface of concrete. Unless otherwise shown or indicated, provide form ties that, upon removal, will leave a uniform, circular hole not larger than one-inch diameter in the concrete surface.
 3. Ties for exterior walls, below-grade walls, and walls subject to hydrostatic pressure shall be provided with waterstops.
 4. Wire ties are unacceptable.

2.4 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60 deformed bars.
- B. Welded Wire Fabric: ASTM A185/A185M.
- C. Steel Wire: ASTM A82/A82M.
- D. Provide supports for reinforcing including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing in place.
 1. Use wire bar-type supports complying with CRSI MSP1 recommendations, except as specified in this Section. Do not use wood, brick, or other unacceptable materials.
 2. For slabs on grade, use precast concrete blocks, four inches square minimum with compressive strength equal to or greater than the surrounding concrete, or supports with sand plates or horizontal runners where base materials will not support chair legs.
 3. For all concrete surfaces where legs of supports are in contact with forms, provide supports having either hot-dip galvanized, plastic-protected, or stainless steel legs in accordance with CRSI MSP1.
 4. Provide precast concrete supports over waterproof membranes.
- E. Adhesive Dowels:

1. Dowels:
 - a. Dowel reinforcing bars shall comply with ASTM A615, Grade 60.
2. Adhesive:
 - a. Adhesive system shall use two-component adhesive mix.
 - b. Epoxy adhesives shall comply with physical requirements of ASTM C881/C881M, Type IV, Grade 2 and 3, Class A, B, and C, except gel times.
 - c. Adhesives shall have a current evaluation report by ICC Evaluation Service for use in both cracked and uncracked concrete with seismic recognition for SDC A through F as tested and assessed in accordance with ICC-ES AC308.
 - d. Adhesives shall have minimum bond strength and minimum design bond strength (bond strength multiplied by strength reduction factor) in accordance with Table 03 00 05-A:

TABLE 03 00 05-A:
ADHESIVE BOND STRENGTH ^{1,2}

Anchor Rod Diameter / Dowel Size	Uncracked Concrete		Cracked Concrete	
	Bond Strength (psi)	Design Bond Strength (psi)	Bond Strength (psi)	Design Bond Strength (psi)
3/8-inch / #3	2040	1300	1090	700
1/2-inch / #4	1920	1200	920	560
5/8-inch / #5	1830	1150	710	390
3/4-inch / #6	1760	1050	710	460
7/8-inch / #7	1670	900	610	340
1-inch / #8	1650	1050	850	460
- / #9	1900	1000	800	400
1.25-inch / #10	1580	1000	730	400

Table Notes:

1. Bond strengths listed for hammer-drilled, dry hole.
2. Bond strengths listed for maximum short term concrete temperature of 110 degrees F and maximum long term concrete temperature of 75 degrees F.

2.5 RELATED MATERIALS

- A. Waterstops:
 1. PVC Waterstops:
 - a. Manufacturers: Provide products of one of the following:
 - 1) W.R. Meadows, Inc.
 - 2) Greenstreak Plastic Products Company.
 - 3) Or equal.
 - b. Waterstops shall comply with CRD-C 572. Do not use reclaimed or scrap material.
 - c. Minimum Thickness: 3/8-inch.
 - d. Provide waterstops with minimum of seven ribs equally spaced at each end on each side with the first rib located at the edge. Each rib shall be minimum 1/8-inch in height.
 - e. Construction Joints: Waterstops shall be six-inch wide flat-strip type.
 - f. Expansion Joints: Waterstops shall be nine-inch wide centerbulb type.
 2. Hydrophilic Waterstops:
 - a. Products and Manufacturers: Provide one of the following:

- 1) Duroseal Gasket, by BBZ USA, Inc.
 - 2) Adeka Ultraseal MC-2010M, by Asahi Denka Kogyo K.K.
 - 3) Hydrotite, by Greenstreak Plastic Products Company.
 - 4) Or equal.
- b. Hydrophilic waterstop materials shall be bentonite-free and shall expand by minimum of 80 percent of dry volume in the presence of water to form a watertight joint seal without damaging the concrete in which it is cast.
 - c. Waterstop material shall be composed of resins and polymers that absorb water and cause a completely reversible and repeatable increase in volume.
 - d. Waterstop material shall be dimensionally stable after repeated wet-dry cycles with no deterioration of swelling potential.
 - e. Select material in accordance with manufacturer's recommendations for type of liquid to be contained.
 - f. Minimum cross-sectional dimensions: 3/16-inch by 3/4-inch.
 - g. Location of hydrophilic waterstops shall be as shown or indicated on the Drawings, or where approved by ENGINEER.
 - h. Hydrophilic Sealant: Shall adhere firmly to concrete, metal, and PVC in dry or damp condition and be indefinitely elastic when cured.
 - 1) Products and Manufacturers: Provide one of the following:
 - a) Duroseal Paste, by BBZ USA, Inc.
 - b) Adeka Ultraseal P-201, by Asahi Denka Kogyo K.K.
 - c) Hydrotite, by Greenstreak Plastic Products Company.
 - d) Or equal.
- B. Membrane-Forming Curing Compound: ASTM C309, Type II.
- C. Epoxy Bonding Agent:
1. Two-component epoxy resin bonding agent.
 2. Products and Manufacturers: Provide one of the following:
 - a. Sikadur 32, Hi-Mod LPL, by Sika Corporation.
 - b. Eucopoxy LPL, by the Euclid Chemical Company.
 - c. Or equal.
- D. Epoxy-Cement Bonding Agent:
1. Three-component blended epoxy resin-cement bonding agent.
 2. Products and Manufacturers: Provide one of the following:
 - a. Sika Armatec 110 EpoCem, by Sika Corporation.
 - b. Duralprep A.C., by Euclid Chemical Company.
 - c. Or equal.
- E. Preformed Expansion Joint Filler:
1. Provide preformed expansion joint filler complying with ASTM D1752, Type I (sponge rubber) or Type II (cork).
- F. Joint Sealant and Accessories:
1. For joint sealants and accessories used on isolation joints, control joints, and expansion joints, refer to Section 07 92 00, Joint Sealants.

2.6 GROUT

- A. Non-shrink Grout:

1. Pre-packaged, non-metallic, cementitious grout requiring only the addition of water at the Site. In accordance with ASTM C1107.
2. Minimum 28-day Compressive Strength: 7,500 psi.
3. Bond Strength: 1,350 to 1,700 psi.
4. Percent Expansion: 0.25% to 0.75%.
5. Products and Manufacturers: Provide one of the following:
 - a. NS Grout by Euclid Chemical Company.
 - b. Set Grout by Master Builders, Inc.
 - c. Embeco 636 by Master Builders, Inc.
 - d. NBEC Grout by Five Star Products, Inc.
 - e. Or equal.

2.7 MORTAR

- A. Mortar uses in sanitary sewer manholes shall be hydraulic cement mortar in accordance with ASTM C-398.
- B. Mortar used in water meter vaults and water valve vaults shall be Type M in accordance with ASTM C-270.

PART 3 EXECUTION

3.1 INSPECTION

- A. CONTRACTOR shall examine the substrate and the conditions under which the Work will be performed and notify ENGINEER in writing of unsatisfactory conditions. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 FORMWORK

- A. Construct formwork in accordance with ACI 347 such that concrete members and structures are of correct size, shape, alignment, elevation, and position.
- B. Provide openings in formwork to accommodate the Work of other trades. Accurately place and securely support items required to be built into formwork.
- C. Clean and adjust forms prior to placing concrete. Apply form release agents or wet forms as required. Re-tighten forms during and after concrete placing, when required, to eliminate cement paste leaks.
- D. Removing Formwork:
 1. Comply with ACI 301 and ACI 347, except as otherwise indicated in the Contract Documents.
 2. Do not remove formwork and shoring until supported concrete members have acquired minimum of 90 percent of specified compressive strength. Results of suitable quality control tests of field-cured specimens may be submitted to ENGINEER for review as evidence that concrete has attained sufficient strength for removal of supporting formwork and shoring prior to removal times indicated in the Contract Documents.
 3. Removal time for formwork is subject to ENGINEER's acceptance. Forms shall be left in place for a minimum of 7 days.

4. Repair form tie-holes following in accordance with ACI 301.
5. Do not remove formwork and backfill before end of curing period without approval of Engineer. In such cases where Engineer approves early removal of forms, newly-exposed surfaces shall be cured in accordance with Part 3 of this specification.

3.3 REINFORCING, JOINTS, AND EMBEDDED ITEMS

- A. Comply with the applicable recommendations of Laws and Regulations and standards referenced in this Section, including CRSI MSP1, for details and methods of placing and supporting reinforcing.
- B. Clean reinforcing to remove loose rust and mill scale, earth, ice, and other materials which act to reduce or destroy bond between reinforcing material and concrete.
- C. Position, support, and secure reinforcing against displacement during formwork construction and concrete placing. Locate and support reinforcing by means of metal chairs, runners, bolsters, spacers, and hangers, as required.
 1. Place reinforcing to obtain minimum concrete coverages as shown on the Drawings and as required in ACI 318. Arrange, space, and securely tie bars and bar supports together with 16-gage wire to hold reinforcing accurately in position during concrete placing. Set with ties so that twisted ends are directed away from exposed concrete surfaces.
 2. Do not secure reinforcing to formwork using wire, nails or other ferrous metal. Metal supports subject to corrosion shall not be in contact with formed or exposed concrete surfaces.
- D. Provide sufficient quantity of supports of strength required to carry reinforcing. Do not place reinforcing more than two inches beyond the last leg of continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.
- E. Splices: Provide standard reinforcing splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements shown or indicated for minimum lap of spliced bars, as shown on the Drawings.
- F. Install welded wire fabric in lengths as long as practical, lapping adjoining sections a minimum of one full mesh.
- G. Do not place concrete until reinforcing is inspected and ENGINEER indicates that conditions are acceptable for placing concrete. Concrete placed in violation of this paragraph shall be rejected. Notify ENGINEER in writing at least two working days prior to proposed concrete placement.
- H. Joints:
 1. Provide construction, isolation, expansion, and control joints as indicated or required. Locate construction joints so as to not impair the strength and appearance of the structure. Place isolation and control joints in slabs-on-grade to stabilize differential settlement and random cracking.
 2. In walls, locate joints at a maximum spacing of 40 feet and approximately 12 feet from corners.
 3. In foundation slabs and slabs-on-grade, locate joints at intervals of approximately 40 feet.
 4. In mats and structural slabs and beams, locate joints in compliance with ACI 224R.

5. Locations of joints shall be in accordance with the Contract Documents and as approved by ENGINEER in the Shop Drawings.
 6. Where construction joints are indicated to be roughened, intentionally roughen surfaces of previously-placed concrete to amplitude of 1/4-inch.
- I. Installation of Embedded Items: Do not embed in concrete uncoated aluminum items. Where aluminum items are in contact with concrete surfaces, coat aluminum to prevent direct contact with concrete.
- J. Adhesive Dowels:
1. Adhesive dowels shall be reinforcing bar dowels set in an adhesive in hole drilled into hardened concrete. Comply with adhesive system manufacturer's installation instructions regarding hole diameter, drilling method, embedment depth required to fully develop required tensile strength, and hole cleaning and preparation instructions. Unless more-stringent standards are required by adhesive system manufacturer, comply with the following.
 2. Drill holes to adhesive system manufacturer's recommended diameter and depth to develop required tensile strength. Holes shall not be more than 1/4-inch greater than nominal bar diameter, and hole depth shall not be less than twelve times nominal bar diameter. Hammer-drill holes. Cored holes are not allowed.
 3. Embedment depths shall be based on concrete compressive strength of 2,000 psi when embedded in existing concrete, and 4,000 psi when embedded in new concrete.
 4. Determine location of existing reinforcing steel in vicinity of proposed holes prior to drilling. Adjust location of holes to be drilled to avoid drilling through or damaging existing reinforcing bars only when approved by ENGINEER.
 5. Before setting adhesive dowel, hole shall be free of dust and debris using method recommended by adhesive system manufacturer. Hole shall be brushed, with manufacturer-approved brush and blown clean with clean, dry, oil-free compressed air to remove dust and loose particles. Hole shall be dry as defined by adhesive system manufacturer.
 6. Inject adhesive into hole through injection system mixing nozzle and necessary extension tubes, placed to bottom of hole. Withdraw discharge end as adhesive is placed, but keep end of tube immersed to prevent forming air pockets. Fill hole to depth that ensures that excess material is expelled from hole during dowel placement.
 7. Twist dowels during insertion into partially-filled hole to guarantee full wetting of bar surface with adhesive. Insert bar slowly to avoid developing air pockets.

3.4 CONCRETE PLACING

- A. Site Mixing: Use drum-type batch machine mixer, mixing not less than 1.5 minutes for one cubic yard or smaller capacity. Increase required mixing time by minimum of 15 seconds for each additional cubic yard or fraction thereof.
- B. Ready-Mixed Concrete: Comply with ASTM C94/C94M.
- C. Concrete Placing:
1. Place concrete in a continuous operation within planned joints or sections in accordance with ACI 304R.
 2. Do not begin placing concrete until work of other trades affecting concrete is completed.
 3. Wet concrete and subgrade surfaces to saturated surface dry condition immediately prior to placing concrete.

4. Deposit concrete as near its final location as practical to avoid segregation due to re-handling or flowing.
 5. Avoid separation of the concrete mixture during transportation and placing. Concrete shall not free-fall for distance greater than four feet during placing.
 6. Complete concrete placing within 90 minutes of addition of water to the dry ingredients.
- D. Consolidate placed concrete in accordance with ACI 309R using mechanical vibrating equipment supplemented with hand rodding and tamping, such that concrete is worked around placing and other embedded items and into all parts of formwork. Insert and withdraw vibrators vertically at uniformly-spaced locations. Do not use vibrators to transport concrete within the formwork. Vibration of formwork or placing is not allowed.
- E. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing.
1. In hot weather comply with ACI 305R.
 2. In cold weather comply with ACI 306R.

3.5 QUALITY OF CONCRETE WORK

- A. Make concrete solid, compact, smooth, and free of laitance, cracks, and cold joints.
- B. Concrete for liquid-retaining structures and concrete in contact with earth, water, or exposed directly to the elements shall be watertight.
- C. Cut out and properly replace to extent directed by ENGINEER, or repair to satisfaction of ENGINEER, surfaces that contain cracks or voids, are unduly rough, or are in defective in any way. Patches or plastering are unacceptable.
- D. Repair, removal and replacement of defective concrete directed by ENGINEER shall be at no additional cost to OWNER.

3.6 CURING

- A. Begin initial curing as soon as free water has disappeared from exposed surfaces. Where possible, keep continuously moist for not less than 7 hours. Continue curing by using moisture-retaining cover or membrane-forming curing compound, or by keeping exposed surfaces moist continuously for entire curing period. Cure formed surfaces by moist curing until formwork is removed. Provide protection, as required, to prevent damage to exposed concrete surfaces. Total curing period shall not be less than seven days. Curing methods and materials shall be compatible with scheduled finishes.

3.7 FINISHING

- A. Slab Finish:
1. After placing concrete slabs, do not work the surface further until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently. Use a wood float only. Check and level surface plane to a tolerance not exceeding 1/4-inch in ten feet when tested with a ten foot straightedge placed on the surface at not less than two different angles. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float the surface to a uniform, smooth, granular

- texture. Slab surfaces shall receive a float finish. Provide additional trowel finishing as required in this Section.
2. After floating, begin first trowel finish operation using power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over the surface.
 3. Consolidate concrete surface by the final hand troweling operation. Finish shall be free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8-inch in ten feet when tested with a ten-foot straightedge. Grind smooth surface defects that would telegraph through applied floor covering system.
 4. Use trowel finish for the following:
 - a. Interior exposed slabs, unless otherwise shown or indicated.
 - b. Apply non-slip broom finish, after troweling, to exterior concrete slab and elsewhere as shown.
- B. Apply chemical floor hardener to exposed interior concrete floor areas when cured and dry, in accordance with hardener manufacturer's instructions.
- C. Formed Finish:
1. Provide smooth form concrete finish at exposed surfaces. Use largest practical form panel sizes to minimize form joints. Exposed surfaces include interior water-contacting surfaces of tanks, whether or not directly visible. All surfaces shall be considered as exposed, unless buried or covered with permanent structural or architectural material. After removing forms, patch form tie holes and defects in accordance with ACI 301. Remove fins exceeding 1/8-inch in height. Where surface will be coated or will receive further treatment, remove all fins flush with concrete surface.
 2. Provide rough form finish at all unexposed surfaces. After removing forms, patch form tie holes and defects in accordance with ACI 301. Remove fins exceeding 1/2-inch in height.

3.8 GROUT PLACING

- A. Place grout as shown and indicated, and in accordance with grout manufacturer's instructions and recommendations. If grout manufacturer's instructions conflict with the Contract Documents, notify ENGINEER and not proceed until obtaining ENGINEER's clarification.
- B. Dry-packing is not allowed, unless otherwise indicated.
- C. Manufacturers of proprietary grout materials shall make available upon 72 hours notice the services of qualified, full-time, factory-trained employee to aid in ensuring proper use of grout materials at the Site.
- D. Placing grout shall comply with temperature and weather limitations described in Article 3.4 of this Section.

3.9 FIELD QUALITY CONTROL

- A. Site Testing Services:
1. Employ independent testing laboratory to perform field quality control testing for concrete. ENGINEER will direct where samples are obtained.
 2. Testing laboratory will provide all labor, material, and equipment required for sampling and testing concrete, including: scale, glass tray, cones, rods, molds, air tester, thermometer, and other incidentals required.

3. Provide curing and necessary cylinder storage in accordance with Section 01 45 29, Testing Laboratory Services.
- B. Quality Control Testing During Construction:
1. Perform sampling and testing for field quality control during concrete placing, as follows:
 - a. Sampling Fresh Concrete: ASTM C172.
 - b. Slump: ASTM C143/C143M; one test for each concrete load at point of discharge.
 - c. Concrete Temperature: ASTM C1064/C1064M; one for every two concrete loads at point of discharge, and when a change in the concrete is observed. Test each load when time from batching to placement exceeds 75 minutes.
 - d. Air Content: ASTM C231; one for every two concrete load at point of discharge, and when a change in the concrete is observed.
 - e. Unit Weight: ASTM C138/C138M; one for every two concrete loads at point of discharge, and when a change in the concrete is observed.
 - f. Compression Test Specimens:
 - 1) In accordance with ASTM C31/C31M, make one set of compression cylinders for each 50 cubic yards of concrete, or fraction thereof, of each mix design placed each day. Each set shall be four standard cylinders, unless otherwise directed by ENGINEER.
 - 2) Cast, store, and cure specimens in accordance with ASTM C31/C31M.
 - g. Compressive Strength Tests:
 - 1) In accordance with ASTM C39/C39M; one specimen tested at seven days, and three specimens tested at 28 days.
 - 2) Concrete that does not comply with strength requirements shall be considered as defective Work.
 - h. Submit test results from certified by testing laboratory to ENGINEER within 24 hours of completion of test.
 - i. When there is evidence that strength of in-place concrete does not comply with the Contract Documents, CONTRACTOR shall employ the services of concrete testing laboratory to obtain cores from hardened concrete for compressive strength determination. Cores and tests shall comply with ASTM C42/C42M and the following:
 - 1) Testing of Adhesive Dowels: CONTRACTOR shall employ testing agency to perform field quality control testing of drilled dowel installations. After adhesive system manufacturer's recommended curing period and prior to placing connecting reinforcing, proof-test for pullout ten percent of adhesive dowels installed. Adhesive dowels shall be tensioned to 60 percent of specified yield strength. Where dowels are located less than six bar diameters from edge of concrete, ENGINEER shall determine tensile load required for test. If one or more dowels fail, retest all dowels installed for the Work. Dowels that fail shall be reinstalled and retested at CONTRACTOR's expense.

END OF SECTION

SECTION 05 56 00

METAL CASTINGS

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install metal castings.
2. Castings include metal items that are not part of miscellaneous metal fabrications or metal systems in other Specifications Sections.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before metal castings Work.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. ASTM A48/A48M, Specification for Gray Iron Castings.
2. ASTM A126, Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
3. ASTM C478, Specification for Precast Reinforced Concrete Manhole Sections.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Shall have at least five years experience manufacturing products substantially similar to those required and shall be able to submit documentation of at least five installations in satisfactory operation for at least five years each.

B. Component Supply and Compatibility:

1. Obtain all frame, lid or cover and grate products included in this Section regardless of component manufacturer, from a single castings manufacturer.
2. Castings manufacturer shall review and approve or prepare all Shop Drawings and other submittals for all components furnished under this Section.
3. Components shall be constructed for specified service conditions and shall be integrated into overall assembly by castings manufacturer.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
 - a. Fabrication and installation of all casting assemblies. Include plans, elevations, and details of sections and connections. Show anchorage and accessory items. Include setting drawings for location and installation of castings and anchorage devices.
2. Product Data:

- a. Copies of manufacturer's catalog information for the products proposed for use, specifications, load tables, dimension diagrams, anchor details, and installation instructions.
- B. Informational Submittals: Submit the following:
 - 1. Certificates:
 - a. Furnish certification, signed by authorized officer of CONTRACTOR and notarized, stating that all components are furnished by the same manufacturer.
 - b. Manufacturer's certification that the casting or lot of castings was made, sampled, tested and inspected in accordance with ASTM A48.
 - 2. Qualifications Statements: Submit qualifications for the following:
 - a. Manufacturer, when required by ENGINEER.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Packing, Shipping, Handling, and Unloading:
 - 1. Deliver products to the Site to ensure uninterrupted progress of the Work. Deliver anchorage materials to be embedded in concrete in ample time to prevent delaying the Work.
 - 2. Comply with Section 01 65 00, Product Delivery Requirements.
- B. Storage and Protection:
 - 1. Protect materials from corrosion and deterioration.
 - 2. Comply with Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide products from the following manufacturers:
 - 1. Neenah Foundry Company.
 - 2. EJ (formerly East Jordan Ironworks).
 - 3. Or equal.
- B. Material: ASTM A48/A48M, Class 35 B.
- C. Products:
 - 1. Round Manhole Frame with Solid Lid.
 - 2. Round Manhole Frame with Solid Bolted Lid.
 - 3. Round Manhole Frame with Solid Lid – Flush Top.
 - 4. Catch Basin Frame with Grate.
 - 5. Curb Inlet Frame Grate and Curb Box.
 - 6. Valve Box Frame and Lid.

2.2 FABRICATION

- A. Fabrication, General:

1. Castings shall be of uniform quality, free of sand holes, gas holes, shrinkage cracks, and other surface defects.
2. Castings shall be ground smooth and well-cleaned by shot blasting in the shop.
3. Design and fabricate round frames and covers to prevent rocking and rattling under traffic loads that will be imposed in actual use.
4. Fabricate castings true to pattern so that component parts fit together.
5. Each casting shall be identifiable and, depending on its size, shall indicate the following: name of producing foundry, ASTM material designation, individual part number, and cast or heat date. Castings shall include all lettering shown or indicated on the Drawings.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine conditions under which Work is to be performed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Comply with casting manufacturer's printed instructions and the Contract Documents. Where castings are installed on precast concrete, fabricated fiberglass, or other fabricated products, install casting in accordance with requirements of manufacturer of product on which casting will be installed.
- B. Set castings accurately to required location, alignment, and elevation, plumb, level, true and free of rack, measured from established lines and levels. Where applicable, brace temporarily or anchor temporarily in formwork.

END OF SECTION

SECTION 31 11 00

CLEARING AND GRUBBING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. Provide all labor, materials, equipment, and incidentals required to perform clearing and grubbing as shown and specified in the Contract Documents.
 - 2. The Work includes removing from the Site and disposing of trees, stumps, brush, roots, shrubs, vegetation, logs, rubbish, and other objectionable material.
 - 3. Pay all costs associated with transporting and disposing of debris resulting from clearing.
 - 4. Limits of Clearing and Grubbing: Clear and grub the areas shown or indicated on the Drawings.
- B. Related Sections and Details:
 - 1. Section 02 41 00, Demolition.
 - 2. York County Engineering Standards 16-series Standard Details.

1.2 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with Laws and regulations for environmental requirements, disposal of debris, burning debris on Site, and use of herbicides.
 - 2. Coordinate clearing work with York County and other authorities having jurisdiction, including Utility providers.

1.3 SUBMITTALS

- A. Action Submittals: Submit the following
 - 1. Shop Drawings:
 - a. Plan for removing trees and other large vegetation not explicitly shown or indicated for removal in the Contract Documents.
 - b. Plan showing proposed limits of clearing and grubbing, if different from clearing and grubbing limits shown or indicated in the Contract Documents.

1.4 WARRANTY

- A. CONTRACTOR shall warrant that Work performed under this Section will not permanently damage trees, shrubs, turf, and plants designated to remain, or other adjacent work, facilities, or property. If damage resulting from CONTRACTOR's operations becomes evident during the correction period, CONTRACTOR shall replace damaged items and property at no additional cost to OWNER.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 PREPARATION

A. Protection:

1. Throughout the Project, protect existing site improvements, including streets, drives, and Underground Facilities to remain (if any), and adjacent property and structures. Repair damage caused by CONTRACTOR to original condition or replace in kind, to satisfaction of ENGINEER, at no additional cost to OWNER.
2. Protect trees, shrubs, vegetation, and grassed areas to remain by providing temporary fencing, barricades, wrapping, or other methods shown, specified, or accepted by ENGINEER. Correct at CONTRACTOR's expense damage caused by CONTRACTOR outside the limits of clearing Work.
3. Do not remove trees without approval of ENGINEER, unless shown or indicated for removal.
4. Do not locate construction equipment, stored materials, or stockpiles within drip line of trees and vegetation to remain.

B. Site Preparation:

1. Obtain, pay costs associated with, and comply with applicable permits required for clearing and grubbing Work. Do not begin clearing and grubbing Work to acquiring all applicable permits.
2. Delineation of Clearing and Grubbing Limits:
 - a. Locate and clearly flag trees and vegetation to remain, and other materials to remain in the clearing and grubbing limits. Locate and clearly flag salvable vegetation to be relocated.
 - b. Provide flagging to delineate limits of areas to be cleared or grubbed. Review at Site with ENGINEER before commencing removal of trees, vegetation, and other materials to be removed.
 - c. Replace flagging that is lost, removed, or destroyed, until clearing and grubbing Work is complete and ENGINEER allows removal of flagging.
3. Erosion and Sediment Controls:
 - a. Provide applicable erosion and sediment controls before commencing clearing and grubbing Work.
 - b. Comply with York County Engineering Standards 16-series Standard Details and related Standard Details and erosion control requirements and rules and regulations.
 - c. Continue providing erosion and sediment controls as clearing and grubbing Work progresses to previously uncleared, ungrubbed areas of the Site.

3.2 CLEARING AND GRUBBING

- A. Clearing and grubbing shall be performed along the project at the locations designated on the drawings or as directed by the Engineer.
- B. Conduct operations in a manner so as to prevent limb, bark, or root injuries to trees, shrubs, or other types of vegetation that are to remain growing and also to prevent damage to adjacent property.

- C. Exercise extreme caution in order not to clear and grub areas outside of the construction right-of-way.
- D. Remove and dispose of all trees not reserved by the property owner, shrubs, stumps, roots, brush, tree laps, logs, rubbish, undergrowth, and debris within limits of clearing and grubbing shown or indicated in the Contract Documents, unless otherwise shown or indicated.
- E. Any areas of growth or individual trees which are to be preserved due to their desirability for landscape or erosion control purposes will be designated on the drawings or by the ENGINEER.
- F. Maintenance of cleared and grubbed areas include:
 - 1. Clean-up of overgrown areas.
 - 2. Continuous weeding, brush cutting, and pruning for all areas within the contract site that has been cleared and/or grubbed. This shall take place from the Notice to Proceed until the final approval of the contract. This work is to be accomplished regardless of the phase of work in progress or any delays caused by weather, utilities, or property acquisitions.
 - 3. CONTRACTOR is to provide for bush-hogging or weed-eating certain areas within the public access or easements that have become overgrown as directed by the ENGINEER. This includes any staging areas being used by the CONTRACTOR for the duration of the contract.
- G. Trees and Shrubs Improperly Destroyed or Damaged:
 - 1. For each tree or shrub to remain that is destroyed or damaged beyond repair by CONTRACTOR, provide two replacements of the same species at locations to be designated by ENGINEER.
- H. Trees and shrubs to remain that have been damaged or require trimming shall be protected, treated and repaired under the direction of a qualified arborist, or other professional with qualifications acceptable to ENGINEER.
- I. Salvable Vegetation:
 - 1. Trees, shrubs, and other vegetation requiring removal to facilitate the Work, and that will be transplanted elsewhere at the Site, shall be carefully balled and burlapped or placed in temporary pots, and stored at the Site in an acceptable area. Work involving removing and relocating trees, shrubs, and other vegetation shall be under the direction of qualified arborist acceptable to ENGINEER, or other professional acceptable to ENGINEER, hired by CONTRACTOR.
- J. Disposal of Cleared and Grubbed Materials:
 - 1. Dispose at appropriate off-Site location trees, stumps, rubbish, debris, and other cleared and grubbed material. Cleared or grubbed materials may remain at the Site only when allowed in the Contract Documents or when approved by ENGINEER in writing. Do not use cleared or grubbed material as fill, backfill, or in embankments.
 - 2. Dispose of cleared and grubbed material in accordance with Laws and Regulations.
 - 3. Do not burn clearing debris at the Site, unless approved by OWNER and authorities having jurisdiction. If burning is permitted, comply with requirements of authorities

having jurisdiction and Laws and Regulations. If burning is permitted at the Site, also comply with OWNER's requirements.

K. Removal of Site Improvements: Comply with Section 02 41 00, Demolition.

3.3 TOPSOIL REMOVAL

- A. Existing topsoil to be removed is defined as friable, clay loam, surface soil present in depth of at least four inches. Topsoil shall be free of subsoil, clay lumps, stones, and other objects over two-inch diameter and other objectionable material.
- B. Stripping:
 - 1. Strip topsoil to depths encountered, in manner that prevents intermingling of topsoil with underlying subsoil or other objectionable material. Remove heavy growths of grass and vegetation from areas before stripping.
 - 2. Do not strip topsoil from within drip line of each tree to remain as part of the completed Project.
- C. Stockpile topsoil in storage stockpiles in areas shown, or where otherwise accepted by ENGINEER. Construct storage piles so that surface water drains freely. Stabilize large topsoil piles with a cover crop and mulch, and provide silt fencing around perimeter of pile to prevent topsoil erosion and sedimentation; silt fencing shall be in accordance with York County Engineering Standard Details 16.03 and 16.03A and rules and regulations. Cover smaller topsoil stockpiles, when used, with reinforced fabric to prevent windblown dust. Topsoil in excess of the quantity required for the finished Project shall remain property of OWNER.

3.4 ENVIRONMENTAL PROTECTION AND RESTORATION

- A. South Carolina Department of Health and Environmental Control.
- B. South Carolina Department of Natural Resources.
- C. US Army Corps of Engineers.
- D. US Department of the Interior.
- E. York County Environmental Compliance or local Authority Having Jurisdiction.

END OF SECTION

SECTION 31 23 05

EXCAVATION AND FILL

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:

1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals required to perform all excavating, filling, and grading, and disposing of earth materials as shown, specified, and required for construction of structures, Underground Facilities, roads, and other facilities required to complete the Work.
2. Preparation of subgrade for slabs and pavements is included under this Section.
3. No classification of excavated materials will be made. Excavation includes all materials regardless of type, character, composition, moisture, or condition thereof, except rock requiring drilling, blasting or special equipment for removal which is under Section 31 23 16.26, Rock Removal.

B. Related Sections:

1. Section 03 30 05, Concrete.
2. Section 31 23 16.26, Rock Removal.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. ACI 522R, Pervious Concrete.
2. ANSI/AISC 360, Specification for Structural Steel for Buildings.
3. ASTM C29/C29M, Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate.
4. ASTM C33/C33M, Specification for Concrete Aggregates.
5. ASTM C94/C94M, Specification for Ready-Mixed Concrete.
6. ASTM C138/C138M, Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
7. ASTM C172, Practice for Sampling Freshly Mixed Concrete.
8. ASTM C150/C150M, Specification for Portland Cement.
9. ASTM C595/C595M, Specification for Blended Hydraulic Cements.
10. ASTM C618, Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
11. ASTM C989, Specification for Slag Cement for Use in Concrete and Mortars.
12. ASTM D422, Test Method for Particle-Size Analysis of Soils.
13. ASTM D448, Classification for Sizes of Aggregate for Road and Bridge Construction.
14. ASTM D698, Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft³ (600 kN-m/m³)).
15. ASTM D1556, Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
16. ASTM D1557, Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
17. ASTM D2216, Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

18. ASTM D4253, Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
19. ASTM D4254, Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
20. ASTM D4318, Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
21. ASTM D4832, Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.
22. ASTM D6023, Test Method for Density (Unit Weight), Yield, Cement Content, and Air Content (Gravimetric) of Controlled Low-Strength Material (CLSM).
23. ASTM D6103, Test Method for Flow Consistency of Controlled Low Strength Material (CLSM).
24. ASTM D6938, Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
25. ASTM E329, Specification for Agencies Engaged in Construction Inspection and/or Testing.
26. South Carolina Department of Transportation Qualified Products Listings and Policies for Construction and Maintenance Materials.
27. Work Area Traffic Control Handbook (WATCH).
28. York County Ordinance 154.110.

1.3 TERMINOLOGY

- A. The following words or terms are not defined but, when used in this Section, have the following meaning:
1. "Subgrade" is the uppermost surface of native soil material unmoved from cuts; the bottom of excavation.

1.4 QUALITY ASSURANCE

- A. Qualifications:
1. Professional Engineer:
 - a. Engage a registered professional engineer legally qualified to practice in the same jurisdiction as the Site and experienced in providing engineering services of the kind indicated.
 - b. Responsibilities include but are not necessarily limited to:
 - 1) Reviewing system performance and requirements shown or indicated in the Contract Documents.
 - 2) Preparing written requests for clarifications or interpretations of performance and requirements for submittal to ENGINEER by CONTRACTOR.
 - 3) Preparing or supervising the preparation of design calculations and related submittals verifying compliance of the system with the requirements of the Contract Documents.
 - 4) Signing and sealing all calculations, drawings, and submittals prepared by professional engineer.
 - 5) Certifying that:
 - a) it has performed the design of the system in accordance with the performance requirements stated in the Contract Documents, and
 - b) the said design conforms to Laws and Regulations, and to the prevailing standards of practice.

- B. Quality Assurance Testing:
1. OWNER typically retains 3rd party for Quality Control testing on capital projects. Specific Quality Assurance Testing requirements and procedures shall be established on a Project-by-Project basis.
 2. Materials used in the Work may require testing and retesting, as directed by ENGINEER, during the Project. Allow free access to material stockpiles and facilities at all times. Tests, including retesting of rejected materials and installed Work, shall be performed by OWNER and at OWNER'S expense.
- C. Regulatory Requirements:
1. Perform excavation work in compliance with requirements of authorities having jurisdiction and Laws and Regulations, including:
 - a. OSHA, 29 CFR Part 1926, Section .650 (Subpart P – Excavations).
 2. Obtain required permits and approvals for excavation and fill Work, including work permits from right-of-way owners and permits from environmental authorities having jurisdiction over discharge of water from excavations.

1.5 SUBMITTALS

- A. Informational Submittals: Submit the following:
1. Procedure Submittals:
 - a. Excavation Plan: Prior to starting excavation operations, submit written plan to demonstrate compliance with OSHA 29 CFR Part 1926.650. As a minimum, excavation plan shall include:
 - 1) Name of CONTRACTOR's "competent person" in responsible charge of excavation and fill Work.
 - 2) Excavation method(s) and additional items to be included in the Work, as listed in Paragraph 1.5.A.2.a of this Section.
 - 3) Copies of "manufacturer's data" or other tabulated data if protective system(s) are designed on the basis of such data.
 - 4) Copies of required permits and approvals, from authorities having jurisdiction and affected utility owners, for excavation methods proposed.
 - b. Proposed compaction procedure and compaction equipment proposed for use. Where different procedures or equipment will be used for compacting different types of material or at different locations at the Site, indicate where each procedure and equipment item will be used.
 2. Excavation Support Plan and Related Information Prepared by CONTRACTOR's Professional Engineer:
 - a. CONTRACTOR and CONTRACTOR's professional engineer shall prepare the following for submittal:
 - 1) Sheet piling and bracing, or other protective system(s) required.
 - 2) Dewatering system.
 - 3) Cofferdams.
 - 4) Underpinning.
 - b. Drawings and calculations shall be prepared by professional engineer qualified in the specialty involved. ENGINEER's review and acceptance of submittal does not imply approval by ENGINEER of the associated Work. CONTRACTOR shall be solely responsible for designing, installing, operating and maintaining the system(s) required to satisfactorily perform all necessary sheet piling, bracing, protection, underpinning, and dewatering.

3. Delivery Tickets:
 - a. Copy of delivery ticket for each load of aggregate and borrow material delivered to the Site. Each delivery ticket shall indicate project and contract by name and number, date, material type, department of transportation item number when applicable, and quantity delivered.
4. Quality Assurance Test Results Submittals:
 - a. Submit results of quality assurance testing performed by in accordance with Paragraph 1.4.B of this Section, unless included as part of another submittal under this Section. Submit results for the following quality assurance testing:
 - 1) Tests on borrow fill material.
 - 2) Optimum moisture – maximum dry density curve for each type of fill material.
5. Qualifications Statements:
 - a. Professional engineer.

1.6 SITE CONDITIONS

- A. Subsurface Information: The Project Manual indicates information available relative to subsurface conditions at the Site. Such information and data is not intended as a representation or warranty of continuity of conditions between soil borings or test pits, nor of groundwater levels at dates and times other than date and time when measured, nor that purpose of obtaining the information and data were appropriate for use by CONTRACTOR. OWNER will not be responsible for interpretations or conclusions drawn therefrom by CONTRACTOR.
- B. Soil borings and other exploratory operations may be made by CONTRACTOR, at no additional cost to OWNER. Coordinate CONTRACTOR-performed test borings and other exploratory operations with OWNER and utility owners as appropriate. Perform such explorations without disrupting or otherwise adversely affecting operations of OWNER or utility owners. Comply with Laws and Regulations relative to required notifications.
- C. Existing Structures:
 1. The Contract Documents show or indicate certain structures and Underground Facilities adjacent to the Work. Such information was obtained from existing records and is not guaranteed to be correct or complete. CONTRACTOR shall explore ahead of the excavation to determine the exact location of all existing structures and Underground Facilities. Existing structures and Underground Facilities shall be supported and protected from damage by CONTRACTOR. Immediately repair and restore existing structures and Underground Facilities damaged by CONTRACTOR without additional cost to OWNER.
 2. Movement or operation of construction equipment over Underground Facilities shall be at CONTRACTOR's sole risk and only after CONTRACTOR has prepared and submitted to ENGINEER and utility owners (as applicable), and received acceptance therefrom, a plan describing CONTRACTOR's analysis of the loads to be imparted and CONTRACTOR's proposed measures to protect structures and Underground Facilities during the Project.
 3. Coordinate with utility owners for shut-off of services in active piping and conduits. When required by utility owner, OWNER will assist CONTRACTOR with utility owner notifications. Completely remove buried piping and conduits indicated for removal and not otherwise indicated as being abandoned or to remain in place.

4. In general, service lines and laterals to individual houses and businesses are not shown; however, CONTRACTOR shall assume that a service exists for each utility owner to each house, business, and property.
5. Do not interrupt existing utilities serving facilities occupied and used by OWNER or others, except when such interruption is indicated in the Contract Documents or when allowed in writing by ENGINEER after acceptable temporary utility services are provided by CONTRACTOR for the affected structure or property.

PART 2 PRODUCTS

2.1 MATERIALS

A. Select Fill:

1. Material shall be well-graded, crushed aggregate, free of organic material. Material shall be Coarse Aggregate No. 57 in accordance with the Coarse Aggregate Gradation Table in the appendix of the SCDOT Standard Specifications for Highway Construction.

B. General Fill:

1. Material shall be free of: roots, vegetative matter, waste, construction material, rock larger than $\frac{3}{4}$ cubic foot, debris, waste, frozen materials, organic material, and other deleterious matter. Small rock shall not exceed 10% of the fill material.
2. Fill shall have a liquid limit not greater than 45, and plasticity index not greater than 25, or as directed by ENGINEER.
3. Previously-excavated materials complying with the Contract Documents requirements for general fill may be used for general fill.
4. When on-Site materials are found unsuitable for use as general fill, provide select fill or approved off-Site general fill materials. Prior to using off-Site material as general fill, furnish submittal for and obtain ENGINEER's approval of the material proposed for use.

C. Subbase Material:

1. Material shall be naturally- or artificially-graded mixture of natural or crushed gravel or crushed stone. Crushed slag is unacceptable. Material shall be coarse aggregate obtained from sources listed on the most recent edition of SCDOT Qualified Products List 2.
2. Crushed Recycled Concrete Subbase Material:
 - a. CONTRACTOR may use crushed recycled concrete material as subbase material.
 - b. Recycled concrete material shall be crushed and screened and shall comply with subbase gradation requirements of this Section. Before using in the Work, remove existing reinforcing steel from recycled concrete material.
 - c. Crushed recycled concrete material shall not contain chloride ions or aggregates susceptible to alkali-silica reaction.
 - d. The pH of recycled concrete material shall not exceed 11.

D. Drainage Fill:

1. Material shall be washed, uniformly-graded mixture of crushed stone, or crushed or uncrushed gravel, with 100 percent passing 1.5-inch sieve and not more than five percent passing a No. 4 sieve.
- E. Pipe Bedding Material:
 1. Aggregate material shall be angular, clean washed, crushed stone and gravel, free of: debris, waste, frozen materials, organic material and other deleterious matter. Material shall be Size No. 67 (or, No. 57, for sewer lines) in accordance with ASTM D448 and South Carolina Department of Transportation Standard Specifications.
- F. Stone Stabilization Material:
 1. Stone stabilization material shall be angular, clean washed No. 67 stone in accordance with ASTM D448.

2.2 SOURCE QUALITY CONTROL

- A. Perform quality assurance testing, and submit results to ENGINEER, in accordance with the 'Quality Assurance' Article in Part 1 of this Section.

PART 3 EXECUTION

3.1 INSPECTION

- A. Provide ENGINEER with sufficient notice and with means to examine areas and conditions under which excavating, filling, and grading will be performed. ENGINEER will advise CONTRACTOR in writing when ENGINEER is aware of conditions that may be detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 TEST PITS

- A. General:
 1. In advance of the construction, excavate, make observations and measurements, and fill test pits to determine conditions or location of the existing Underground Facilities and structures. Perform all work required in connection with excavating, stockpiling, maintaining, sheeting, shoring, filling, and replacing pavement for test pits. CONTRACTOR shall be responsible for the definite location of each existing Underground Facility involved within the area of excavation for the Work. Exercise care during such location work to avoid damaging and disrupting the affected Underground Facility or structure. CONTRACTOR shall be responsible for repairing, at his expense, damage to Underground Facility or structure caused during the Work.

3.3 PREPARATION

- A. Do not burn clearing debris at the Site unless approved by OWNER and authorities having jurisdiction. If burning is permitted, comply with requirements of authorities having jurisdiction and Laws and Regulations. If burning is permitted at the Site, also comply with OWNER's requirements.

B. Use of Explosives:

1. Do not bring explosives to the Site or use explosives without written consent of OWNER and authorities having jurisdiction. Obtaining such written consent will not relieve CONTRACTOR of responsibility for injury or damage caused by CONTRACTOR's blasting operations. Submit to ENGINEER copies of written consent and permits for blasting. When permitted, blasting shall comply with Section 31 23 16.26, Rock Removal. CONTRACTOR is solely responsible for handling, storing, and using explosive materials when use of explosives is permitted.

C. Dust Control:

1. Control objectionable dust caused by CONTRACTOR's operation of vehicles and equipment, clearing, and other actions. To minimize airborne dust, apply water or use other methods subject to ENGINEER's acceptance and approval of authorities having jurisdiction.

D. Maintenance and Protection of Traffic:

1. Maintain traffic in accordance with the most recent edition of the Watch Area Traffic Control Handbook.

3.4 DEWATERING

A. Dewatering – General:

1. Provide and maintain adequate drainage and dewatering equipment to remove and dispose of all surface water and ground water entering excavations, or other parts of the Work and work areas. Keep each excavation dry during excavation, subgrade preparation, and continually thereafter until the structure to be built therein is acceptable to ENGINEER and backfilling operations are completed and acceptable to ENGINEER.
2. Keep all working areas at the Site free of surface water at all times. Provide temporary drainage ditches and temporary dikes, and provide required temporary pumping and other work necessary for diverting or removing rainfall and all other accumulations of surface water from excavations and fill areas. Perform diversion and removal of surface water in manner that prevents accumulation of water behind permanent or temporary structures and at any other locations in the construction area where such accumulations may be detrimental.
3. Water used for working or processing, resulting from dewatering operations, or containing oils or sediments that will reduce the quality of the surface water or groundwater downstream of the point of discharge, shall not be directly discharged. Divert such waters through temporary settling basin or filter before discharging to surface water, groundwater, or drainage routes.
4. CONTRACTOR shall be responsible for condition of piping, conduits, and channels used for drainage and such piping, conduits, and channels shall be clean and free of sediment.
5. Remove water from excavations as fast as water collects.

B. Temporary Dewatering System:

1. CONTRACTOR shall design, provide, and operate dewatering system to include sufficient trenches, sumps, pumps, hose, piping, well points, deep wells, and similar facilities, necessary to depress and maintain groundwater level 1'-0" below the base of each excavation during all stages of construction operations.

2. Design and operate dewatering system to avoid settlement and damage to existing structures and Underground Facilities.
 3. Groundwater table shall be lowered in advance of excavation for a sufficient period of time to allow dewatering of fine grain soils.
 4. Maintain groundwater level at excavations two feet below lowest subgrade excavation until the structure has sufficient strength and weight to withstand horizontal and vertical soil and water pressures from natural groundwater.
 5. Operate dewatering system continuously, 24 hours per day, seven days per week. Provide standby pumping facilities and personnel to maintain the continued effectiveness of the system. Do not discontinue dewatering operations without first obtaining ENGINEER's acceptance for such discontinuation.
 6. If, in ENGINEER's opinion, the water levels are not being lowered or maintained as required, provide additional or alternate temporary dewatering devices as necessary, at no additional cost to OWNER.
 7. Locate elements of temporary dewatering system to allow continuous dewatering operation without interfering with the Work to the extent practicable.
 8. Where portions of dewatering system are located in the area of permanent construction, submit to and obtain ENGINEER's acceptance of details of proposed methods of constructing the Work at such location. Control of ground water shall continue until the permanent construction provides sufficient dead load to withstand hydrostatic uplift of the normal groundwater, until concrete has attained sufficient strength to withstand earth and hydrostatic loads, and until waterproofing Work is completed.
 9. Perform pumping of water from excavations in a manner that prevents carrying away of unsolidified concrete materials, and that avoids damaging the subgrade.
 10. Before discontinuing dewatering operations or permanently allowing rise of groundwater level, prepare computations to demonstrate that structures affected by the water level rise are protected by fill or other means to sustain uplift. Use a safety factor of 1.25 when preparing such calculations.
- C. Disposal of Water Removed by Dewatering System:
1. CONTRACTOR's dewatering system shall discharge to a suitable location acceptable to OWNER, in accordance with Laws and Regulations.
 2. Convey water from excavations in closed conduits. Do not use trench excavations as temporary drainage ditches.
 3. Dispose of water removed from excavations in a manner that does not endanger health and safety, property, the Work, and other portions of the Project.
 4. Dispose of water in manner that causes no inconvenience to OWNER, others involved in the Project, and adjacent and downstream properties.

3.5 EXCAVATION

- A. Perform all excavation required to complete the Work as shown, specified, and required. Excavations shall include removing and handling of earth, sand, clay, gravel, hardpan, soft, weathered or decomposed rock, pavements, rubbish, and other materials within the excavation limits. Where the excavation includes rock that requires drilling, blasting, or specialized equipment for removal, remove rock in accordance with Section 31 23 16.26, Rock Removal.
- B. Excavation Protection:

1. Provide excavation protection system(s) in accordance with Laws and Regulations to prevent injury to persons and property, including Underground Facilities.
 2. Excavation Less Than Five Feet Deep: Excavations in stable rock or in soil conditions where there is no potential for a cave-in may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.
 3. Excavations Greater Than Five Feet Deep: Excavations in stable rock may be made with vertical sides. Under all other conditions, excavations shall be sloped and benched, shielded, or shored and braced.
 4. Provide and maintain excavation protection system(s) in accordance with submittals accepted by ENGINEER and required under Paragraph 1.5 of this Section.
- C. Maintain excavations in dry condition in accordance with "Dewatering" Article in Part 3 of this Section.
- D. Elevation of bottom of footings shown is approximate. ENGINEER may direct such minor changes in dimensions and elevations as may be required to secure a satisfactory footing.
- E. When excavations are made below required grades without written order of ENGINEER, fill such excavations with compacted select fill material, as directed by ENGINEER, at CONTRACTOR's expense.
- F. Extend excavations sufficiently on each side of structures, footings, and similar construction to allow setting of forms, installation of shoring and bracing, and the safe sloping of banks, as necessary.
- G. Subgrades – General:
1. Subgrades shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud, muck, and other soft or unsuitable materials; and shall remain firm and intact under all construction operations. Subgrades that are otherwise solid but become soft or mucky on top due to construction operations shall be reinforced with course aggregate material obtained from sources listed on the most recent edition of SCDOT Qualified Products List 2. Finished elevation of stabilized subgrades shall not be above subgrade elevations shown.
 2. If, in ENGINEER's opinion, subgrade becomes softened or mucky because of construction delays, failure to dewater properly, or other cause within CONTRACTOR's control, subgrade shall be excavated to firm material, trimmed, and backfilled with select fill material at CONTRACTOR's expense.
- H. Proofrolling Subgrades:
1. Prior to placing fill or constructing pavements or slabs, proofroll the subgrade surface with sufficient proofrolling apparatus. Before starting proofrolling, submit to and obtain acceptance from ENGINEER of proofrolling apparatus and procedure to be used.
 2. Proofrolling operations shall be made in the presence of ENGINEER. Notify ENGINEER at least 24 hours in advance of start of proofrolling operations.
 3. Subgrades displaying pronounced elasticity or deformation, deflection, cracking, or rutting shall be stabilized as directed by ENGINEER. Unsuitable materials shall be undercut to the depth directed by ENGINEER and replaced with select fill material. Other suitable stabilization methods may be directed by ENGINEER.

- I. Pipe Trench Preparation:
 - 1. Not more than 100 feet of trench may be opened in advance of installing pipe in trench unless prior approval is given by the ENGINEER.
 - 2. Trench width shall be minimized to greatest extent practical, and shall comply with the following:
 - a. Trench width shall be sufficient to provide space for installing, jointing and inspecting piping. Refer to Drawings for trench requirements.
 - b. Waterlines:
 - 1) Maximum allowable trench width at the top of pipe shall be equal to the pipe barrel OD plus sixteen inches, unless otherwise shown or indicated.
 - 2) Prior approval of County Inspector is required to deviate from this; if no prior approval is received, bedding shall be installed per ENGINEER's direction and at Contractor's expense.
 - c. Sewer lines: Maximum allowable trench width at the top of pipe shall be:
 - 1) For 8"-15" pipe, the maximum trench width at the top of pipe shall be nominal pipe size plus 30 inches.
 - 2) For 18"-30" pipe, the maximum trench width at the top of pipe shall be nominal pipe size plus 36 inches.
 - 3) For 36" and larger pipe, the maximum trench width at the top of pipe shall be nominal pipe size plus 42 inches.
 - 4) Prior approval of ENGINEER is required to deviate from maximum allowable widths. Such deviation requiring an increase in bedding and/or change in pipe class will be installed at Contractor's expense.
 - d. Trench width shall be sufficient for shoring and bracing, or shielding and dewatering.
 - e. Do not use excavating equipment that requires the trench to be excavated to excessive width.
 - 3. Depth of trench shall be as shown or indicated. If required and approved by ENGINEER in writing, depths may be revised.
 - 4. Where ENGINEER considers existing material beneath bedding material unsuitable, remove and replace such unsuitable material with select fill material.
- J. Excavated Materials to be Used as Fill:
 - 1. Stockpile excavated materials that are acceptable for use as fill.
 - 2. As excavation proceeds, keep stockpiles of excavated materials suitable for use as fill separate from unsuitable materials and waste materials.
 - 3. Place, grade, and shape stockpiles for proper drainage.
 - 4. Locate and retain soil materials away from edge of excavations.
 - 5. Dispose of excess soil material and waste materials as specified in this Section.
 - 6. Stockpiled excavated soils for use as select fill or general fill shall be tested and classified by laboratory as on-Site select fill or on-Site general fill. Perform required quality assurance testing for material verification on stockpiled materials as soon as possible to demonstrate compliance of excavated materials with the Contract Documents.

3.6 UNAUTHORIZED EXCAVATION

- A. All excavations outside lines and grades shown or indicated and that are not approved by ENGINEER, together with removing and disposing of the associated material, shall be at

CONTRACTOR's expense. Fill unauthorized excavations with properly-compacted select fill material at CONTRACTOR's expense.

3.7 EROSION AND SEDIMENT CONTROLS

- A. Provide temporary erosion and sediment controls in accordance with York County Engineering Standards 16-series Standard Details and related Standard Details and erosion control requirements. When applicable, also comply with requirements of the erosion and sediment control plan approved by authorities having jurisdiction.

3.8 SHEETING, SHORING, AND BRACING

A. General:

1. Design and provide sheeting, shoring, bracing, cofferdams, and similar excavation supports as shown, specified, and required for the Work.
2. Clearances and types of temporary sheeting, shoring, bracing, and similar excavation supports, insofar as they may affect the finished character of the Work and the design of sheeting to be left in place, will be subject to the ENGINEER's approval; but CONTRACTOR is responsible for adequacy of all sheeting, shoring, bracing, cofferdams, and similar excavation supports.
3. Materials:
 - a. Previously-used materials shall be in good condition, and shall not be damaged or excessively pitted. All steel or wood sheeting designated to remain in place shall be new. New or used sheeting may be used for temporary sheeting, shoring, and bracing.
 - b. All steel work for sheeting, shoring, bracing, cofferdams and other excavation supports, shall be in accordance with ANSI/AISC 360, except that field welding will be allowed.
 - c. Provide permanent steel sheet piling or pressure-creosoted timber sheet piling where subsequent removal of sheet piling might allow lateral movement of soil under adjacent structures
4. As excavation progresses, carry down shoring, bracing, cofferdams, and similar excavation supports to required elevation at bottom of excavation.
5. Comply with Laws and Regulations regarding sheeting, shoring, bracing, cofferdams, and similar excavation supports.
6. Maintain sheeting, shoring, bracing, bracing, and other excavation supports in excavations regardless of time period excavations will be open.
7. Unless otherwise shown, specified, or directed, remove materials used for temporary construction when the Work is completed. Perform such removal in manner not injurious to the structures and Underground Facility, their appearance, and adjacent construction.

B. Sheeting Left in Place:

1. Materials: Steel sheeting shown or indicated to be left in place shall consist of rolled sections of continuous interlocking type. Steel sheeting material designated to be left in place shall be new. Type and design of the sheeting and bracing shall comply with the above requirements for steel work for all sheeting and bracing.
2. Installation:
 - a. Steel sheeting to be left in place shall be driven straight to lines and grades as shown, indicated, or directed. Piles shall penetrate into firm materials with secure

interlocking throughout pile's entire length. Damaged piling having faulty alignment shall be pulled and replaced by new piling.

- b. Type of guide structure used and method of driving steel sheeting to be left in place shall be determined by CONTRACTOR's professional engineer. Jetting is not allowed.
 3. Cut off at elevations shown, indicated, or directed by ENGINEER sheeting left in place and remove cut off pilings from the Site.
 4. Clean wales, braces, and all other items to be embedded in the permanent structure, and ensure that concrete surrounding the embedded element is sound and free of air pockets and harmful inclusions. Provisions shall include the cutting of holes in the webs and flanges of wale and bracing members, and welding of steel diaphragm waterstops perpendicular to the centerline of brace ends that are to be embedded.
 5. Subsequent to removing the inside face forms, and when removal of bracing is allowed, cut back steel at least two inches inside the wall face and patch opening with concrete repair mortar in accordance with Section 03 00 05, Concrete. Concrete shall be thoroughly worked beneath wales and braces, around stiffeners, and at other place where voids may be formed.
 6. Portions of sheeting or soldier piles and breast boards that are in contact with structure foundation concrete shall be left in place, together with wales and bracing members that are cast into foundation or superstructure concrete.
- C. Removal of Sheeting and Bracing:
1. Remove sheeting and bracing from excavations, unless otherwise directed by ENGINEER in writing. Perform removal to avoid damaging the Work and adjacent construction. Removal shall be equal on both sides of excavation to ensure no unequal loads on structures and Underground Facilities.
 2. Defer removal of sheeting and bracing, where removal may cause soil to come into contact with concrete, until the following conditions are satisfied:
 - a. Concrete has cured for not less than seven days.
 - b. Wall and floor framing, up to and including grade level floors, is in place.

3.9 TRENCH SHIELDS

- A. Excavation of earth material below bottom of trench shield shall not exceed the limits established in Laws and Regulations.
- B. When using a shield for installing piping:
1. Portions of trench shield extending below the mid-diameter of an installed, rigid pipe, such as prestressed concrete pipe and other types of rigid pipe, shall be raised above the pipe's mid-diameter elevation prior to moving the shield along the trench for further construction.
 2. Bottom of shield shall not at any time extend below mid-diameter of installed pipe that is flexible or has flexing capability, such as steel, ductile iron, PVC, CPVC, polyethylene, and other pipe that has flexing capability.
- C. When using a shield for installing structures, bottom of the shield shall not extend below the top of the bedding for the structures.
- D. When removing the shield or moving the shield ahead, exercise extreme care to prevent moving piping, structures, and other Underground Facilities, and prevent disturbance of

bedding material for piping, structures, and other Underground Facilities. When piping, structures, or Underground Facilities are disturbed, remove and reinstall the disturbed items in accordance with the Contract Documents.

3.10 FILL AND COMPACTION – GENERAL PROVISIONS

- A. Provide and compact all fill required for the finished grades as shown and as specified in this Section.
- B. Place fill in excavations as promptly as progress of the Work allows, but not until completing the following:
 - 1. ENGINEER's authorization after observation of construction below finish grade, including dampproofing, waterproofing, perimeter insulation, and similar Work.
 - 2. Inspection, testing, approval, and recording of locations of Underground Facilities.
 - 3. Removal of concrete formwork.
 - 4. Removal of shoring and bracing, and filling of voids with satisfactory materials.
 - 5. Removal of trash and debris.
 - 6. Permanent or temporary horizontal bracing is in place on horizontally-supported walls.
 - 7. Field testing of tanks, Underground Facilities including piping and conduits, and water-retaining structures.
- C. Fill that includes organic materials or other unacceptable material shall be removed and replaced with approved fill material in accordance with the Contract Documents.
- D. Placement – General:
 - 1. Place fill to the grades shown or indicated. Bring up evenly on all sides fill around structures and Underground Facilities.
 - 2. Fill areas shall be undercut and proof-rolled as directed by ENGINEER.
 - 3. Place fill materials at moisture content and density as specified in Table 31 23 05-A of this Section and this Article's requirements on compaction density. Furnish and use equipment capable of adding measured amounts of water to the fill materials to bring fill materials to a condition within required moisture content range. Furnish and use equipment capable of discing, aerating, and mixing the fill materials to ensure reasonable uniformity of moisture content throughout the fill materials, and to reduce moisture content of borrow materials by air drying, when necessary. When subgrade or lift of fill materials requires moisture-conditioning before compaction, fill material shall be sufficiently mixed or worked on the subgrade to ensure uniform moisture content throughout the lift of material to be compacted. Materials at moisture content in excess of specified limit shall be dried by aeration or stockpiled for drying.
 - 4. Perform compaction with equipment suitable for the type of fill material placed. Select and use equipment capable of providing the minimum density required in the Contract Documents. Use light compaction equipment, with equipment gross weight not exceeding 7,000 pounds within horizontal distance of ten feet from the wall of completed, below-grade structures. Furnish and use equipment capable of compacting in restricted areas next to structures and around piping and Underground Facilities. Effectiveness of the equipment selected by CONTRACTOR shall be tested at start of compacted fill Work by constructing a small section of fill within the area where fill will be placed. If tests on the test section of fill indicate that required compaction is not obtained, do one or more of the following: increase the amount of coverages, decrease the lift thicknesses, or use different compactor equipment.

5. Place fill materials in horizontal, loose lifts, not exceeding specified uncompacted thickness. Place fill in a manner ensuring uniform lift thickness after placing. Mechanically compact each lift, by not less than two complete coverages of the compactor. One coverage is defined as the conditions reached when all portions of the fill lift have been subjected to the direct contact of compactor's compacting surface. Compaction of fill materials by inundation with water is unacceptable.
 6. Do not place fill materials when standing water is present on surface of the area where fill will be placed. Do not compact fill when standing water is present on the fill to be compacted. Do not place or compact fill in a frozen condition or on top of frozen material. Fill containing organic materials or other unacceptable material previously described shall be removed and replaced prior to compaction.
 7. If required densities are not obtained because of improper control of placement or compaction procedures, or because of inadequate or improperly-functioning compaction equipment, CONTRACTOR shall perform all work required to provide the required densities. Such work shall include, at no additional cost to OWNER, complete removal of unacceptable fill areas and replacement and re-compaction until acceptable fill is provided.
 8. Repair, at CONTRACTOR's expense, observed or measured settlement. Make repairs and replacements as required within 30 days after being so advised by ENGINEER.
- E. Fill Against Concrete:
1. Placing fill against concrete below finished grade is not allowed until the concrete has attained its specified strength, as determined by duration of concrete curing and testing of field-cured concrete cylinders. Requirements for strength and curing time are in Section 03 00 05, Concrete.
 2. Elevation of fill placed against concrete walls shall not differ by more than two feet on each side of walls, unless walls are adequately braced or all floor framing is in place up to and including grade level slabs.
 3. Backfill structural foundation units as soon as practicable, in accordance with this Section, after concrete has gained sufficient strength to avoid damage, to avoid ponding of surface water and accumulation of debris.
 4. Where fill is placed against waterproofed surface, exercise care that waterproofing material is not damaged.
- F. Fill in Electrical Ductbank Trenches:
1. Provide general fill for full depth of electrical ductbank trench, below and above electrical ductbank. Where one ductbank passes beneath another pipe or ductbank, provide select fill to the elevation of the bottom of upper ductbank or pipe, as applicable.
 2. Placing and compacting fill in electrical ductbank trenches shall comply with requirements of Paragraph "G. Fill in Pipe Trenches", of this Article.
- G. Fill in Pipe Trenches:
1. Place pipe bedding material in pipe trenches in horizontal layers, and thoroughly compact each layer before the next layer is placed.
 2. Piping Installed in Fills Above Pre-construction Grade:
 - a. Prior to installing piping, place the fill in accordance with the Contract Documents until the fill reaches a minimum elevation two feet higher than the top of piping to be installed. Excavate the trench; install the piping and backfill. Subsequently provide the remainder of the fill required for the Work.

3. Piping trenches may be backfilled prior to testing of piping, unless nature of the test requires observation of pipe during testing. Do not construct building or structure over piping until piping has been successfully tested and passed.
 4. Pipe Bedding: Pipe bedding material shall be as indicated on the Drawings or as directed by the ENGINEER and in accordance with York County Standard Drawing Detail No. 15.02.
 - a. Place loose backfill by hand around the pipe and completely under the pipe haunches in uniform layers not to exceed 6 inches in depth.
 - b. Place each layer and then carefully and uniformly tamp with mechanical tamp, so that the pipe is not damaged nor the alignment disturbed.
 - c. Depending upon soil and ground water conditions, greater depths (undercut) may be required to create a stable condition.
 - d. When the bottom of the trench is not sufficiently stable to prevent vertical or lateral displacement of the pipe after installation, stone stabilization shall be installed to develop a nonyielding foundation for the bedding and pipe. When such conditions are encountered, the trench shall be excavated to a depth determined by the ENGINEER, and #67 crushed stone shall be placed
 5. Placing and Compacting Pipe Trench Fill: Unless otherwise shown, placement and compaction of pipe trench fill materials shall comply with the following:
 - a. Pipe bedding material shall be spread and the surface graded to provide a uniform and continuous support beneath piping at all points between bell holes or pipe joints. Slight disturbance of installed pipe bedding material surface during withdrawal of pipe slings or other lifting tackle is acceptable.
 - b. After each pipe's bedding material has been graded, and the piping has been aligned, joined in accordance with the Contract Documents, and placed in final position on bedding material, provide and compact sufficient pipe trench fill material under and around each side of the pipe and back of the bell or end thereof to hold piping in proper position and maintain alignment during subsequent pipe jointing and embedment operations. Deposit and compact pipe trench fill material uniformly and simultaneously on each side of piping to prevent lateral displacement of piping. Place and compact pipe trench fill material to an elevation 12 inches above top of pipe, unless otherwise shown or specified.
 - c. Each layer of pipe trench fill material shall be compacted by at least two complete coverages of all portions of surface of each lift using appropriate compaction equipment.
 - d. Method of compaction and compaction equipment used shall be appropriate for material to be compacted and shall not transmit damaging shocks to the piping.
- H. Temporary Pavement:
1. Place 1-1.5 inches of temporary asphalt concrete pavement immediately after filling excavations in paved roadways and other paved areas that will remain for permanent use.
 2. Maintain surface of paved area over the fill in good and safe condition during progress of the Work, and promptly fill depressions over and adjacent to the fill area caused by settlement of fill.
 3. Permanent replacement pavement shall be equal to that of the existing roadways, unless otherwise shown or specified.
- I. Subbase Placement:
1. Provide subbase material where shown to the limits shown or indicated.

2. Place subbase material in compacted lifts not exceeding depth of six inches each.

J. Drainage Fill Placement:

1. Provide drainage fill material where shown to the limits shown or indicated.
2. Place drainage fill material in compacted layers of uniform thickness not exceeding depth of six inches each. Compact lifts of drainage fill using suitable compaction equipment.

K. Compaction Density Requirements:

1. Compaction required for all types of fills shall be in accordance with Table 31 23 05-A of this Section. Moisten material or aerate the material as necessary to provide the moisture content that will facilitate obtaining the required compaction.

**TABLE 31 23 05-A
REQUIRED MINIMUM DENSITY**

Material	Percent Compaction (ASTM D698)	Uncompacted Lift (inches)
General Fill		
More than five feet below final grade	100	8
Less than five feet below final grade	95	8
Select Fill		
Below concrete slabs or mats	100	8
Below pavement and sidewalks	100	12
Behind concrete walls	95	8
Subbase Material		
Below pavement and sidewalks	100	12
All other locations	100	8
Pipe Bedding Material		
Below structures or pavement	100	8
All other locations	95	6
Drainage Fill	N/A	6

2. Fill shall be wetted and thoroughly mixed to achieve optimum moisture content plus-or-minus three percent, with the following exceptions:
 - a. On-site clayey soils: Optimum to plus three percent.
3. Replace natural, undisturbed soils or compacted soil subsequently disturbed or removed by construction operations with materials compacted as indicated in Table 31 23 05-A of this Section.
4. Field quality control testing for density; to verify that specified density was obtained, will be performed during each day of compaction Work. Responsibility for field quality control testing is specified in the "Field Quality Control" Article in Part 3 of this Section.
5. When field quality control testing indicates unsatisfactory compaction, provide additional compaction necessary to obtain the specified compaction. Perform additional compaction Work at no additional cost to OWNER until specified compaction is obtained. Such work includes complete removal of unacceptable (as determined by

ENGINEER) fill areas and replacement and re-compaction until acceptable fill is provided in accordance with the Contract Documents.

- L. Replacement of Unacceptable Excavated Materials: In cases where over-excavation to replace unacceptable soil materials is required, backfill the excavation to required subgrade with select fill material and thoroughly compact in accordance with Table 31 23 05-A and the associated "Compaction Density Requirements" in this Article. Slope the sides of excavation in accordance with the maximum inclinations specified for each structure location.

3.11 GRADING

- A. General:
 - 1. Uniformly grade areas within limits of grading under this Section, including adjacent transition areas.
 - 2. Smooth subgrade surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free of irregular surface changes, and shall comply with the following:
 - 1. Grassed Areas or Areas Covered with Gravel, Stone, Wood Chips, or Other Special Cover: Finish areas to receive topsoil or special cover to within not more than one inch above or below the required subgrade elevations.
 - 2. Sidewalks: Shape surface of areas under sidewalks to line, grade, and cross section, with finish surface not more than one inch above or below the required subgrade elevation.
 - 3. Pavements: Shape surface of areas under pavement to line, grade, and cross section, with finish surface not more than 1/2-inch above or below the required subgrade elevation.
- C. Grading Surface of Fill Under Concrete Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 1/2-inch when tested with a ten-foot straight edge.
- D. Compaction:
 - 1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.12 PAVEMENT SUBBASE COURSE

- A. Comply with York County Ordinance 154.110.
- B. General:
 - 1. Place subbase material, in layers of specified thickness, over ground surface to support pavement base course.
 - 2. After completing filling and grading, shape and compact pavement subgrade to an even, firm foundation in accordance with this Section. Remove unsuitable subgrade

materials, including soft materials, boulders, vegetation, and loose stones, and replace with compacted fill material as directed by ENGINEER.

C. Grade Control:

1. During construction, maintain lines and grades including crown and cross-slope of subbase course.

D. Placing of Pavement Subbase Course:

1. Place subbase course material on prepared subgrade in layers of uniform thickness, in accordance with indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placing operations.
2. Compaction and Grade Control: Comply with compaction requirements for excavation and fill in this Section, and the following requirements:
 - a. Compaction with roller shall begin at the sides of the area to be paved and continue toward the center. Continue compaction until there is no movement of the course ahead of the roller.
 - b. After compaction of top lift of pavement subbase, provide and uniformly spread pipe bedding material and screenings compacted, on the surface, and sweep using gang-dragged broom, followed by compaction.
 - c. After rolling, check for grade with a line not less than 40 feet in length; depression over 1/2-inch deep shall be filled to satisfaction of ENGINEER.
3. After completing compaction, other than that necessary for bringing material for the next course, do not haul or drive over the compacted subbase.
4. Do not install pavement subbase in excess of 500 feet in length without compacting to prevent softening of the subgrade.
5. If subgrade material becomes churned up into or mixed with the subbase material, remove the mixed material and replace with clean, compacted subbase material.

E. Shoulders:

1. Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials placed in such quantity to compact to thickness of each lift of subbase material.
2. Compact and roll not less than 12-inch width of shoulder simultaneously with compacting and rolling of each lift of subbase material.

3.13 DISPOSAL OF EXCAVATED MATERIALS

A. General:

1. CONTRACTOR shall haul away material removed from excavations that does not comply with requirements for fill, or is in excess of the quantity required for fill.
2. Disposal of materials shall be in compliance with Laws and Regulations, at no additional cost to OWNER.

3.14 TEMPORARY BARRIERS

- A. Provide temporary barrier surrounding excavations and excavation work areas to provide temporary protection to persons and property. Barrier shall have openings only at vehicular, equipment, and worker access points.

B. Minimum Material Requirements for Temporary Barriers:

1. Temporary barrier shall not be less snow fence-type fencing, four feet high.
2. Fence shall be constructed of vertical hardwood slats measuring not less than 1.5 inches by 1/4-inch interwoven with strands of horizontal wire, or shall be of equivalent plastic construction.
3. Posts:
 - a. Posts shall be steel, either "U"-, "Y"-, "T"-shaped, or channel section.
 - b. Posts shall have a nominal weight of not less than 1/3-pound per linear foot, exclusive of the anchor.
 - c. Posts shall have tapered anchors weighing not less than 0.67 pounds, each firmly attached by means of welding, riveting or clamping.
 - d. Posts shall have corrugations, knobs, notches, or studs placed and constructed to engage a substantial number of fence line wire in the proper position.
 - e. Provide each post with sufficient quantity of galvanized wire fasteners or clamps, of not less than 0.120-inch diameter, for attaching fence wire to post.

3.15 FIELD QUALITY CONTROL

- A. Site Tests: OWNER will employ a testing laboratory to perform field quality control testing. Specific Quality Assurance Testing requirements and procedures shall be established on a Project-by-Project basis.
 1. Responsibilities and Duties of CONTRACTOR:
 - a. Use of testing laboratory shall in no way relieve CONTRACTOR of the responsibility to provide materials and Work in full compliance with the Contract Documents.
 - b. To facilitate testing laboratory, CONTRACTOR shall advise OWNER at least two days in advance of filling operations to allow for completion of field quality control testing and for assignment of personnel.
 - c. It shall be CONTRACTOR's responsibility to accomplish the specified compaction for fill and other earthwork. CONTRACTOR shall control construction operations by confirmation tests to verify and confirm that CONTRACTOR has complied, and is complying at all times, with the Contract Documents relative to compaction, control.

END OF SECTION

SECTION 31 23 16.26

ROCK REMOVAL

PART 1 GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. Provide all labor, materials, equipment, and incidentals as shown, specified, and required to perform rock removal required for the Work, including disposing of excavated rock material.
 - 2. Obtain permits required by authorities having jurisdiction for rock removal Work, including transporting, storing, and using blasting materials.
 - 3. Perform rock removal Work in compliance with Laws and Regulations applicable permits, and requirements of authorities having jurisdiction.
- B. Coordination:
 - 1. Review procedures under this and other Sections and coordinate the Work that must be performed with or before rock removal.
- C. Related Sections:
 - 1. Section 31 23 05, Excavation and Fill.

1.2 REFERENCES

- A. Standards referenced in this Section are:
 - 1. United States Bureau of Mines (USBM), Report of Investigations (RI) 8507.

1.3 TERMINOLOGY

- A. The following words or terms are not defined but, when used in this Section, have the following meaning:
 - 1. "Rock removal" is removal of igneous, metamorphic, or sedimentary rock or stone; boulders over two cubic yards in volume in open areas and boulders over one cubic yard in volume in trenches; and mass concrete; that cannot be removed using rippers or other mechanical methods and therefore requires drilling and blasting or use of large excavator-mounted pneumatic breakers. The following material will not be measured nor allowed for payment as rock removal:
 - a. Soft, weathered or disintegrated rock that can be removed by normal excavating equipment, including bulldozers with rippers and large trackhoes with rock teeth or rock buckets.
 - b. Loose or previously blasted rock.
 - c. Broken stone in rock fills.
 - d. Rock or stone that falls into the excavation from outside limits of excavation shown or indicated in the Contract Documents.
 - e. Boulders that can be removed without drilling, blasting, or pneumatic breakers.
 - f. Pavements, sidewalks, and gutters of concrete, asphalt, or masonry.
 - 2. "Trenches" means excavations having vertical sides whose depth exceeds its width, made for Underground Facilities and drainage beds.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Professional Engineer:
 - a. CONTRACTOR or blasting Subcontractor shall retain a registered professional engineer legally qualified to practice in South Carolina. Professional engineer shall have at least five years experience conducting preblast surveys, structural evaluations, and structural condition assessments.
 - b. Responsibilities include:
 - 1) Preparing or supervising preparation of preblast survey.
 - 2) Preparing written requests for clarifications or interpretations of the Contract Documents for submittal to ENGINEER by CONTRACTOR.
 - 3) Signing and sealing preblast survey report.
 - 4) Performing condition assessments of structures damaged by blasting.

1.5 SUBMITTALS

A. Informational Submittals: Submit the following:

1. Test and Evaluation Reports:
 - a. Rock surface survey information, in accordance with Part 3 of this Section.
 - b. Preblast survey report, in accordance with Part 3 of this Section.
 - c. Blasting records, when requested by ENGINEER, in accordance with Part 3 of this Section.
 - d. Vibration and overpressure monitoring results, in accordance with Part 3 of this Section.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 EXAMINATION

A. Top-of-Rock Survey:

1. Prior to blasting and rock removal, CONTRACTOR shall survey and measure the elevation of the top of rock to determine the in-place quantity of rock to be excavated.
2. Uncover rock to be excavated in sections or areas acceptable to ENGINEER for surveying.
3. Submit to ENGINEER field notes, site plan showing rock elevations measured, cross-sections of rock surface when necessary or required by ENGINEER, and detailed estimation of quantity of rock to be excavated.

3.2 PREBLAST SURVEY

A. General:

1. Preblast survey shall be performed or supervised by CONTRACTOR's or Subcontractor's professional engineer qualified in accordance with Part 1 of this Section.
2. Complete preblast survey before starting blasting and rock removal.
3. Preblast Survey Limits:

- a. Preblast survey shall document the preblast condition, defects, and other physical factors that could reasonably be affected by blasting, of all existing residences; commercial, industrial, and institutional buildings; water supply wells; Underground Facilities and above-ground utilities; and other structures within the greater of the following distances from the limits of rock removal Work to be performed by blasting: 500 feet, or limit required in Laws and Regulations.
 - b. Preblast survey shall include structures such as dams, ponds and reservoirs, cisterns, structures of historical significance, and structures with unusually costly or vulnerable contents.
 - c. Preblast survey shall document the species and sensitivity of livestock and other animals that could be affected by blasting.
 4. If, during the Work, CONTRACTOR is requested by a property owner or tenant to view alleged damage to property, CONTRACTOR shall give written notice to OWNER prior to visiting to the property.
- B. Preparation for Preblast Survey:
1. Contact all owners and tenants, or their legal representative, of properties within limits of preblast survey to obtain permission to conduct preblast survey of the associated property. If property owner and tenant (if any) does not grant permission to conduct preblast survey, contact property owner and tenant (if any) a second time by registered mail (return receipt requested). Second request for permission to conduct preblast survey shall include description of preblast survey to be performed and purpose of preblast survey. At least 72 hours prior to starting blasting, provide to authority having jurisdiction, in writing, names and addresses of property owners and tenants (if any) who refuse access for preblast survey.
 2. Notify property owners and tenants at least 48 hours prior to conducting preblast survey.
 3. Not less than 48 hours before conducting blasting, submit preblast survey report as specified in Paragraph 3.2.D of this Section.
- C. Method:
1. Buildings, Structures, Underground Facilities, and Above-ground Utilities:
 - a. Include in preblast survey detailed examination of interior and exterior of structures, Underground Facilities, and above-ground utilities located within specified limits of preblast survey.
 - b. Underground Facilities: With owner of Underground Facility, document condition of access points such as chambers, manholes, and vaults. Televisize the underground pipes or conduits as noted in the Drawings.
 - c. Obtain color photographs, video, and prepare sketches and written descriptions to document the condition of areas within specified limits of preblast survey.
 - d. Document evident structural faults or deficiencies and recent repairs.
 2. Wells: Include in preblast an assessment of water supply wells located within specified limits of preblast survey, including:
 - a. Information on well's date of construction, depth, method of construction, yield, water quality, and other existing available data. Obtain information from owner of well and installer (if known).
 - b. Perform short-duration pump test on each well utilizing existing pump serving the associated well. Activate pump, measure volume of water and drawdown in the well for period of one-hour or less until approximate steady state conditions are achieved. Use data obtained from these measurements to estimate approximate yield of each well.

- c. Upon completion of specified short-duration pump test, obtain groundwater sample from well and submit to water quality laboratory certified by authority having jurisdiction for potable water wells. Cost of laboratory testing shall be paid by CONTRACTOR. Laboratory shall analyze samples for iron, manganese, total dissolved solids, turbidity and total coliform using methods acceptable to authority having jurisdiction for potable water wells.
- D. Survey Report:
 - 1. General:
 - a. Prepare written report summarizing results of preblast survey.
 - b. Not less than 48 hours before blasting, submit two copies of completed preblast survey report to each authority having jurisdiction for their reference, if required. Submit one copy of preblast survey to OWNER, two copies to ENGINEER, and retain one copy at the Site.
 - c. CONTRACTOR's or Subcontractor's professional engineer shall sign and seal final preblast survey report.
 - 2. Contents: Preblast survey report shall contain the following:
 - a. Location and description of each property within or partially within the specified preblast survey limits.
 - b. Descriptions of conditions of buildings, structures, Underground Facilities, above-ground utilities, wells, and other elements included in the preblast survey.
 - c. Summary of visual observations and inspections.
 - d. Color photographs, sketches, and video as appropriate.
 - e. All data, results, and yield estimates developed from water supply well assessments.
 - 3. Photographic Documentation: Provide video to present supplemental information, as required. Include in photographs and video (where appropriate) a scale to indicate dimensions. Label photographs with name of the professional engineer responsible for preblast survey, name of property owner, and sufficient information to determine the location of the image. Include in preblast survey report one print of each photograph and include discs with video and electronic copies of photographs.
 - 4. CONTRACTOR's or Subcontractor's professional engineer shall report all findings that, in professional engineer's opinion, indicate that building, structure, Underground Facility, above-ground utility, or well will be adversely affected by the rock removal and blasting Work.

3.3 BLASTING AND ROCK REMOVAL

- A. Notify the York County Department of Fire Safety – Fire Prevention Section or the York County Fire Administrator and obtain blasting permits prior to commencing any blasting operations.
- B. Perform blasting in accordance with Laws and Regulations relative to blasting, storage and use of explosives, and rock removal.
- C. Perform rock removal adjacent to Underground Facilities and above-ground utilities and life-safety facilities with utmost care, after properly notifying and coordinating with utility owners, life-safety facility owners, and authorities having jurisdiction.
- D. Perform blasting to avoid endangering persons or property, and damaging or weakening adjacent foundations, structures, sheeting, bracing, and other facilities. Cover or otherwise suitably confine blasting.

- E. CONTRACTOR shall be fully responsible for injury and damage caused by blasting, and shall repair or replace all injury and damage immediately, as accepted by ENGINEER at no additional cost to OWNER.
- F. Limit Criteria for Blasting Vibration, Particle Velocity, and Airblast Overpressure:
 - 1. Amount of vibration, frequency and overpressure generated by blasting shall not exceed limits in Laws or Regulations, and limits established by authorities having jurisdiction.
 - 2. Maximum peak particle velocity (PPV) shall not exceed limits indicated in Figure B-1, Appendix B, of the USBM RI 8507.
 - 3. Peak airblast overpressure measured at location of nearest occupied, above-ground structure (considering wind direction) shall not exceed 0.014 psi.
- G. Keep records of all blasts, including: date; location, depth, number, and diameter of drill holes; type and amount of explosive; and other pertinent data. Submit records to ENGINEER when requested.
- H. Removal by Methods Other than Blasting:
 - 1. Where conditions of hazard exist, or clearances with existing facilities, piping, or structures are very small, or where the potential for damage to persons or property is strong, perform rock removal by means other than blasting.
 - 2. Blasting is not allowed except in areas where so allowed by Fire Department Blasting Permit as issued by the Office of State Fire Marshal.
- I. Removal and Disposal of Rock:
 - 1. Remove blasted or broken rock from excavations with suitable equipment.
 - 2. Do not use excavated rock as backfill. Dispose of excavated rock off the Site at CONTRACTOR's expense in compliance with Laws and Regulations.

3.4 SITE QUALITY CONTROL

- A. Blast Monitoring:
 - 1. Perform seismic blast monitoring in accordance with Laws and Regulations.
 - 2. Monitor blasting to allow evaluation of compliance with the limitations specified in the Contract Documents. At minimum, monitor each blast as follows:
 - a. Blast Monitoring Zone: Monitor vibrations at exterior walls of all structures within 500 feet of each blast.
 - b. If no structures are located within specified blast monitoring zone, monitor vibrations at three equally spaced radial points located at perimeter of specified blast monitoring zone.
 - c. Monitor overpressures for all structures within specified blast monitoring zone.
 - 3. Submit vibration and overpressure monitoring results to ENGINEER within 24 hours of blasting. CONTRACTOR's monitoring does not relieve CONTRACTOR of responsibility for controlling vibration and overpressure during blasting.

3.5 UNAUTHORIZED ROCK REMOVAL

- A. Rock removal outside the limits shown or indicated in the Contract Documents or that is not approved by ENGINEER, including removal, disposal, and backfill, will be at CONTRACTOR's expense.

- B. Fill unauthorized excavation below pipe or foundation with compacted select backfill as directed by ENGINEER in writing, at no additional cost to OWNER. Backfill other unauthorized excavation as specified in Section 31 23 05, Excavation and Fill.

END OF SECTION

SECTION 32 12 00

FLEXIBLE PAVING

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install flexible, hot-mix, hot-laid, asphalt concrete pavement.
2. The Work includes:
 - a. Preparation such as saw cutting, milling where shown or indicated, cleaning, and other preparation for installing flexible pavements.
 - b. Providing asphalt concrete paving materials.
 - c. Providing tack coat material.
 - d. Providing pavement markings where shown or indicated.
 - e. Providing quality controls and testing.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before flexible paving Work.

C. Related Sections:

1. Section 31 23 05, Excavation and Fill.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. AASHTO M320, Specification for Performance-Graded Asphalt Binder.
2. AASHTO MP1a, Specification for Performance-Graded Asphalt Binder.
3. AI MS-2, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.
4. ASTM C1371, Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
5. ASTM C1549, Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
6. ASTM D242/D242M, Specification for Mineral Filler For Bituminous Paving Mixtures.
7. ASTM D692/D692M, Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.
8. ASTM D946/D946M, Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.
9. ASTM D977, Specification for Emulsified Asphalt.
10. ASTM D1073, Specification for Fine Aggregate for Bituminous Paving Mixtures.
11. ASTM D1188, Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples.
12. ASTM D2726, Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.
13. ASTM D2950, Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.
14. ASTM D3549, Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.

15. ASTM D6690, Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
16. ASTM E329, Specification for Agencies Engaged in Construction Inspection and/or Testing.
17. ASTM E408, Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
18. ASTM E1918, Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
19. ASTM E1980, Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces
20. FS TT-P-115, Paint, Traffic, Highway, White and Yellow.
21. South Carolina Department of Transportation (SCDOT) Qualified Products Listings for Construction and Maintenance Materials.
22. South Carolina Department of Transportation Standard Specifications for Highway Construction.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Asphalt Concrete Production Facility:
 - a. Production facility for asphalt concrete, tack coat materials, and other bitumastic materials shall be certified by the SCDOT for furnishing such materials for SCDOT highways.
2. CONTRACTOR's Testing Laboratory:
 - a. Retain the services of independent testing laboratory to perform testing and determine compliance with the Contract Documents of the materials provided under this Section.
 - b. Do not employ the same laboratory hired by OWNER for field quality control testing under the "Field Quality Control" Article of this Section.
 - c. Testing laboratory shall comply with ASTM E329 and requirements of Section 01 45 29, Testing Laboratory Services.
 - d. Testing laboratory shall be experienced in the types of testing required.
 - e. Selection of testing laboratory is subject to ENGINEER's acceptance.

B. Regulatory Requirements:

1. Reference Specifications and Details:
 - a. Comply with applicable requirements of SCDOT Standard Specifications for Highway Construction or other Authorities Having Jurisdiction where the Work takes place.
2. Obtain required highway and street rights-of-way work permits.
3. Jurisdiction:
 - a. Paved areas to be constructed are jurisdiction of OWNER or SCDOT.

C. Quality Assurance Testing:

1. Quality assurance testing is in addition to source quality control testing, when required, and field quality control testing required under Article 3.4 of this Section.
2. Materials used in the Work may require testing and retesting, as directed by ENGINEER, during the Project. Allow free access to material stockpiles and facilities at all times. Tests not specifically indicated to be performed at OWNER's expense, including retesting of rejected materials and installed Work, shall be performed at CONTRACTOR's expense.
3. CONTRACTOR's Quality Assurance Testing Laboratory Scope:
 - a. Use of testing laboratory shall not relieve CONTRACTOR of responsibility for providing materials and the Work in compliance with the Contract Documents.

- b. Quality assurance testing laboratory shall perform the following, unless evidence of material compliance with reference specifications indicated in Paragraph 1.3.B of this Section, is submitted to ENGINEER by CONTRACTOR and asphalt concrete production facility:
 - 1) Test in accordance with reference specifications indicated in Article 1.3 of this Section. In lieu of quality assurance testing submit evidence and certification of material compliance with reference specifications. When evidence of conformance submitted is not acceptable to ENGINEER, perform quality assurance testing.
- c. To facilitate testing services, CONTRACTOR shall:
 - 1) Secure and deliver to testing laboratory and ENGINEER (when requested by ENGINEER) representative Samples of materials that CONTRACTOR proposes to furnish and that are required to be tested.
 - 2) Furnish such labor as is necessary to obtain and handle Samples at the Site or at asphalt concrete production facility and other material sources.
 - 3) Advise testing laboratory and ENGINEER sufficiently in advance of operations to allow for completion of quality assurance tests and for the assignment of personnel.

1.4 SUBMITTALS

- A. The Submittals required in 1.4.B and 1.4.C apply to non-SCDOT work. Any work involving SCDOT roads are subject to SCDOT submittal procedures.
- B. Action Submittals: Submit the following:
 - 1. Shop Drawings:
 - a. Submit the proposed asphalt concrete mix design for each asphalt concrete material, and other bituminous materials, required under this Section, providing complete data on materials, including location in the Work, source, material content and percentages, temperatures and all other pertinent data. Indicate proportion of bituminous material from reclaimed asphalt pavement.
 - b. Proposed gradation for each aggregate to be used in flexible paving. Submit gradation test results for the same material furnished on a previous project. Indicate the proportion of reclaimed asphalt pavement.
 - c. In lieu of the information required under Paragraphs 1.4.B.1.a and 1.4.B.1.b, above, submit certificates of compliance with the reference specifications indicated in Part I of this Section, for each for the following:
 - 1) Each mix design required.
 - 2) Bituminous materials required.
 - 3) Aggregates to be used in flexible paving, from each material source and each required gradation.
 - 4) Density of uncompacted asphalt concrete material.
 - 5) Density of previously-compacted, previously-tested asphalt concrete material.
 - 6) Density and voids analysis for each asphalt concrete material test specimen.
 - 7) Evidence of asphalt concrete plant inspection and compliance with the reference specifications indicated in Part I of this Section.
 - 8) Proportion of reclaimed asphalt pavement in bituminous materials and aggregate.
 - 2. Product Data:
 - a. Manufacturer's complete product data on all pavement marking materials proposed for use, including product literature, specifications, and recommended application techniques and other installation data.

- C. Informational Submittals: Submit the following:
1. Quality Assurance Test Data Submittals and Source Quality Control Submittals:
 - a. Submit for quality assurance tests and source quality control tests required.
 2. Delivery Tickets:
 - a. Submit copy of delivery ticket for each load of asphalt concrete, tack coat materials, and other materials obtained from asphalt concrete production facility, signed by CONTRACTOR
 3. Field Quality Control Submittals:
 - a. Submit results of required field quality control testing.
 4. Qualifications:
 - a. Asphalt concrete production facility, when required by ENGINEER.
 - b. CONTRACTOR's testing laboratory, when required by ENGINEER.

1.5 SITE CONDITIONS

- A. Weather Limitations:
1. Temperature:
 - a. For base course and binder course paving lifts equal to or greater than two inches thickness, atmospheric temperature shall be 40 degrees F and rising.
 - b. For surface course paving or other pavement courses in lifts less than two inches thick, temperature of surface on which pavement is to be placed shall be 50 degrees F or greater.
 2. Prohibitions:
 - a. Do not place flexible paving materials when weather is foggy or during precipitation.
 - b. Do not place flexible paving materials when the base on which the material will be placed contains moisture in excess of optimum.
 - c. Place flexible paving materials only when ENGINEER concurs that weather conditions are suitable.

PART 2 PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. System Description:
1. Provide subbase course of the thickness shown on the Drawings, in accordance with Section 31 23 05, Excavation and Fill.

2.2 ASPHALT CONCRETE MIXES

- A. Asphalt Concrete Mixtures: Provide the following materials designed and manufactured in accordance with reference specifications indicated in Part I of this Section:
1. Base Course: Comply with Section 309 of SCDOT Standard Specifications for Highway Construction.
 2. Binder Course: Comply with Section 402 of SCDOT Standard Specifications for Highway Construction and obtain from sources listed on the most recent edition of SCDOT Qualified Products List 37.
 3. Surface Course (Wearing Course, Top Course): Comply with Section 403 of SCDOT Standard Specifications for Highway Construction.

2.3 BITUMINOUS MATERIALS

A. Bituminous Materials for Asphalt Concrete:

1. Bituminous materials for asphalt concrete shall comply with Section 401 of the SCDOT Standard Specifications for Highway Construction, for the asphalt concrete mixes specified.

2.4 AGGREGATES IN FLEXIBLE PAVEMENTS

A. Aggregates for Asphalt Concrete – General:

1. Aggregate materials used in flexible pavement shall be in accordance with Section 401 of the SCDOT Standard Specifications for Highway Construction, for the asphalt concrete mix designs indicated.

2.5 PAVEMENT MARKING MATERIALS

A. Material: Pavement marking materials shall be in accordance with Section 625 for fast dry waterborne paint markings, Section 626 for epoxy pavement markings, and Section 627 of the SCDOT Standard Specifications for Highway Construction for thermoplastic pavement markings.

B. Colors:

1. Roadway Center Markings Between Opposing Traffic Lanes: Yellow.
2. Roadway Side Striping: White, unless otherwise shown or specified. On roads with divided median, right-side striping of each direction shall be white, and left-side striping shall be yellow.
3. Roadway Miscellaneous Lane Markings (turn lane arrows and text): White.
4. No-Parking Areas: Yellow.
5. Handicap Parking Spaces: Unless otherwise indicated with signs, provide handicap symbol on pavement with white paint on blue background.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the subbase and base on which flexible paving will be installed. Notify ENGINEER in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.
- B. Do not place materials on subgrades, or subbase that is muddy or has water thereon.

3.2 PREPARATION

A. Preparation: Before starting installation of flexible paving, perform the following:

1. Grade Control: Establish and maintain throughout flexible paving installation the required lines and grades, including crown and cross-slope for each asphalt concrete course during construction operations.

2. Prepare subgrade and provide subbase for flexible pavement in accordance with Section 31 23 05, Excavation and Fill. Before installing flexible pavement, obtain ENGINEER's concurrence that subgrade and subbase are suitable for installing flexible pavement.
 3. Coordinate placement of flexible pavement with York County Ordinance No. 154 and the Work including drainage structures, manholes, valve boxes, and similar items.
 4. Provide appropriate maintenance and protection of traffic measures during placement of pavement.
- B. Milling:
1. Perform milling of existing pavement where shown or indicated.
 2. "Milling" consists of the milling, shaping, and removing portions of existing surfaces by cold milling process and subsequent cleaning.
 3. Milling Equipment:
 - a. Milling machines shall be power-operated, self-propelled machines capable of removing the desired thickness of existing surfaces. Machines shall have sufficient power, traction, and stability to accurately maintain depth of cut and slope. Machines shall produce a finished profile and cross slope to within 1/4 inch of that required and shall produce uniform surface texture free of gouges and ridges greater than 3/8-inch deep.
 - b. Machines shall be equipped with a means to control dust and other particulate matter created by the cutting action.
 - c. Provide equipment that removes milled material as quickly as the rate of milling.
 - d. Use vacuum trucks, street sweepers or power brooms to clean milled surfaces.
 4. Milling Operations:
 - a. Perform milling so that, when final course of pavement is placed, required elevations and grades are provided. Where required, establish a taut reference string line to control line and grade of milling.
 - b. Minimize the time between milling and placement of pavement over milled surface.
 - c. Areas not accessible to the milling machine, such as around or adjacent to drainage structures, manholes, curbs, and transverse joints on structures, may be removed by a small milling machine, handwork or other method acceptable to ENGINEER.
 - d. Remove milled material as soon as it is milled. Remove fines and other material prior to opening milled area to traffic. Control objectionable dust emissions. When traffic has been allowed into milled area or when more than 48 hours have elapsed since milling, clean the milled area again prior to applying tack coat.
 - e. Maintain drainage to drainage inlets and other drainage structures in a manner acceptable to ENGINEER.
 - f. Properly dispose of milled material at a location away from the Site.
- C. Surface Preparation:
1. Repair surface defects in existing pavement to provide uniform surface to receive new pavement.
 2. Provide crack sealant to completely fill cracks more than 1/16-inch wide in areas shown or indicated on the Drawings.
 3. Clean existing surfaces over which asphalt concrete pavement will be installed, by removing from the surface foreign material, excess asphalt concrete, excess joint sealant, and crack filler, and other undesirable matter.
 4. Provide tack coat as indicated in Part 3 of this Section.

3.3 INSTALLATION OF FLEXIBLE PAVING

- A. General:
 - 1. Provide final pavement surfaces of uniform texture, at required grades and cross-sections.
 - 2. Construct roadways to the lines, grades, and typical sections shown or indicated.
- B. Installation of Asphalt Concrete:
 - 1. Asphalt concrete mixture shall be transported to the site of paving and placed as soon as possible after mixing.
 - 2. Placement of each asphalt concrete course shall be completed over the full width of the section under construction during each day's paving operations.
 - 3. Spread and finish asphalt concrete courses by means of self-propelled mechanical spreading and finishing equipment. Compacted thickness of layers placed shall not exceed 150 percent of specified thickness unless approved in writing by ENGINEER.
 - 4. Compaction:
 - a. Rollers:
 - 1) Use sufficient rolling equipment to satisfactorily compact and finish the quantity of asphalt concrete placed. There shall be not less than two rollers on the Project at all times. When acceptable to ENGINEER, one of the rollers may be a pneumatic-tire roller.
 - 2) During rolling operations, roller speed shall not exceed three miles per hour. When sufficient number of rollers is not available, reduce the quantity of asphalt concrete placed to accommodate the available rollers' speed.
 - 3) Required rollers shall be at the Site, in acceptable operating condition, prior to placing of asphalt concrete.
 - 4) Use of vibratory rollers in lieu of steel-wheeled rollers is acceptable, however when thickness of asphalt concrete is one-inch or less, rolling shall be in the static mode.
 - b. Rolling of initially-placed asphalt concrete material, or breakdown rolling, shall begin as soon as the asphalt concrete mixture will bear the roller without undue displacement.
 - c. Rolling shall be longitudinal, overlapping on successive trips by not less than one-half roller rear wheel width, and not more than three-quarters of roller rear wheel width. Alternate trips of the roller shall be of slightly different lengths.
 - d. At all times, roller motion shall be slow enough to avoid displacing the asphalt concrete.
 - e. Operate rollers continuously from breakdown of laid asphalt concrete through finish rolling.
 - f. Perform finish rolling using a steel-wheeled roller or a vibratory steel-wheel roller operating in the static mode.
 - g. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.
 - h. At each location not accessible to roller, thoroughly compact asphalt concrete with tampers and finish, where necessary, with a hot smoothing iron to provide uniform, smooth layer over the entire area so compacted.
 - 5. Each compacted asphalt concrete course shall be within plus or minus 1/4-inch of the indicated thickness.
 - 6. Placement of Adjacent Strips of New Asphalt Concrete:
 - a. When more than one width of asphalt concrete material will be placed, a six-inch wide strip of asphalt concrete adjacent to the area on which the future material is to be placed shall not be rolled until such future material is placed.
 - b. Do not leave the unrolled strip unrolled for more than two hours after placement, unless the six-inch unrolled strip is first heated with a joint heater.

- c. After the first strip or width of asphalt concrete is compacted, place, finish, and compact the second width or strip as required for the first width, except that rolling shall be extended to include the six-inch strip of the first width not previously compacted.
- C. Construction Joints:
 - 1. Construction joints shall be made in such a manner as to ensure a neat junction, thorough compaction, and bond throughout.
 - 2. Provide a transverse joint extending over the full width of the strip being laid and at right angles to its centerline at end of each workday and at other times when the placement of hot-mix asphalt concrete will be suspended for a period of time that will allow asphalt concrete mixture to chill.
 - 3. Thoroughly compact by rolling the forward end of a freshly laid strip of asphalt concrete before the asphalt concrete mixture becomes chilled. When the Work is resumed, the end shall be cut vertically for the full depth of the layer.
- D. Joining of Pavements:
 - 1. When pavement is to join existing or previously-laid pavement, the existing or previously-laid pavement shall be neatly and carefully edged to allow for overlapping and feathering of the subsequent course of asphalt concrete material.
 - 2. Where new pavement is to meet existing pavement, the existing pavement shall be sawcut and notched.
 - 3. Where new pavement will meet existing asphalt pavement, remove existing pavement 12 inches onto undisturbed existing pavement course at edges where new pavement will meet existing pavement.
 - 4. Tack Coat:
 - a. Provide tack coat material at the following locations:
 - 1) At edges where new pavement will connect to existing or previously-installed pavement.
 - 2) On surface of existing or previously-installed pavement course over which new pavement will be installed, prior to placement of the subsequent pavement course. Tack coat may be deleted when a succeeding layer of asphalt pavement is being applied over a freshly-placed asphalt pavement course that has been subjected to very little or no traffic, with approval of ENGINEER
 - 3) Where new pavement will abut curbing, concrete gutters, drainage structures and frames, manhole cover frames, valve boxes, and similar items.
 - b. Tack Coat Installation: Install tack coat immediately prior to installing pavement. Place pavement while tack coat is wet. Apply tack coat in accordance with reference specifications indicated in Part I of this Section.
- E. Curing:
 - 1. Do not allow traffic onto pavement until directed by ENGINEER. Traffic will not be allowed on new asphalt concrete pavement until surface temperature is less than 140 degrees F.
 - 2. Hold construction traffic on new pavement to a minimum as acceptable to ENGINEER.
- F. Asphalt Concrete Curbs: Provide extruded asphalt curbs of the height and profile indicated on the Drawings.
- G. Defective Pavement Work:

1. When directed by ENGINEER, remove and replace defective flexible paving Work. Cut out such areas of defective pavement and fill with fresh asphalt concrete materials, compacted to required density.

3.4 ADJUSTING

A. Frames and Covers:

1. Set frames of drainage structures, manholes, valve boxes, and similar items to final grade. Adjust frames of existing structures and frames furnished under other Sections. Frames shall be substantially similar elevation to finished surface course of pavement.
2. Replace covers and gratings of existing structures immediately following adjusting associated frames. Install covers and gratings of structures provided under the Project as quickly as possible.
3. Where there is a delay between adjusting of frames and installation of surface course, provide temporary bituminous material around perimeter of each frame to smooth vehicle access over the frame. Maintain and repair temporary bituminous material as required until placement of surface course. Remove temporary bituminous material before installing surface course.

B. Pavement Adjustment:

1. Repair or replace in manner acceptable to ENGINEER areas of pavement that are observed to pond or collect water.

3.5 CLEANING

- #### A. Cleaning:
- After completing the paving operations, clean surfaces of excess or spilled bituminous materials, excess asphalt concrete, and foreign matter.

3.6 PROTECTION

- #### A. Protect finished pavement until pavement has become properly hardened and cool.
- #### B. Cover openings of drainage structures, manholes, valve boxes, and similar items in the paved area until permanent coverings are provided.

3.7 PAVEMENT MARKINGS

A. Pavement Markings: Provide pavement markings where shown or indicated.

1. Preparation:
 - a. Sweep surface with power broom supplemented by hand brooms to remove loose material and dirt.
 - b. Do not begin marking bituminous concrete pavement until approved by ENGINEER.
 - c. When reflective glass beads are required, mix with paint prior to paint application.
2. Application:
 - a. Using mechanical equipment, provide uniform, straight edges in two separate coats. Apply in accordance with paint manufacturer's recommendations.

END OF SECTION

SECTION 32 92 00

LAWNS AND MEADOWS

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide all labor, materials, tools, equipment and incidentals as shown, specified and required to furnish and install all lawns and meadows.
2. Extent of lawns and meadows is shown.
3. Types of products required include the following.
 - a. Topsoil.
 - b. Lawn grass seed.
 - c. Meadow grass seed mixture.
 - d. Wildflower meadow seed mixture.
 - e. Inorganic soil amendments.
 - f. Organic soil amendments.
 - g. Fertilizers.
 - h. Mulches.
 - i. Erosion-control materials.
 - j. Accessories.

B. Coordination:

1. Review installation procedures under other Sections and coordinate the installation of items that must be installed with, or before, lawns and meadows.

C. Related Sections:

1. Section 31 11 00, Clearing and Grubbing.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. Association of Official Analytic Chemists, (AOAC).
 - a. Official Methods of Analysis of AOAC International.
2. Association of Official Seed Analysts, (AOSA).
 - a. Journal of Seed Technology; Rules for Testing Seeds.
3. American Society of Agronomy, (ASA).
 - a. Reference No. 1 - Methods of Soils Analysis, Soil Science Society of America, Incorporated.
4. American Society for Testing and Materials, (ASTM).
 - a. ASTM B 221, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
 - b. ASTM C 602, Specification for Agricultural Liming Materials.
 - c. ASTM D 75, Practice for Sampling Aggregates.
 - d. ASTM D 977, Specification for Emulsified Asphalt.
 - e. ASTM D 2487, Practice for Classification of Soils for Engineering Purposes (United Soil Classification System).
 - f. ASTM D 5268, Specification for Topsoil Used for Landscape Purposes.

- g. ASTM E 329, Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
- 5. South Carolina Department of Transportation (SCDOT).
 - a. Qualified Products List 88.
 - b. Supplemental Technical Specification SC-M-810-4.
- 6. South Carolina Department of Health and Environmental Control (SCDHEC) Storm Water Management BMP Handbook, Appendix C.

1.3 DEFINITIONS

- A. The term “finish grade” shall be used to describe the finished surface elevation of planting soil.
- B. The term “manufactured topsoil” shall be used to describe soil produced off-Site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil acceptable as a component of loam.
- C. The term “loam” shall be used to describe topsoil that has been mixed with additional organic and inorganic additives, as specified.
- D. The term “percentage pure live seed” shall be defined as the percent (%) purity multiplied by percent (%) germination divided by 100 to equal the percent pure live seed (PLS) and shall be calculated for all seed lots using each seed lots own unique purity and germination test results. A PLS pound shall be defined as the bulk weight of seed required to equal one pound of 100 percent pure, germinated seed.
- E. The term “subgrade” shall be used to describe the surface of subsoil remaining after completing excavation; or the top surface of a fill or backfill immediately beneath topsoil and which has not been tested for acceptable use as topsoil.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Engage a single landscape installer skilled, trained and with successful and documented experience in the planting of lawns and meadows and with specific skill and successful experience in the installation of the types of materials required; and who agrees to employ only tradesmen with specific skill and successful experience in this type of Work. Submit names and qualifications to ENGINEER along with the following information on a minimum of three successful projects:
 - a. Names and telephone numbers of owner, architects or engineers responsible for projects.
 - b. Approximate contract cost of the lawns and meadows.
 - c. Amount of area installed.
 - 2. Installer’s Site Supervisor: Require installer to maintain an experienced full-time landscape supervisor on-Site during the time of preparation for, and planting of, lawns and meadows. Supervisor shall have achieved landscape or horticultural certification acceptable to governing authorities having jurisdiction at the Site.
 - 3. Ratio of laborers to certified landscape supervisors shall not exceed 12 to one. Certified landscape supervisor shall be on-Site throughout the day-to-day performance of the Work of this Section.

4. Application of herbicides, chemicals and insecticides shall be done by personnel licensed to perform such applications by governing authorities having jurisdiction at the Site and in accordance with each manufacturer's instructions provided on each product label.
- B. Soil-Testing Laboratory Qualifications:
1. An independent laboratory, recognized by governing authorities having jurisdiction at the Site, with the experience and capability to conduct testing indicated and that specializes in types of soil tests to be performed.
 2. To qualify for approval, an independent testing agency shall demonstrate to ENGINEER'S satisfaction, based on evaluation of criteria submitted by testing agency, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work, in accordance with ASTM E 329.
- C. References: Comply with the applicable references in Article 1.2.
- D. Soil Analysis: Furnish report of soil analysis to ENGINEER, prepared by a qualified soil-testing laboratory, stating percentages of organic matter; mechanical gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious materials content; pH; and mineral and plant-nutrient content of soil. Chemical analysis shall include tests for percentages of nitrate nitrogen, ammonium nitrogen, phosphorus, potassium, calcium, iron, manganese, copper, zinc, extractable aluminum, and total soluble salts.
1. Existing On-Site Soil:
 - a. Separate soil stockpiled and proposed for use as topsoil for lawns and meadows into 1000 cubic yard piles and label with a numbering system used to reference all soil samples and test results.
 - b. Obtain a one cubic foot representative sample for each 1000 cubic yards of soil stockpiled on-Site proposed for use as topsoil for lawns and meadows, in compliance with ASTM D 75 and Appendixes, for securing samples from stockpiles.
 - c. Place samples taken from each stockpile, into separate clean, new and previously unused, containers and mix thoroughly. Maintain separation and legible labeling of each sample taken from each stockpile, throughout the process of mixing, drying and delivering to soil analysis laboratory. Label samples on outside of container.
 - d. Take one cup of soil from each container and allow to dry at room temperature. Once dry, place each one-cup sample in a separate, accurately labeled, new and previously unused one-cup sized plastic container, seal tightly and deliver to soil testing laboratory.
 - e. Report suitability of soil as a topsoil component for lawn and meadow plant growth. State recommended quantities of nitrogen, phosphorus, secondary and micronutrients, potash and soil amendments to be added to produce satisfactory topsoils. Include calculations, types of fertilizer and recommendations for application rates in either gallons or pounds per cubic foot of soil.
 - f. In addition, all on-Site soil that will be used as topsoil shall be provided with additional compost and peat moss amendments specified, whether or not testing indicates positive need for such amendments, for such material to be used as loam.
 2. Manufactured Imported Topsoil:

- a. Test each 1000 cubic yards of manufactured topsoil at the proposed source. In addition, after ENGINEER'S approval of manufactured topsoil based on results and recommendations of soil testing reports, test each 1000 cubic yards of manufactured topsoil that is delivered to the Site for conformance to results and recommended modifications of approved soil test reports. Manufactured topsoil that differs from proposed source material, after modification according to recommendations of soil test reports, shall be rejected for use in the Work.
- b. Obtain a one cubic foot representative sample for each 1000 cubic yards of manufactured topsoil proposed for lawn and meadow Work, in compliance with ASTM D 75 and Appendixes, for securing samples from stockpiles.
- c. Place samples taken from each stockpile into separate clean, new and previously unused, containers and mix thoroughly. Maintain separation and legible labeling of each sample, taken from each stockpile, throughout the process of mixing, drying and delivering to soil analysis laboratory. Label samples on outside of container.
- d. Take one cup of topsoil from each container and allow to dry at room temperature. Once dry, place each one-cup sample in a separate, accurately labeled, new and previously unused one-cup sized plastic container, seal tightly and deliver to soil testing laboratory.
- e. Report suitability of manufactured topsoil as a component for lawn and meadow plant growth. State recommended quantities of nitrogen, phosphorus, secondary and micronutrients, potash and soil amendments to be added to produce satisfactory manufactured topsoil. Include calculations, types of fertilizer and recommendations for application rates in either gallons or pounds per cubic foot of manufactured topsoil.
- f. Organic component of manufactured topsoil shall be obtained from compost and peat moss amendments specified, for such material to be used as loam.

E. Source Quality Control:

1. Analysis and Standards: Package all products with manufacturer's certified analysis performed in accordance with methods established by AOAC, wherever applicable, or as specified.
2. Provide manufactured imported topsoil from a commercial processing facility specializing in the manufacture of topsoil.
3. Seed that has been stored at temperatures, or under conditions not recommended by the seed supplier, or has become wet, moldy, or otherwise damaged, shall not be acceptable. The PLS for each seed lot shall be 75 percent, minimum.
4. Certify that all seed has been stored under conditions recommended by the seed supplier and has not been subjected to conditions damaging to PLS percentages.
5. Seed may be mixed by an approved method on-Site or at the seed supplier's facilities. If the seed is mixed on-Site, each variety shall be delivered in the original containers and shall bear the supplier's certified analysis. Where seed is mixed by the seed supplier, provide ENGINEER with the seed supplier's certified statement as to the composition of the mixture.

1.5 SUBMITTALS

A. Action Submittals: Submit the following:

1. Shop Drawings:
 - a. Schedule for lawn and meadow-planting showing anticipated planting dates for each type of Work.

2. Product Data:
 - a. Manufacturer's product data, specifications and installation instructions for all required materials.
 - b. Composition and analysis of commercial fertilizers and all purchase receipts showing the total quantity actually purchased for this Project.
 - c. Proportions of each component contained in hydro seed mixture. Identify number of pounds of each component required for each 100 gallons of water. Include the number of square feet of lawn, grass meadow or wildflower meadow mixture that can be installed with each full tank of hydro seed mixture.
 - d. PLS for each type of seed and each seed lot. Include bulk weight of seed required to equal one pound of 100 percent pure, germinated seed.
 3. Samples:
 - a. Submit 12-inch by 12-inch sheet of erosion control fabric with manufacturer's selections of standard biodegradable filler papers, and yarns.
- B. Informational Submittals: Submit the following:
1. Certificates:
 - a. Certification of Grass and Wildflower Seed: For each grass-seed monostand and seed mixture, furnish seed supplier's certification stating the botanical and common name, and percentage by weight of each species and variety, and percentage of purity, germination and weed seed. Include the year of production and date of packaging. Certify that seed has been stored in compliance with all recommendations of the seed supplier.
 - b. Certificates of inspection as may be required by governmental authorities to accompany shipments, and manufacturer's certified analysis for soil amendments and fertilizer materials. For standard products submit other data substantiating that materials comply with specified requirements.
 2. Test Reports: Submit the following:
 - a. Soil analysis reports for existing soil and imported manufactured topsoil, as specified. Include recommendations for remediating existing soil into acceptable topsoil.
 3. Qualifications Data: Submit qualifications data for the following:
 - a. Landscape installer.
 - b. Landscape supervisor.
 - c. Testing agency.
 4. Source Quality Control Submittals
 - a. Written statement providing the location from which manufactured topsoil is to be obtained and the names and addresses of the suppliers.
- C. Closeout Submittals: Submit the following:
1. Operations and Maintenance Data:
 - a. Submit recommended procedures to be established by OWNER for the maintenance of lawns and meadows for one full year. Submit prior to expiration of required maintenance period.
 2. Warranty Documentation:
 - a. Submit written warranty, signed by CONTRACTOR and landscape installer, as specified.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials:
 - 1. Do not deliver seed until Site conditions are ready for installation.
 - 2. Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery.
 - 3. Deliver seed in undamaged, original containers, sealed by the supplier and indicating compliance with approved Shop Drawings.
 - 4. Inspect lawn and meadow materials upon arrival at Site. Immediately and permanently remove unacceptable materials from Site.
- B. Storage of Materials:
 - 1. Store and cover materials to prevent deterioration. Remove packaged materials that become wet or show deterioration or water marks from the Site.
 - 2. Seed that becomes wet, moldy or damaged during the time of storage on-Site or that has been damaged during transit is not acceptable.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Proceed with and complete lawn and meadow planting as rapidly as portions of the Site become available, working within the seasonal limitations for each type of lawn, grass and wildflower planting required.
 - 2. Proceed with planting only when current and forecasted weather conditions are favorable to successful planting and establishment of lawns and meadows.
 - a. Do not spread seed when wind velocity exceeds five miles per hour.
 - b. Do not plant when drought, or excessive moisture, or other unsatisfactory conditions prevail.
 - 3. Herbicides, chemicals and insecticides shall not be used on areas bordering wetlands.
- B. Scheduling:
 - 1. Coordinate planting with specified extended service periods to provide required service from date of Substantial Completion. Plant during one of the following periods:
 - a. Permanent Seeding:
 - 1) Comply with recommendations of supplier.
 - b. Temporary Seeding:
 - 1) Comply with recommendations of supplier.
 - 2. Do not begin lawn and meadow planting until water, acceptable for use and adequate in supply, is available on-Site and can be successfully transported to the areas of Work. Coordinate provision of adequate and acceptable water supply with Project Schedule.
 - 3. Do not proceed with installation of loam until all subgrade utility services have been installed, are operating successfully and have been approved by ENGINEER.
- C. Pre-installation Conference:
 - 1. Prior to commencement of lawn and meadow planting and associated Work, CONTRACTOR shall schedule and meet at the Site with the landscape installer, the installers of other Work in and around lawn and meadow areas that follows the lawn and meadow Work, including fencing Work; and ENGINEER and other representatives directly concerned with performance of the Work. Review foreseeable methods and procedures related to the lawn and meadow Work, including the following:
 - a. Review Project requirements and the Contract Documents.

- b. Review required submittals, both completed and yet to be completed.
 - c. Review availability of water and methods of delivery.
 - d. Review status of below-grade work and required access during lawn and meadow planting and establishment.
 - e. Review Project Schedule and availability of materials, tradesmen, equipment and facilities needed to make progress and avoid delays.
 - f. Review environmental conditions, other Project conditions, and procedures for coping with unfavorable conditions.
 - g. Review procedures required for protection of lawns and meadows during the remainder of the construction period.
 - h. Review required inspection, testing, and certifying procedures.
- 2. Record the discussions of the Pre-installation Conference and the decisions and agreements or disagreements reached, and furnish a copy of the record to each party attending.
 - 3. Record all revisions or changes agreed upon, reasons therefor, and parties agreeing or disagreeing with them.
 - 4. Reconvene the meeting at the earliest opportunity if additional information must be developed in order to conclude the subjects under consideration.

1.8 WARRANTY

- A. General Warranty: The special warranties specified in this Article shall not deprive OWNER of other rights or remedies OWNER may otherwise have under the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by CONTRACTOR under the Contract Documents.
- B. Special Warranties: Warranty lawns and meadows through the specified extended service period.

1.9 EXTENDED SERVICE

- A. Extended Lawn Service:
 - 1. Begin extended service immediately after each lawn area is acceptably established. Provide extended service for not less than the following periods:
 - 2. Seeded Lawns: Sixty days from date after lawn areas are acceptably established.
 - a. When full service period has not elapsed before end of planting season, or if lawn is not acceptably established, continue service during next planting season.
 - 3. Service lawn by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.
 - a. In areas where mulch has been disturbed by wind or extended service operations, add new mulch. Anchor as required to prevent displacement.
 - 4. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources. Keep newly germinated plants uniformly moist to a depth of 4-inches, applied at a minimum rate of 1-inch per week, or greater as required to maintain minimum moisture depth specified. Provide and maintain watering gages and soil moisture probes until end of maintenance period.
 - a. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

- b. After plants have their first true leaves and grasses show mature blades, watering shall be performed to provide moisture to a depth of 6-inches, and not performed again until top 1-inch of loam has dried.
 - 5. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 40 percent of grass-leaf height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowing. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowing to maintain the following grass height:
 - a. Bent Grass: Mow to 1/2-inch high or less.
 - b. Bermuda Grass: Mow 1/2 to 1-inch high.
 - c. Carpet, Centipede, Perennial Rye and Zoysia Grasses: Mow 1 to 2-inches high.
 - d. Kentucky Bluegrass and Buffalo, Annual Rye and Chewings Red Fescue Grasses: Mow 1-1/2 to 2-inches high.
 - e. Bahia, Turf-Type Tall Fescue and St. Augustine Grasses: Mow 2 to 3-inches high.
 - 6. Lawn Fertilization: Apply fertilizer after initial mowing and when grass is dry.
 - a. Use fertilizer that will provide actual nitrogen of at least one pound for each 1000 square feet of lawn area.
 - 7. After seed has passed its expected germination period, reseed all areas and parts of areas that fail to show a uniform stand of grass. Reseed repeatedly until all areas are covered with grass.
- B. Extended Meadow Service:
- 1. Begin extended service immediately after each meadow area is satisfactorily established and continue for not less than 40 days.
 - 2. Service meadow by watering, weeding, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch.
 - 3. Watering: Provide and maintain temporary piping, hoses, and meadow- watering equipment to convey water from sources. Keep meadow uniformly moist to a depth of 6-inches. Provide and maintain watering gages and soil moisture probes until end of maintenance period.
 - a. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - b. Water meadow at a rate in accordance with supplier's written recommendations. Water at controlled rates that are less than the rate at which the soil can absorb water to prevent runoff.
 - c. After plants have their first true leaves and grasses show mature blades, perform watering to provide moisture to a depth of 8-inches, and do not perform again until top 1-inch of loam has dried.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Topsoil:
 - 1. All soil accepted as topsoil, whether obtained from on-Site or off-Site sources, shall comply with specified topsoil analysis.

2. Provide fertile, friable, natural loam, surface soil, capable of sustaining vigorous plant growth; free of any admixture of subsoil, clods of hard earth, plants or roots, sticks, stones larger than 1-inch in diameter, or other extraneous material harmful to plant growth, in compliance with ASTM D 5268. Provide topsoil with the following analysis:
 - a. 3/4-inch mesh: 100 percent passing.
 - b. No. 4-sieve: 90 to 100 percent passing.
 - c. No. 200-sieve: 0 to 10 percent passing.
 - d. Clay content of material passing No. 200-sieve not greater than 60 percent, as determined by hydrometer tests.
 - e. pH-adjusted with ferrous sulphate or ground limestone to provide pH 5.5 to pH 7.0 at time of installation of lawns, grass and meadow areas, unless particular species of grass or wildflower stand requires a different pH to meet its growing needs.
 - f. Electrical conductivity of a 1:2 soil-water suspension shall not exceed 1.0 milliohm per centimeter and with less than 200 parts per million of extractable aluminum.
 - g. Cation Exchange Capacity: 5, minimum.
 - h. Organic content not less than five percent, as determined by ignition loss of oven-dried samples passing No. 10-sieve (Muffle Furnace Temperature: 110 plus or minus five degrees C for eight hours).
 - i. Free of pests and pest larvae.
 3. Topsoil Source: Reuse surface soil stockpiled on-Site, where possible. Verify suitability of stockpiled surface soil to produce topsoil, as specified. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
 - a. Supplement acceptable on-Site soil with manufactured topsoil from off-Site sources, when quantities available on-Site are insufficient to complete the Work.
- B. Lawn Grass Seed:
1. Lawn Grass Seed Mixture: Provide fresh, clean, new-crop seed complying with the tolerance for purity and germination established by AOSA. Provide seed of the grass species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed, specified.
 2. Seed Species: Provide seed in compliance with SCDHEC Storm Water Management BMP Handbook Appendix C for turf-type grasses.
- C. Meadow Grass Seed:
1. Tall Grassy Meadow with Minor Forbs: Provide a mixture of fresh, clean, new-crop seed complying with the tolerance for purity and germination established by AOSA. Provide seed of each species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed specified.
 2. Seed Species: Provide seed in compliance with SCDHEC Storm Water Management BMP Handbook Appendix C .
- D. Wildflower Meadow Seed:
1. Wildflower Meadow with Minor Grasses: Provide a mixture of fresh, clean, new-crop seed complying with the tolerance for purity and germination established by AOSA. Provide seed of each grass and forb species, proportions and minimum percentages of purity, germination, and maximum percentage of weed seed specified.
 2. Seed Species: Seed of grass and forb species as follows, with not less than 80.0 percent germination, not less than 80 percent pure seed, and not more than 1.0 percent weed seed by weight:

- a. Provide seed in compliance with Table 1 of SC-M-810-4 for legumes.
- E. Inorganic Soil Amendments:
- 1. Ground Oolitic Limestone: ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:
 - a. Class: Class T, with a minimum 99 percent passing through No. 8-sieve and a minimum 75 percent passing through No. 60-sieve.
 - 2. Perlite: Agricultural-grade, expanded pumice.
 - 3. Agricultural Gypsum: Commercial-grade and finely ground, containing a minimum of 90 percent calcium sulfate.
 - 4. Grit Aggregate: Commercial-grade filter sand consisting of hard, durable rounded grains of quartz or other rock that do not compact to a solid mass when wet, with a pH in the range required for topsoil. Provide clean, washed, natural or manufactured aggregate, free of toxic materials, salt and other chemical contamination.
- F. Organic Soil Amendments:
- 1. Compost: Well-composted, stable, weed-free organic matter, produced by the aerobic decomposition of organic residues; pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through a 1-inch screen; soluble salt content of 5 to 10 decisiemens/meter; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - a. Organic Matter Content: 50 to 60 percent of dry weight.
 - b. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
 - 2. Peat: Partially decomposed stems and leaves of several species of sphagnum moss; finely divided or granular texture. Supply shredded material, free from lumps, wood, roots, stones, decomposed colloidal residue and other extraneous foreign matter, capable of passing through a 1/2-inch screen, which can easily be incorporated with the soil. Supply material, which has been conditioned in storage piles after excavation for at least six months, including one freezing and thawing period. Supply peat humus with the following analysis:
 - a. Not less than 90 percent organic matter by weight on an oven-dry basis.
 - b. pH range of 3.4 to 4.8.
 - c. Moisture content 35 percent at time of incorporation into soil.
 - d. Water absorbing ability 150 percent to 350 percent by weight.
 - 3. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
 - 4. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.
- G. Fertilizers:
- 1. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of four percent nitrogen and 20 percent phosphoric acid.
 - 2. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
 - 3. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

- a. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports.
 4. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - a. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
- H. Mulches:
 1. Straw Mulch: Provide air-dry, clean, mildew- and certified seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
 2. Peat Mulch: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
 3. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch screen; soluble salt content of 5 to 10 decisiemens/meter; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - a. Organic Matter Content: 50 to 60 percent of dry weight.
 - b. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
 4. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
 5. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.
 6. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant- growth or germination inhibitors.
- I. Erosion-Control Materials:
 1. Erosion-Control Blankets: 100 percent biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended 6-inches long steel wire staples.
 2. Erosion-Control Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, a minimum of 0.92 pounds per cubic yard, with 50 to 65 percent open area. Include manufacturer's recommended 6-inches long steel wire staples.
- J. Accessories:
 1. Provide herbicides, chemicals and insecticides as needed for disease, fungus or pest control. All herbicides, chemicals and insecticides shall be bear approval labels indicating they are approved by the United States Department of Agriculture for the intended uses and application rates.
 2. Post Emergent Crab Grass and Plantain Chemical: Provide recommended post emergent crab grass and plantain control throughout the maintenance period to ensure germinated and established lawns free of crab grass and other undesirable grasses and forbs.
 3. Wood Edging: Of sizes shown, and wood stakes as follows:
 - a. Species: All Heart Redwood or Western Red Cedar, All Heart.
 - b. Stakes: Same species as edging, 1-inch by 2-inches by 18-inches long in nominal size, with galvanized nails for anchoring edging.

4. Steel Edging: Standard commercial steel edging, rolled edge, fabricated in sections of standard lengths, with loops stamped from or welded to face of sections to receive stakes.
 - a. Edging Size: 1/4-inch wide by 5-inches deep.
 - b. Stakes: Tapered steel, a minimum of 15-inches long.
 - c. Accessories: Standard tapered ends, corners, and splicers.
 - d. Finish: Zinc-coated.
 - e. Paint Color: Black.
 5. Aluminum Edging: Standard-profile extruded-aluminum edging, ASTM B 221, alloy 6063-T6, fabricated in standard lengths with interlocking sections with loops stamped from face of sections to receive stakes.
 - a. Edging Size: 3/16-inches wide by 5-1/2-inches deep.
 - b. Stakes: Aluminum, ASTM B 221, alloy 6061-T6, approximately 1-1/2- inches wide by 12-inches long.
 - c. Finish: Black anodized.
 6. Polyethylene Edging: Standard black polyethylene edging, V-lipped bottom horizontally grooved, extruded in standard lengths, with 9-inch steel angle stakes.
 - a. Edging Size: 0.07-inch wide by 5-inches deep.
 - b. Top Profile: Round top; 1/2-inch diameter.
- K. Water: Acceptable for lawn and meadow application and containing no material harmful to plant growth and establishment.

2.2 LOAM MIXES

- A. Follow recommendations of soil-testing laboratory for modifying on-Site soil and manufactured soil, for use as topsoil.
- B. On-Site soil and manufactured soil that has been provided with all inorganic soil amendments and fertilizers recommended by soil-testing laboratory, and acceptable for use as topsoil, shall be mixed with an additional organic soil amendment mix in a ratio of two parts topsoil to one part organic soil amendment mix, by volume.
 1. Prepare soil amendment mix by combining 40 percent compost, 40 percent peat moss, ten percent wood derivatives, five percent well-rotted manure and five percent grit aggregate, by volume.
- C. Loam: Thoroughly blend topsoil with organic soil amendment mix and use as planting media for all lawn and meadow Work.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which lawn and meadow Work is to be performed, and notify ENGINEER, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to ENGINEER.

3.2 PREPARATION

- A. Thoroughly blend and mix loam before spreading. Incorporate fertilizers, and ground limestone or acidulant, after spreading, as specified, and at rates recommended by soil-testing laboratory.
- B. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding overspray.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- D. Perform percolation tests on existing subgrade and placed fills prior to fine grading.
 - 1. Perform percolation testing of subgrades and placed fills to determine whether or not the subgrade will drain properly. Perform percolation tests in accordance with the following procedure:
 - a. Dig a hole in the subgrade that is 4-inches in diameter and 12-inches deep.
 - b. Fill the hole with water and wait for the water to completely drain from the hole.
 - c. Immediately refill the hole with water and measure the rate of fall in the water level.
 - 2. In the event that water drains at a rate less than 1-inch in one hour, excavate soil to a minimum depth of 24-inches, and deeper, as necessary to break the compaction. Backfill, recompact and retest each area so prepared to confirm drainage rates exceed one inch in one hour.
 - 3. Perform minimum of one soil percolation test for every 10,000 square feet of lawn and meadow area.
- E. Excavate or fill subgrade, as required, to bring subgrade to elevations shown. Maintain all angles of repose. Confirm that subgrade is at proper elevations and that no further earthwork is required to bring the subgrade to proper elevations. Provide subgrade elevations that slope parallel to finished grade and towards subsurface drains shown.
- F. Remove all construction debris, trash, rubble and all extraneous materials from subgrade. In the event that fuels, oils, concrete washout or other material harmful to plant growth or germination have been spilled into the subgrade, excavate the subgrade sufficiently to remove all such harmful materials and fill with approved fill, compacted to the required subgrade compaction level.

3.3 FINE GRADING

- A. Immediately prior to dumping and spreading loam, clean subgrade of all stones greater than 2-inches and all other extraneous matter. Remove all such material from Site. Notify ENGINEER that subgrade has been cleaned, and obtain approval prior to spreading loam.
- B. Do not attempt to spread excessively wet, muddy or frozen loam. Do not spread loam more than five days before seeding or planting.

- C. Spread loam to a depth of 6-inches but not less than required to meet finish grades after light rolling and natural settlement.
 - 1. Spread approximately one-half the thickness of required loam depth. After spreading loam, rototill, disk or harrow loam and subgrade to bring top 2-inches of subgrade upward into loam layer, so that there is a transitional layer between loam and subgrade.
 - 2. Spread remainder of loam to required finish grades.
 - 3. Compact each lift sufficiently to reduce settling, but not enough to prevent the movement of water and feeder roots through loam. After compaction spread loam should offer firm, even resistance when a soil sampling tube is inserted.
 - 4. Phase the placement of the final lift so that wheeled vehicles do not have to travel over areas where final lifts are already in-place.
 - 5. Spread and compact to a smooth, uniform surface plane, to within plus or minus 1/2-inch of finish elevations. Roll and rake and remove all ridges, and fill depressions, as required. Remove all stones larger than 1-inch in any dimension and all sticks, roots, trash and other extraneous matter.
 - 6. Perform percolation tests as for subgrades, except limit depth of holes to 2/3 the depth of loam layer.
- D. Spread ground limestone or acidulant and fertilizer, as specified. Mix ground limestone with dry loam before spreading fertilizer and work lightly into the top 4-inches of loam by harrowing or tilling at least three days before applying commercial fertilizers.
- E. Grade planting areas to smooth, even surface with loose, uniformly fine texture. Remove all stones and extraneous material in excess of 1-inch diameter. Roll, rake and remove ridges and fill depressions, as required to meet finish grades.
- F. Moisten prepared areas before seeding. Water thoroughly and allow surface moisture to dry before planting. Do not create a muddy loam condition.
- G. Prior to seeding or planting, restore loam to specified condition, if eroded or otherwise disturbed.

3.4 CONVENTIONAL SEEDING

- A. General: Maintain grade stakes until removal is mutually agreed upon by all parties concerned.
- B. Rake or harrow all seedbeds immediately prior to seeding to produce a rough, grooved surface, no deeper than 1-inch. Seed only when seedbed is in a friable condition and not muddy or hard.
- C. Sow seed using a spreader or seeding machine.
- D. Distribute seed evenly over entire area by sowing equal quantity in two directions at right angles to each other.
- E. Sow lawn grass seed mixture at the rate of not less than required by SCDHEC Storm Water Management BMP Handbook Appendix C .

- F. Sow meadow grass with minor forbs seed mixture at the rate of not less than required by SCDHEC Storm Water Management BMP Handbook Appendix C.
- G. Sow wildflower meadow with minor grasses seed mixture at the rate of not less than 19-pounds per acre.
- H. Cultipacker, or approved similar equipment, may be used to cover the seed and to firm the seedbed in one operation. In areas inaccessible to cultipacker:
 - 1. Rake the seed lightly into top 1/8-inch of loam, roll in two directions with a water ballast roller, weighing not less than 100 pounds per linear foot.
 - 2. Take care during raking that seed is not raked from one spot to another.
 - 3. Protect seeded areas against erosion by spreading specified mulch after completion of seeding operations.
 - a. Protect seeded areas against hot, dry weather or drying winds by applying peat moss mulch not more than 24 hours after completion of seeding operations. Presoak and scatter evenly to a depth of from 1/8-inch to 3/16-inches thick and roll to a smooth surface. Do not mound.
 - b. For slopes no steeper than one on six, spread straw mulch to form a continuous loose blanket not less than 1-1/2-inch deep over seeded areas at the approximately rate of two tons-per acre.
 - 1) Anchor mulch by spraying with asphalt emulsion at the rate of ten to 13-gallons per 1000 square feet.
 - 2) Place mulch with equipment that will blow or eject, by means of a constant air stream, controlled quantities of the mulch and asphalt in a uniform pattern over the specified area. If the mulch is excessively cut or broken, take measures to reduce the cutting or breakage. Introduce the asphalt into the air stream by means of a spray arranged so that it will partially coat the mulch with a spotty asphalt tack prior to the depositing of the mulch covering. Rate of application not less than 75-gallons per ton of mulch.
 - c. Protect seeded areas, with slopes exceeding one on six, by providing erosion-control fiber mesh and where slopes exceed one on four, by providing erosion-control blankets. Install erosion-control materials according to manufacturer's written instructions and as follows:
 - 1) Vertically down slope without stretching fabric.
 - 2) Install hold down staples three per square yard minimum in center of fabric or as required to hold and shape the fabric to the contours of the slope. Install hold down staples along edges and overlaps of fabric at 9 inches on centers minimum, or as required to hold and shape the fabric to the contours of the slope.
 - 3) Lap fabric 4-inches minimum and turn edges of fabric into 8-inch deep by 16-inch wide earth trench and fill trench with earth.
- I. Using a uniform fine spray, thoroughly and evenly water seeded areas. Provide adequate water to moisten seedbed to a depth of 2-inches.
 - 1. Repeat this process when peat mulch color lightens. Maintain all seedbeds in a uniformly moist condition, conducive to seed germination and plant establishment, as specified.
- J. Reseed areas that remain without mulch for longer than three days.

- K. Take precautions to prevent damage or staining of construction or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.
- L. Prevent foot or vehicular traffic, or the movement of equipment, over the mulched areas. Reseed areas damaged as a result of such activity.

3.5 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
- B. Mix slurry with asphalt-emulsion tackifier.
- C. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry application at a minimum rate of 500-pounds per acre dry weight, but not less than the rate required to obtain specified seed-sowing rate so that the seed comes into direct contact with loam.
- D. Apply slurry cover coat of fiber mulch at a rate of 1000-pounds per acre.

3.6 RECONDITIONING EXISTING LAWNS AND MEADOWS

- A. Recondition existing lawn and meadow damaged by CONTRACTOR'S operations, including areas used for storage of materials or equipment and areas damaged by movement of vehicles. Recondition existing lawns and meadow areas where minor regrading is required.
- B. Recondition other existing lawn and meadow areas shown.
- C. Provide fertilizer, seed and soil amendments, as specified for new lawn and meadow, and as required to provide satisfactorily reconditioned lawns and meadows. Provide new loam as required to fill low spots and meet new finish grades.
- D. Till stripped, bare, and compacted areas thoroughly to a depth of 12-inches.
- E. Remove diseased or unsatisfactory lawn and meadow areas; do not bury into soil. Remove topsoil containing extraneous materials resulting from CONTRACTOR'S operations including oil drippings, stone, gravel and other construction materials.
- F. In areas approved by ENGINEER, where substantial lawns and meadows remain (but are thin), mow, dethatch, core aerate and rake. Fill low spots, remove humps, cultivate soil, fertilize, and seed. Remove weeds before seeding or if extensive, apply selective chemical weed killers, as required. Apply a seedbed mulch, if required, to maintain moist condition.
- G. Water newly planted areas and keep moist until new lawns and meadows are established, as specified.

3.7 ACCEPTANCE CRITERIA FOR LAWNS AND MEADOWS

- A. Lawn and meadow Work will be considered acceptable when:

1. Seeded Lawn: When a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 square feet and bare spots not exceeding 5-inches by 5-inches.
2. Seeded Meadow: When a healthy, uniform, close stand of meadow grass and forbs has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 20 square feet and bare spots not exceeding 12-inches by 12-inches.

3.8 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris, created by lawn and meadow Work, from paved areas. Clean wheels of vehicles before leaving Site to avoid tracking soil and loam onto roads, walks, or other paved areas.
- B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout extended service period and remove when service period ends. Treat, repair or replace damaged lawns and meadows.
- C. Remove erosion-control measures after lawn and meadow extended service period ends.
- D. Take all precautions to ensure that hydroseed slurry is only placed on the areas designated. Completely clean any overspray, on areas not designated to receive slurry.

3.9 INSPECTION AND ACCEPTANCE

- A. Where lawns and meadows do not comply with specified acceptance criteria, reestablish lawns and meadows and continue extended service period until lawns and meadows comply with criteria for acceptance.

3.10 DEMONSTRATION

- A. Engage installer's Site supervisor to train and instruct OWNER'S personnel in the proper maintenance of lawns and meadows and procedures to be performed throughout the year for proper care and maintenance of lawn and meadows.
 1. Include instructions and training on reconditioning established lawns and meadow and sources of lawn and meadow materials.
 2. Schedule training with OWNER, through ENGINEER, with at least seven days' advance notice.
- B. Review Operation and Maintenance information and be sure all instructions are clearly understood by OWNER'S personnel and are supplemented with additional information, clarifications and instructions, as required.
- C. Provide minimum of two, nonconsecutive, full days on-Site training time during day shift normal working hours.

END OF SECTION

SECTION 33 05 05

BURIED PIPING INSTALLATION

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide all labor, materials, equipment, and incidentals as shown, specified, and required to install and test all buried piping, fittings, and specials. The Work includes the following:
 - a. All types and sizes of buried piping, except where buried piping installations are specified under other Sections.
 - b. Unless otherwise shown or specified, this Section includes all buried piping Work required, beginning at the outside face of structures or structure foundations, including piping beneath structures, and extending away from structures.
 - c. Work on or affecting existing buried piping.
 - d. Installation of all jointing and gasket materials, specials, couplings, harnessed and flanged adapters, sleeves, tie rods, cathodic protection, and other Work required for a complete, buried piping installation.
 - e. Supports, restraints, and thrust blocks.
 - f. Pipe encasements, with the exception of piping embedded in concrete within a structure or foundation specified under Section 40 05 05, Exposed Piping Installation.
 - g. Field quality control, including testing.
 - h. Cleaning and disinfecting.
 - i. Incorporation of valves, meters, and special items shown or specified into piping systems in accordance with the Contract Documents and as required.

B. Coordination:

1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before buried piping Work.
2. Coordinate with appropriate piping Sections of Division 40, Process Integration.

C. Related Sections:

1. Section 03 00 05, Concrete.
2. Section 31 23 05, Excavation and Fill.
3. Section 40 05 19, Ductile Iron Process Pipe.
4. Section 40 05 31, Thermoplastic Process Pipe.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. ASME Boiler and Pressure Vessel Code.
2. ASME B31.3, Process Piping.
3. American Society for Non-Destructive Testing (ASNT), ASNT-TC-1A, Recommended Practice, Personnel Qualification, and Certification in Non-destructive Testing.
4. ASTM A377, Specification for Ductile Iron Pressure Pipe
5. ASTM B32, Specification for Solder Metal.
6. ASTM D2321, Practice for Underground Installation of Thermoplastic Pipe for Sewers and other Gravity-Flow Applications.
7. ASTM D2774, Practice for Underground Installation of Thermoplastic Pressure Piping.

8. ASTM F1417, Test Method for Installation Acceptance of Plastic Gravity Sewer Lines using Low-Pressure Air.
9. ASTM F2164, Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.
10. ANSI/AWWA C105, Polyethylene Encasement for Ductile-Iron Pipe Systems.
11. ANSI/AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
12. ANSI/AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
13. ANSI/AWWA C605, Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.
14. ANSI/AWWA C651, Disinfecting Water Mains.
15. AWWA M23, PVC Pipe – Design and Installation.
16. AWWA M41, Ductile-Iron Pipe and Fittings.
17. ASCE 37, Design and Construction of Sanitary and Storm Sewers.
18. NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 1. Comply with requirements and recommendations of authorities having jurisdiction over the Work, including:
 - a. York County.
 - b. South Carolina Department of Transportation.
 - c. South Carolina Department of Health and Environmental Control.
 2. Obtain required permits for Work in roads, rights-of-way, railroads, and other areas of the Work.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 1. Shop Drawings:
 - a. Laying schedules for piping with restrained joints.
 - b. Details of piping, specials, joints, harnessing and thrust blocks, and connections to piping, structures, equipment, and appurtenances.
 2. Product Data:
 - a. Manufacturer's literature and specifications, as applicable, for products specified in this Section.
 3. Testing Procedures:
 - a. Submit proposed testing procedures, methods, apparatus, and sequencing. Obtain ENGINEER's approval prior to commencing testing.
- B. Informational Submittals: Submit the following:
 1. Certificates:
 - a. Certificate signed by manufacturer of each product certifying that product conforms to applicable referenced standards.
 2. Field Quality Control Submittals:
 - a. Results of each specified field quality control test.
- C. Closeout Submittals: Submit the following:
 1. Record Documentation:

- a. Maintain accurate and up-to-date record documents showing modifications made in the field, in accordance with approved submittals, and other Contract modifications relative to buried piping Work. Submittal shall show actual location of all piping Work and appurtenances at same scale as the Drawings.
- b. Show piping with elevations referenced to Project datum and dimensions from permanent structures. For each horizontal bend in piping, include dimensions to at least three permanent structures, when possible. For straight runs of piping provide offset dimensions as required to document piping location.
- c. Include profile drawings with buried piping record documents when the Contract Documents include piping profile drawings.
- d. Conform to Section 01 78 39, Project Record Documents.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.
2. Upon delivery inspect pipe and appurtenances for cracking, gouging, chipping, denting, and other damage and immediately remove from Site and replace with acceptable material.

B. Storage:

1. Store materials to allow convenient access for inspection and identification. Store material off ground using pallets, platforms, or other supports. Protect packaged materials from corrosion and deterioration.
2. Pipe and fittings other than PVC and CPVC may be stored outdoors without cover. Cover PVC and CPVC pipe and fittings stored outdoors.

C. Handling:

1. Handle pipe, fittings, specials, and accessories carefully in accordance with pipe manufacturer's recommendations. Do not drop or roll material off trucks. Do not drop, roll or skid piping.
2. Avoid unnecessary handling of pipe.
3. Keep pipe interiors free from dirt and foreign matter.
4. Protect interior linings and exterior coatings of pipe and fittings from damage. Replace pipe and fittings with damaged lining regardless of cause of damage.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Piping materials are specified in the Buried Piping Schedule at end of this Section. Piping materials shall conform to Specifications for each type of pipe and piping appurtenances in applicable Sections of Division 40, Process Integration.
- B. General:
 1. Pipe Markings:
 - a. Factory-mark each length of pipe and each fitting with designation conforming to those on approved laying schedules.

- b. Manufacturer shall cast or paint on each length of pipe and each fitting pipe material, diameter, and pressure or thickness class.
- C. Polyethylene Encasement:
 - 1. Polyethylene may be supplied in tubes or sheets.
 - 2. Polyethylene encasement materials shall be in accordance with ANSI/AWWA C105.
- D. Cathodic Protection:
 - 1. Bonding Cables: Bonding cable and test lead wires shall be not less than No. 6 AWG, Type CP copper cathodic protection cable, with low density, high molecular weight polyethylene insulation.
 - 2. Test Lead Stations: Provide test lead stations where shown and indicated in the Contract Documents. Standard connection boxes for test lead stations shall be plastic terminal boxes, 18 inches long and five-inch inside diameter, with locking cast iron lid with "CP TEST" cast into cover. Inside terminal box shall be terminal block with seven terminals. Terminal box shall be manufactured by C.P. Test Services "NM-7" or equal.

2.2 BURIED PIPING IDENTIFICATION

- A. Polyethylene Underground Warning Tape for Metallic Pipelines:
 - 1. Tracer tape shall be of inert, acid- and alkali-resistant, polyethylene, four mils thick, six inches wide, suitable for direct burial. Tape shall be capable of stretching to twice its original length.
 - 2. Message shall read, "CAUTION [insert customized name of pipe service, i.e., "POTABLE WATER", "SANITARY SEWER", "REUSE WATER", or other service as appropriate, as indicated in the Buried Pipe Schedule at the end of this Section] PIPE BURIED BELOW", with bold letters approximately two inches high. Messages shall be printed at maximum intervals of two feet. Tape shall be custom colored as follows:
 - a. Blue, for water pipelines.
 - b. Green, for sewer pipelines.
 - 3. Manufacturer: Provide products of one of the following:
 - a. Brady Corporation.
 - b. Seton Identification Products.
 - c. Marking Services, Inc.
 - d. Or equal.
- B. Detectable Underground Warning Tape for Non-Metallic Pipelines:
 - 1. Tape shall be of inert, acid- and alkali-resistant, polyethylene, five mils thick, six inches wide, with aluminum backing, and have 15,000 psi tensile strength and 80 percent elongation capability. Tape shall be suitable for direct burial.
 - 2. Message shall read, "CAUTION [insert customized name of pipe service, i.e., "POTABLE WATER", "SANITARY SEWER", "CHLORINE GAS", or other appropriate service, as indicated in the Buried Pipe Schedule at the end of this Section] PIPE BURIED BELOW" with bold letters approximately two inches high. Messages shall be printed at maximum intervals of two feet. Tape shall be custom colored as follows:
 - a. Blue, for water pipelines.
 - b. Green, for sewer pipelines.
 - c. Purple, for reuse pipelines.
 - 3. Manufacturer: Provide products of one of the following:
 - a. Brady Corporation.
 - b. Seton Identification Products.

- c. Marking Services, Inc.
- d. Or equal.

PART 3 EXECUTION

3.1 INSTALLATION

A. General:

1. Install piping as shown, specified, and as recommended by pipe and fittings manufacturer.
2. In event of conflict between manufacturer's recommendations and the Contract Documents, request interpretation from ENGINEER before proceeding.
3. ENGINEER will observe excavations and bedding prior to laying pipe by CONTRACTOR. Notify ENGINEER in advance of excavating, bedding, pipe laying, and backfilling operations.
4. Minimum Cover Over Buried Water Piping and Sewer Force Mains:
 - a. Provide minimum cover of 30-inches, unless pipe material is ductile iron or other approved material and insulated to prevent freezing, or otherwise shown or approved by ENGINEER.
 - b. For all crossings of water courses:
 - 1) Provide minimum cover under channel bed of 36-inches.
 - 2) Provide ductile iron pipe with restrained joints.
 - c. For crossing of water courses greater than 15-feet in width:
 - 1) Provide easily-accessible valves which allow for isolating the section for testing and repair.
 - 2) Provide a blow-off on the side opposite the supply side. Direct blow-off away from any streams.
5. Minimum Cover Over Buried Sewer Piping:
 - a. Provide minimum cover of 36-inches and maximum cover of 16-feet over PVC pipe. Provide ductile iron pipe if less than 36-inches or greater than 16-feet of cover.
6. Earthwork is specified in Section 31 23 05.
7. Excavation in excess of that required or shown, and that is not authorized by ENGINEER shall be filled at CONTRACTOR's expense with granular material furnished, placed, and compacted in accordance with Section 31 23 05, Excavation and Fill.
8. Comply with NFPA 24 for "Outside Protection", where applicable to water piping systems used for fire protection.

B. Manufacturer's Installation Specialist:

1. Provide services of competent installation specialist of pipe manufacturer when pipe installation commences for:
 - a. Thermoplastic pipe.
2. Retain installation specialist at the Site for minimum of 1 day (eight hours per day at the Site) or until competency of pipe installation crew has been satisfactorily demonstrated.

C. Separation of Sewers and Potable Water Piping:

1. Horizontal Separation:
 - a. Where possible, existing and proposed potable water mains and service lines, and sanitary and storm sewers shall be separated horizontally by clear distance of at least ten feet.

- b. If local conditions preclude the specified clear horizontal separation, installation will be allowed if potable water main is in separate trench and with bottom of potable water main at least 18 inches above top of sewer.
 - c. Exception:
 - 1) Where it is not possible to provide minimum horizontal separation between water main and sanitary sewer main as described above, construct potable water main and sewer of ceramic epoxy-lined ductile iron pipe with restrained push-on joint or restrained mechanical joint pipe complying with public water supply design standards of authority having jurisdiction. Hydrostatically test water main and sewer as specified in this Section prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.
 - 2) Where it is not possible to provide minimum horizontal distance between water main and storm sewer or catch basin, provide ductile iron with joints as far as possible from the storm sewer or catch basin
 - d. Install sewer lines, manholes, pump stations and force mains at least 100-feet from public water supply wells and at least 20-feet from any other potable water well.
 - e. Install water mains no less than 25-feet from any portion of a waste-water tile-filed or spray-field.
2. Vertical Separation:
- a. a. Sewer Main Crossing over Water Main:
 - 1) Provide minimum vertical distance of 18-inches between outside of potable water main and outside of sewer when sewer crosses over potable water main.
 - 2) Provide cement-lined ductile iron sewer and water mains for a distance of 10-feet on each side of the point of crossing, with valves as far as possible from the crossing. Provide valves on sewer and water mains that comply with drinking water standards.
 - 3) Hydrostatically test water main and sewer as specified in this Section, prior to backfilling. Hydrostatic test pressure at crossing shall be at least 150 psi.
 - b. Sewer Main Crossing under Water Main:
 - 1) Provide minimum vertical distance of 18-inches between outside of potable water main and outside of sewer when sewer crosses under potable water main.
 - 2) If less than 18-inches of vertical separation is possible, provide water main ceramic epoxy-lined ductile iron sewer main for a distance of 10-feet on each side of the point of crossing, with joints as far as possible from the crossing.
 - c. Provide adequate structural support where potable water main crosses sewer. At minimum, provide compacted select backfill for ten feet on each side of crossing.
 - d. PVC Water Main Crossing Other Buried Pipeline Utilities:
 - 1) Provide minimum vertical distance of 12-inches and Type 5 bedding for water main. If this requires water main deeper than 5-feet, DIP (or brass or stainless for 2" mains) may be installed with less than 12-inches clearance provided 3-foot cover is provided for water main.
- D. Plugs:
- 1. Temporarily plug installed pipe at end of each day of work, during lunch, or other interruption of pipe installation to prevent entry of animals, liquids, and persons into pipe, and entrance or insertion of deleterious materials into pipe.
 - 2. Install standard plugs in bells at dead ends, tees, and crosses. Cap spigot and plain ends.
 - 3. Fully secure and block plugs, caps, and bulkheads installed for testing to withstand specified test pressure.
 - 4. Where plugging is required for phasing of the Work or subsequent connection of piping, install watertight, permanent type plugs, caps, or bulkhead acceptable to ENGINEER.

- E. Bedding Pipe: Bed pipe as specified and in accordance with details on the Drawings.
1. Trench excavation and backfill, and bedding materials shall conform to Section 31 23 05, as applicable.
 2. Where ENGINEER deems existing bedding material unsuitable, remove and replace existing bedding with approved granular material furnished, placed, and compacted in accordance with Section 31 23 05, Excavation and Fill. Payment for additional excavation and providing granular material will be made under the unit price payment items in the Contract.
 3. Where pipe is installed in rock excavation, Type 5 bedding or bedding as directed by ENGINEER shall be installed.
 4. Excavate trenches below bottom of pipe by amount shown and indicated in the Contract Documents. Remove loose and unsuitable material from bottom of trench.
 5. Carefully and thoroughly compact pipe bedding with hand held pneumatic compactors.
 6. Do not lay pipe until ENGINEER approves bedding condition.
 7. Do not bring pipe into position until preceding length of pipe has been bedded and secured in its final position.
- F. Laying Pipe:
1. Conform to manufacturer's instructions and requirements of standards and manuals listed below, as applicable:
 - a. Ductile Iron Pipe: ANSI/AWWA C600, ANSI/AWWA C105, AWWA M41, ASTM A377
 - b. Thermoplastic Pipe: ASTM D2321, ASTM D2774, ANSI/AWWA C605, AWWA M23, AWWA M45, AWWA, M55.
 - c. Sanitary and Storm Sewers: ASCE 37.
 2. Install pipe accurately to line and grade shown and indicated in the Contract Documents, unless otherwise approved by ENGINEER. Remove and reinstall pipes that are not installed correctly.
 3. Slope piping uniformly between elevations shown.
 4. Keep groundwater level in trench at least 12-inches below bottom of trench before laying pipe. Do not lay pipe in water. Maintain dry trench conditions until jointing and backfilling are complete. Keep clean and protect interiors of pipe, fittings, valves, and appurtenances.
 5. Start laying pipe at lowest point and proceed towards higher elevations, unless otherwise approved by ENGINEER.
 6. Place bell and spigot-type pipe so that bells face the direction of laying, unless otherwise approved by ENGINEER.
 7. Excavate around joints in bedding and lay pipe so that pipe barrel bears uniformly on trench bottom.
 8. Deflections at joints shall not exceed 75 percent of amount allowed by pipe manufacturer, unless otherwise approved by ENGINEER.
 9. For copper tubing, snake piping in trench to compensate for thermal expansion and contraction.
 10. Carefully examine pipe, fittings, valves, and specials for cracks, damage, and other defects while suspended above trench before installation. Immediately remove defective materials from the Site and replace with acceptable products.
 11. Inspect interior of all pipe, fittings, valves, and specials and completely remove all dirt, gravel, sand, debris, and other foreign material from pipe interior and joint recesses before pipe and appurtenances are moved into excavation. Bell and spigot-type mating surfaces shall be thoroughly wire brushed and wiped clean and dry immediately before pipe is laid.
 12. Field cut pipe, where required, with machine specially designed for cutting the type of pipe being installed. Make cuts carefully, without damage to pipe, coating or lining, and with smooth end at right angles to axis of pipe. Cut ends on push-on joint type pipe shall be

tapered and sharp edges filed off smooth. Do not flame-cut pipe. When making connections to existing mains which require water mains to be removed from service, automatic traveling pipe cutting machines will be required on 16-inch and larger.

13. Do not place blocking under pipe, unless specifically approved by ENGINEER for special conditions.
14. Touch up protective coatings in manner satisfactory to ENGINEER prior to backfilling.
15. Notify ENGINEER in advance of backfilling operations.
16. On steep slopes, take measures acceptable to ENGINEER to prevent movement of pipe during installation.
17. Thrust Restraint: Where required, provide thrust restraint conforming to Article 3.3 of this Section.
18. Exercise care to avoid flotation when installing pipe in cast-in-place concrete, and in locations with high groundwater.

G. Polyethylene Encasement:

1. Provide polyethylene encasement for ductile iron piping to prevent contact between pipe and surrounding bedding material and backfill.
2. Polyethylene encasement installation shall be in accordance with ANSI/AWWA C105.

H. Jointing Pipe:

1. Ductile Iron Mechanical Joint Pipe:

- a. Immediately before making joint, wipe clean the socket, plain end, and adjacent areas. Taper cut ends and file off sharp edges to provide smooth surface.
- b. Lubricate plain ends and gasket with soapy water or manufacturer's recommended pipe lubricant, in accordance with ANSI/AWWA C111, just prior to slipping gasket onto plain end of the joint assembly.
- c. Place gland on plain end with lip extension toward the plain end, followed by gasket with narrow edge of gasket toward plain end.
- d. Insert plain end of pipe into socket and press gasket firmly and evenly into gasket recess. Keep joint straight during assembly.
- e. Push gland toward socket and center gland around pipe with gland lip against gasket.
- f. Insert bolts and hand-tighten nuts.
- g. If deflection is required, make deflection after joint assembly and prior to tightening bolts. Alternately tighten bolts approximately 180 degrees apart to seat gasket evenly. Bolt torque shall be as follows:

Pipe Diameter (inches)	Bolt Diameter (inches)	Range of Torque (ft-lbs)
3	5/8	40 to 60
4 to 24	3/4	60 to 90
30 to 36	1	70 to 100
42 to 48	1.25	90 to 120

- h. Bolts and nuts, except those of stainless steel, shall be coated with two coats, minimum dry film thickness of eight mils each, of high build solids epoxy or bituminous coating manufactured by Tnemec, or equal.
 - i. Restrained mechanical joints shall be in accordance with Section 40 05 19, Ductile Iron Process Pipe.
2. Ductile Iron Push-On Joint Pipe:

- a. Prior to assembling joints, thoroughly clean with wire brush the last eight inches of exterior surface of spigot and interior surface of bell, except where joints are lined or coated with a protective lining or coating.
 - b. Wipe clean rubber gaskets and flex gaskets until resilient. Conform to manufacturer's instructions for procedures to ensure gasket resiliency when assembling joints in cold weather.
 - c. Insert gasket into joint recess and smooth out entire circumference of gasket to remove bulges and to prevent interference with proper entry of spigot of entering pipe.
 - d. Immediately prior to joint assembly, apply thin film of pipe manufacturer's recommended lubricant to surface of gasket that will come in contact with entering spigot end of pipe, or apply a thin film of lubricant to outside of spigot of entering pipe.
 - e. For assembly, center spigot in pipe bell and push pipe forward until spigot just makes contact with rubber gasket. After gasket is compressed and before pipe is pushed or pulled in the rest of the way, carefully check gasket for proper position around the full circumference of joint. Final assembly shall be made by forcing spigot end of entering pipe past gasket until spigot makes contact with base of the bell. When more than a reasonable amount of force is required to assemble the joint, remove spigot end of pipe to verify proper positioning of gasket. Do not use gaskets that have been scored or otherwise damaged.
 - f. Maintain an adequate supply of gaskets and joint lubricant at the Site when pipe jointing operations are in progress.
3. Ductile Iron Proprietary Joints:
- a. Install pipe that utilizes proprietary joints for restraint specified in Section 40 05 19, Ductile Iron Process Pipe, or other such joints, in accordance with manufacturer's instructions.
4. Thermoplastic Pipe Joints:
- a. Bell and Spigot Joints:
 - 1) Bevel pipe ends, remove all burrs, and provide a reference mark at correct distance from pipe end before making joints.
 - 2) Clean spigot end and bell thoroughly before making the joint. Insert O-ring gasket while ensuring that gasket is properly oriented. Lubricate spigot with manufacturer's recommended lubricant. Do not lubricate bell and O-ring. Insert spigot end of pipe carefully into bell until reference mark on spigot is flush with bell.
5. Copper Tubing Joints:
- a. Soldered Joints:
 - 1) Assemble copper tubing with soldered joints. Solder shall be 95-5 tin-antimony solder conforming to ASTM B32.
 - 2) Ream or file pipe to remove burrs.
 - 3) Clean and polish contact surfaces of joints.
 - 4) Apply flux to both male and female ends.
 - 5) Insert end of tube into full depth of fitting socket.
 - 6) Heat joint evenly.
 - 7) Form continuous solder bead around entire circumference of joint starting at the bottom.
 - b. Threaded Joints:
 - 1) When open flames for soldering are impractical, or at unions and connections to equipment and appurtenances, assemble copper tubing with flared ends as permitted by authority having jurisdiction.

- 2) Ends of tubing shall be flared at an angle of 45 degrees with flaring tool recommended by pipe manufacturer. Flaring tool shall have same outside diameter as tube to be flared.
 - 3) Tubing to be flared shall be soft temper or annealed prior to flaring.
 - 4) End of tube shall be cut square and reamed to remove burrs.
 - 5) Tube that is out-of-round shall be resized back to round.
 - 6) Clean and polish contact surfaces of joints using an abrasive cloth.
 - 7) Place flare nut over the end of tube with threads closest to end being flared.
 - 8) Insert appropriate length of tube between flaring bar of flaring tool and position the yolk with flaring cone over tube end and clamp yoke in place.
 - 9) Turn handle of yolk clockwise without over-tightening. Cracked or deformed tubes will be rejected.
 - 10) Do not apply jointing compounds to mating surfaces of flare fitting and flared tube end before attaching flare nut to threaded connection.
6. Mechanical Coupling Joints:
- a. Do not use sleeve couplings in water mains except for: connections to existing mains, connections between different pipe materials, or as necessary for repairs during pressure/leakage tests.
 - b. Provide couplings for sewer lines 12-inches and smaller per Section 33 05 06, Couplings, Adapters and Specials.
 - c. Prior to installing and assembling mechanical couplings, thoroughly clean joint ends with wire brush to remove foreign matter.
 - d. Loosen the stainless steel clamping bands and remove clamps from coupling. Slide coupling over plain ends of pipes to be joined without using lubricants. Place clamps over each end of coupling at grooved section and tighten with torque wrench to torque recommended by manufacturer.
- I. Backfilling:
1. Conform to applicable requirements of Section 31 23 05, Excavation and Fill.
 2. Place backfill as Work progresses. Backfill by hand and use power tampers until pipe is covered by at least one foot of backfill.
- J. Connections to Valves and Hydrants:
1. Install valves and hydrants as shown and indicated in the Contract Documents.
 2. Provide suitable adapters when valves or hydrants and piping have different joint types.
 3. Provide thrust restraint at all hydrants and at valves located at pipeline terminations.
- K. Transitions from One Type of Pipe to Another:
1. Provide necessary adapters, specials, and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.
- L. Closures:
1. Provide closure pieces shown or required to complete the Work.

3.2 TRACER WIRE INSTALLATION

- A. Detectable Underground Tracer Wire for Non-Metallic Pipelines:
1. Provide and install a 14-gauge solid copper wire on top of all new non-metallic pipeline.
 2. Secure the wire to the pipe with duct tape near every bell and at the center of each pipe joint.
 3. Fasten the wire securely to a cast iron fitting at each main line valve and to service lines.

- B. Detectable Underground Tracer Wire for Hydrant Leads:
 - 1. Provide and install a 14-gauge solid copper wire around all new hydrant leads.
 - 2. Install wire around all horizontal portions of the hydrant lead, as well as the buried hydrant gate valve.
 - 3. Wrap the wire at frequency of no less than one revolution per linear foot of pipe.
 - 4. Fasten the wire securely to the 90-degree fittings at each end of the horizontal portion of hydrant lead.

3.3 THRUST RESTRAINT

- A. Provide thrust restraint on pressure piping systems where shown or indicated in the Contract Documents.
- B. Thrust restraint shall be accomplished by using restrained pipe joints. Concrete thrust blocks and/or harnessing buried pipe may be used if approved by the ENGINEER. Thrust restraints shall be designed for axial thrust exerted by test pressure specified in the Buried Piping Schedule at the end of this Section.
- C. If so approved, place concrete thrust blocks against undisturbed soil. Thrust blocks shall not be installed where undisturbed soil does not exist and/or where the Site consists of backfill material.
- D. Restrained Pipe Joints:
 - 1. Pipe joints shall be restrained by means suitable for the type of pipe being installed.
 - a. Ductile Iron, Push-on Joints and Mechanical Joints: Restrain with proprietary restrained joint system as specified in Section 40 05 19, Ductile Iron Process Pipe; lugs and tie rods; or other joint restraint systems approved by ENGINEER.
 - b. Thermoplastic Joints: Where bell and spigot-type or other non-restrained joints are utilized, provide tie rods across joint or other suitable joint restraint system, subject to the approval of ENGINEER.
- E. Concrete Thrust Blocks:
 - 1. Provide concrete thrust blocks on pressure piping at changes in alignment of 15 degrees or more, at tees, plugs and caps, and where shown or indicated in the Contract Documents. Construct thrust blocks conforming to 03 00 05, Concrete.
 - 2. Install thrust blocks against undisturbed soil. Place concrete so that pipe and fitting joints are accessible for repair.
 - 3. Concrete thrust block size shall be as shown on the Drawings or as approved by ENGINEER.
- F. Harnessed lengths of buried pipe shall be as shown on the Drawings.

3.4 WORK AFFECTING EXISTING PIPING

- A. Location of Existing Underground Facilities:
 - 1. Locations of existing Underground Facilities shown on the Drawings should be considered approximate.
 - 2. Determine the true location of existing Underground Facilities to which connections are to be made, crossed, and that could be disturbed, and determine location of Underground Facilities that could be disturbed during excavation and backfilling operations, or that may be affected by the Work.

- B. Taking Existing Pipelines and Underground Facilities Out of Service:
 - 1. Conform to Section 01 14 16, Coordination with Owner's Operations.
 - 2. Do not take pipelines or Underground Facilities out of service unless specifically listed in Section 01 14 16, Coordination with Owner's Operations, or approved by ENGINEER.
 - 3. Notify ENGINEER in writing prior to taking pipeline or Underground Facilities out of service. Shutdown notification shall be provided in advance of the shutdown in accordance with the General Conditions and Section 01 14 16, Coordination with Owner's Operations.
- C. Work on Existing Pipelines or Underground Facilities:
 - 1. Cut or tap piping or Underground Facilities as shown or required with machines specifically designed for cutting or tapping pipelines or Underground Facilities, as applicable.
 - 2. Install temporary plugs to prevent entry of mud, dirt, water, and debris into pipe.
 - 3. Provide necessary adapters, sleeves, fittings, pipe, and appurtenances required to complete the Work.
 - 4. Conform to applicable requirements of Section 01 14 16, Coordination with Owner's Operations and Section 01 73 29, Cutting and Patching.

3.5 FIELD QUALITY CONTROL

- A. General:
 - 1. Test all piping, except as exempted in the Buried Piping Schedule in this Section.
 - 2. When authorities having jurisdiction are to witness tests, notify ENGINEER and authorities having jurisdiction in writing at least 48 hours in advance of testing.
 - 3. Conduct all tests in presence of ENGINEER.
 - 4. Remove or protect pipeline-mounted devices that could be damaged by testing.
 - 5. Provide all apparatus and services required for testing, including:
 - a. Test pumps, compressors, hoses, calibrated gages, meters, test containers, valves, fittings, and temporary pumping systems required to maintain OWNER's operations.
 - b. Temporary bulkheads, bracing, blocking, and thrust restraints.
 - 6. Provide air if an air test is required, power if pumping is required, and gases if gases are required.
 - 7. Unless otherwise specified, OWNER will provide fluid required for hydrostatic testing. CONTRACTOR shall provide means to convey fluid for hydrostatic testing into piping being tested. CONTRACTOR shall provide fluid for other types of testing required.
 - 8. Repair observed leaks and repair pipe that fails to meet acceptance criteria. Retest after repair.
 - 9. Unless otherwise specified, testing shall include existing piping systems that connect with new piping system. Test existing pipe to nearest valve. Piping not installed by CONTRACTOR and that fails the test shall be repaired upon authorization of OWNER. Unless otherwise included in the Work, repair of existing piping or Underground Facilities will be paid as extra Work.
- B. Test Schedule:
 - 1. Refer to the Buried Piping Schedule in this Section for type of test required and required test pressure.
 - 2. Unless otherwise specified, required test pressures are at lowest elevation of pipeline segment being tested.
 - 3. For piping not listed in Buried Piping Schedule in this Section:
 - a. Hydrostatically test pipe that will convey liquid at a pressure greater than five psig. Provide process air pipe test for pipe that will convey air or gas under pressure or vacuum, except chlorine gas, which requires separate test.

- b. Use exfiltration testing, low-pressure air testing, or vacuum testing for other piping.
 - c. Disinfect for bacteriological testing piping that conveys potable water.
 - 4. Test Pressure:
 - a. Use test pressures listed in Buried Piping Schedule in this Section.
 - b. If test pressure is not listed in Buried Piping Schedule, or if test is required for piping not listed in the Buried Piping Schedule, test pressure will be determined by ENGINEER based on maximum anticipated sustained operating pressure and methods described in applicable ANSI/AWWA manual or standard that applies to the piping system.
- C. Hydrostatic Testing:
- 1. Preparation for Testing:
 - a. For thermoplastic pipe, follow procedures described in Section 7 of ANSI/AWWA Standard C605.
 - b. For ductile iron pipe, follow procedures described in ANSI/AWWA Standard C600.
 - c. Prior to testing, ensure that adequate thrust protection is in place and joints are properly installed.
 - d. The maximum length pipe tested in one test shall be 5,000-feet.
 - 2. Test Procedure:
 - a. Fill pipeline slowly to minimize air entrapment and surge pressures. Fill rate shall not exceed one foot of pipe length per second in pipe being tested.
 - b. Expel air from pipe as required. Obtain approval of ENGINEER prior to tapping pipe for expelling air.
 - c. Examine exposed joints and valves, and make repairs to eliminate visible leakage.
 - d. After specified wetting period, add fluid as required to pressurize line to required test pressure. Maintain test pressure for a stabilization period of ten minutes before beginning test.
 - e. Timed test period shall not begin until after pipe has been filled, exposed to required wetting period, air has been expelled, and pressure stabilized.
 - f. Timed Test Period: After stabilization period, maintain test pressure for at least two hours. During timed testing period, add fluid as required to maintain pressure within five psig of required test pressure.
 - g. Pump from test container to maintain test pressure. Measure volume of fluid pumped from test container and record on test report. Record pressure at test pump at 15 minute intervals for duration of test.
 - 3. Allowable Leakage Rates: Leakage is defined as the quantity of fluid supplied to pipe segment being tested to maintain pressure within five psi of test pressure during timed test period. Allowable leakage rates for piping are:
 - a. No Leakage: Pipe with fused, threaded, soldered, or brazed joints.
 - b. Rates based on formula or table in ANSI/AWWA Manual M41:
 - 1) Metal pipe joined with rubber gaskets as sealing members, including the following joint types:
 - a) Bell and spigot and push-on joints.
 - b) Mechanical joints.
 - c) Bolted sleeve type couplings.
 - d) Grooved and shouldered couplings.
 - c. Rates based on formula or table in ANSI/AWWA C605:
 - 1) Plastic pipe joined with O-ring gasket sealing members.
- D. Exfiltration Testing for Manholes:
- 1. Test 25-percent of all manholes, as selected by ENGINEER.

2. Plug and bulkhead inlet and outlet pipes and lateral connections to manhole to be tested and admit fluid until the manhole is full.
 3. Allow water level to saturate, then refill and mark the level of water.
 4. Test duration shall be at least two hours.
 5. Allowable leakage rate shall be 3-gallons per hour.
- E. Gravity Sewer Pipe Leakage Testing
1. After minimum 10-days following completion of backfill, determine level of the ground water table and submit to County Inspector. If level of ground water table is above the top of the pipe, test the sewer line for infiltration. Otherwise, use low pressure air test.
 2. Infiltration Test:
 - a. Test up to 1-mile section of constant diameter pipe at a time.
 - b. Isolate test section by installing suitable upstream watertight bulkheads.
 - c. Take 6 readings at 5-minute intervals and use the average to determine rate of infiltration for the test section.
 - d. Infiltration shall not exceed 100 gallons per day per inch-diameter per mile.
 - e. Isolate and test any individual section between two manholes separately if so directed by ENGINEER.
 - f. Facilitate York County Water/Sewer Department to use video equipment in any section to detect infiltration sources.
 3. Low Pressure Air Test:
 - a. Plug and bulkhead ends and lateral connections of pipe segment to be tested.
 - b. Required test pressure shall be increased by an amount equal to the elevation of groundwater above invert of lowest point of pipe segment being tested.
 - c. Test in accordance with requirements of authority having jurisdiction.
 - d. For thermoplastic pipe, use test procedures described in ASTM 1417.
- F. Vacuum Testing:
1. Plug and bulkhead ends and lateral connections of pipe segment or manhole to be tested.
 2. Following set-up of test apparatus, draw vacuum of ten inches of mercury on pipe segment or manhole being tested.
 3. Start test upon reaching specified test vacuum. Test duration shall be 15 minutes.
 4. Record vacuum drop at end of test. If vacuum drop is greater than one inch of mercury, pipe segment or manhole fails the test and shall be repaired and retested. If vacuum drop is less than one inch of mercury, pipe segment or manhole passes the test.
- G. Vertical Deflection Test for Thermoplastic Pipe:
1. Conduct vertical deflection test at least thirty days after backfill has been placed.
 2. Perform test using one of the following two methods
 - a. Manually pull pin-type vertical gauge mounted on sled through pipe. Gauge shall be manufactured by Quality Test Products, or equal. Set gauge so that sled will stop if vertical deflection of pipe exceeds five percent. Excavate and re-install piping that fails deflection test, and retest.
 - b. Use rigid ball or mandrel for deflection test, which shall have diameter of at least 95 percent of base inside diameter or average inside diameter of piping, depending on which is specified in applicable ASTM standard, including appendix, to which pipe is manufactured. Perform test without mechanical pulling devices. Re-install and retest pipe segments that exceed deflection of five percent.
- H. Bacteriological Testing:

1. Bacteriological testing for potable water lines, finished water lines, and other piping in accordance with the Buried Piping Schedule, is specified in Part 3 of this Section.

3.6 CLEANING AND DISINFECTION

- A. Cleaning, General: Clean pipe systems as follows:
 1. Thoroughly clean all piping, including flushing with water, dry air, or inert gas as required, in manner approved by ENGINEER, prior to placing in service. Flush chlorine solution and sodium hypochlorite piping with water.
 2. Piping 24-inch diameter and larger shall be inspected from inside and debris, dirt and foreign matter removed.
 3. For piping that requires disinfection and has not been kept clean during storage or installation, swab each section individually before installation with five percent sodium hypochlorite solution.
- B. Disinfection:
 1. Disinfect all potable and finished water piping.
 2. Suggested procedure for accomplishing complete and satisfactory disinfection is specified below. Other procedures may be considered for acceptance by ENGINEER.
 - a. Prior to disinfection, clean piping as specified and flush thoroughly.
 - b. Conform to procedures described in ANSI/AWWA C651. Use continuous feed method of disinfecting, unless alternative method is acceptable to ENGINEER.
 3. Water for initial flushing, testing, and disinfection will be furnished by OWNER. CONTRACTOR shall provide all temporary piping, hose, valves, appurtenances, and services required. Cost of water required for redisinfection will be paid by CONTRACTOR to OWNER at water utility's standard rates.
 4. Chlorine shall be provided by CONTRACTOR.
 5. Bacteriologic tests shall be performed by CONTRACTOR. Provide certified test laboratory report to OWNER.
 6. Chlorine concentration in water entering the piping shall be between 50 and 100 ppm, such that minimum residual concentration of 25 mg/L remains after 24-hour retention period. Disinfect piping and all related components. Repeat as necessary to provide complete disinfection.
 7. After required retention period, flush chlorinated water to closed drain line, unless otherwise acceptable to ENGINEER. Properly dispose of chlorinated water in accordance with Laws and Regulations. Do not discharge chlorinated water to storm sewers, ditches, or overland.

3.7 CATHODIC PROTECTION

- A. General:
 1. Provide cathodic protection for buried steel pipelines.
 2. Provide insulated joint at each of the following:
 - a. Connection to steel water tanks and each branch connecting to a water line.
 - b. Connection between concrete pipe and steel pipe, and between ductile iron pipe and steel pipe.
 - c. Connection through wall.
 - d. Where indicated.
 3. Provide electrical bond across all other gasketed steel pipe joints.
 4. Provide test lead stations for monitoring electrical currents on pipeline at locations shown and indicated in the Contract Documents.

B. Details of Cathodic Protection:

1. Insulated Joints: Where shown or indicated in the Contract Documents, provide insulated flange type joints. After joint is made, provide exterior coating around joint as specified for piping being joined.
2. Electrical Bond Across Rubber Gasket Joints: Provide two electrical bonding cables across each rubber-gasketed bell and spigot joint. Before exterior coating is applied to bell and spigot joints, two small areas of metal shall be exposed on each side of joint, one on spigot ring and one on bell. Thoroughly clean each area and bond two cathodic protection cables to pipe, one on each side of joint. Bond each cable by thermite process. Coat completed connections and exposed metal as specified for exterior coating of pipe being joined.
3. Electrical Bond Across Mechanical Couplings: Provide two electrical bonding cables across each mechanical coupling. Before the exterior coating is applied to mechanical couplings, expose two small areas of metal on pipe surface on each side of coupling, on middle ring and on each follower ring of coupling. Thoroughly clean each area and bond two cathodic protection cables to pipe, one on each side of joint and to middle ring and follower rings of mechanical coupling. Bond each cable by thermite process. Coat completed connections and exposed metal as specified for exterior coating of pipe being joined.
4. Electrical Bond Across Valves and Flanges: Provide two electrical bonding cables across valves and flanged connections other than insulated flange type joints. Provide electrical bond as specified for bond across rubber gasket joints.
5. Test Lead Stations: Provide test lead stations where shown and indicated in the Contract Documents. Terminate test lead on ground surface in standard connection box at a protected location acceptable to ENGINEER.

3.8 SCHEDULES

- A. Schedules listed below, following the "End of Section" designation, are part of this Specification section.
1. Table 33 05 05-A, Buried Piping Schedule.

END OF SECTION

TABLE 33 05 05, BURIED PIPING SCHEDULE

Service	Diameter (inch)	Material	Interior Lining	Exterior Coating	Pressure Class/ Thickness	Joint	Test	Remarks
Sanitary Sewer	8	DI	CL	AC, Zinc	350	POJ	Air	
Sanitary Sewer	12	DI	CL	AC, Zinc	350	POJ	Air	
Sanitary Sewer	16	DI	CL	AC, Zinc	250	POJ	Air	

The following abbreviations are used in the Buried Piping Schedule.

A. Service Abbreviations

Service	Abbrev		Service	Abbrev.
Sanitary Sewer	SAN		Wastewater	WW
Storm Sewer	ST		Chlorine Solution	CLS
Sanitary Force Main	SFM		Sodium Hypochlorite	NAOCL
Raw Water	RW		Plant Effluent Water	PEW
Potable Water	PW		Drain	DR
County Water	CW		Chlorine Gas	CLG

B. Material Abbreviations

Material	Abbrev		Material	Abbrev.
Ductile Iron	DI		Polyvinyl Chloride	PVC
Cast Iron	CI		Copper	C
Chlorinated Polyvinyl Chloride	CPVC			

C. Lining/Coating Abbreviations

Lining	Abbrev		Coating	Abbrev.
Cement Mortar Lined	CL		Asphaltic Coated	AC
Painted	P		Polyethylene Wrapped	PEW
Ceramic Epoxy	CE			

D. Joint Abbreviations

Joint Type	Abbrev		Joint Type	Abbrev.
Bell and Spigot	BS		Restrained Mech. Joint	RMJ
Restrained Bell and Spigot	RBS		Soldered	Sd
Push-on Joint	POJ		Threaded	Thd
Restrained Push-on Joint	RPOJ		Split Flexible Coupling	SPFC
Mechanical Joint	MJ		Plasticized PVC Coupling	PPVC
Sleeve-type Flexible Coupling	SLFC			

E. Test Abbreviations

Test	Abbrev		Test	Abbrev.
Hydrostatic Test (test pressure in psig)	HYD ()		Process Air Pipe Test (test pressure in psig)	PA ()
Exfiltration	EX		Vacuum Test	VAC
Low-pressure Air Sewer Test	AIR		Disinfection and Bacteriological Testing	DBT
Vertical Deflection	VD		No Test Required	NR

SECTION 33 05 06

COUPLINGS, ADAPTERS AND SPECIALS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. Provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install all couplings, adapters, and specials for process piping.
- B. Coordination:
 - 1. Review installation procedures under this and other Sections and coordinate installation of items that must be installed with or before couplings, adapters, and specials for process piping Work.
- C. Related Sections:
 - 1. Section 33 05 05, Buried Piping Installation
 - 2. Section 40 05 05, Exposed Piping Installation.
 - 3. Section 40 05 19, Ductile Iron Process Pipe.
 - 4. Section 40 05 31, Thermoplastic Process Pipe.

1.2 REFERENCES

- A. Standards referenced in this Section are:
 - 1. ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings.
 - 2. ASME B31, Standards of Pressure Piping.
 - 3. ASTM F593, Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
 - 4. AWWA C606, Grooved and Shouldered Joints.
 - 5. ASTM C1173, Standard Specification for Flexible Transition Couplings for Underground Piping Systems.
 - 6. ASTM D2000, Standard Classification System for Rubber Products in Automotive Systems.

1.3 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer shall have at least five years experience producing substantial similar products to those specified and shall be able to provide documentation of at least five installations in satisfactory operation for at least five years each.
- B. Component Supply and Compatibility:
 - 1. Obtain each type of coupling, adapter, and special for process piping product included in this Section, regardless of component manufacturer, from a single couplings, adapters, and specials manufacturer.
 - 2. Supplier shall prepare, or review, and approve all submittals for components furnished under this Section.

3. Components shall be suitable for specified service conditions and be integrated into overall assembly by the Supplier.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 1. Shop Drawings:
 - a. Submit piping layout Shop Drawings in accordance with Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation.
 2. Product Data:
 - a. Submit product data on each type of coupling, expansion joint, and other piping specialties and accessories, including gaskets, hardware, and appurtenances sufficient to demonstrate compliance with the Contract Documents.
 3. Tapping Plan: Submit a complete tapping plan including, but not limited to, the following elements:
 - a. Sequence and schedule of tapping operation.
 - b. Means and methods of installing tap machine, sleeves and valves including area of excavation needed for tapping machine and method for supporting pipe and valve during tapping operation.
 - c. Identify necessary coordination with other elements of work.
 - d. Other elements of operation for safe and complete installation of tapped system.
- B. Informational Submittals: Submit the following:
 1. Certificates:
 - a. When requested by ENGINEER submit certificate attesting to compliance with standards referenced in this Section, signed by manufacturer.
 2. Manufacturer's Instructions:
 - a. Provide instructions for handling, storing, installing, and adjusting of products.
 3. Source Quality Control:
 - a. When requested by ENGINEER, submit results of source quality control tests.
 4. Qualifications Statements:
 - a. Submit qualifications of manufacturer when requested by ENGINEER.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 33 05 05, Buried Piping Installation.

PART 2 PRODUCTS

2.1 COUPLINGS

- A. Sleeve-type (Transition), Flexible Couplings, for water pipe 16-inches diameter and smaller:
 1. Pressure and Service: Same as connected piping.
 2. Products and Manufacturers: Provide products of one of the following:
 - a. Style 253, as manufactured by Dresser Piping Specialties, part of Dresser, Inc.
 - b. Style 441, by Smith Blair, Inc.
 - c. Or equal.
 3. Material: Ductile Iron.
 4. Gaskets: O-ring type gaskets at each end of the sleeve.

5. Bolts and Nuts: Alloy steel, corrosion resistant, primer-coated. For buried or submerged applications, provide stainless steel bolts complete with washers complying with ASTM F593, AISI Type 316 and with nitrided stainless nuts.
 6. Harnessing:
 - a. Harness couplings to restrain pressure piping. For pipelines that will be under pressure, test pressures are specified in piping schedules in Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation.
 - b. Tie adjacent flanges with bolts of corrosion-resistant alloy steel. Provide flange-mounted stretcher bolt plates to be designed by manufacturer, unless otherwise approved. For buried or submerged applications, provide external bolting and other hardware of Type 316 stainless steel, including tie bolts, bolt plates, lugs, nuts, and washers.
 - c. On plain-end piping, for harnessing couplings, provide anchor restraint system such as Dresser Piping Specialties STAR Anchor Style 443, or equal.
 - d. Conform to dimensions, size, spacing, and materials for lugs, bolts, washers, and nuts as recommended by manufacturer and approved by ENGINEER for pipe size, wall thickness, and test pressure required. Provide minimum 5/8-inch diameter bolts.
 7. Remove pipe stop(s) if used, unless otherwise shown or specified.
- B. Sleeve-type (Transition), Flexible Couplings, for water pipe greater than 16-inches diameter:
1. Pressure and Service: Same as connected piping.
 2. Products and Manufacturers: Provide products of one of the following:
 - a. Style 253, as manufactured by Dresser Piping Specialties, part of Dresser, Inc.
 - b. Style 441, by Smith Blair, Inc.
 - c. Or equal.
 3. Material: Steel.
 4. Gaskets: O-ring type gaskets at each end of the sleeve.
 5. Bolts and Nuts: Alloy steel, corrosion resistant, primer-coated. For buried or submerged applications, provide stainless steel bolts complete with washers complying with ASTM F593, AISI Type 316 and with nitrided stainless nuts.
 6. Harnessing:
 - a. Harness couplings to restrain pressure piping. For pipelines that will be under pressure, test pressures are specified in piping schedules in Section 33 05 05, Buried Piping Installation, and Section 40 05 05, Exposed Piping Installation.
 - b. Tie adjacent flanges with bolts of corrosion-resistant alloy steel. Provide flange-mounted stretcher bolt plates to be designed by manufacturer, unless otherwise approved. For buried or submerged applications, provide external bolting and other hardware of Type 316 stainless steel, including tie bolts, bolt plates, lugs, nuts, and washers.
 - c. On plain-end piping, for harnessing couplings, provide anchor restraint system such as Dresser Piping Specialties STAR Anchor Style 443, or equal.
 - d. Conform to dimensions, size, spacing, and materials for lugs, bolts, washers, and nuts as recommended by manufacturer and approved by ENGINEER for pipe size, wall thickness, and test pressure required. Provide minimum 5/8-inch diameter bolts.
 7. Remove pipe stop(s) if used, unless otherwise shown or specified.
- C. Transition Couplings for gravity sewer pipe:

1. Provide mechanical couplings for gravity sewer pipe in accordance with ASTM C1173 and CSA B602.
2. Pressure and Service: Same as connected piping.
3. Products and Manufacturers: Provide products of one of the following:
 - a. Fernco, Strong Back.
 - b. Mission.
 - c. Romac.
 - d. Gladding-Mcbean Repair
 - e. Or equal.
4. Material: Stainless steel shield and a molded in busing.
5. Gaskets: Manufactured to meet the requirements of ASTM D 5926 or compounded for water and sewer service in accordance with ASTM D2000 MAA 610.
6. Clamps: Manufactured to meet the requirements of CSA B602. Clamp Housing and Clamp Band 301 Stainless Steel. Clamp Screw 305 Stainless Steel.

2.2 MISCELLANEOUS SPECIALTIES AND ACCESSORIES

- A. Dielectric Connections:
 1. General: Where copper pipe connects to steel pipe, cast-iron pipe, or ductile iron pipe, provide either dielectric union or an insulating section of rubber or plastic pipe. When used, insulating section shall have minimum length of 12 pipe diameters.
 2. Manufacturers: Provide products of one of the following:
 - a. Epco Sales, Inc.
 - b. Watts Regulator Company.
 - c. Capitol Manufacturing Company.
 - d. Wilkins, a Zurn Company.
 - e. Or equal.
 3. Ratings:
 - a. Dielectric Unions: Rated for 250 psi, ANSI B16.39.
 - b. Flanges: 175 psi, ANSI 16.42 (Iron), ANSI 16.24 (Bronze)
 4. Insulating Sections: Rated for same pressure as associated piping test pressure. Material shall be suitable for the application and service.
 5. Bodies and flanges, and bolts and nuts shall be steel with galvanized coating. Provide nylon insulator, brass tailpiece and EPDM gaskets.

2.3 METER SETTERS

- A. General: Provide horizontal inlet and outlet meter setter, lock wing ground key angle meter valve with meter flange on inlet and angle dual check valve with meter flange on outlet. Provide bypass with lock wing ball valve and check valve.
- B. Products and Manufacturers: Provide the following:
 1. Mueller Company LLC, Model H-1423-2N.
 2. Or equal.
- C. Dimensions: 1-1/2" shall be 12" high by 12-1/4" length and 2" shall be 12" high by 17-1/4" length.

2.4 SERVICE SADDLES

- A. Brass Service Saddles on PVC Mains:

1. General: Provide service saddle as single strap design manufactured in bronze with corporation thread outlet.
 2. Manufacturers: Provide products of one of the following:
 - a. Ford S-70.
 - b. McDonald 3801 or 3805.
 - c. Mueller H-13000 series.
 - d. Romac 101B.
 - e. Power Seal 3401.
 - f. Or equal.
- B. Ductile Iron Service Saddles:
1. General: Provide service saddle manufactured in ductile iron with corporation thread outlet.
 2. Manufacturers: Provide products of one of the following:
 - a. Double Strap:
 - 1) Ford F202.
 - 2) Smith-Blair 313.
 - 3) JCM Industries 402.
 - 4) Romac 202U.
 - 5) PowerSeal 3413DI.
 - 6) Or equal.
 - b. Stainless Steel Strap:
 - 1) Ford FCD202.
 - 2) Smith-Blair 317.
 - 3) JCM Industries 405.
 - 4) Romac 202S.
 - 5) PowerSeal 3417DI.
 - 6) Or equal.
- C. Stainless Steel Service Saddles:
1. General: Provide service saddle manufactured in stainless steel with corporation thread outlet.
 2. Manufacturers: Provide products of one of the following:
 - a. Ford FS323.
 - b. Romac 304.
 - c. Or equal.

2.5 METER BOXES

- A. General: Provide meter boxes for all meters as required.
- B. Manufacturers: Provide products of one of the following:
1. Size of meter $\frac{3}{4}$ ", residential, provide box manufactured of polyethylene plastic using the structural foam method of construction. The cover shall be manufactured of cast iron (LYLV244-233-LL-G as manufactured by Ford Meter Box Company, or equal).
 2. Size of meter $\frac{3}{4}$ ", irrigation, provide box manufactured of polyethylene plastic using the structural foam method of construction. The cover shall be two piece, lock down, manufactured of cast iron (DG218-243 as manufactured by Ford Meter Box Company, or equal).

3. Size of meter 1", provide box manufactured of cast iron. The cover shall be lock down, manufactured of cast iron (LYLBB144-444-G-NL as manufactured by Ford Meter Box Company, or equal).
4. Size of meter 1-1/2" and 2", provide box manufactured of polymer concrete meeting ANSI/SCTE-77 Tier 22 (Model 1730 as manufactured by Oldcastle Infrastructure, or equal).

2.6 PAINTING

A. Shop Painting:

1. Clean and coat ferrous metal surfaces of products in the manufacturer's shop in accordance with the following
 - a. For Submerged items: Prime Coat, first coat, and second coat of paint shall be Dura-Plate 235 Multipurpose Epoxy B67-235 B67V235 Hardener
 - 1) Dry Mills: 4-6 mils for each coat
 - b. For Non-Submerged Items: Prime Coat and first coat of paint shall be Dura-Plate 235 Multipurpose Epoxy B67-235 B67V235 Hardener. The Second coat shall be Hi-Solids Polyurethane B65-300 Series Color, B60V30 Hardener or Acrolon 218 HS Acrylic Polyurethane B65-600 Series B65V600 Hardener.
 - 1) Prime Coat, Dry Mills: 4-6 Mils.
 - 2) First Coat, Dry Mills: 4-6 Mils.
 - 3) Second Coat, Dry Mills: 3-4 Mils.
2. Coat machined, polished and non-ferrous surfaces bearing surfaces and similar unpainted surfaces with corrosion prevention compound that shall be maintained during storage and until products are placed into operation.

PART 3 EXECUTION

3.1 INSPECTION

- ### A.
- Inspect materials for defects in material and workmanship. Verify compatibility of products with pipe, fittings, valves, and appurtenances.

3.2 INSTALLATION

A. Installation:

1. Install piping specialties in accordance with the Contract Documents and manufacturer's instructions.
2. For buried installations, refer to Section 33 05 05, Buried Piping Installation.
3. For exposed installations, refer to Section 40 05 05, Exposed Piping Installation.

- ### B.
- Adjust joints as required to ensure that expansion joints will be fully extended when ambient temperature is at minimum operating temperature, and fully compressed at maximum operating temperature for the system in which expansion joints are installed.

END OF SECTION

SECTION 33 05 13

MANHOLES AND STRUCTURES

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:

1. Provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all precast and cast-in-place manholes.

B. General:

1. Manholes and structures shall conform in shape, size, dimensions, material, and other respects to the details shown or as directed by ENGINEER.
2. Cast-iron frames, grates and covers shall be the standard frame and grate or cover unless otherwise shown and shall be as specified in Section 05 56 00, Metal Castings.
3. Concrete for cast-in-place manholes and structures and for inverts in precast and masonry manholes and structures shall be Class "A" and shall conform to the requirements specified under Section 03 00 05, Concrete.
4. All manholes and structures shall be precast construction, unless otherwise shown. All sanitary or process manholes and structures carrying untreated wastewater shall be PVC lined or coated with Sauerlesen or Sewer Shield 100 or Tnemec Perma-Shield 431.

C. Related Sections:

1. Section 03 00 05, Concrete.
2. Section 05 56 00, Metal Castings.

1.2 REFERENCES

A. Standards referenced in this Section are listed below:

1. American Society for Testing and Materials, (ASTM).
 - a. ASTM A139, Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over)
 - b. ASTM C32, Specification for Sewer and Manhole Brick (made from Clay or Shale).
 - c. ASTM C398, Standard Practice for Use of Hydraulic Cement Mortars in Chemical-Resistant Masonry.
 - d. ASTM C443, Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
 - e. ASTM C478, Specification for Precast Reinforced Concrete Manhole Sections.
 - f. ASTM C923, Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals.
2. American Water Works Association, (AWWA).
 - a. AWWA C203, Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied
 - b. AWWA C302, Reinforced Concrete Pressure Pipe, Non-cylinder Type, for Water and Other Liquids.
3. National Precast Concrete Association
 - a. Manhole Invert Channels; Tech Notes.

1.3 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Shop Drawings:
 - a. Submit drawings showing design and construction details of all precast concrete and cast-in-place manholes and structures, including details of joints between the manhole bases and riser sections and stubs or openings for the connections.
 - b. Submit drawings for slab and wall reinforcing for 6-foot diameter and larger manholes for approval.
 - c. Submit drawings of strap on vents, mountings straps and anchor
 - 2. Submit manufacturer's certification for 1,000-pound pull-out test for each manhole step with each shipment. Certification shall include manhole location, date of test and results.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE MANHOLES AND STRUCTURES

- A. Precast manholes and structures shall conform to the details shown. Provide cast-in-place concrete bases if shown on the drawings.
- B. Except where otherwise specified precast manhole components shall consist of reinforced concrete pipe sections especially designed for manhole construction and manufactured in accordance with ASTM C 478, except as modified herein.
- C. Precast, reinforced concrete manhole bases, riser sections, flat slabs and other components shall be manufactured by wet cast methods only, using forms which will provide smooth surfaces free from irregularities, honeycombing or other imperfections.
- D. Joints between manhole components shall be the tongue and groove type and shall conform to ASTM C443. Joints shall be sealed by employing a single, continuous rubber O-ring gasket and shall conform to ASTM C443 or with butyl rubber sealants conforming with ASTM C990. Butyl rubber sealant shall be "Rubber Seal" as manufactured by Ru Van, Inc., or approved equal. The circumferential and longitudinal steel reinforcement shall extend into the bell and spigot ends of the joint without breaking the continuity of the steel. Joints between the base sections, riser sections and top slabs of manholes 72-inches in diameter and less shall be rubber and concrete joints. Joints for manhole components greater than 72-inches in diameter shall be provided with steel bell and spigot rings.
- E. All precast manhole components shall be of approved design and of sufficient strength to withstand the loads imposed upon them. They shall be designed for a minimum earth cover loading of 130 pounds per cubic foot, an HL-93 wheel loading, and an allowance of 30 percent in roadways and 15 percent in rights-of-way for impact. Manhole bases shall have two cages of reinforcing steel in their walls, each of the area equal to that required in the riser sections. Wall thickness shall be a minimum of 1/12th of the inside diameter of the manhole and not be less than 5-inches. Concrete top slabs shall not be less than 8-inches thick.
- F. Lifting holes, if used in manhole components, shall be tapered, and no more than two shall be cast in each section. Expansion grout shall be furnished to seal the lifting holes. The lifting holes shall be made to be sealed by expansion grout from the outside face of the section only.

- G. The point of intersection (P.I.) of the sewer pipe centerlines shall be marked with 1/4-inch diameter steel pin firmly enclosed in the floor of each manhole base and protruding approximately 1-inch above the finished floor of the base.
- H. Mark date of manufacture and name or trademark of manufacturer on inside of each section.
- I. The barrel of the manhole shall be constructed of various lengths of riser pipe manufactured in increments of one foot to provide the correct height with the fewest joints. Openings in the barrel of the manholes for sewers or drop connections will not be permitted closer than one foot from the nearest joint. Special manhole base or riser sections shall be furnished as necessary to meet this requirement.
- J. A precast slab or eccentric or concentric cone, as shown or approved, shall be provided at the top of the manhole barrel to receive the cast iron frame and cover.
- K. Eccentric cones with bolt down frame and cover shall have a minimum vertical height, as measured from the top of the cone to the bottom of the bell, of 32-inches. Eccentric cones without bolt down frame and cover to be installed flush to finish grade shall have a minimum vertical height of 24-inches.
- L. Concentric cones with a vertical height of 20-inches may be used on 4-foot diameter manholes less than 5-feet deep.
- M. Transition cone sections for an eccentric transition from a 60-inch riser to a 48-inch cone section shall be placed directly beneath the 48-inch cone.
- N. Transition slabs for 6-foot diameter and larger manholes to be buried shall be placed a minimum of 5-feet above the invert shelf. Flat top slabs for 6-foot and larger diameter manholes shall not be used if manhole is located within pavement or maintained lawns.
- O. Connectors between manholes and pipe shall be standard mechanical boot type connectors, conforming to ASTM C923, which allow for the expansion ring at the manhole wall to be completely seated in a vertical plane. Compression type connectors shall not be used.
 - 1. Approved Manufacturers of mechanical boot type connectors include:
 - a. Quik-LOK by A-LOK Products, Inc.
 - b. G-3 by A-LOK Products, Inc.
 - c. Or Approved Equal.
- P. Grading Rings: Modular precast concrete and lined with same materials as manhole.
- Q. Flexible Joints: Comply with ASTM C923.

2.2 MASONRY COMPONENTS

- A. Masonry Work, where shown or otherwise approved by ENGINEER, shall conform to the following:
 - 1. Brick shall conform to the requirements of: ASTM C32, Grade MS for manhole brick.
 - 2. Mortar shall be portland cement 1:3 mix and in accordance with ASTM C398.
 - 3. Cement shall be Type II portland cement as specified for concrete masonry.

2.3 MISCELLANEOUS METALS

- A. Metal frames and covers and similar required items shall be provided as shown and in accordance with Section 05 56 00, Metal Castings.

2.4 DROP CONNECTIONS

- A. Drop connections for manholes and structures shall be constructed where shown or directed by the ENGINEER and shall conform to the design and details shown. Concrete for pipe encasement shall be Class "B" as specified under Section 03 00 05, Concrete. Concrete shall be bonded to manhole in the manner shown or otherwise approved by ENGINEER.
- B. Pipe for inside drop connections shall be SDR 35 PVC.
- C. Drop connections shall not enter the manhole in the cone section.
- D. Outside drops shall only be installed to address elevation differences of minimum 2-feet. The influent pipe of an outside drop shall be a minimum pipe length of 18-feet.
- E. Inside drop connections shall only be installed when safety considerations or work space limitations preclude installing an outside drop connection, and with Engineer approval. Inside drops shall not be installed on 4-foot diameter manholes.

2.5 MANHOLE STEPS

- A. Provide access steps on all manholes with eccentric cones.
- B. Steps shall be copolymer polypropylene and conform to ASTM C478 and current OSHA regulations.
- C. Steps and common straight wall of manholes with eccentric cones and flat slab tops shall be located over widest shoulder of manhole invert.

2.6 MANHOLE VENT PIPES

- A. Furnish 5-inch welded steel vent pipes as shown on the drawings. Unless otherwise specified, vent pipe shall be Schedule 40, grade "B" steel in conformance with ASTM A139, with minimum yield strength of 35,000 pounds per square inch.
- B. Vent pipes shall have inside coal tar lining of minimum 0.094-inch thickness in conformance with AWWA C203. Alternatively, a coal tar epoxy lining of minimum 0.024-inch dry film thickness may be used. Coal tar epoxy lining shall be: Kloppers No. 300M, Americoat No. 78, Carboline-Carbomastic No. 14, or Equal.
- C. The outside surface of vent pipes shall be sand or grit blasted to commercial standard and have 1 coat of zinc chromate primer applied in conformance with Federal Specification TT-86A. Vent pipes shall be finished with 2 evenly applied coats of rust-inhibiting enamel paint. Paint to be: Kloppers Glamortex No. 501 olive green enamel, Southern Coatings Rustolay No. 5037 garden green enamel, or Equal.
- D. Vent pipes shall be flanged by plain end and cast in place with bolt holes in flange straddling the vent center lines.

- E. 5-inch diameter steel vent pipe shall be furnished with compatible, coated flange and all necessary hardware for bolted attachment.

PART 3 EXECUTION

3.1 MANHOLE BASES

- A. Cast-in-place bases shall be placed on suitable foundations after the pipes are laid. They shall be cast monolithically to an elevation at least 12-inches above the top of the highest pipe entering the manhole, except where a drop connection is to be installed. Base, walls and bottom shall be at least of the thickness shown and reinforced to withstand the loads to be expected. Connections for sewer pipes shall conform to the details shown.
- B. Precast bases shall be set on a crushed stone or crushed gravel or concrete foundation as shown. Precast bases shall be set at the proper grade and carefully leveled and aligned.

3.2 PRECAST MANHOLE SECTIONS

- A. Set sections vertical with steps and sections in true alignment. The base of the bell or groove end at joints between components shall be buttered with 1:2 cement-sand mortar to provide a uniform bearing between components. All joints shall be sealed with cement mortar inside and out and troweled smooth to the contour of the wall surface. Raised or rough joint finishes will not be accepted.
- B. Install sections, joints and gaskets in accordance with manufacturers recommendations.
- C. Lifting holes shall be plugged with expansion grout from the outside of the barrel prior to backfilling.

3.3 MANHOLE CHANNELS

- A. All invert channels through manholes and structures shall be constructed of Class "A" concrete. Channels shall be properly formed to the sizes, cross sections, grades and shapes shown or as ordered. Benches shall be built up to the heights shown or as directed by the ENGINEER and given a uniform wood float finish. Care shall be taken to slope all benches for proper drainage to the invert channel.

3.4 GRADING RINGS

- A. Grading rings shall be used for all precast manholes, where required. Stacks or grade rings shall be a maximum of 21-inches in height, constructed on the roof slab or cone section on which the manhole frame and cover shall be placed. The height of the stack or grade rings shall be such as required to bring the manhole frame to the proper grade. Brick shall not be used to adjust rim elevations of above-grade manholes.
- B. Each grade ring shall be laid in a full bed of mortar and shall be thoroughly bonded.
- C. The outside grading rings shall be neatly plastered with 1/2-inch of cement mortar as the Work progresses.

3.5 MANHOLE FRAMES AND COVERS

- A. Frames and covers shall be anchored to manhole with Red Jacket masonry anchors (or Equal) and thoroughly sealed to concrete with tar sealant putty.
- B. Anchor sleeve threaded stud and nut shall be stainless or galvanized steel.
- C. Provide bolt down covers as indicated on the Drawings.

3.6 STUBS FOR FUTURE CONNECTIONS

- A. As shown or required for connections, cast iron sleeves, bell end tile, ductile iron or reinforced concrete pipe stubs with approved watertight plugs shall be installed in manholes and structures. Where pipe stubs, sleeves or couplings for future connections are shown or directed by the ENGINEER, CONTRACTOR shall provide all materials and labor in order to complete the Work.

3.7 FALSE WALLS

- A. False walls shall be constructed in manholes when shown on the Drawings. Holes of the appropriate size shall be cored or blocked out in the manhole wall at the elevation and alignment shown on the Plans. A four-inch thick masonry wall shall be constructed in the opening. Inverts shall be constructed to match proposed pipe elevations and alignments and permit installation of the future extension without demolition work other than removal of the false wall

3.8 GRADING AT MANHOLES AND STRUCTURES

- A. All manholes and structures in unpaved areas shall be built, as shown or directed by the ENGINEER, to an elevation higher than the original ground. The ground surface shall be graded to drain away from the manhole. Fill shall be placed around manholes to the level of the upper rim of the manhole frame, and the surface evenly graded on a 1 to 5 slope to the existing surrounding ground, unless otherwise shown or directed by the ENGINEER. The slope shall be covered with 4-inches of topsoil, seeded and maintained until a satisfactory growth of grass is obtained.
- B. Manholes and structures in paved areas shall be constructed to meet the final surface grade. In paved areas on State Highways, all manholes and structures shall be 1/2-inch below final wearing surfaces. Manholes and structures shall not project above finished roadway pavements.
- C. CONTRACTOR shall be solely responsible for the proper height of all manholes and structures necessary to reach the final grade at all locations. CONTRACTOR is cautioned that ENGINEER'S review of Shop Drawings for manhole components will be general in nature and CONTRACTOR shall provide an adequate supply of random length precast manhole riser sections to adjust any manhole to meet field conditions for final grading.

3.9 MANHOLE WATERTIGHTNESS

- A. All manholes and structures shall be free of visible leakage. Each manhole shall be tested for leaks and inspected, and all leaks shall be repaired in a manner subject to ENGINEER'S

approval. Manhole testing shall conform to the requirements of Section 33 05 05, Buried Piping Installation.

3.10 FLEXIBLE PIPE JOINT AT MANHOLE BASE

- A. Provide a flexible joint between each pipe entering and exiting the manhole. This may be accomplished by the installation in the manhole base of the bell end of a pipe or by other means subject to approval of ENGINEER. Joints shall be similar to the approved pipe joints. The joint into the manhole base shall be completely watertight.

3.11 PIPE JOINT AT MANHOLE BASE

- A. Pipe openings shall be maximum 3-inches larger than outer diameter of pipe.
- B. Openings shall be reinforced with minimum 2-square inches of steel bent to a 90-degree angle.
- C. Pipe shall be centered about opening and supported by a concrete collar 12-inches greater than the outer diameter of the pipe. Collar shall extend 12-inches from the outside of the manhole wall. Collar shall be reinforced from the outside to become an integral part of the manhole invert or to a point flush with the inside wall of the manhole.

END OF SECTION

SECTION 33 05 23.17

UTILITY BORING AND JACKING

PART 1 GENERAL

1.1 DESCRIPTION

A. Scope:

1. Design, furnish and install the proposed piping alignment by jacking and boring construction methods, as shown on the Drawings and conform to this specification. The work includes, but not limited to, survey, design, excavation, dewatering, removal of all materials encountered in the jacking and boring operations, disposal of all material not required in the work, grouting bulkheads, testing, cleaning, restoration, and incidentals as shown on the Drawings and as specified herein.
2. Install all jointing and gasketing materials, specials, flexible couplings, mechanical couplings, harnessed and flanged adapters, sleeves, tie rods, and all other Work required to complete the jack and bore, or tunneling installations.
3. The jacking and boring construction method shall consist of pushing (jacking) the casing pipe into the earth with a boring auger rotating with the casing/pipe to remove the spoil. The operations are to be completed while simultaneously providing ground stabilization techniques. Include provisions for preventing uncontrolled inflow of loose or saturated soils.
4. Provide additional geotechnical/subsurface investigations required to establish the appropriate parameters (i.e., limiting pressures, setback distances, depth of cover, etc.) for completing the design of the jacking and alignment, as specified herein.
5. OWNER is responsible for obtaining the required general construction permits, easements, and approvals from the South Carolina Department of Transportation (SCDOT), York County, and any respective property owners within the alignment. When encasement pipe is installed in the state rights-of-way, the entire installation shall be as required by SCDOT.

B. Coordination:

1. Review installation procedures under other Sections and other contracts and coordinate with the Work that is related to this Section.
2. Coordinate construction activities with the respective authorities.

C. Related Sections:

1. Section 31 23 05, Excavation and Fill.
2. Section 33 05 05, Buried Piping Installation.
3. Section 40 05 19, Ductile Iron Process Pipe.
4. Section 40 05 31, Thermoplastic Process Pipe.

1.2 REFERENCES

A. Standards referenced in this Section are:

1. ASTM A139, Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over).
2. ASTM D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.
3. ANSI/AWWA C151, Ductile Iron Pipe, Centrifugally Cast.
4. ANSI/AWWA C600, Installation of Ductile-Iron Mains and Their Appurtenances.

1.3 QUALITY ASSURANCE

- A. Demonstrate expertise in “trenchless” methods by providing a list of five (5) utility references for which similar work has been performed in the last two years. The references should include a name and telephone number where contact can be made to verify the CONTRACTOR’s capability. Provide documentation showing successful completion of the projects used for reference. Conventional trenching experience will NOT be considered applicable.
- B. All supervisory personnel must be adequately trained and have at least ten years of experience in jack and boring operations. Submit the names and resumes of all supervisory field personnel prior to the start of construction.
- C. ENGINEER will base the review of submitted details and data on the requirements of the completed work, safety of the work in regard to the public, potential for damage to public or private utilities and other existing structures and facilities, and the potential for unnecessary delay in the execution of the work. Such review shall not be construed to relieve the CONTRACTOR in any way of the CONTRACTOR’s responsibilities under the contract.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Jacking and Boring Plan describing the equipment, methods, operational procedures, construction sequence, contingency plans, and other items of concern to be performed during the jacking and boring construction.
 - 2. Project Safety Plan, including, but not limited to, monitoring for gases encountered, hazardous chemical list, and all MSDS and technical data sheets.
 - 3. Submit site layout, equipment arrangement, and entry/exit pits drawings and technical specifications of the machine and equipment (including any modifications) proposed.
 - 4. Submit Construction drawings, Specifications, and Contingency plans on the following items:
 - a. Complete details of the site clearing, excavation, drainage, security, and equipment mobilization including, but not limited to, the methods, procedures and equipment arrangement to be used during the construction.
 - b. Complete details and drawings, and calculations of the significant factors and constraints associated with jacking and boring installations including, but not limited to, fluid pressures, jacking forces, pipe capacities, jacking and receiving pits shoring design, etc.
 - c. Provide plan and profile of the proposed jacking and boring alignments, indicating depth, angle of deflection, and radius of all pipe bends along the alignment.
 - d. Complete details of the grouting techniques/methods to be utilized for filling grout into the annulus between the adjacent soils and the outside of the casing piping, including but not limited to, fitting procedures, equipment, pumping procedures, fluid pressures, mixtures and plug systems. Also include methods of monitoring and controlling the grouting pressures.
 - e. Method of monitoring and controlling the specified line and grade of excavation including, but not limited to, the methods, procedures, reliability, and necessary ancillary equipment to be used during construction operations.
 - f. Complete details of the groundwater control, launching seals, muck/spoils containment, dewatering, drying, and removal including, but not limited to, the methods, procedures, equipment, contingency plans and off-site disposal location.

- g. Complete details of the casing and carrier piping capacities, maximum jacking loads, storage, assembly, and installation including, but not limited to, the methods, procedures, and equipment to be used.
 - h. The type of spoils separation system to be used.
 - i. Information regarding the inject lubricant to be used for the jacking portion of the Work.
- B. Informational Submittals: Submit the following:
 - 1. Certificates:
 - a. Certificate signed by manufacturer of each product certifying that product conforms to applicable referenced standards.
 - 2. Field Quality Control Methods: At least 10 days prior to the start of the jacking and boring, submit a description of quality control methods proposed to use during the operations to the ENGINEER. Describe:
 - a. Procedures for controlling and checking line and grade.
 - b. Field forms for establishing and checking line and grade.
 - 3. Bring to the attention of the ENGINEER any known discrepancies with actual jacking and boring methods that will be performed. This shall be stated, in writing, to ENGINEER no later than the pre-construction meeting.
- C. Closeout Submittals:
 - 1. Maintain accurate and up-to-date record documents showing modifications made in the field, in accordance with approved submittals, and other Contract modifications relative to boring and jacking Work. Submittal shall show actual location of all boring and jacking Work and appurtenances at same scale as the Drawings.
 - 2. Show piping with elevations referenced to Project datum and dimensions from permanent structures.
 - 3. Include profile drawings with boring and jacking record documents when the Contract Documents include boring and jacking profile drawings.
 - 4. Submit record drawings prior to the time of Substantial Completion.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Do not place/store materials, equipment, or personnel on or around state roads.
- B. Deliver materials to the site to ensure uninterrupted progress of the Work.
- C. Handle all pipe, fittings, specials and accessories carefully with approved handling devices. Handling devices shall include ropes, fabric, or rubber-protected slings and straps. Chains, cables, or hooks inserted into the pipe ends shall NOT be used. Two slings spread apart shall be used for lifting each length of pipe. Do not drop or roll material off trucks.
- D. Store pipes and fittings on heavy wood blocking or platforms so they are not in contact with the ground. Space pipe supports suitably and of such widths as not to allow deformation of the pipe at the point of contact with the supports.
- E. Limit stacking of pipe to a height that will not cause deformation of the bottom pipes under anticipated temperature conditions.
- F. Securely cap/plug all ends of stored piping to prevent entry of soil, debris, and vermin.

PART 2 PRODUCTS

2.1 EQUIPMENT

A. Jack and Boring System, General:

1. The jack and boring system shall consist of, but not limited to, the following components:
 - a. Jacking system suitable for forcing the casing through the embankment.
 - b. Auger Boring and Spoil removal system.
 - c. Pipe lubrication system.
2. The excavation equipment and system shall be fully capable of excavating and removing all material that will be encountered during the construction operations.
3. The automated spoil transportation system shall match the excavation rate to the rate of spoil removal, maintaining settlement or heave within tolerances specified herein.
 - a. If a slurry spoil transportation system is used, the groundwater pressure may be managed by use of the slurry pumps (which may be variable speed), pressure control valves and a flow meter. A slurry bypass unit shall be included in the system to allow the direction of flow to be changed and isolated, as needed. A solids separation process shall be provided when using slurry transportation systems. The process shall be designed to provide adequate separation of the spoil from the slurry so that the clean slurry can be returned to the cutting head for reuse.
 - b. If an Auger spoil transportation system is utilized, the groundwater pressures may be managed by controlling the volume of spoil removal with respect to the advance rate (Earth Pressure Balance Method) and the application of compressed air. In soils with excessive groundwater, approval of the ENGINEER shall be required for the earth pressure balance auger systems. Approval shall be based on the evaluation of the equipment's ability to balance soil and groundwater pressures at the face, stability of the soils and the significance of the groundwater present.

B. Pipe Jacking Equipment:

1. The main jacks shall be mounted in a jacking frame and located in the drive (starting) shaft. The jacking frame successively pushes the steel casing pipes toward a receiving shaft. The jacking capacity shall be sufficient to push the auger/boring machine and/or length of casing piping through the ground.
2. The main jacking equipment installed shall have a capacity greater than the anticipated jacking load. The hydraulic cylinder extension rate shall be synchronized with the excavation rate of the boring, which shall be determined by the specific soils conditions.
3. The CONTRACTOR shall provide intermediate jacking stations when the total anticipated jacking force needed to complete the installation exceeds the designed maximum jacking force of the pipe.

C. Pipe Lubrication System:

1. Utilize a pipe lubrication system when anticipated jacking forces on the pipe are expected to exceed the capacity of the main jacks or exceed the pipe design strength with the appropriate safety factor. A prior approved lubricant shall be injected at the rear of the auger, or boring machine and, if necessary, through the casing pipe walls to lower the friction developed on the surface of the pipe during jacking.

2.2 MATERIALS

A. Carrier Piping:

1. Carrier piping used for the conveyance of water and wastewater shall refer to Sections 33 05 05, Buried Piping Installation, and 40 05 19, Ductile Iron Pipe, or 40 05 31, Thermoplastic Pipe, for material and installation specifications.
2. All ductile iron carrier pipe installed with joint inside an encasement pipe must utilize rigid restrained joints.
 - a. Approved Manufacturers:
 - 1) US Pipe Mech-Lok.
 - 2) US Pipe MJ Harness-Lok.
 - 3) Approved equal.
3. All PVC carrier pipes shall have restrained joints with a working pressure at least equal to that of the PVC pipe on which it is to be installed and a minimum safety factor of 2:1.
 - a. Approved Manufactures:
 - 1) EBAA Iron, Inc. Series 2000PV ductile iron MEGALUG retainers with Mega-Bond Coating System.
 - 2) Approved equal.

B. Steel Casing Piping:

1. Casing pipe and joints shall be constructed so as to prevent leakage of any substance from the casing throughout its length.
2. Use only new, welded or seamless steel pipe per ASTM A-139, Grade B. Casing minimum thickness to be as shown on the Drawings. The casing wall thickness shall be designed to accommodate the maximum jacking load allowed, as well as the expected earth and live loads.
3. Joints in steel casing pipe shall be butt-welded joints, conforming to the requirements of AWWA C206. Pipe 36 inches in diameter and larger shall be welded both inside and outside of the pipe/casing.
4. After welding, the joint and the surrounding damaged or uncoated area shall be coated with the same material and to the same thickness as the shop applied coating.
5. All steel casing pipe and welds shall meet or exceed either the site-specific regulatory agency's requirement, or the manufacturer's minimum wall thickness to meet or exceed the greater of either: installation (jacking), loading, or carrier load requirements.
6. The size (diameter) of the steel casing shall be as shown on the Drawings.
7. All steel pipes shall be designed for the external and internal loads to which they will be subjected. Steel casing shall meet ASTM specifications and be designed to meet or exceed a minimum live load of a Cooper E-80 loading. The loading consists of 80 kip (356 kN) axle loads spaced 5-feet (1.5 m) on centers.

C. Annular Spacers

1. Support carrier pipe within the steel casing by means of annular spacers. Casing spacers shall prevent the carrier pipe from floating, and shall electrically insulate the carrier pipe from the casing.
2. The annular spacers shall be made of non-corrodible materials such as HDPE or stainless steel.
3. For steel spacers, runners shall be made of polyethylene to provide dielectric insulation between the spacer and the carrier pipe.
4. Spacers shall be installed at minimum one behind the bell end and one in the center of each 18-ft or 20-ft joint of carrier pipe in accordance with the manufacturer's recommendations.
5. Verify size, position, spacing, and configuration of spacers with manufacturer. Final spacer installation shall be based on approved submittal.

6. Verify the tolerances of the casing spacer are compatible with the carrier pipe's outside diameter including provisions for the pipe to be slightly out-of-round.
 7. Wooden skids are not acceptable.
- D. Grout (Annular Backfill, between casing and adjacent soils):
1. Grout shall consist of one (1) part Portland cement, three (3) parts sand and the minimum amount of water necessary to obtain the desired consistency; and all grout mixtures shall contain 2% of bentonite by weight of the cement.
 2. If voids are encountered or occur outside the encasement pipe, grout connections shall be provided and regularly spaced at 10-feet on center in the top section of the encasement pipe.
- E. Casing End Seals
1. Seals shall be standard wrap-around end seals, manufactured of synthetic rubber, with self-curing rubber sealing strips.
 2. The end seals shall be provided with 316- stainless steel bands and clamps.

PART 3 EXECUTION

3.1 INSTALLATION

- A. General:
1. Provide notice of intent to begin Bore and Jack operations to ENGINEER prior to beginning any Work in roadway or railway rights-of-way. Acknowledgement of intent must be received no less than 5 working days before Work begins.
 2. Comply with the lawful requirements of SCDOT, York County, public agencies, and owners of public utilities or other facilities respecting the safeguarding of structures and improvements that might be endangered by the jacking and boring, or microtunneling construction operations.
 3. Install the required steel casing by means of jacking and boring as shown, specified herein, and as recommended by the pipe manufacturer.
 4. The jacking and boring operation, along with the installation of the casing pipe, shall be done simultaneously and continuously until the casing pipe is in final position.
 5. CONTRACTOR shall be responsible for the CONTRACTOR's means and methods of jacking and boring, and shall ensure the safety of the work, the CONTRACTOR'S employees, the public, and adjacent property, whether public or private.
 6. Maintain traffic flow at all times during the progress of the work. CONTRACTOR shall provide adequate signs, barricades, flag persons, lights and other control devices in accordance with the provisions and requirements of the SCDOT standards. No lanes of traffic shall be closed without prior approval.
 7. Provide erosion and sediment control to minimize erosion and the transport of sediment beyond the limits of the work area.
 8. Anticipate that portions of the jacking and boring excavation will be below the groundwater table and dewatering will be required.
 9. Comply with all local, state, and federal laws, rules, and regulations at all times to prevent pollution of the air, ground, and water.
 10. Locate, mark and protect existing utilities and facilities in the work area. Perform test pits as required.

11. If there is a conflict between manufacturer's recommendations and the Drawings or Specifications, request instructions from ENGINEER in writing, before proceeding.

B. Jacking and Boring Operations:

1. Provide and maintain adequate boring equipment and install support systems as required.
2. The boring operations shall consist of excavating the embankment material ahead of the casing, removing excavated material through the pipe and forcing the pipe through the embankment with jacks into the spaced provided. No jetting, sluicing, or wet boring is permitted.
3. Required launching and receiving pits/shafts shall be excavated and maintained to the minimum dimensions necessary to perform the operations and allow for safe working practices.
4. The pits or shafts shall be adequately barricaded, sheeted, braced, dewatered, and ventilated as required, in accordance with applicable specifications and regulations.
5. CONTRACTOR to use thrust blocks designed to distribute loads in a uniform manner so that any deflection of the thrust block is uniform and does not impart excessive load on the shaft itself or cause the jacking frame to become misaligned.
6. Position jacks so that the resultant force is applied along the centerline of the casing pipe, and force is applied evenly to the entire end of the pipe.
7. Backstops shall be provided for adequately distributing the jack thrust without causing deformation of the soil or other damage.
8. CONTRACTOR to monitor and control the jacking pressure/force applied to ensure that pipe manufacturer's recommended limits are not exceeded.
9. CONTRACTOR responsible for all testing, survey, and documentation of the pre/post construction site conditions, in which to provide as a basis of comparison for the post construction conditions to be evaluated.
10. Once jacking has begun, the operation must continue without interruption, insofar as practical, to prevent the pipe from becoming firmly set in the embankment.

C. Steel Casing Installation

1. The installation of the casing shall be in accordance with manufacturer's recommendations and subject to the approval of the agency having jurisdiction.
2. The casing pipe shall be adequately protected to prevent crushing or other damage under the jacking pressures. Provide timbers for cushioning between the pipe pushed end and the jacking equipment.
3. The casing installation shall produce NO upheaval, settlement, cracking, movement, or distortion of the existing roads.
4. Install casing piping concurrent with the bore, as earth is removed.
5. After the installation of the casing piping, the CONTRACTOR shall inject grout through the grout connections in such a manner as to completely fill all voids outside the casing pipe resulting from the jacking and boring operations. Grout pressure shall be controlled and monitored, so as to avoid deformation of the steel casing and avoid movement of the surrounding ground. After completion of the grouting operations, the grout connections shall be closed with cast-iron threaded plugs.

D. Carrier Pipe Installation

1. All joints of the carrier piping, within the casing, shall be restrained in accordance with the Section 40 05 19, Ductile Iron Process Pipe or Section 40 05 31, Thermoplastic Process Pipe.
2. Clean all dirt and debris from the casing piping.

3. Attach the centered/restrained casing spacers/guides to the carrier pipe sections, as required to prevent excessive sag, bending, shear stress and to support the pipe barrel in accordance with pipe manufacturer's recommendations. Piping is NOT to be supported by bells/joints.
 4. Provide casing spacers at each joint, 6-inches from each side of joint, and at minimum 10-foot intervals, or as recommended by manufacturer. There shall be a minimum of two (2) casing spacers installed on each section of pipe.
 5. Lubricant for pipe guides shall be drilling mud or flax soap. Petroleum, or Oil based products are NOT allowed.
 6. The CONTRACTOR shall protect and preserve the interior surfaces of the steel casing from damage.
 7. CONTRACTOR to provide casing end seals, and secure seals in place with stainless steel bands in accordance with the manufacturer's recommended procedures. The installation shall be watertight.
- E. Transitions from One Type of Pipe to Another:
1. Provide all necessary adapters, specials and connection pieces required when connecting different types and sizes of pipe or connecting pipe made by different manufacturers.

3.2 WORK AFFECTING EXISTING PIPING

- A. Location of Existing Piping:
1. Locations of existing piping shown should be considered approximate. Determine the true location of existing piping to which connections are to be made, and location of other facilities which could be disturbed during earthwork operations, or which may be affected by CONTRACTOR'S Work in any way.
 2. Conform to applicable requirements of the General Conditions, and Section 01 73 29, Cutting and Patching, pertaining to cutting and patching. Conform to applicable requirements of Section 01 14 16, Coordination with Owner's Operations, pertaining to connections to existing facilities.

END OF SECTION

SECTION 33 31 01

SEWER LATERALS AND APPURTENANCES

PART 1 GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. Provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install wastewater sewer laterals and appurtenances.
- B. Coordination:
 - 1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before the Work required under this Section.
- C. Related Sections:
 - 1. Section 33 05 05, Buried Piping Installation.
 - 2. Section 33 05 06, Couplings, Adapters and Specials

1.2 REFERENCES

- A. Standards which may be referenced in this Section are:
 - 1. AWWA M41, Ductile-Iron Pipe and Fittings.
 - 2. AWWA C104, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
 - 3. AWWA C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 4. AWWA C151, Ductile-Iron Pipe, Centrifugally Cast.
 - 5. ASTM D2466, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
 - 6. ASTM D2564, Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems,
 - 7. ASTM D2665, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
 - 8. ASTM D2774, Practice for Underground Installation of Thermoplastic Pressure Piping.
 - 9. ASTM D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
 - 10. ASTM D3212, Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
 - 11. ASTM F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
 - 12. ASTM F794, Standard Specification for Poly(Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
 - 13. ASTM F1417, Test Method for Installation Acceptance of Plastic Gravity Sewer Lines using Low-Pressure Air.
 - 14. ANSI/AWWA C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.
 - 15. NSF/ANSI Standard 14, Plastics Piping System Components and Related Materials.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications:

1. Manufacturer shall be able to provide evidence of at least five installations of substantially similar products in satisfactory operation for at least five years.

1.4 SUBMITTALS

A. Action Submittals: Submit the following:

1. Product Data:
 - a. Product data sheet.
 - b. Complete catalog information, including dimensions, weight, specifications, and identification of materials of construction of parts.

B. Informational Submittals: Submit the following:

1. Certifications: Submit a certificate signed by the manufacturer of each product stating that the product complies with the applicable referenced standards.

1.5 DELIVERY, STORAGE AND HANDING

A. Packing, Shipping, Handling and Unloading:

1. Deliver materials to the Site to ensure uninterrupted progress of the Work.

B. Storage and Protection:

1. Protect materials from corrosion and deterioration.
2. Store equipment in covered storage off the ground and prevent condensation and in accordance with the manufacturer's recommendations for long-term storage.

PART 2 PRODUCTS

2.1 GENERAL

A. Sewer Laterals: Provide one of the following as conditions warrant:

1. Less than 16-feet cover, SDR 35 with minimum ring stiffness of 46psi, or Schedule 40 PVC pipe conforming to ASTM D2665, NSF 14 and ASTM D2466.
 - a. Fittings shall be socket type in accordance with ASTM D2466.
 - b. Joining shall be through solvent cement in accordance with ASTM D2564.
2. 16-feet of cover or greater, Ductile Iron pipe of pressure class 350 conforming to AWWA C151.
 - a. Pipe interior shall have a cement-mortar lining of standard thickness according to AWWA C104.
 - b. Pipe exterior shall have a bituminous coat a minimum of 1-millimeter thick.
 - c. Joining shall be by rubber gaskets and in conformance with AWWA C111.
3. Joints, PVC pipe joints shall be solvent cemented in accordance with ASTM D2855.

B. Sewer Lateral Wye Branches:

1. Sewer lateral wye branches shall be the same type material as the sewer main, and shall conform to the applicable sewer pipe specifications.

C. Sewer Lateral Cleanouts: Provide cleanouts of same material as the lateral.

- D. Sewer Lateral Cap: Provide HS-20 traffic-rated plugs.
- E. Couplings: See Section 33 05 06, Couplings, Adapters and Specials.
- F. Saddles:
 - 1. Provide saddles of ABS plastic, PVC, elastomeric PVC or approved equivalent.
 - 2. Connect saddles to vitrified clay pipe using epoxy sealant.
 - 3. Connect saddles to PVC pipe using a flat or profile gasket, as appropriate to the pipe, and minimum two stainless steel bands around the pipe and saddle.
 - 4. Connect the lateral to the saddle with a compression gasket, solvent weld adapter, and/or stainless steel band, as appropriate.
- G. Sewer Cut-ins:
 - 1. Provide cast iron cut-ins where new sewer laterals are connected to existing sewer mains smaller than 36-inch (GENCO, Model D, Type K, DFW flexible saddle, pre-approved equivalent).
 - 2. For sewer cut-ins on 36-inch and larger sewer mains a Kor-N-Tee, Inserta-Tee or pre-approved equivalent shall be used.

PART 3 EXECUTION

3.1 INSTALLATION

- A. 4-Inch and 6-Inch Laterals
 - 1. Connect laterals to the main with tees or wyes if the lateral is installed during construction with the main.
 - 2. Connect to existing mains with saddles placed in holes cored by an approved coring machine.
 - 3. Install laterals to the property line using 45-degree bends at the tee or saddle and pipe as shown in the Drawings.
 - 4. Install laterals that will discharge at terminal ends of the sewer main at 2% slope. Install all other laterals with a minimum slope of 1/8-inch per foot (1%).
 - 5. Cap the end of the lateral to be water/air tight.
 - 6. Encase all tees, saddles and bends shall be completely in #67 washed stone.
 - 7. Cut an "S" in the curb at the location where lateral crosses under curb.
 - 8. In subdivisions constructed without curb, paint a green "S" on the edge of pavement at the location where the lateral crosses under the edge of pavement.
 - 9. Connect to the sewer main all laterals except those serving lots adjacent to in line manholes or upstream from dead-end manholes in cul-de-sacs.
 - 10. Laterals connected to manholes shall be laid on a line from the center of the lot to the center of the manhole and shall extend not more than three inches inside the manhole wall.
 - 11. Manholes in cul-de-sacs shall have a maximum of 3 laterals. Any in line manhole shall have a maximum of 4 laterals.
 - 12. The lateral elevation entering the manhole shall match crown to crown with the main entering the manhole and a trough shall be formed for the lateral invert.
 - 13. Laterals that are connected to outfall lines shall enter the manhole at the shelf and an invert shall be formed to carry the lateral flow to the main invert.

14. Install laterals with a minimum of 4-feet of cover at the property line, unless otherwise approved by York County Water/Sewer Department. Install laterals with a maximum of 5-feet unless greater depth of the lateral installation is approved by a York County Inspector.
- B. 8-Inch and Larger Laterals
1. Connect 8-inch and larger diameter laterals to manholes with the lateral crown level with the crown of the main line pipe, or with outside drops, in accordance with the Drawings.
 2. When the lateral is the same diameter as the main line pipe, provide a drop of 0.2 feet in the manhole between the invert of the lateral and the invert of the main line pipe.
 3. Provide a minimum slope of 1/8-inch per foot (1%).
- C. Install sewer laterals to be perpendicular to the mainline when possible.
- D. Cleanouts shall be installed at the roadway right-of-way or easement line.
- E. Install all sewer laterals and appurtenances in accordance with Section 33 05 05, Buried Piping Installation.

END OF SECTION

Appendix A



Planning & Development Services

18 W. Liberty Street

York, SC 29745

(803) 909-7200

www.yorkcountygov.com

Letter of Notification for Plan Review

Stockbridge Trunk Sewer

Review of:

Linear Project

Status:

Approved

Digital

To:

Christian Volz

Dewberry

cvolz@dewberry.com

704-680-8860

Project:

20201280

Stockbridge Trunk Sewer

Near Intersection of Zimmerman Driv

York County, SC is installing approximately 39 manholes, 938 linear feet LF of 8", 3,210 LF of 12" and 775 LF of 16" ductile iron gravity sewer.

We have completed our review of the plan identified above. The plan was approved per attached comments, if any. This letter is not to be construed as a zoning compliance, grading, or building permit, certificate of occupancy, or a substitute for any permit or certificate required by any state or federal government entity.

For approved commercial civil site plans, once the owner/developer has received NPDES approval (if applicable) for the project (this is issued by SCDHEC and can take up to 14 days from the date the project is approved by York County), you may contact the Environmental Compliance Inspector listed on your approval letter to schedule the pre-construction meeting. This meeting will occur on-site with county staff members, the financially responsible person, site engineer, and the contractor (who must be licensed in South Carolina through the SC Labor Licensing Board). Your preliminary grading permit will be issued at the pre-construction meeting. Once this meeting has occurred, building permits can be applied for.

Note for online users

Building plans submitted online do not require paper copies to be submitted upon approval of the plans. Approved plans can be viewed and/or printed at www.yorkcountygov.com/permitting under applicant login.

Sincerely,

A handwritten signature in black ink that reads "Ashley Hill".

Ashley Hill

Development Coordinator

Planning & Development Services

803-909-7200

Review Comments

Linear Project

The following comments are grouped as "Review Comments" or "Advisory Comments". "Review Comments" are items related to your plan review that require action on your part. "Advisory Comments" are informational notes that may be important in the future and are for your information.

Engineering - W&S - Amanda Cain - amanda.cain@yorkcountygov.com - 803-909-7149

Approved

Review Comments:

Advisory Comments:

This is a York County project. Engineering completes the review of the utilities.

Environmental - Christine Taylor - christine.taylor@yorkcountygov.com - 803-909-7156

Approved

Review Comments:

New NPDES Permit YC permit #20-00182

3 plans sets and 3 SWPPP booklets to York County Planning and Development office.

The following documents will be forwarded to SCDHEC for review and issuance of the NPDES permit:

Notice of Intent

York County Approval Letter

Floodplain - Christine Taylor - christine.taylor@yorkcountygov.com - 803-909-7156

Approved

Review Comments:

Zoning - Marion Ray - marion.ray@yorkcountygov.com - 803-909-7213

Approved

Review Comments:

Appendix B

Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) For Construction Activities:

Project/Site Name:

Stockbridge Trunk Sewer

Primary Permittee:

York County (SC) Government

Project Address/Location:

4,923 LF Linear Pipeline Project
Along: Zimmerman Dr./Blowing Rock
Cove/Brookhaven Dr/ Hawks Creek Pkwy
York County, SC

Permittee/Owner Contact:

Barry McKinnon
PO Box 148
York, SC 29745
809-818-5781
Barry.Mckinnon@yorkcountygov.com

SWPPP Preparer:

Dewberry Engineers Inc
Robert "Skip" Notte
9300 Harris Corners Parkway, Suite 220
Charlotte, NC 28269
704-624-0739
snotte@dewberry.com

Day-to-Day Operator:

York County Contractor TBD

C-SWPPP Preparation Date:

05 / 06 / 2022



LD Permit #20-00182

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Section 1

PROJECT OVERVIEW

1.1 Narrative (CGP Section 3.2.1)

Construction Activities and BMP Summary

amdn

This gravity sewer is part of the regional improvements to York County's waste water system. The gravity sewer will be owned and maintained by York County.

The total project area is approximately 3.15 AC with the limits of land disturbance approximately 3.15 AC Acres. Erosion and sediment control measures shall include silt fence, temporary seeding, and permanent seeding as defined on page G-002 of the construction documents.

Pre-Development Conditions

The project area is a mixture of previously disturbed residential, public ROW, wooded or pastureland, and a small unnamed tributary to Torrence Creek in the Catawaba Watershed (SCDHEC WS# 030501011508).

The site topography varies in elevation from approximately 675 feet to 620 feet. No existing drainage or flooding concerns are known. Existing soils include HaB, HaC, HeB, PaE2, and PhD.

See the Pre-Development Drainage Area Map in Appendix B for more information.

Post-Development Conditions

The post-development conditions will consist of approximately 39 manholes, 938 linear feet LF of 8", 3,210 LF of 12" and 775 LF of 16" ductile iron gravity sewer installed from the connection. Disturbed areas will be re-seeded and graded to the existing conditions prior to the commencement of work.

The proposed work does not add any meaningful impervious surface area (besides manhole lids) and existing drainage patterns will not be modified, so no flood concerns will be created.

Flooding Issues

Firm Panels (45091C0192E, 45091C0211F, 45091C0203E, 45091C0185E) do not identify any Special Flood Hazard Areas Subject to Inundation by the 1% Annual Chance Flood within the project area. The proposed construction activities will not add any impervious surface area (besides manhole lids) to the impacted area or alter existing drainage patterns. No fill will be placed and existing grades will remain the same. No flood concerns will be created.

1.2 Stormwater Management and Sediment Control (CGP Section 3.2.2)

Erosion Prevention BMPs

As the existing site is cleared, grubbed and graded to the proposed contours shown on the construction site plans, erosion prevention BMPs shall be placed throughout the construction site to aid in the prevention of sediment-laden stormwater runoff. These BMPs shall be focused in areas with high potential of erosion, areas preceding infiltration practices, and shall be applied to all steep slopes. That is slopes equal to or greater than 3H:1V.

Each erosion prevention measure shall be selected on a site-specific basis and details have been provided on the construction site plans sheet C-501. The plans identify all proposed Erosion Prevention BMPs and the recommended installation, maintenance, and inspection procedures.

Examples of Erosion Prevention BMPs are, but are not limited to, surface roughening, temporary seeding, erosion control blankets, turf reinforcement mats, sodding, riprap, outlet protection, dust control, and polyacrylamide (PAM). Information on the design and proper use of Erosion Prevention BMPs can be located in the [SC DHEC's BMP Handbook](#).

Sediment Control BMPs

Sediment Control BMPs are designed to remove some of the sediment accumulated within stormwater runoff, to the best extent practicable. These BMPs help prevent sediment impacts to adjacent properties and water bodies from stormwater discharges originating from construction sites.

Typically these BMPs are placed near each of the site's outfalls and are installed prior to clearing and grubbing of the site (before large areas of soil are exposed). However, these BMPs can also be located throughout the construction site and, in these circumstances, are installed after mass grading has occurred. Placement, sizing and modifications of Sediment Control BMPs should be left to the SWPPP preparer and/or the Site Engineer. Contractors must consult Dewberry Engineers Inc., the York County Environmental Compliance Plan Reviewer, and the Site Inspector before making any significant changes to these BMPs.

Each sediment control BMP shall be selected on a site-specific basis. Examples of Sediment Control BMPs are, but are not limited to sediment traps, sediment basins, silt fence, rock check dams, rock sediment dikes, sediment tubes, and inlet protection. Please consult [SC DHEC's BMP Handbook](#) for more information on Sediment Control BMPs.

Structural Control BMPs and Floodplain Placement

This site-specific SWPPP utilizes the following structural control BMPs: temporary wattles, erosion control blankets, turf reinforcement matting, and sodding. These practices have been designed to either divert flows from exposed soils, to retain/detain flows, and to otherwise limit the runoff and the discharge of pollutants from disturbed areas of the construction site.

Throughout the lifespan of the construction project these BMPs will be installed and maintained, as required by the SWPPP and the construction site plans, until final stabilization has been achieved for the areas draining to each BMP. Upon final stabilization, each structural control BMP must be modified to the post-construction conditions shown within the approved construction site plans or removed, if the structural BMP was a temporary structure.

There are no structural controls proposed within the 100-year floodplain.

Construction Entrances and Dust Control

All access areas into and out of the limits of disturbance, as shown on the construction site plans, are required to be equipped with a construction entrance. The use of this BMP will limit the amount of sediment being transported by construction vehicles onto existing roadways or other impervious areas. Any tracked sediment, along with any attached pollutants, deposited on impervious areas could be washed downstream during the next rain event. Each construction entrance must be installed as shown in the details section of the construction site plans.

If a new entrance or exit is required, that is not shown on the plans, install the construction entrance as noted by the construction entrance detail, mark the location on the plans and make a record of this minor modification in the SWPPP's modification log, which is located within one of the appendices of the On-site SWPPP.

Each stabilized construction entrance should be used in conjunction with Street Sweeping measures if it becomes apparent that sediment is still being tracked onto adjacent impervious areas, even with the use of the construction entrance.

During extremely dry conditions, drought, and/or excessive winds, the construction site should be treated for dust control to prevent the suspension of fine sediment particles into the air, being carried offsite, and deposited on adjacent properties or surface waters. This practice may not be directly called out for on the construction site plans. A water tanker used to spray the soil down may be an effective way to prevent excessive dust at a construction site.

Water Quality BMPs During Construction

Site-specific water quality BMPs (e.g., sediment basins, sediment traps, rock check dams, and rock sediment dikes) must be installed prior to the mass clearing, grubbing and grading of the site, and must be kept in functioning order throughout the lifespan of all construction activities. Each of these BMPs must be maintained and inspected until all areas draining to these BMPs have reached final stabilization, approved by the

construction site inspector or the SWPPP Preparer, and recorded within the stabilization log located as an appendix of the On-site SWPPP.

Other Stormwater Management Procedures

Based on the nature, conditions, and/or procedures associated with this construction site, the following items must be followed and adopted by all those conducting land disturbing activities at this site:

- All construction debris must be stockpiled in designated areas, which have been provided with the proper BMPs to prevent the discharge of pollutants through stormwater runoff from building or other similar materials off-site or into surface waters.
- Any additional waste material or stockpile material (i.e., soil and mulch) must also be stored in the designated areas as shown on the Construction Site Plans or as the contractor, responsible for day-day activities at this site, deems appropriate. Silt fence or an approved equal shall surround all stockpiled materials.
- All parties conducting work at this construction site must be informed of and make note of pollutant sources, both industrial and construction, at this site, and be informed of all controls and measures that will be implemented to prevent the discharge of these pollutants in stormwater runoff.
- Any additional non-stormwater discharges, as referenced in the CGP, should be eliminated or reduced to the maximum extent feasible. All unpreventable non-stormwater discharges shall be treated through the approved stormwater management system before release off-site. Following is a list of allowable non-stormwater discharges:
 - Fire hydrant flushing
 - Wash water without detergents
 - Water used for dust control
 - Potable water
 - Building wash down water without detergents
 - Uncontaminated pavement wash water
 - Uncontaminated condensation from mechanical equipment
 - Uncontaminated ground or spring water
 - Water from foundation of footing drains
 - Uncontaminated excavation dewatering
 - Landscape irrigation.

1.3 Sequence of Construction

The construction sequence for this project has been provided on sheet C0.1 GENERAL NOTES of the construction site plans. Each item/step of that construction sequence that has been listed is the sequence that should be implemented.

For additional information or questions on the sequencing please contact the Dewberry Engineers Inc. or York County Environmental Compliance.

1.4 Non-Numeric Effluent Limits

Stormwater Volume and Velocity Control

During the implementation of construction activities, all parties performing work at this construction site whose work may affect the implementation of the SWPPP must be informed of and directed on how to comply with this Non-Numeric Effluent Limit, which requires the management of stormwater runoff **within** the construction site and at **each outfall**. The purpose of this requirement is to control the stormwater volume and velocity at these locations to minimize erosion.

Specifically, each responsible party should be made aware of the practices that have been or should be implemented at the construction site to accomplish these particular stormwater management practices. Below is a list of practices that may be utilized within the disturbed area and at each outfall at construction sites to control stormwater volume and velocity:

Volume Control

- Limiting the amount of disturbed area and exposed soils
- Staging and/or Phasing of the Construction Sequence;
- Sediment Basins and Sediment Traps
- Diverting off-site flow around the construction site;
- Controlling the Drainage Patterns within the Construction Site;
- Temporary Stabilization of Disturbed Areas.

Velocity Control

- Surface Roughening and/or other Slope Stabilization Practices;
- Level Spreaders, Riprap Plunge Pools and/or other Velocity Dissipation BMPs located at the Construction Site's and Sediment Basin Outfalls.
- Use of Rock Checks, Sediment Tubes, Etc. in Temporary Diversions Swales and Ditches.
- Use of Erosion Control Blankets, Turf Reinforcement Mats, and other Non-Vegetative BMPs that can be used to Quickly Stabilize Disturbed Areas.

The SWPPP Preparer/Engineer should approve any modifications (Additional BMPs or Changes to Existing BMPs) to address the management of stormwater volume and velocity prior to implementation. All approved SWPPPs that were issued coverage under the CGP should include ample BMPs and other control measures to address this specific Non-Numeric Effluent Limit.

Soil Exposure, Compaction and Preservation

Throughout construction activities, **the amount of soil exposed during construction should be kept to a minimum**. This may be accomplished by minimizing the amount the disturbed area within the permitted Limits of Disturbance (shown on the approved construction site plans) to only that which is necessary to complete the proposed work. For areas that have already been disturbed and where construction activities will not begin for a period of 14 days or more, temporary stabilization techniques must be implemented.

Prior to implementation of any major grading activities, **topsoil is to be preserved** by placing it in areas designated for stockpiling until final grades are reached. Each stockpile must be equipped with proper sediment and erosion controls to preserve the topsoil and protect adjacent areas from impacts. Once final grades have been reached, the preserved topsoil should be utilized to apply to areas identified for stabilization. Topsoil contains nutrients and organisms that aid in the growth of vegetation.

The **Compaction of Soil** should also be minimized to the degree practicable during grading activities. This is especially important during the replacement of topsoil to aid in a quick establishment of vegetative cover. Compaction of soil may also reduce rainfall's ability to infiltrate into the soil, increasing the amount of stormwater runoff.

Soil Stabilization

Throughout construction activities, soil stabilization techniques are to be initiated as soon as practicable whenever any clearing, grading, excavating, or other land-disturbing activities have permanently or temporarily ceased on any portion of the construction site and will not resume for a period exceeding 14 calendar days. For areas where initiating stabilization measures is infeasible, (e.g., where snow cover, frozen ground, or drought conditions preclude stabilization), initiate vegetative or non-vegetative stabilization measures as soon as practicable.

Steep Slopes (Slopes of 30% grade or greater)

All disturbed steep slopes (30% grade, ~3H:1V, or greater), and steep slopes to be created through grading activities must be managed in a fashion that limits the potential of erosion along the slopes. All parties whose work is/was responsible for the creation/disturbance of steep slopes must comply with the following items:

- **Minimize the Disturbance** of all steep slopes, when possible.
- **Divert Concentrated or Channelized Flows** of stormwater away from and around steep slope disturbances.
- **Use Specialized BMP Controls** including temporary and permanent seeding with soil binders, erosion control blankets, surface roughening, reducing continuous slope length with terracing or diversions, gradient terraces, interceptor dikes and swales, grass-lined channels, pipe slope drains, subsurface drains, level spreaders, check dams, seep berms, and triangular silt dikes to minimize erosion.
- **Initiate Stabilization Measures** as soon as practicable on any disturbed steep slope areas where construction activities have permanently or temporarily ceased, and will not resume for a period exceeding 7 calendar days.
- **A Vegetative and/or Non-Vegetative Cover** must be established within 3 working days from the time that stabilization measures were initiated.

Stabilization of steep slopes should be a priority for those performing work at the construction site. At the very least, runoff control BMPs should be implemented to transport stormwater runoff from the top of the slope to the toe of the slope. An example of this is to install diversion swales along the top of slope and direct the runoff towards

pipe slopes drains to transports the runoff to the toe of the slope. All pipe slope drain outlets are to be equipped proper outlet protection.

Sediment Discharge Minimization

Permittees, Contractors, and all other parties responsible for conducting land-disturbing activities are required to install and maintain all erosion and sediment BMPs that are identified on the approved construction site plans. These BMPs have been designed and approved to address such factors as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soils particle sizes expected to be present on the construction site. **Proper installation, inspection, and maintenance will allow these BMPs to operate at maximum efficiencies in order to minimize sediment discharges to the maximum extent practical.**

Pollutant Discharge Minimization

Permittees, Contractors, and all other parties responsible for conducting land-disturbing activities are required to install, implement, and maintain effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, the following items must be implemented:

- **Minimize the discharge of pollutants from dewatering trenches and excavations** by managing runoff with the appropriate controls. Otherwise these discharges are prohibited;
- **Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters.** Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
- **Minimize the exposure of building materials, building products, construction wastes, trash,** landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater; and
- **Minimize the discharge of pollutants from spills and leaks** and implement chemical spill and leak prevention and response procedures.

Prohibited Discharges

Permittees, Contractors, and all other responsible parties for conducting land-disturbing activities are prohibited to discharges, from the construction site, the following items:

- **Wastewater from washout of concrete,** unless managed by an appropriate control;
- **Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;**
- **Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;** and
- **Soaps or solvents used in vehicle and equipment washing.**

1.5 Buffer Zone Management

This linear utility project is exempt from the Buffer Zone Management due to section (3.2.4.C.IV.a) Linear Project. This includes any linear construction projects. To Include roadways and/or utilities (such as roads that are not part of a development and utility construction including electrical power lines, gas lines, main sewer truck, water distribution lines, and other utilities that are not part of a development). BMP measures to ensure sediment does not enter stream include dewatering to a filter sock, double row silt fence, and stone outlet.

1.6 Certification Statements

Applicant Certification

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 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 am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

I hereby certify that, to the best of my knowledge, these plans contain all information required by Chapter 152 – Stormwater Management and Sediment Control of the York County Code of Ordinances and as referenced by this application. I hereby certify that all land disturbing activities including clearing, grading, construction and/or development will be done pursuant to this plan and agree to indemnify any person damaged by failure to comply with the approved plan. County and state authorities will be allowed to enter upon the project site at any reasonable time provided they present appropriate credentials.

Name *Dr. Perry*
Title *Assistant County Engineer*
Date *5/10/2022*

Design Professionals Certification

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. I also certify that this plan is designed to contain sediment on the property concerned and to provide for the control of stormwater runoff from the property and that, to the best of my knowledge and belief, all the provisions are in accordance with Chapter 152 - Stormwater Management and Sediment Control of the York County Code of Ordinances.



(Signature and Seal)

Name ROBERT S. NOTTE

Title PROJECT MANAGER

Date 5/12/2022

Section 2

SITE FEATURES AND SENSITIVE AREAS

2.1 Sources of Pollution

Throughout construction activities, each permittee, contractor, and person responsible for conducting work will need to ensure that sources of pollution are managed to prevent their discharge from the construction site. Expected pollution sources during construction have been identified in **Table 2.1-A**, but due to the nature of construction activities, it is often tough to predict all pollution sources that may appear throughout the life of a construction project. For that reason, the following table has also been provided to help all those performing work at this construction site identify possible sources of pollution

Stormwater runoff subjected to the identified pollution sources must be treated by the appropriate BMPs as directed by this SWPPP.

In the event that any additional sources of pollution are identified during construction, the person(s) with day-to-day operational control at the site is to add the new source(s) to **Table 2.1-A** and consult with the SWPPP Preparer to properly address this source and to prevent the discharge of its pollutant through stormwater runoff.

Table 2.1-A: Potential Sources of Pollution

Source	Material or Chemical	Location*	Appropriate Control Measures
Loose soil exposed/disturbed during clearing, grubbing and grading activities	Sediment	All areas within the Limits of Disturbance	As directed by the construction Plans. This includes Silt Fence, sediment tubes, sediment basins, and sediment traps.
Areas where construction equipment are cleaned, a.k.a. concrete washout	Heavy Metals & pH	Located adjacent to each construction entrance	Concrete Washout Basin as shown on sheet C-8 of the plans.
Water encountered during trenching	Nutrients & Sediment	In and around any trenching activities.	Direct water into impoundments such as basins or traps to allow for the sedimentation of the listed pollutants.
Paving Operations	Sediment & Trash	All areas to be paved.	Inlet protection.
Material Delivery and Storage Areas	Nutrients, pH, Sediment, Heavy Metals, oils & grease	All areas used as storage areas	Silt fence and/or sediment dikes
Equipment fueling and maintenance areas	Metals, hydrocarbons, oils and greases	Areas surrounding fuel tanks	Provide secondary containments, locate in upland areas. Repair leaking and broken hoses.
Paints	Metal oxides, stoddard solvent, talc, calcium-carbonate, arsenic	Throughout site, primarily in areas of building construction	Washwater should be contained and is prohibited from being discharged

*Area where material/chemical is used on site.

2.2 Surface Waters

Stormwater runoff from the site discharges overland to unnamed streams tributaries, to Torrence Creek, and eventually to Lake Wylie. No increase in impervious surface area will be part of this project. Figure 2.2 depicts the anticipated stormwater runoff route.

Figure 2.2: Stormwater Runoff Route



2.3 Impairments and TMDLs

Some Waters of the State (WoS) have been identified as not meeting the State's water quality standards for recreational swimming, fish consumption, aquatic life use, and/or shellfish harvesting for one or more pollutants even after controls for point and nonpoint source pollution have been put in place. These waterbodies have been classified as "impaired." Once these waterbodies have been identified they are listed on the State's 303(d) List of Impaired Waterbodies. South Carolina lists impairments as "stations" where samples were taken along a waterbody.

The most recently-approved 303(d) list can be found at the following link:

<http://www.scdhec.gov/environment/water/tmdl/index.htm#4>

After a pre-determined period of time, DHEC is obliged to develop a Total Maximum Daily Load (TMDL) for the pollutant of concern for each impaired station listed on the 303(d) List. A TMDL is the amount of a single pollutant (such as bacteria, nutrients, metals) that can enter a waterbody on daily basis and that waterbody still meet water quality standards. "TMDL" refers to both a calculation of a pollutant entering a waterbody as well as the document containing this calculation along with source assessments, watershed and land use information, reductions and allocations information, implementation and other relevant information, maps, figures, and pictures.

Once a TMDL has been developed and approved by the EPA, the impaired WoS is removed from the 303(d) list. A separate list is maintained for WoS with approved TMDLs.

Any construction site whose discharges are released into a WoS listed on the 303(d) List or for which an EPA-approved TMDL has been developed must address the specific pollutant set forth in the TMDL and/or potential pollutants for the impairment. The SWPPP must include a description of BMPs to address these pollutants.

The primary permittee and/or contractor must ensure that the construction site discharges remain in compliance with the State's water quality standards. To do so, these parties will have to ensure the function of all approved BMPs to handle the specific pollutant.

Construction Stormwater Discharges are expected to contain pollutants that contribute and/or can cause the following impairments to receiving water bodies: BIO (Macroinvertebrate Community), Turbidity, TP (Total Phosphorus), TN (Total Nitrogen), CHLA (Chlorophyll-a), and Fecal Coliform in waters classified for Shellfish Harvesting in the coastal zone. The presence of any of these impairments in receiving waters will require approval control of the site's construction stormwater discharges. Information on each of these impairments and how to treat stormwater runoff for these impairments has been provided below.

Impairments Effected by Construction Site Discharges and Methods to Control Potential Pollutants Causing or Contributing to the Impairments

- 1. BIO (Macroinvertebrate Community):** A balanced and varied group of Macroinvertebrate organisms is an indicator of a healthy stream that supports aquatic life. A balanced community can be defined as a natural, diverse group of organisms (including Macroinvertebrate) characterized by the ability to sustain itself through season changes, presence of food chain species and a lack of domination by pollutant tolerant or invasive species. If these conditions do not exist, then the site may be considered impaired due to the presence of an undesirable or non-existent Macroinvertebrate community. Sediment from construction sites may further threaten the propagation of these organisms.

Address by: Examples include limiting the amount of disturbed area, designing sediment control BMPs to remove the maximum amount of sediment possible, immediate stabilization of disturbed areas, and other practices may be utilized to control the discharge of sediment from construction sites.

- 2. Turbidity:** Turbidity can be generally defined as the "cloudiness" of a waterbody and may be caused by the growth of aquatic phytoplankton and the presence of suspended solids in the water column. In SC, a water quality standard for turbidity is applicable to all waters of the State (see R. 61-68 D. 11. for numeric targets by waterbody classification). Turbidity levels that exceed the water quality standard may reduce light penetration, thereby inhibiting aquatic flora

growth, and may reduce the ability of fauna, such as fish, to absorb oxygen across their gills.

Address by: Examples include limiting the amount of disturbed area, designing sediment control BMPs to remove the maximum amount of sediment possible, immediate stabilization of disturbed areas, and other practices may be utilized to control the discharge of sediment from construction sites.

3. **TP (Total Phosphorus):** Similar to total nitrogen, TP is an essential nutrient for the propagation of aquatic life. In SC, a water quality standard for TP is applicable to lakes greater than 40 acres (see R. 61-68 D. 11. for numeric and narrative targets). At acceptable levels, TP is assimilated by aquatic flora ensures the propagation of an overall balanced, indigenous aquatic community. TP levels that exceed the water quality standard are considered impaired and may cause negative impacts to the overall health of the aquatic community by promoting excessive algal growth in lakes. Phosphorous may enter a site's stormwater when excess amounts of the nutrient are applied to the site during temporary or final stabilization.

Address by: To prevent this soil should be tested to determine the quantity of the nutrient present in the soil and the correct amount that needs to be added so that it is absorbed by the vegetation.

4. **TN (Total Nitrogen):** Similar to total phosphorus, TN is an essential nutrient for the propagation of aquatic life. In SC, a water quality standard for TN is applicable to lakes greater than 40 acres (see R. 61-68 D. 11. for numeric and narrative targets). At acceptable levels, TN is assimilated by aquatic flora and ensures the propagation of an overall balanced, indigenous aquatic community. TN levels that exceed the water quality standard are considered impaired and may cause negative impacts to the overall health of the aquatic community by promoting excessive algal growth in lakes. Nitrogen may enter a site's stormwater when excess amounts of the nutrient are applied to the site during temporary or final stabilization

Address by: Examples include that the soil should be tested to determine the quantity of the nutrient present in the soil and the correct amount that needs to be added so that it is absorbed by the vegetation.

5. **Chlorophyll-a (CHLA):** CHLA is a pigment present in the cells of photosynthetic flora and some algal species. The presence of CHLA in an aquatic environment is a water quality indicator of the overall productivity in the aquatic system. CHLA is linked to the levels of TP, TN and light penetration in the water column. In SC, a water quality standard for CHLA is applicable to lakes greater than 40 acres (see R. 61-68 D. 11. for numeric and narrative targets). CHLA levels that exceed the water quality standard may suggest that other undesirable water quality impacts are present as the aquatic system may be too productive to support the propagation of an overall balanced, indigenous aquatic community.

Excess nutrients may discharge from a construction site during temporary and final stabilization. Limiting the amount of phosphorus and nitrogen applied while establishing vegetation will prevent excessive levels of CHLA in receiving waters.

Address by: Examples include that the soil should be tested to determine the quantity of the nutrients present in the soil and the correct amount that needs to be added so that it is absorbed by the vegetation.

6. **Fecal Coliform (FC) in Shellfish Harvesting waters:** Fecal Coliform is an indicator bacteria for other pathogens which may be present in a waterbody. Shellfish Harvesting Waters are tidal salt waters protected for shellfish harvesting and must be protected to a higher standard than other waters because of the risk to human health posed by ingesting shellfish from areas with high levels of bacteria. Bacteria levels increase following rain events. Potential sources of bacteria on construction sites include improperly located porta-johns and litter that may attract rodents and other animals.

Address by: Porta-johns should be placed away from WoS and not placed on catch basins and other drainage structures. Litter and construction debris should be placed in identified areas and emptied on a routine basis.

Impairment Sources and Prevention

Construction sites can contribute to these impairments directly through the release of excess soil and/or nutrients within stormwater runoff. For this reason, proper sediment and erosion control BMPs should be implemented and the design of the stormwater management systems, during both construction and post-construction, should address the control of stormwater runoff. A reduction in the volume released or the rate at which this volume is released can significantly improve the quality of stormwater runoff and limit the amount of the pollutants that contribute to the above listed impairments.

As an example, sediment basins and/or traps should be used during construction to allow for sedimentation of soils/nutrients, and to control the release of stormwater into the impaired water body. Vegetated Detention and Infiltration structures should be implemented as post-construction BMPs to control stormwater volumes. Caution is advised when using fertilizers to reach Final Stabilization; excess fertilizer can contribute to each of the above listed impairments.

Site-Specific Requirements

This construction site's discharges drain into WoS that is either Impaired or has an established TMDL for the following impairment(s): ECOLI (Lake Wylie, DHEC WQMS #RL-13088). Due to the possibility of pollutants in construction stormwater discharges from this site that may contribute to any of these impairments, the following must be conducted throughout the lifespan of all land-disturbing activities at this site:

- Monthly monitoring of the construction site's outfalls;
- Biweekly inspections of all the primary sediment control BMPs;

- Employee training/acknowledgement during the Pre-Construction Meeting;

Additionally post-construction BMPs may be required to be installed, once final stabilization is reached, to address any established TMDL or Impairment once construction operations have been completed.

2.4 Critical Areas (CZC only)

This project site does not contain any Critical Areas, such as costal waters, tidelands, beaches, or dune systems.

Section 3

Compliance Requirements

3.1 SWPPP Availability

A copy of the SWPPP (including a copy of the permit), NOI, CGP coverage letter from DHEC and the Plans must be retained at the construction site (or other location easily accessible during normal business hours to: York County, DHEC or EPA) from the date of commencement of construction activities to the date of final stabilization.

3.2 Pre-Construction Conferences

A pre-construction conference shall be held approximately 2 weeks prior to the start of the construction activities at the York County Government Center (6 South Congress Street, York, SC 29745). The Contractor shall coordinate with York County Engineering, York County Planning, and Dewberry Engineers Inc.

Persons conducting this conference must document each contractor, subcontractor, blanket utility, etc. attending the conference. This documentation must be maintained with the On-Site SWPPP (OS-SWPPP), including dates, locations, times, as well as identification of those in attendance.

3.3 Inspection Requirements

Inspection of all BMPs is to take place after each 1/2-inch rainfall event or at a minimum once every week by the Contractor and the York County Inspector. Logs of this inspection will be retained on site.

3.4 Maintenance Requirements

There will be no permanent maintenance required for this site as there are no proposed permanent improvements that are being constructed.

Construction Maintenance. All BMPs and other protective measures identified in the OS-SWPPP must be maintained in effective operating condition. If site inspections required by Section 4.2 identify BMPs that are not operating effectively, maintenance must be performed within seven (7) calendar days, before the next inspection, or as reasonably possible, and before the next storm event whenever practicable to maintain the continued effectiveness of stormwater controls. If the required maintenance takes longer than 7 days, documentation as to the reason shall be provided upon request of the Department or other regulatory staff along with estimated time of completion.

If periodic inspection or other information indicates that a BMP has been used inappropriately, or incorrectly, the Permittee must address the necessary replacement or modification required to correct the BMP within a time frame of 48 hours of identification.

If existing BMPs need to be modified or if additional BMPs are necessary to comply with the requirements of this permit and/or SC's Water Quality Standards, implementation must be completed before the next storm event whenever practicable. If implementation before the next storm event is impracticable, the situation must be documented in the OSSWPPP and alternative BMPs must be implemented as soon as reasonably possible.

Sediment from sediment traps or sedimentation basins must be removed as indicated in the OS-SWPPP or when the design capacity has been reduced by 50 percent, whichever occurs first.

Sediment collected by Silt Fence, or another sediment control measure, must be removed when the deposited sediment reaches 1/3 of the height of the above-ground portion of these BMPs, or before it reaches a lower height based on the manufacturer's specifications.

3.5 Record Keeping

Inspection records and rainfall event records are to be kept on site in the permit box. These documents are located in the Appendices.

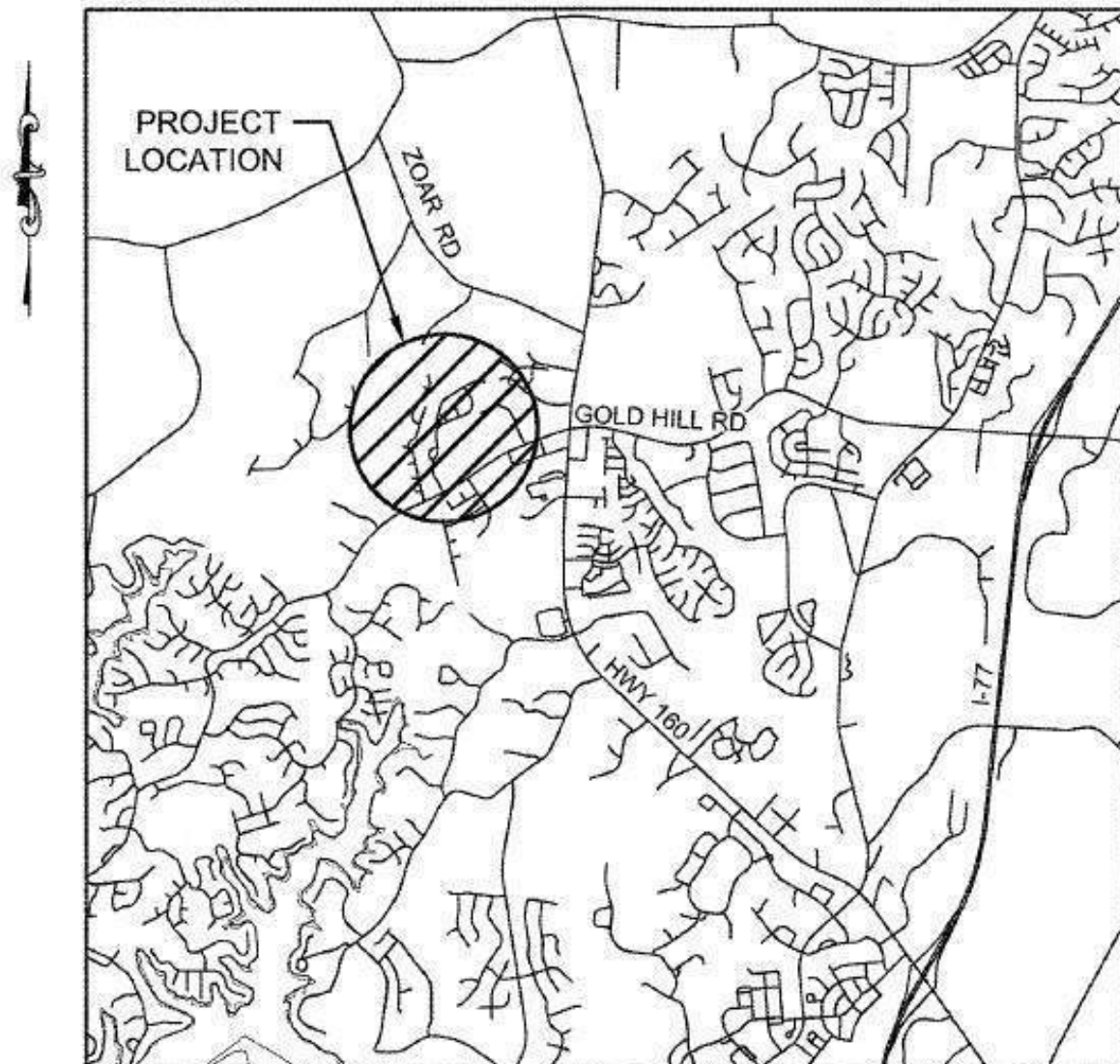
3.6 Final Stabilization

After storage activities have been completed, contractor will repair any on-site rutting with appropriate equipment and utilize permanent seeding for final stabilization. Contractor will use the applicable means for the seasonal conditions in order to ensure permanent seeding is established, (i.e. mulch blankets, woven nets, hydro seeding, etc.).

Once final stabilization has been obtained, the Notice of Termination is to be submitted.

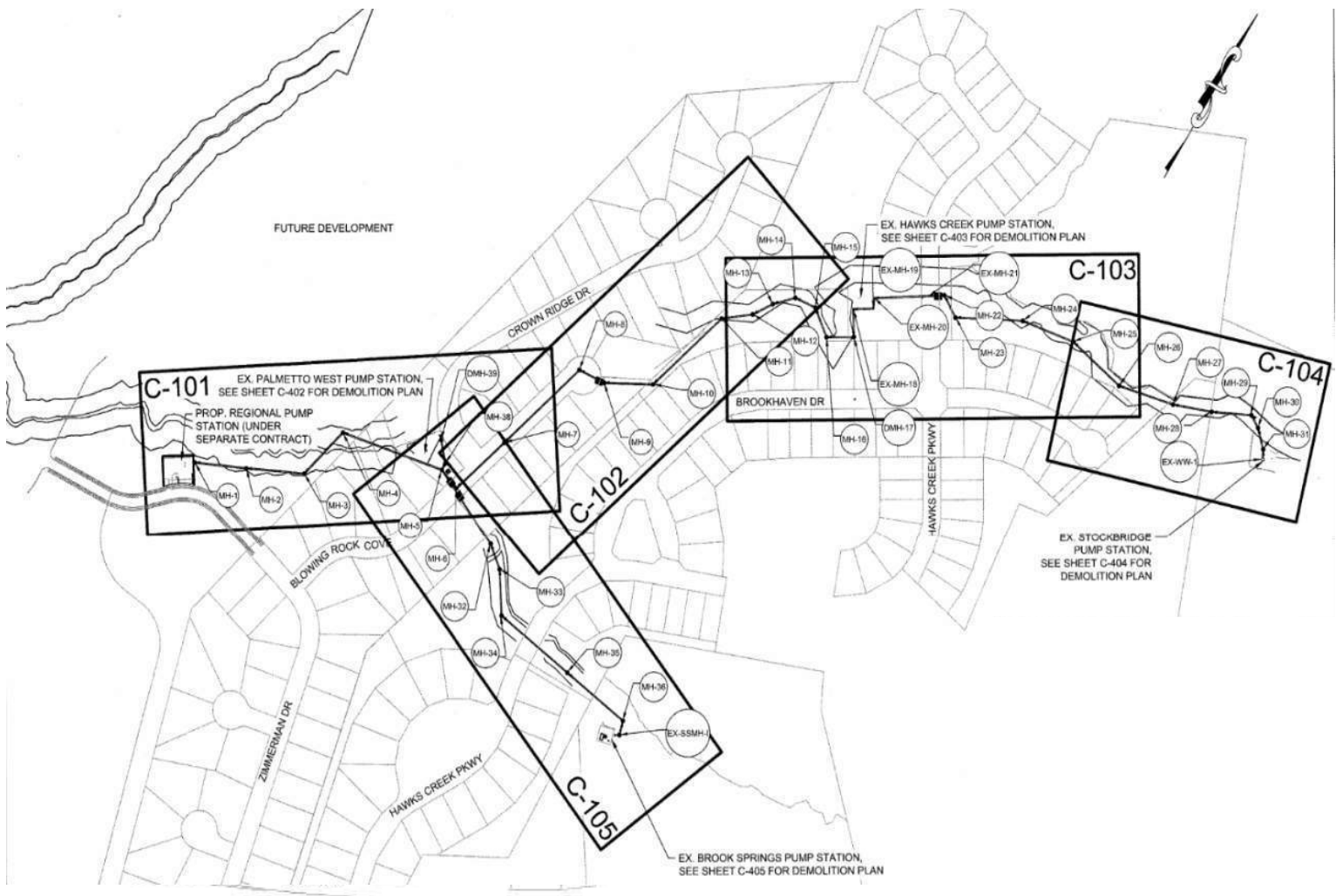
Appendix A - Maps

Appendix A - Locations Map – (See also Sheet C0.0 of the Construction Drawings)

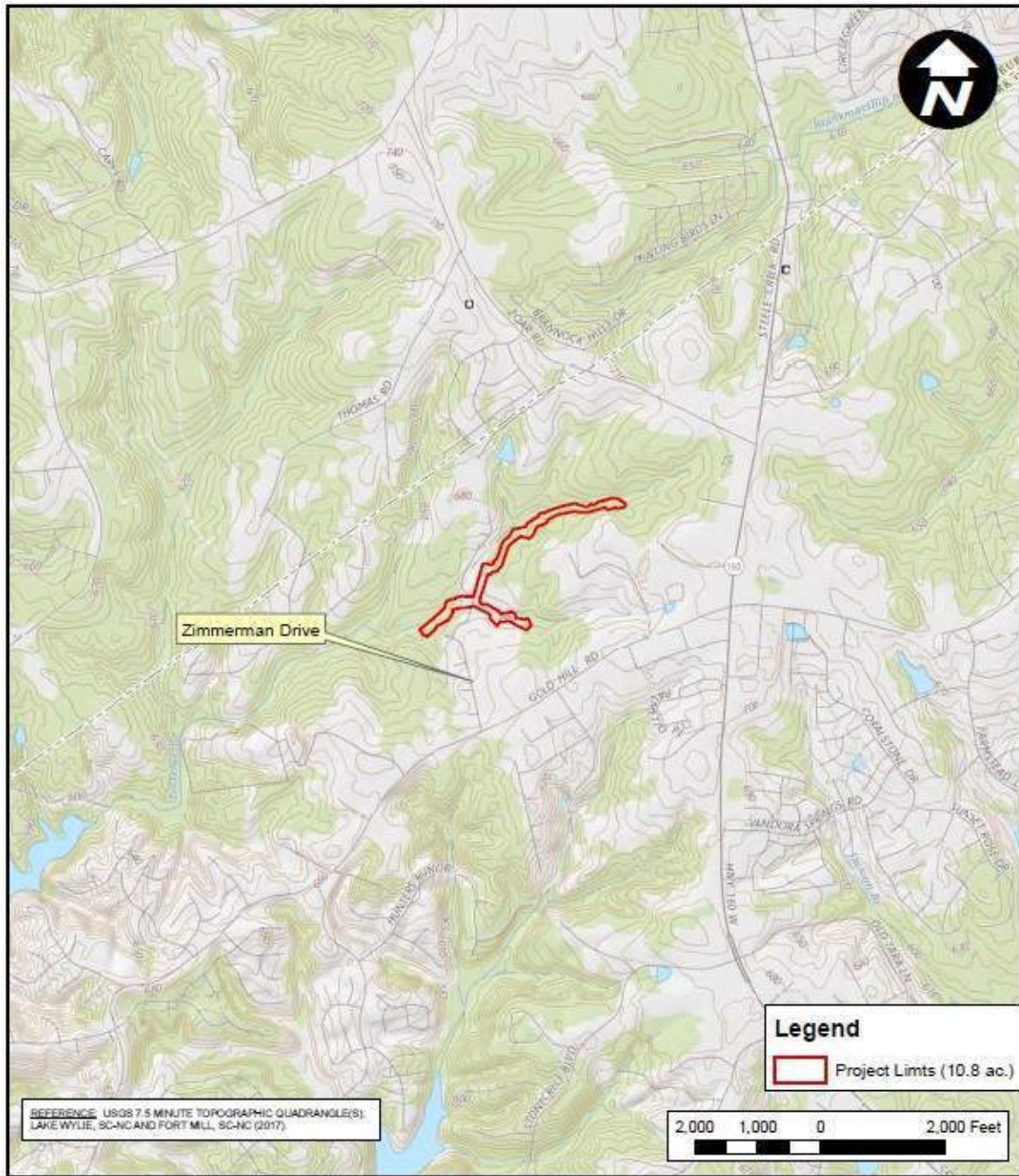


Appendix A - Site Map

(See also Sheets C-101 to C-105 of the Construction Drawings)



**Appendix A - Topographic Map –
USGS Lake Wylie and Fort Mill Quadrangles (2017)**
(See also Sheets C-101 to C-105 of the Construction Drawings)

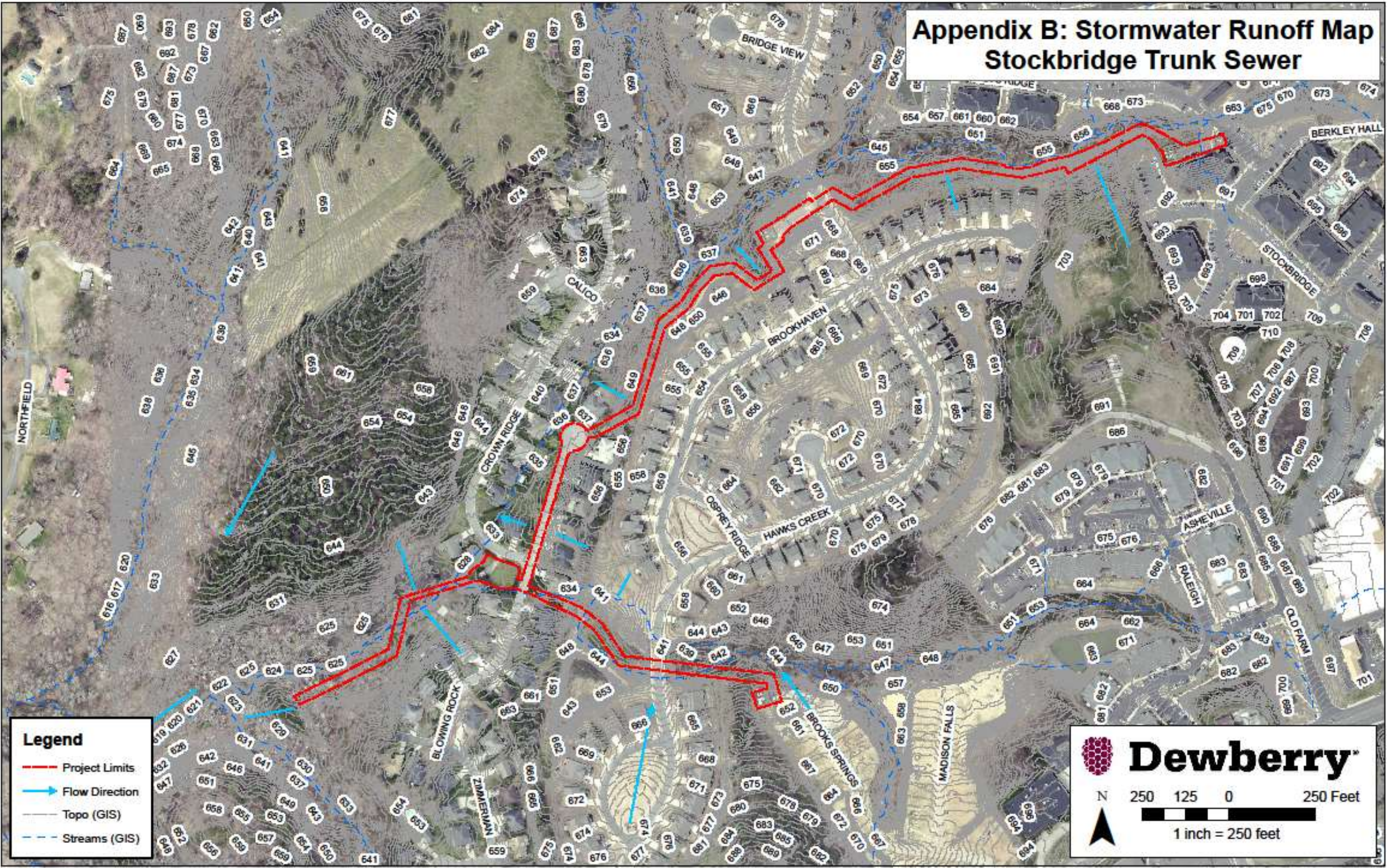


Appendix A - Soils Maps





Appendix B – Drainage Map



Appendix C

Additional Approvals and Certifications

DHEC Authorization to Construct

**Wastewater Construction Permit
Bureau of Water**



PROJECT NAME: STOCKBRIDGE TRUNK SEWER	COUNTY: YORK
LOCATION: STARTS AT THE EX. STOCKBRIDGE COMMONS PUMP STATION AND CONTINUES WEST TO THE HAWKS CREEK PS TO ALONG THE STREAM TO ZIMMERMAN ROAD TO PALMETTO WEST PS ALONG THE STREAM TO THE PROPOSED REGIONAL PUMP STATION	

PERMISSION IS HEREBY GRANTED TO: YORK COUNTY GOVERNMENT
PO BOX 148
YORK SC 29745

for the construction of a sanitary sewer system in accordance with the construction plans, specifications, design calculations and the Construction Permit Application signed by Robert Notte, Registered Professional Engineer, S.C. Registration Number: 28814.

PROJECT DESCRIPTION: Installation of approximately 938 LF-8", 3,210 LF-12", and 775 LF-16" DIP gravity sewer lines, 39 manholes, and all necessary appurtenances to connect to Stockbridge Regional Pump Station followed by demolition of four existing pump stations (Stockbridge Commons, Hawks Creek, Brook Springs and Palmetto West).

TREATMENT FACILITY: This project will connect to ROCK HILL CITY OF (NPDES permit SC0020443) but will not contribute any new flow.

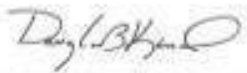
STANDARD CONDITION:

NOTE: 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. This is a permit for construction only and does not constitute DHEC approval, temporary or otherwise, to place the system in operation. An Approval to Place in Operation is required and can be obtained following the completion of construction by contacting the LANCASTER EQC OFFICE at 803-285-7461. Additional permits may be required prior to construction (e.g., Stormwater).

SPECIAL CONDITIONS:

1. All construction materials for this project must conform to the Standard Specifications for YORK COUNTY.
2. This project is approved with zero wastewater flow. Any future development that proposes to tie onto this system must first be approved by this Department.
3. Final operational approval for this project shall not be granted until the final operational approval is granted for the system to which this project will connect (Stockbridge Regional Pump Station, permit number 41840-WW).

PERMIT NUMBER:	41848-WW
ISSUANCE DATE:	June 04, 2019
EXPIRATION DATES:	Construction must be completed and the Approval to Place in Operation granted prior to June 04, 2022 or this permit will expire.


Douglas B. Kinard, P.E., Director
Drinking Water Protection Division

MPM

Bureau of Water, DHEC, 2600 Bull Street, Columbia, SC 29201

Appendix D – Engineering Reports

Jurisdictional Delineation Report
Carolina Wetland Services, Inc.
March, 2018



CAROLINA WETLAND SERVICES, INC.
550 E. Westinghouse Blvd.
Charlotte, NC 28273
704-527-1177 (office)
704-527-1133 (fax)

March 2, 2018

Mr. John P. Willie
Vice President
GTA Consultants
710 Peninsula Lane, Suite B
Charlotte, NC 28273

**Subject: Jurisdictional Delineation Report
Zimmerman Drive Site
York County, South Carolina
CWS Project No. 2018-0052**

Dear Mr. Willie,

The Zimmerman Drive site (multiple York County Tax parcels [Figure 3]) is approximately 10.8 acres in extent and extends from Reynolds Ridge Lane in the northeast to Zimmerman Drive in the south in Fort Mill, South Carolina (Figure 1). GTA consultants has contracted Carolina Wetland Services, Inc. (CWS) to delineate the extent of jurisdictional features within the project area.

Street Address of Project: From Reynolds Ridge Lane, in the northeast project area, to Zimmerman Drive, in the southern project area, Fort Mill, South Carolina.

Waterway: UT-Torrence Branch

Basin: Catawba (HUC¹ 03050101)

City: Fort Mill, SC

County: York

Tax Parcel No(s): See Figure 3

Decimal Degree Coordinate Location of Project Site: 35.062421°, -81.002408°

USGS Quadrangle Name: Lake Wylie, SC-NC and Fort Mill, SC-NC (2017)

Current Land Use

The project area consists predominantly of a forested riparian corridor with on-site elevations ranging from 620-660 feet above mean sea level (Figure 2). Land cover within the project area consists of mixed forest of deciduous and evergreen species, and developed residential areas, sewer line easements, and private roads that access adjoining properties.(Figure 3)².

According to the United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS) Web Soil Survey of York County³ (Figure 4) and the most recently

¹ "HUC" is the Hydrologic Unit Code. U.S. Geological Survey, 1974. Hydrologic Unit Map, State of South Carolina.

² Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K., 2015, Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354.

³ United States Department of Agriculture, 2017. Web Soil Survey of York County, South Carolina. Accessed at <https://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

published NRCS Soil Survey for York County⁴ (Figure 5), current and historic on-site soils consist of Hard Labor sandy loam (6 to 10 percent slopes [HaC]), Pacolet sandy clay loam (15 to 25 percent slopes [PaE2]), and Pacolet-Hard labor complex (10 to 15 percent slopes [PhD]). None of the on-site soils are listed as hydric on the Web Soil Survey Hydric Soils List as containing hydric inclusions.

National Wetlands Inventory

Wetlands are an important source of biodiversity and provide a multitude of ecological services. The National Wetlands Inventory (NWI), created by the U.S. Fish and Wildlife Service, is a program which provides wetland data and analysis to the public. A review of the NWI GIS layer depicts one potential forested wetland and one potential pond as occurring on the site (Figure 6).

Jurisdictional Delineation

On February 23, 2018, CWS scientists Sean Martin, Senior Project Scientist, and Dan Zurlo, Staff Scientist II, delineated on-site jurisdictional waters of the U.S., including wetlands. Jurisdictional areas were delineated (flagged in the field), classified, and mapped with a sub-foot Trimble Geo7X GPS unit using the U.S. Army Corps of Engineers (USACE) Routine On-Site Determination Method. This method is defined in the 1987 Corps of Engineers Delineation Manual,⁵ the 2007 USACE Jurisdictional Form Instructional Guidebook,⁶ with further technical guidance from the 2012 Eastern Mountains & Piedmont Regional Supplement.⁷

Jurisdictional stream channels were classified according to NCDEQ guidance. These classifications include sampling with a D-shaped dip net, photograph documentation, and defining approximate breakpoints (location at which stream channel changes classification) within each on-site stream channel. NCDEQ Stream Classification Forms representative of jurisdictional stream channels are attached as SCP1-SCP3 (Attachment A). Wetland Determination Data Forms representative of on-site jurisdictional wetland areas are attached as DP1-DP4 (Attachment B). A Wetland Determination Data Form representative of on-site non-jurisdictional upland areas and non-jurisdictional upland areas within the NWI indicated wetland is attached as DP5 (Attachment B). Locations of stream classification points and the Wetland Determination Data Forms are depicted on Figures 7a and 7b. Representative photographs of on-site jurisdictional features and existing site conditions are attached as Photograph 1-7 (Attachment C).

Results

Based on the results of this field investigation, there are eight jurisdictional waters of the U.S. located within the project boundary (Figures 7a and 7b). These waters consist of three jurisdictional stream channels (Streams A-C) and five jurisdictional wetlands (Wetlands BB-FF).

⁴ United States Department of Agriculture – Natural Resources Conservation Service, 1980. Soil Survey of York County, South Carolina.

⁵ Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual", Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

⁶ USACE Jurisdictional Determination Form Instructional Guidebook. 2007. USACE Regulatory National Standard Operating Procedures for conducting an approved jurisdictional determination (JD) and documenting practices to support an approved JD. USACE Headquarters, Washington, DC.

⁷ US Army Corps of Engineers, April 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region. US Army Engineer Research and Development Center, Vicksburg, Mississippi.

On-site jurisdictional waters of the U.S. total approximately 0.38 acre, including 2,073 linear feet of jurisdictional stream channel and 0.38 acres of jurisdictional wetlands. On-site jurisdictional waters of the U.S. are summarized in Table 1.

Table 1. Summary of On-Site Potential Waters of the U.S.

Jurisdictional Stream	Jurisdiction	NCDEQ Stream Classification Score	Photograph(s)	Linear Feet (lf)	Acreage (ac.)
	NCDEQ Flow Classification				
Stream A	Perennial	34	1	1,480	0.2
Stream B	Perennial	30	2	523	0.05
Stream C	Perennial	30	3	70	0.005
Stream Total:				2,073 lf	0.255 ac.
Jurisdictional Wetland	Cowardin Classification ⁸		Photograph(s)	Linear Feet (lf)	Acreage (ac.)
Wetland BB	Palustrine Forested		4	N/A	0.015
Wetland CC	Palustrine Forested		4	N/A	0.03
Wetland DD	Palustrine Emergent (Herbaceous)		5	N/A	0.04
Wetland EE	Palustrine Forested		6	N/A	0.02
Wetland FF	Palustrine Emergent (Herbaceous)		7	N/A	0.02
Wetland Total:				N/A	0.125 ac.
Total Jurisdictional Waters of the U.S.:				2,073 lf	0.38 ac.

Perennial Flowing Streams

Perennial flowing streams have year-round flow in normal conditions. Perennial streams generally have greater biological resources than seasonal streams and are capable of supporting aquatic organisms requiring constant flow for reproductive and maturation stages. The results of the on-site field investigation conducted by CWS indicate three perennial streams are located within the project area (Figures 7a and 7b).

Stream A originates off-site at the northeastern project limits and enters the site through a pipe. It flows south-southwest on-site for 1,480 linear feet (934 lf in the northern portion of the project area and 546 linear feet in the southern portion of the project area [Figure 7a and 7b]). Off-site flow not depicted is the portion of Stream A that is piped under a neighborhood (Figure 7). Stream A scored 34 out of a possible 63 points on the NCDEQ Stream Classification Form (SCP1, Attachment A; Photograph 1 Attachment C).

Stream B originates off-site at the northern boundary of the southeastern portion of the project area and flows west for approximately 169 linear feet before entering a culvert. After exiting the culvert, Stream B flows west for 289 linear feet before entering a second culvert. After exiting the second culvert, Stream B flows southwest for 65 linear feet before coming to a confluence with Stream A (Figure 7b). Total on-site flow for Stream B is 523 linear feet. Stream A scored 30 out of a possible 63 points on the NCDEQ Stream Classification Form (SCP2, Attachment A; Photograph 2, Attachment C).

⁸ Cowardin et al. Classification System, 1979.

Stream C originates off-site at the northern boundary of the southeastern portion of the project area and flows southwest for 70 linear feet before coming to a confluence with Stream B (Figure 7b). Stream C scored 30 out of a possible 63 points on the NCDEQ Stream Classification Form (SCP3, Attachment A; Photograph 3, Attachment C).

Wetlands

The USACE and the Environmental Protection Agency (EPA) define wetlands as: "Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."⁹ The USACE uses three parameters to identify jurisdictional wetlands. These parameters are as follows: 1) hydrophytic vegetation, 2) wetland hydrology, and 3) hydric soils. Except in certain atypical situations, all three parameters must be present in order for an area to be determined to be a jurisdictional wetland. The results of the on-site field investigation conducted by CWS indicate that there are five jurisdictional wetland areas (Wetlands BB-FF) located within the project area.

Wetlands BB and CC are similar in hydrophytic vegetation, hydrology, and soil characteristics. Wetland BB is approximately 0.015 acre in extent and is adjacent to Stream A in the eastern portion of the northern project area (Figure 7a; Photograph 4). Wetland CC is approximately 0.03 acre in extent and abuts Stream A within the eastern portion of the northern project area (Figure 7a). Wetland Data Determination form DP1 characterizes Wetlands BB and CC (Attachment B).

Wetland DD is approximately 0.04 acres in extent and is adjacent to Stream A within the northern portion of the project limits (Figure 7a; Photograph 5). Wetland Data Determination form DP2 characterizes Wetland DD (Attachment B).

Wetland EE is approximately 0.02 acre in extent and is located within the eastern portion of the southern part of the project limits (Figure 7b; Photograph 6). Wetland EE abuts Stream B off-site. Wetland Data Determination form DP3 characterizes Wetland EE (Attachment B).

Wetland FF is approximately 0.02 acre in extent and abuts Stream B within the eastern portion of the southern part of the project limits (Figure 7b; Photograph 7). Wetland Data Determination form DP4 characterizes Wetland FF (Attachment B).

Recommendations

CWS recommends submitting the results of this delineation to the USACE for verification. Wetlands and other waters are present on the site, which are regulated by the USACE and/or SCDHEC. The jurisdictional delineation provided by CWS represents our best professional judgment regarding the boundaries of on-site wetlands, streams, and other water features that can be used for preliminary project planning. However, until a Jurisdictional Determination (JD) is issued by a regulatory agency (USACE), the delineation can only be considered preliminary and is not an official governmental approval. CWS recommends that before any construction or other earth disturbance activities occur on site, a formal JD should be obtained.

⁹ Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Thank you for the opportunity to provide these services on this important project. Please do not hesitate to contact Sean Martin at 828-719-1320 or sean@cws-inc.net should you have any questions or comments regarding this report.

Sincerely,



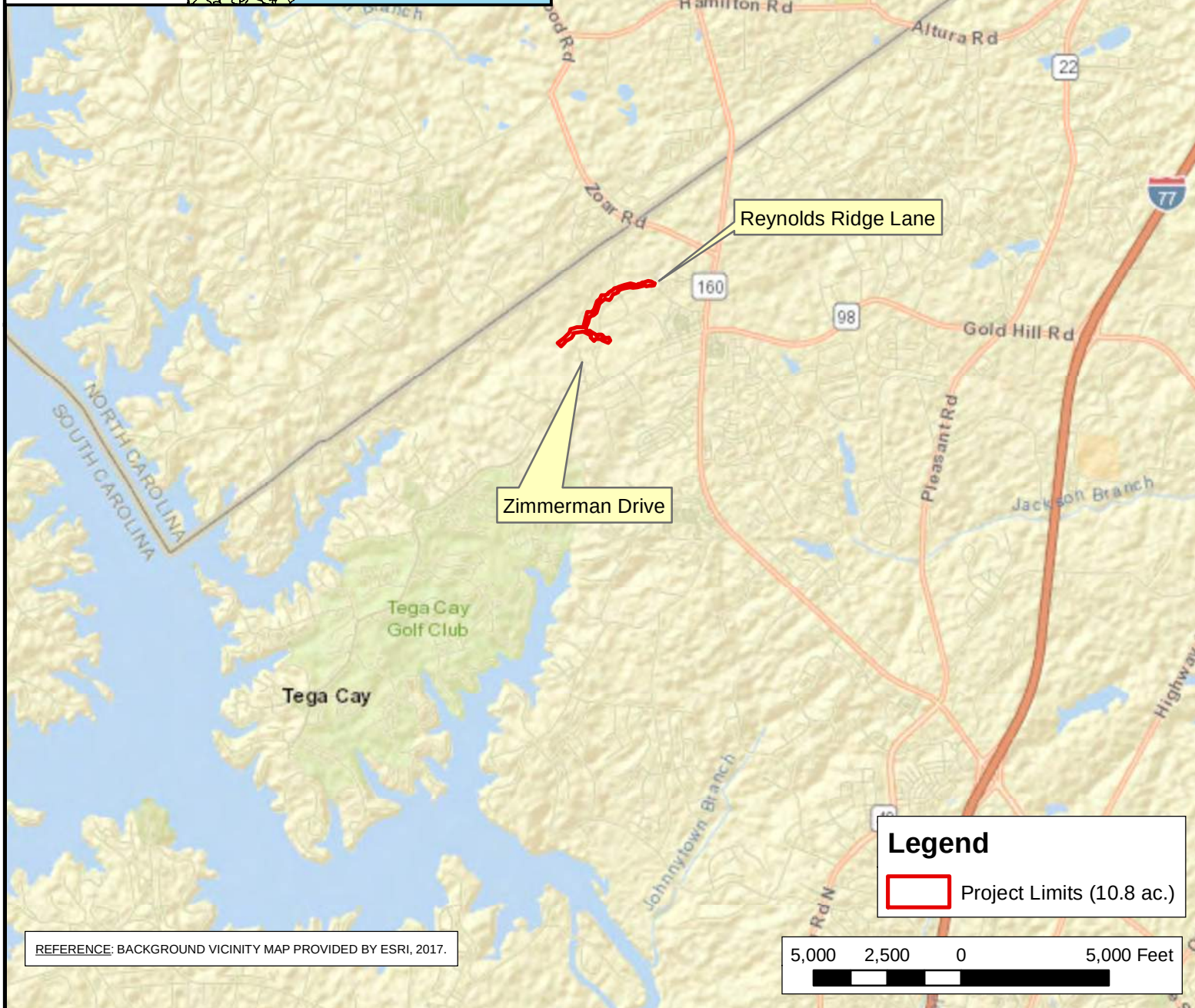
Sean Martin
Senior Project Scientist



Christine Geist, PWS, CE
Consulting Group Manager

Attachments: Figure 1: Vicinity Map
Figure 2: Current USGS Topographic Map
Figure 3: Aerial Imagery
Figure 4: USDA-NRCS Current Soil Survey of York County
Figure 5: USDA-NRCS Historic Soil Survey of York County
Figure 6: National Wetlands Inventory
Figure 7: Overview of Jurisdictional Boundaries
Figure 7a: Jurisdictional Boundaries North
Figure 7b: Jurisdictional Boundaries South
Attachment A: NCDEQ Stream Classification Forms (SCP1-SCP3)
Attachment B: USACE Wetland Determination Data Forms (DP1-DP5)
Attachment C: Photopage (Photographs 1-7)

State Location Extent



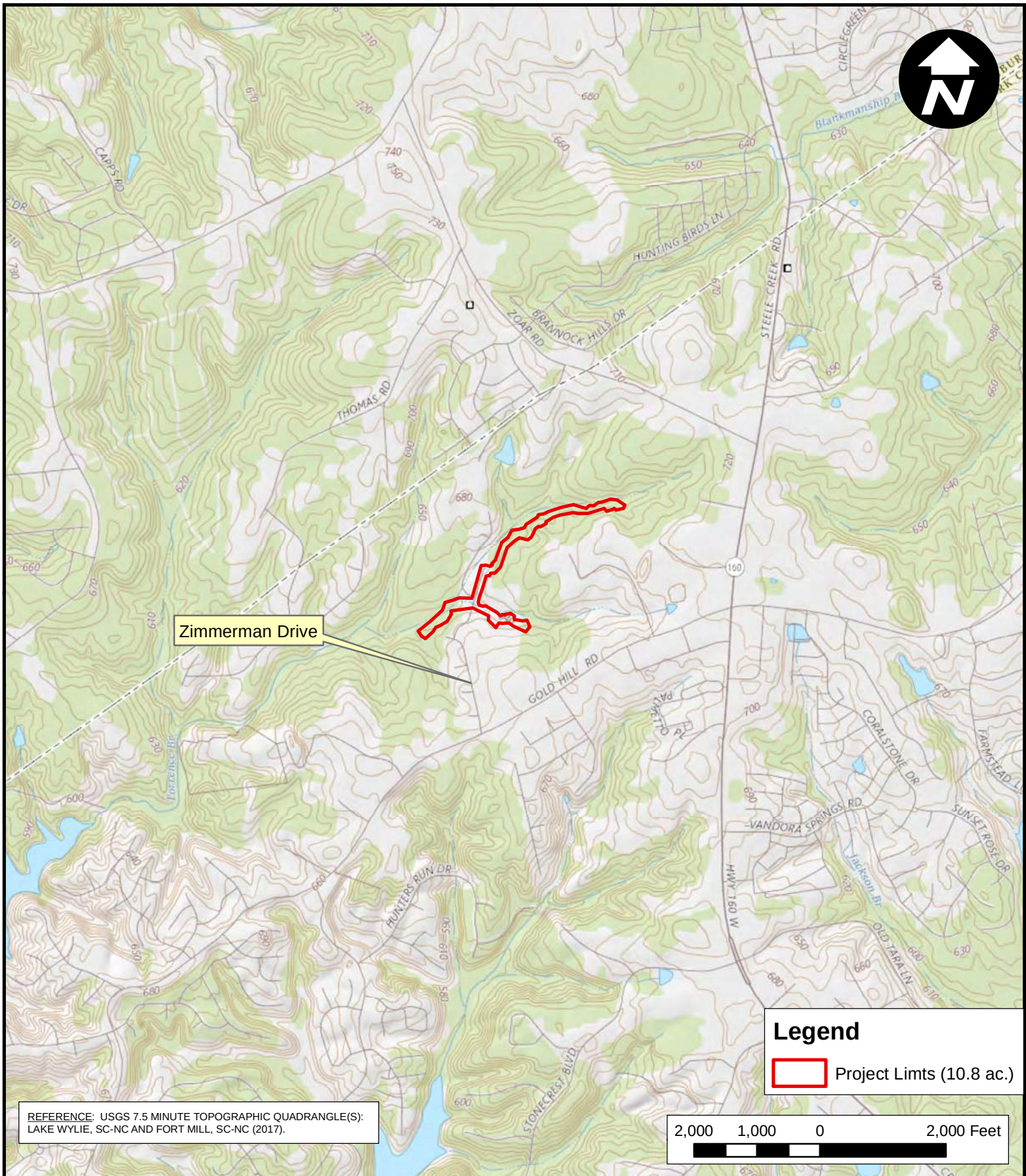
REFERENCE: BACKGROUND VICINITY MAP PROVIDED BY ESRI, 2017.

Legend

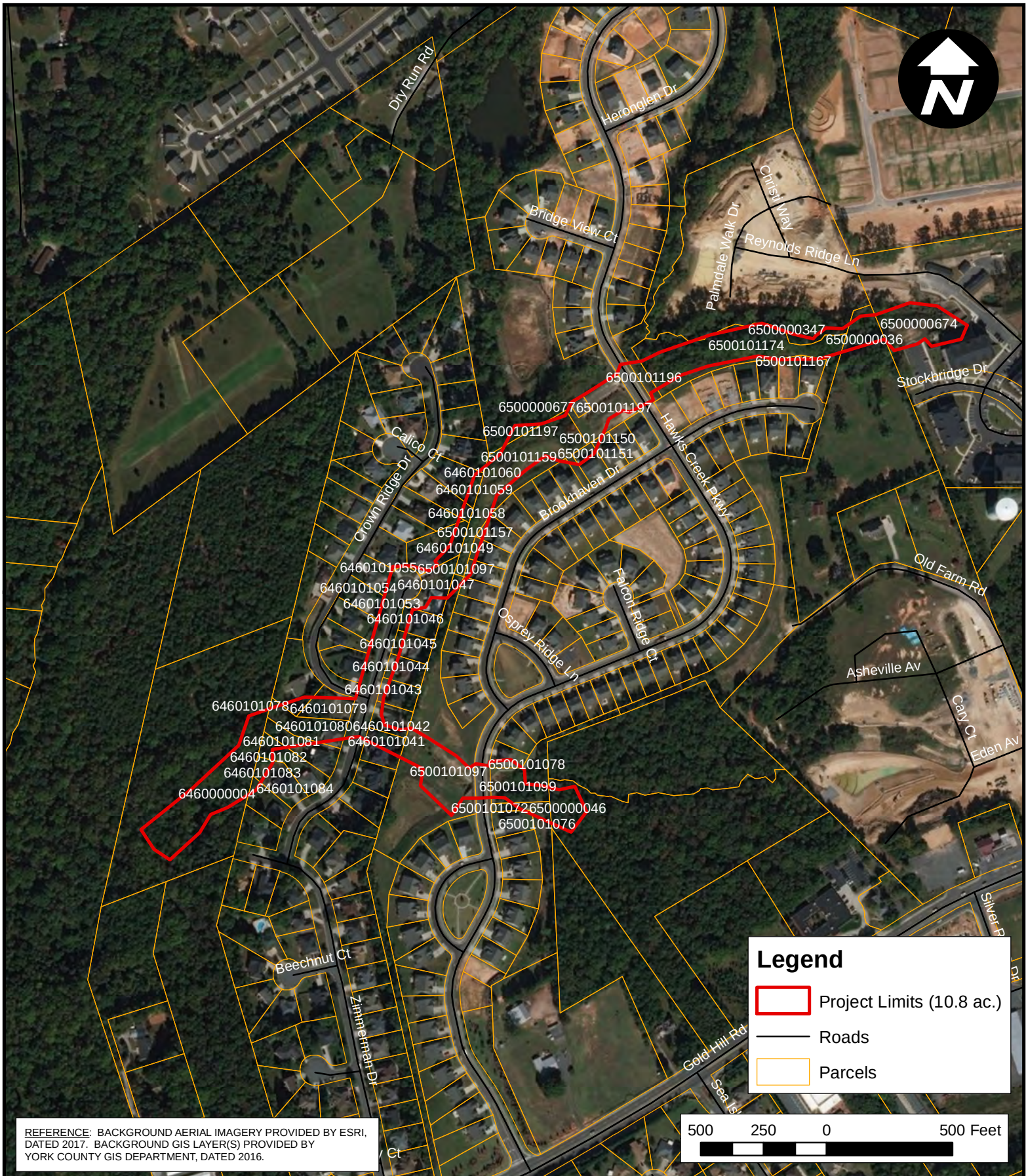
Project Limits (10.8 ac.)

5,000 2,500 0 5,000 Feet

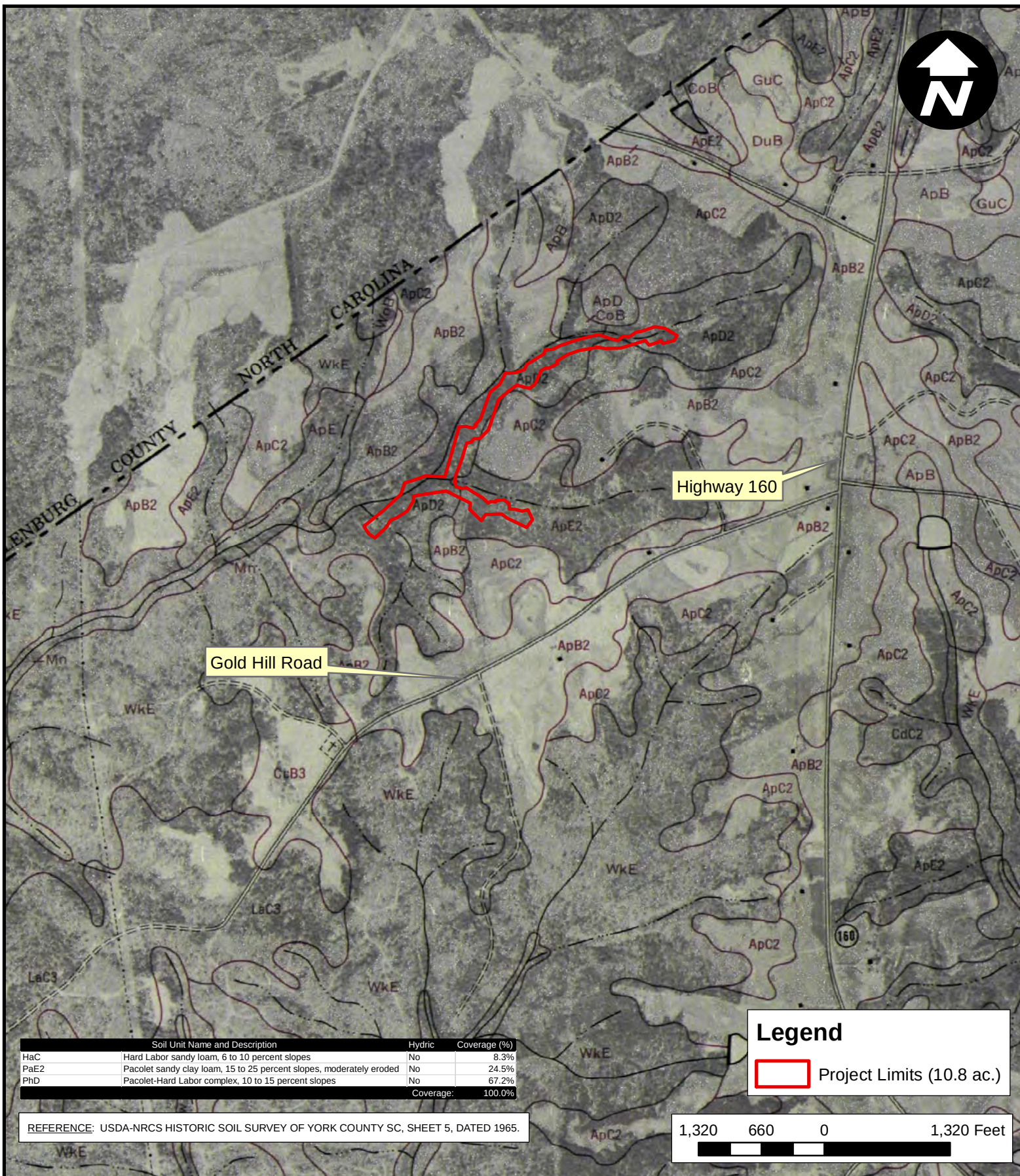
SCALE: 1 inch = 5,000 feet	DATE: 3/2/2018		Vicinity Map	FIGURE NO. 1 of 7
CWS PROJECT NO: 2018-0052	DRAWN BY: DJZ		Zimmerman Site York County Fort Mill, South Carolina	
COORDINATES: 35.062421, -81.002408	CHECKED BY: CAG			



SCALE: 1 inch = 2,000 feet	DATE: 3/2/2018		USGS Topographic Map	FIGURE NO. 2 of 7
CWS PROJECT NO: 2018-0052	DRAWN BY: DJZ		Zimmerman Site York County Fort Mill, South Carolina	
COORDINATES: 35.062421, -81.002408	CHECKED BY: CAG			



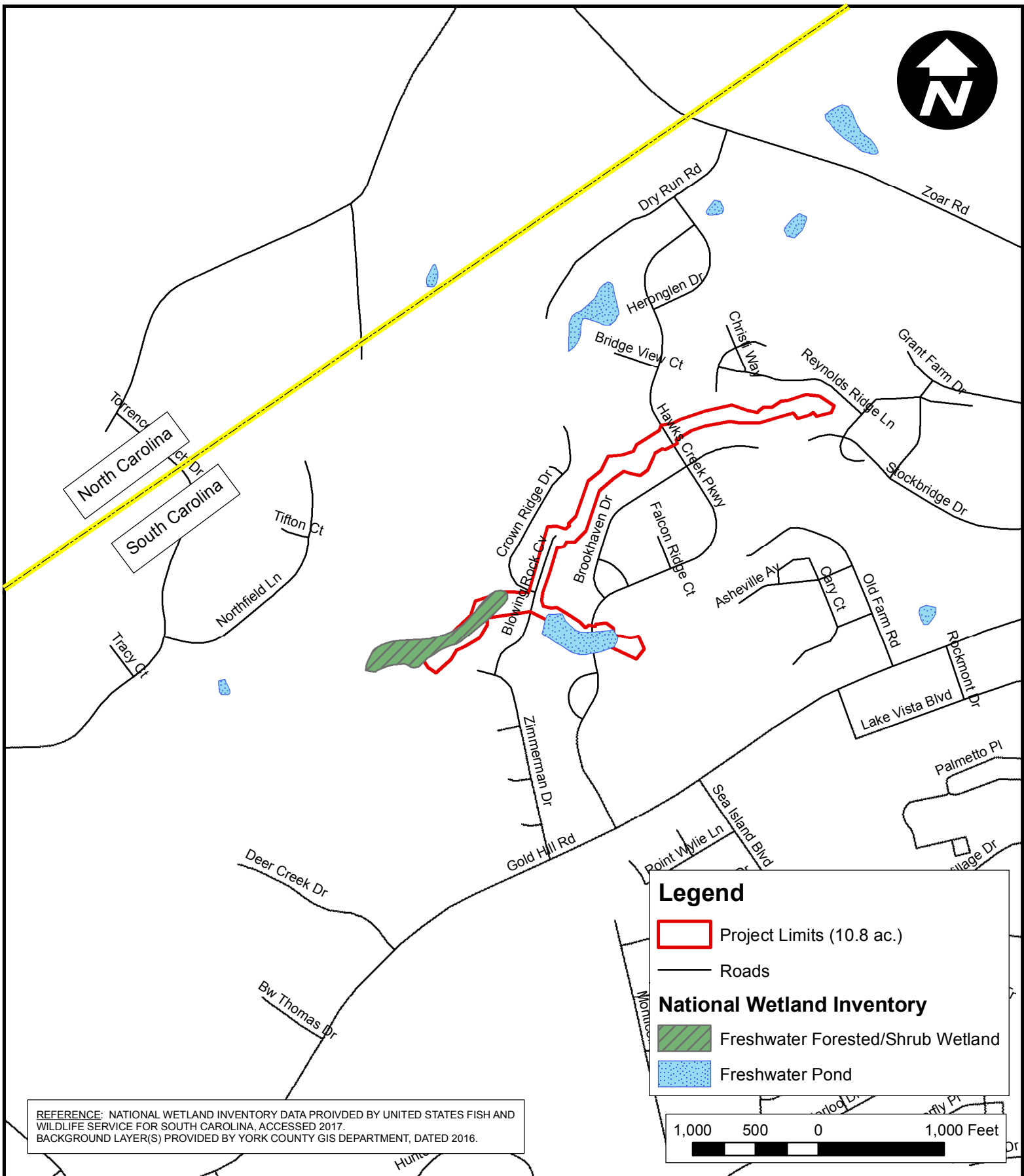
SCALE: 1 inch = 500 feet	DATE: 3/2/2018		Aerial Imagery	FIGURE NO. 3 of 7
CWS PROJECT NO: 2018-0052	DRAWN BY: DJZ		Zimmerman Site York County Fort Mill, South Carolina	
COORDINATES: 35.062421, -81.002408	CHECKED BY: CAG			



Soil Unit Name and Description		Hydric	Coverage (%)
HaC	Hard Labor sandy loam, 6 to 10 percent slopes	No	8.3%
PaE2	Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded	No	24.5%
PhD	Pacolet-Hard Labor complex, 10 to 15 percent slopes	No	67.2%
		Coverage:	100.0%

REFERENCE: USDA-NRCS HISTORIC SOIL SURVEY OF YORK COUNTY SC, SHEET 5, DATED 1965.

SCALE: 1 inch = 1,320 feet	DATE: 3/6/2018		USDA NRCS Historic Soil Survey of York County	FIGURE NO. 5 of 7
CWS PROJECT NO: 2018-0052	DRAWN BY: DJZ		Zimmerman Site York County Fort Mill, South Carolina	
COORDINATES: 35.062421, -81.002408	CHECKED BY: CAG			



SCALE:
1 inch = 1,000 feet

DATE:
2/20/2018

CWS PROJECT NO:
2018-0052

DRAWN BY:
DJZ

COORDINATES:
35.062421, -81.002408

CHECKED BY:
CAG

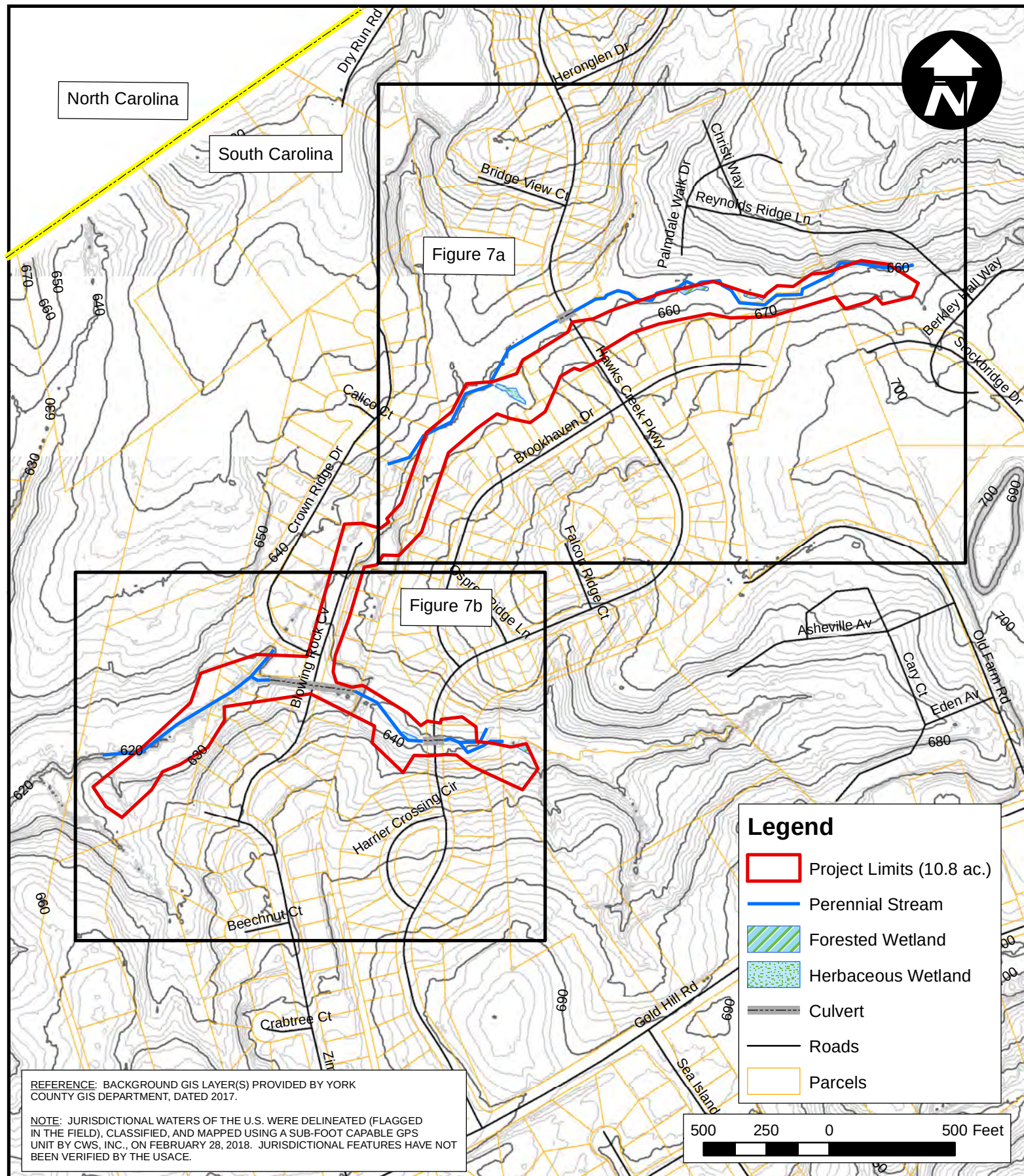


National Wetlands Inventory

**Zimmerman Site
York County
Fort Mill, South Carolina**

FIGURE NO.

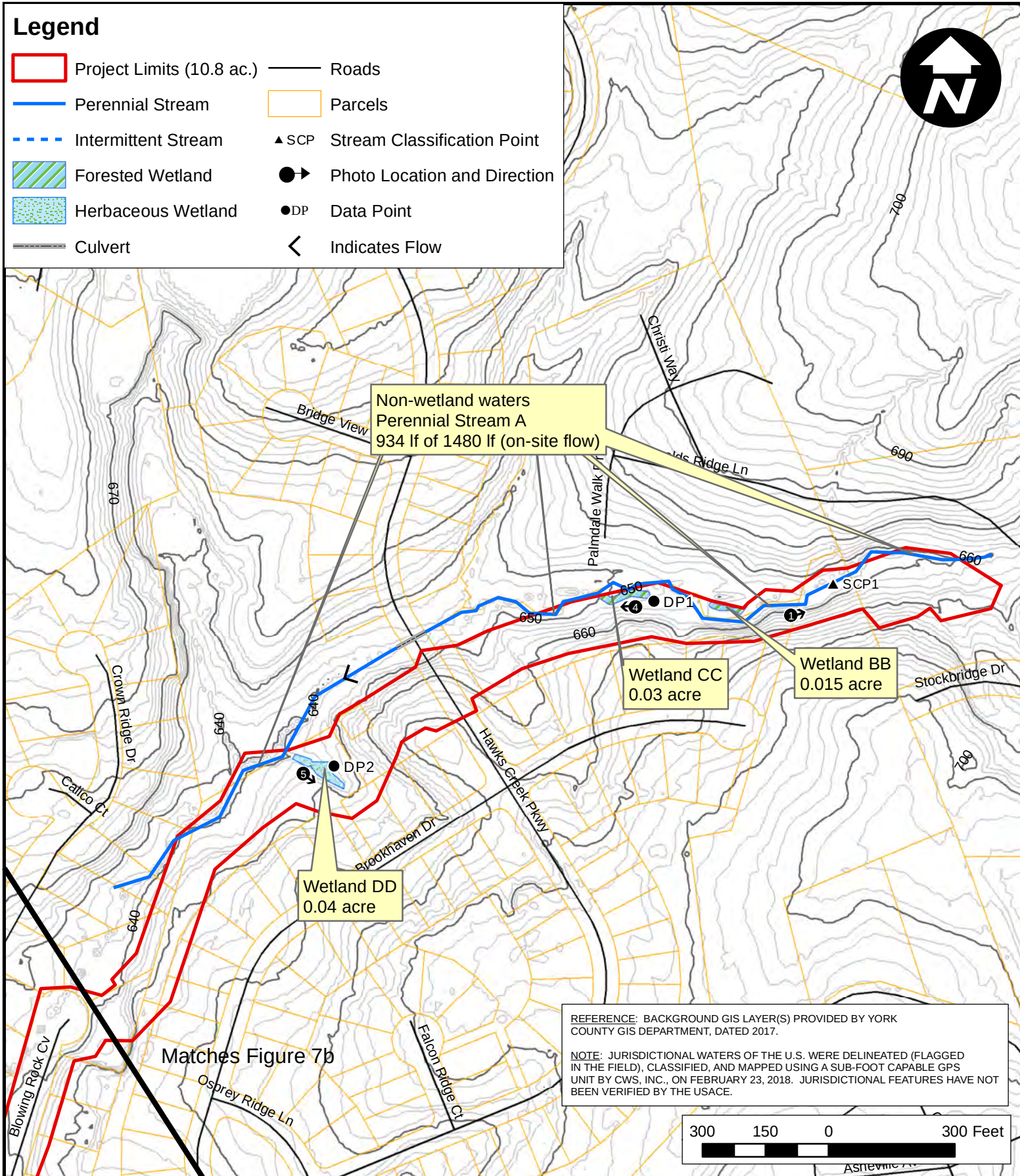
**6
of
7**



SCALE: 1 inch = 500 feet	DATE: 3/6/2018		Overview of Jurisdictional Boundaries	FIGURE NO. 7 of 7
CWS PROJECT NO: 2018-0052	DRAWN BY: DJZ			
COORDINATES: 35.062421, -81.002408	CHECKED BY: CAG		Zimmerman Site York County Fort Mill, South Carolina	

Legend

- Project Limits (10.8 ac.)
- Perennial Stream
- Intermittent Stream
- Forested Wetland
- Herbaceous Wetland
- Culvert
- Roads
- Parcels
- ▲ SCP Stream Classification Point
- ➔ Photo Location and Direction
- DP Data Point
- < Indicates Flow



SCALE:
1 inch = 300 feet

CWS PROJECT NO:
2018-0052

COORDINATES:
35.062421, -81.002408

DATE:
2/28/2018

DRAWN BY:
DJZ

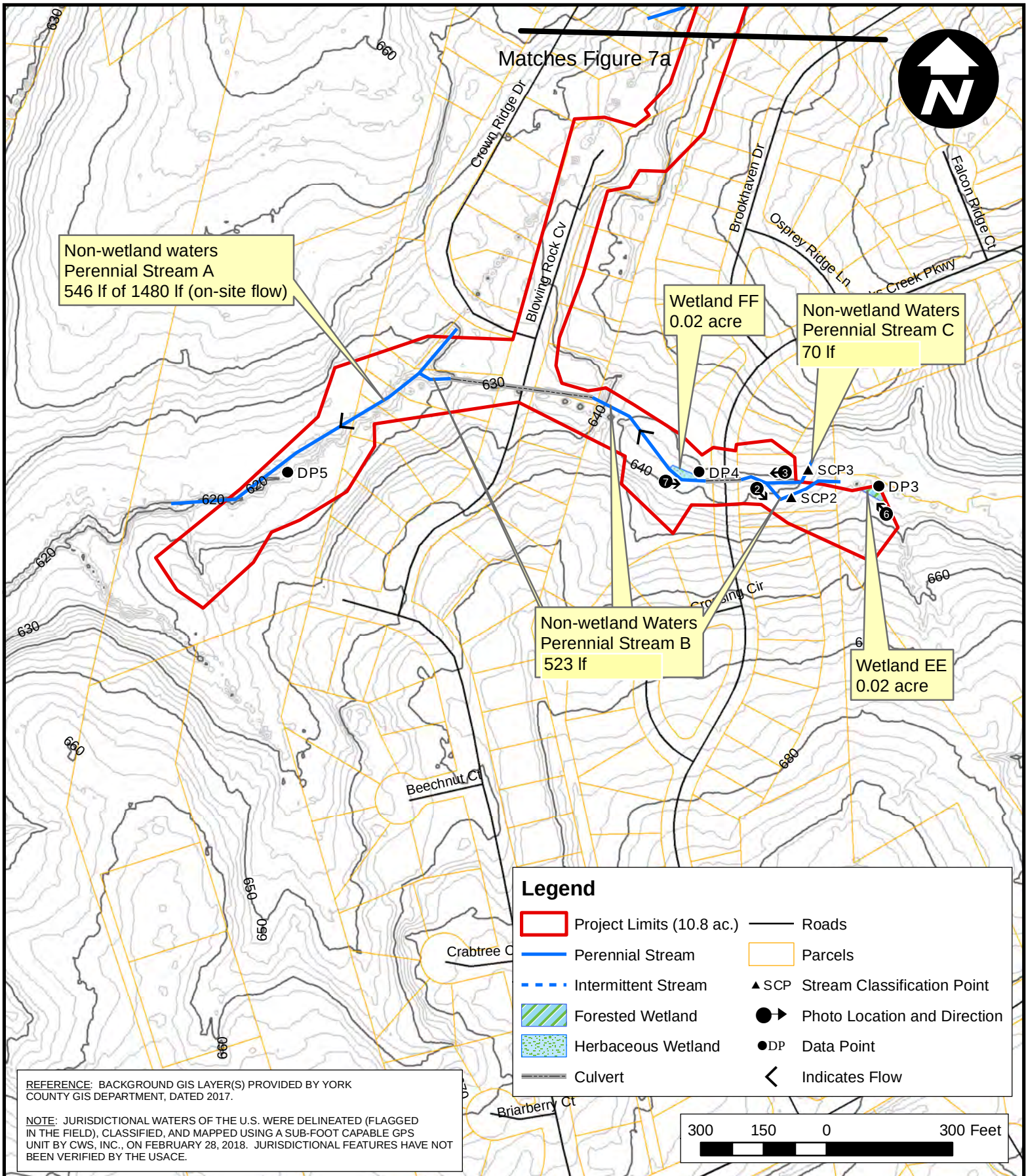
CHECKED BY:
CAG



Jurisdictional Boundaries North

Zimmerman Site
York County
Fort Mill, South Carolina

FIGURE NO.
7a
of
7



Attachment A: NCDEQ Stream Classification Points (SCP1-SCP3)

NC DWQ Stream Identification Form Version 4.11

Date: 2/23/18	Project/Site: Zimmerman Road Site	Latitude: 35.064983
Evaluator: DJZ/SAM	County: York, SC	Longitude: -80.997250
Total Points: <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i> 34	Stream Determination: Ephemeral Intermittent Perennial Perennial	Other Stream Name: SCP1/Stream A

A. Geomorphology	Subtotal = 16	Absent	Weak	Moderate	Strong
1. Continuity of channel bed and bank*		0	1	2	3
2. Sinuosity of channel along thalweg		0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence		0	1	2	3
4. Particle size of stream substrate		0	1	2	3
5. Active/relict floodplain		0	1	2	3
6. Depositional bars or benches		0	1	2	3
7. Recent alluvial deposits		0	1	2	3
8. Headcuts		0	1	2	3
9. Grade control		0	0.5	1	1.5
10. Natural valley		0	0.5	1	1.5
11. Second or greater order channel		No = 0		Yes = 3	

*artificial ditches are not rated; see discussions in manual

B. Hydrology	Subtotal = 10	Absent	Weak	Moderate	Strong
12. Presence of Baseflow		0	1	2	3
13. Iron oxidizing bacteria		0	1	2	3
14. Leaf litter		1.5	1	0.5	0
15. Sediment on plants or debris		0	0.5	1	1.5
16. Organic debris lines or piles		0	0.5	1	1.5
17. Soil-based evidence of high water table?		No = 0		Yes = 3	

C. Biology	Subtotal =	8			
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macroinbenthos (note diversity and abundance)	0	1	2	3	
21. Aquatic Mollusks	0	1	2	3	
22. Fish	0	0.5	1	1.5	
23. Crayfish	0	0.5	1	1.5	
24. Amphibians	0	0.5	1	1.5	
25. Algae	0	0.5	1	1.5	
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			0	

*perennial streams may also be identified using other methods.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 2/23/18	Project/Site: Zimmerman Road Site	Latitude: 35.060789
Evaluator: DJZ/SAM	County: York, SC	Longitude: -81.001024
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 30	Stream Determination: Ephemeral Intermittent Perennial Perennial	Other Stream Name: SCP2/Stream B

A. Geomorphology	Subtotal = 15.5	Absent	Weak	Moderate	Strong
1. Continuity of channel bed and bank*		0	1	2	3
2. Sinuosity of channel along thalweg		0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence		0	1	2	3
4. Particle size of stream substrate		0	1	2	3
5. Active/relict floodplain		0	1	2	3
6. Depositional bars or benches		0	1	2	3
7. Recent alluvial deposits		0	1	2	3
8. Headcuts		0	1	2	3
9. Grade control		0	0.5	1	1.5
10. Natural valley		0	0.5	1	1.5
11. Second or greater order channel		No = 0		Yes = 3	

*artificial ditches are not rated; see discussions in manual

B. Hydrology	Subtotal = 8.5	Absent	Weak	Moderate	Strong
12. Presence of Baseflow		0	1	2	3
13. Iron oxidizing bacteria		0	1	2	3
14. Leaf litter		1.5	1	0.5	0
15. Sediment on plants or debris		0	0.5	1	1.5
16. Organic debris lines or piles		0	0.5	1	1.5
17. Soil-based evidence of high water table?		No = 0		Yes = 3	

C. Biology	Subtotal =	6			
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macroinbenthos (note diversity and abundance)	0	1	2	3	
21. Aquatic Mollusks	0	1	2	3	
22. Fish	0	0.5	1	1.5	
23. Crayfish	0	0.5	1	1.5	
24. Amphibians	0	0.5	1	1.5	
25. Algae	0	0.5	1	1.5	
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0				0

*perennial streams may also be identified using other methods.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 2/23/18	Project/Site: Zimmerman Road Site	Latitude: 35.060930
Evaluator: DJZ/SAM	County: York, SC	Longitude: -81.000897
Total Points: <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i> 30	Stream Determination: Ephemeral Intermittent Perennial Perennial	Other Stream Name: SCP3/Stream C

A. Geomorphology	Subtotal = <u>13.5</u>	Absent	Weak	Moderate	Strong
1. Continuity of channel bed and bank*		0	1	2	3
2. Sinuosity of channel along thalweg		0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence		0	1	2	3
4. Particle size of stream substrate		0	1	2	3
5. Active/relict floodplain		0	1	2	3
6. Depositional bars or benches		0	1	2	3
7. Recent alluvial deposits		0	1	2	3
8. Headcuts		0	1	2	3
9. Grade control		0	0.5	1	1.5
10. Natural valley		0	0.5	1	1.5
11. Second or greater order channel		No = 0		Yes = 3	

*artificial ditches are not rated; see discussions in manual

B. Hydrology	Subtotal = <u>10.5</u>				
12. Presence of Baseflow		0	1	2	3
13. Iron oxidizing bacteria		0	1	2	3
14. Leaf litter		1.5	1	0.5	0
15. Sediment on plants or debris		0	0.5	1	1.5
16. Organic debris lines or piles		0	0.5	1	1.5
17. Soil-based evidence of high water table?		No = 0		Yes = 3	

C. Biology	Subtotal = <u>6</u>				
18. Fibrous roots in streambed		3	2	1	0
19. Rooted upland plants in streambed		3	2	1	0
20. Macroinvertebrates (note diversity and abundance)		0	1	2	3
21. Aquatic Mollusks		0	1	2	3
22. Fish		0	0.5	1	1.5
23. Crayfish		0	0.5	1	1.5
24. Amphibians		0	0.5	1	1.5
25. Algae		0	0.5	1	1.5
26. Wetland plants in streambed		FACW = 0.75; OBL = 1.5 Other = 0			0

*perennial streams may also be identified using other methods.

Notes:

Sketch:

Attachment B: USACE Wetland Data Determination Forms (DP1-DP5)

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Zimmerman Road City/County: York Sampling Date: 2-23-17
Applicant/Owner: GTA Associates, Inc. State: SC Sampling Point: DP1
Investigator(s): DJZ/SAM Section, Township, Range: Rock Hill

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 0-5

Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.064903 Long: -80.998448 Datum: NAD 83

Soil Map Unit Name: Pacoleet-hard labor complex, 10 to 15 percent slopes (PhD) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Data point is representative of jurisdictional wetland areas BB and CC.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <u> </u> Surface Water (A1) <u> </u> True Aquatic Plants (B14) <u> </u> High Water Table (A2) <u> </u> Hydrogen Sulfide Odor (C1) <u> </u> Saturation (A3) <u>X</u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Water Marks (B1) <u> </u> Presence of Reduced Iron (C4) <u> </u> Sediment Deposits (B2) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Drift Deposits (B3) <u> </u> Thin Muck Surface (C7) <u> </u> Algal Mat or Crust (B4) <u> </u> Other (Explain in Remarks) <u> </u> Iron Deposits (B5) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Water-Stained Leaves (B9) <u> </u> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <u> </u> Surface Soil Cracks (B6) <u> </u> Sparsely Vegetated Concave Surface (B8) <u>X</u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u> </u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u> </u> Stunted or Stressed Plants (D1) <u>X</u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u> </u> Microtopographic Relief (D4) <u> </u> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Indicators of wetland hydrology present.		

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: DP1

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>83.3%</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
=Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: _____		20% of total cover: _____		
Sapling/Shrub Stratum (Plot size: <u>15</u>)				
1. <u>Ulmus rubra</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	
2. <u>Acer rubrum</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>Liquidambar styraciflua</u>	<u>25</u>	<u>Yes</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
50 =Total Cover				
50% of total cover: <u>25</u>		20% of total cover: <u>10</u>		
Herb Stratum (Plot size: <u>5</u>)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>X</u> <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u>Problematic Hydrophytic Vegetation</u> ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
=Total Cover				
50% of total cover: _____		20% of total cover: _____		
Woody Vine Stratum (Plot size: <u>30</u>)				
1. <u>Lonicera japonica</u>	<u>20</u>	<u>Yes</u>	<u>FACU</u>	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody Vine – All woody vines greater than 3.28 ft in height.
2. <u>Smilax rotundifolia</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>Vitis rotundifolia</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
50 =Total Cover				
50% of total cover: <u>25</u>		20% of total cover: <u>10</u>		
Remarks: (Include photo numbers here or on a separate sheet.) 83.3% of dominant vegetation is FAC or wetter.				Hydrophytic Vegetation Present? Yes <u>X</u> No _____

SOIL

Sampling Point: DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5	10YR 3/2	95	7.5YR 3/4	5	C	PL	Loamy/Clayey	Distinct redox concentrations
5-8	10YR 5/2	85	7.5YR 4/6	15	C	PL/M	Loamy/Clayey	Prominent redox concentrations
8-12	10YR 5/2	75	5YR 4/6	25	C	PL/M	Loamy/Clayey	Prominent redox concentrations
12-18	10YR 5/1	75	5YR 4/6	25	C	PL/M	Loamy/Clayey	Prominent redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :	
☐ Histosol (A1)	☐ Polyvalue Below Surface (S8) (MLRA 147, 148)	☐ 2 cm Muck (A10) (MLRA 147)	
☐ Histic Epipedon (A2)	☐ Thin Dark Surface (S9) (MLRA 147, 148)	☐ Coast Prairie Redox (A16)	
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (MLRA 136)	☐ (MLRA 147, 148)	
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Piedmont Floodplain Soils (F19)	
☐ Stratified Layers (A5)	☒ Depleted Matrix (F3)	☐ (MLRA 136, 147)	
☐ 2 cm Muck (A10) (LRR N)	☒ Redox Dark Surface (F6)	☐ Red Parent Material (F21)	
☒ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)	☐ (outside MLRA 127, 147, 148)	
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)	☐ Very Shallow Dark Surface (F22)	
☐ Sandy Mucky Mineral (S1)	☐ Iron-Manganese Masses (F12) (LRR N,	☐ Other (Explain in Remarks)	
☐ Sandy Gleyed Matrix (S4)	☐ MLRA 136)		
☐ Sandy Redox (S5)	☐ Umbric Surface (F13) (MLRA 122, 136)		
☐ Stripped Matrix (S6)	☐ Piedmont Floodplain Soils (F19) (MLRA 148)		
☐ Dark Surface (S7)	☐ Red Parent Material (F21) (MLRA 127, 147, 148)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):		Hydric Soil Present?	
Type: _____		Yes	No
Depth (inches): _____		☒	☐

Remarks:
This data form is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.
Indicators of hydric soils present.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Zimmerman Road City/County: York Sampling Date: 2-23-17
Applicant/Owner: GTA Associates, Inc. State: SC Sampling Point: DP2
Investigator(s): DJZ/SAM Section, Township, Range: Rock Hill

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 0-5

Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.064002 Long: -81.000525 Datum: NAD 83

Soil Map Unit Name: Pacoleet-hard labor complex, 10 to 15 percent slopes (PhD) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Data point is representative of jurisdictional wetland area DD.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators</u> (minimum of one is required; check all that apply) <u>X</u> Surface Water (A1) <u> </u> True Aquatic Plants (B14) <u>X</u> High Water Table (A2) <u> </u> Hydrogen Sulfide Odor (C1) <u>X</u> Saturation (A3) <u> </u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Water Marks (B1) <u> </u> Presence of Reduced Iron (C4) <u> </u> Sediment Deposits (B2) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Drift Deposits (B3) <u> </u> Thin Muck Surface (C7) <u> </u> Algal Mat or Crust (B4) <u> </u> Other (Explain in Remarks) <u> </u> Iron Deposits (B5) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Water-Stained Leaves (B9) <u> </u> Aquatic Fauna (B13)		<u>Secondary Indicators</u> (minimum of two required) <u> </u> Surface Soil Cracks (B6) <u> </u> Sparsely Vegetated Concave Surface (B8) <u>X</u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u> </u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u> </u> Stunted or Stressed Plants (D1) <u>X</u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u> </u> Microtopographic Relief (D4) <u>X</u> FAC-Neutral Test (D5)	
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>1</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>6</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: Indicators of wetland hydrology present.			

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: DP2

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>6</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>85.7%</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
=Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: _____		20% of total cover: _____		
Sapling/Shrub Stratum (Plot size: <u>15</u>)				
1. _____				
2. <u>Acer rubrum</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>Liquidambar styraciflua</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
=Total Cover				Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>X</u> <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
50% of total cover: <u>13</u>		20% of total cover: <u>5</u>		
Herb Stratum (Plot size: <u>5</u>)				
1. <u>Juncus effusus</u>	<u>40</u>	<u>Yes</u>	<u>FACW</u>	
2. <u>Sambucus nigra</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>Symphotrichum novae-angliae</u>	<u>15</u>	<u>Yes</u>	<u>FACW</u>	
4. <u>Carex lurida</u>	<u>10</u>	<u>No</u>	<u>OBL</u>	
5. <u>Rubus argutus</u>	<u>10</u>	<u>No</u>	<u>FACU</u>	
6. <u>Sphagnum capillifolium</u>	<u>5</u>	<u>No</u>	<u>UPL</u>	
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
=Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody Vine – All woody vines greater than 3.28 ft in height.
50% of total cover: <u>48</u>		20% of total cover: <u>19</u>		
Woody Vine Stratum (Plot size: <u>30</u>)				
1. <u>Lonicera japonica</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>	
2. <u>Smilax rotundifolia</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	
3. _____				
4. _____				
5. _____				
=Total Cover				Hydrophytic Vegetation Present? Yes <u>X</u> No _____
50% of total cover: <u>13</u>		20% of total cover: <u>5</u>		
Remarks: (Include photo numbers here or on a separate sheet.) 85.7% of dominant vegetation is FAC or wetter.				

SOIL

Sampling Point: DP2

[illegible]

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Zimmerman Road City/County: York Sampling Date: 2-23-17
 Applicant/Owner: GTA Associates, Inc. State: SC Sampling Point: DP3
 Investigator(s): DJZ/SAM Section, Township, Range: Rock Hill

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 0-5

Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.060855 Long: -81.000447 Datum: NAD 83

Soil Map Unit Name: Pacolet sandy clay loam, 15 to 25 percent slopes (PaE2) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland?	Yes <u>X</u> No <u> </u>
Hydric Soil Present?	Yes <u>X</u> No <u> </u>		
Wetland Hydrology Present?	Yes <u>X</u> No <u> </u>		
Remarks: Data point is representative of jurisdictional wetland area EE.			

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators</u> (minimum of one is required; check all that apply) <u>X</u> Surface Water (A1) <u> </u> True Aquatic Plants (B14) <u>X</u> High Water Table (A2) <u> </u> Hydrogen Sulfide Odor (C1) <u>X</u> Saturation (A3) <u> </u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Water Marks (B1) <u> </u> Presence of Reduced Iron (C4) <u> </u> Sediment Deposits (B2) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Drift Deposits (B3) <u> </u> Thin Muck Surface (C7) <u> </u> Algal Mat or Crust (B4) <u> </u> Other (Explain in Remarks) <u> </u> Iron Deposits (B5) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Water-Stained Leaves (B9) <u> </u> Aquatic Fauna (B13)		<u>Secondary Indicators</u> (minimum of two required) <u> </u> Surface Soil Cracks (B6) <u> </u> Sparsely Vegetated Concave Surface (B8) <u>X</u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u>X</u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u> </u> Stunted or Stressed Plants (D1) <u>X</u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u> </u> Microtopographic Relief (D4) <u>X</u> FAC-Neutral Test (D5)	
Field Observations: Surface Water Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>2</u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>0</u> (includes capillary fringe)		Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: Indicators of wetland hydrology present.			

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: DP3

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Betula nigra</u>	<u>40</u>	<u>Yes</u>	<u>FACW</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>8</u> (A) Total Number of Dominant Species Across All Strata: <u>8</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
2. <u>Liquidambar styraciflua</u>	<u>30</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>Acer rubrum</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
90 =Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
50% of total cover: <u>45</u> 20% of total cover: <u>18</u>				
Sapling/Shrub Stratum (Plot size: <u>15</u>)				
1. <u>Fraxinus pennsylvanica</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>	Hydrophytic Vegetation Indicators: <u> </u> 1 - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% <u> </u> 3 - Prevalence Index is ≤3.0 ¹ <u> </u> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Acer rubrum</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>	
3. <u>Liquidambar styraciflua</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
45 =Total Cover				
50% of total cover: <u>23</u> 20% of total cover: <u>9</u>				
Herb Stratum (Plot size: <u>5</u>)				
1. <u>Juncus effusus</u>	<u>10</u>	<u>Yes</u>	<u>FACW</u>	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody Vine – All woody vines greater than 3.28 ft in height.
2. <u>Smilax rotundifolia</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
20 =Total Cover				
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>				
Woody Vine Stratum (Plot size: <u>30</u>)				
1. _____	_____	_____	_____	Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ =Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.) 100% of dominant vegetation is FAC or wetter.				

SOIL

Sampling Point: DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/3	100					Sandy	
3-12	10YR 3/1	98	10YR 4/6	2	C	M	Loamy/Clayey	Prominent redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Polyvalue Below Surface (S8) (MLRA 147, 148)	☐ 2 cm Muck (A10) (MLRA 147)
☐ Histic Epipedon (A2)	☐ Thin Dark Surface (S9) (MLRA 147, 148)	☐ Coast Prairie Redox (A16)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (MLRA 136)	☐ (MLRA 147, 148)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Piedmont Floodplain Soils (F19)
☐ Stratified Layers (A5)	☐ Depleted Matrix (F3)	☐ (MLRA 136, 147)
☐ 2 cm Muck (A10) (LRR N)	☒ Redox Dark Surface (F6)	☐ Red Parent Material (F21)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)	☐ (outside MLRA 127, 147, 148)
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)	☐ Very Shallow Dark Surface (F22)
☐ Sandy Mucky Mineral (S1)	☐ Iron-Manganese Masses (F12) (LRR N,	☐ Other (Explain in Remarks)
☐ Sandy Gleyed Matrix (S4)	☐ MLRA 136)	
☐ Sandy Redox (S5)	☐ Umbric Surface (F13) (MLRA 122, 136)	
☐ Stripped Matrix (S6)	☐ Piedmont Floodplain Soils (F19) (MLRA 148)	
☐ Dark Surface (S7)	☐ Red Parent Material (F21) (MLRA 127, 147, 148)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Water table _____ Depth (inches): _____ 8 _____		Hydric Soil Present? Yes <u> X </u> No _____

Remarks:
 This data form is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.
 Indicators of hydric soils present.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Zimmerman Road City/County: York Sampling Date: 2-23-17
Applicant/Owner: GTA Associates, Inc. State: SC Sampling Point: DP4
Investigator(s): DJZ/SAM Section, Township, Range: Rock Hill

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 0-5

Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.060921 Long: -81.001625 Datum: NAD 83

Soil Map Unit Name: Pacolet sandy clay loam, 15 to 25 percent slopes (PaE2) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u>X</u> No <u> </u>
Hydric Soil Present? Yes <u>X</u> No <u> </u>	
Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Remarks: Data point is representative of jurisdictional wetland area FF.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <u> </u> Surface Water (A1) <u> </u> True Aquatic Plants (B14) <u> </u> High Water Table (A2) <u> </u> Hydrogen Sulfide Odor (C1) <u>X</u> Saturation (A3) <u> </u> Oxidized Rhizospheres on Living Roots (C3) <u> </u> Water Marks (B1) <u> </u> Presence of Reduced Iron (C4) <u> </u> Sediment Deposits (B2) <u> </u> Recent Iron Reduction in Tilled Soils (C6) <u> </u> Drift Deposits (B3) <u> </u> Thin Muck Surface (C7) <u> </u> Algal Mat or Crust (B4) <u> </u> Other (Explain in Remarks) <u> </u> Iron Deposits (B5) <u> </u> Inundation Visible on Aerial Imagery (B7) <u> </u> Water-Stained Leaves (B9) <u> </u> Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> <u> </u> Surface Soil Cracks (B6) <u> </u> Sparsely Vegetated Concave Surface (B8) <u>X</u> Drainage Patterns (B10) <u> </u> Moss Trim Lines (B16) <u> </u> Dry-Season Water Table (C2) <u> </u> Crayfish Burrows (C8) <u> </u> Saturation Visible on Aerial Imagery (C9) <u> </u> Stunted or Stressed Plants (D1) <u>X</u> Geomorphic Position (D2) <u> </u> Shallow Aquitard (D3) <u> </u> Microtopographic Relief (D4) <u>X</u> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>15</u> Saturation Present? Yes <u>X</u> No <u> </u> Depth (inches): <u>10</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No <u> </u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: Indicators of wetland hydrology present.		

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: DP4

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
=Total Cover				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th style="width: 50%;">Total % Cover of:</th> <th style="width: 50%;">Multiply by:</th> </tr> <tr> <td>OBL species _____</td> <td>x 1 = _____</td> </tr> <tr> <td>FACW species _____</td> <td>x 2 = _____</td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = _____</td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = _____</td> </tr> <tr> <td>Column Totals: _____ (A)</td> <td>_____ (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = _____</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species _____	x 1 = _____	FACW species _____	x 2 = _____	FAC species _____	x 3 = _____	FACU species _____	x 4 = _____	UPL species _____	x 5 = _____	Column Totals: _____ (A)	_____ (B)	Prevalence Index = B/A = _____	
Total % Cover of:	Multiply by:																			
OBL species _____	x 1 = _____																			
FACW species _____	x 2 = _____																			
FAC species _____	x 3 = _____																			
FACU species _____	x 4 = _____																			
UPL species _____	x 5 = _____																			
Column Totals: _____ (A)	_____ (B)																			
Prevalence Index = B/A = _____																				
50% of total cover: _____ 20% of total cover: _____																				
Sapling/Shrub Stratum (Plot size: <u>15</u>)																				
1. _____	_____	_____	_____	Hydrophytic Vegetation Indicators: <u> </u> 1 - Rapid Test for Hydrophytic Vegetation ☒ 2 - Dominance Test is >50% <u> </u> 3 - Prevalence Index is ≤3.0 ¹ <u> </u> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
=Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody Vine – All woody vines greater than 3.28 ft in height.																
50% of total cover: _____ 20% of total cover: _____																				
Herb Stratum (Plot size: <u>5</u>)																				
1. <i>Juncus effusus</i>	50	Yes	FACW	Hydrophytic Vegetation Present? Yes <u>X</u> No _____																
2. <i>Panicum pensylvanicum</i>	20	Yes	FACW																	
3. <i>Carex lurida</i>	10	No	OBL																	
4. <i>Phytolacca americana</i>	10	No	FACU																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
90 =Total Cover																				
50% of total cover: <u>45</u> 20% of total cover: <u>18</u>																				
Woody Vine Stratum (Plot size: <u>30</u>)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
=Total Cover																				
50% of total cover: _____ 20% of total cover: _____																				
Remarks: (Include photo numbers here or on a separate sheet.) 100% of dominant vegetation is FAC or wetter.																				

SOIL

Sampling Point: DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 4/2	75	10YR 4/6	25	C	M	Loamy/Clayey	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Polyvalue Below Surface (S8) (MLRA 147, 148)	☐ 2 cm Muck (A10) (MLRA 147)
☐ Histic Epipedon (A2)	☐ Thin Dark Surface (S9) (MLRA 147, 148)	☐ Coast Prairie Redox (A16)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (MLRA 136)	☐ (MLRA 147, 148)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Piedmont Floodplain Soils (F19)
☐ Stratified Layers (A5)	☒ Depleted Matrix (F3)	☐ (MLRA 136, 147)
☐ 2 cm Muck (A10) (LRR N)	☐ Redox Dark Surface (F6)	☐ Red Parent Material (F21)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)	☐ (outside MLRA 127, 147, 148)
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)	☐ Very Shallow Dark Surface (F22)
☐ Sandy Mucky Mineral (S1)	☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)	☐ Other (Explain in Remarks)
☐ Sandy Gleyed Matrix (S4)	☐ Umbric Surface (F13) (MLRA 122, 136)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
☐ Sandy Redox (S5)	☐ Piedmont Floodplain Soils (F19) (MLRA 148)	
☐ Stripped Matrix (S6)	☐ Red Parent Material (F21) (MLRA 127, 147, 148)	
☐ Dark Surface (S7)		

Restrictive Layer (if observed): Type: _____ Depth (inches): _____		Hydric Soil Present? Yes ☒ No ☐

Remarks:
 This data form is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.
 Indicators of hydric soils present.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Zimmerman Road City/County: York Sampling Date: 2-23-17
 Applicant/Owner: GTA Associates, Inc. State: SC Sampling Point: DP5-NWI
 Investigator(s): DJZ/SAM Section, Township, Range: Rock Hill

Landform (hillside, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 0-5

Subregion (LRR or MLRA): LRR P, MLRA 136 Lat: 35.060940 Long: -81.004315 Datum: NAD 83

Soil Map Unit Name: Pacoleet-hard labor complex 10 to 15 percent slopes (PhD) NWI classification: PFO1

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u> </u> No <u>X</u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u>X</u>
Hydric Soil Present? Yes <u> </u> No <u>X</u>	
Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Remarks: Data point is representative of non-jurisdictional upland areas within the NWI indicated wetland.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ☐ Surface Water (A1) ☐ True Aquatic Plants (B14) ☐ High Water Table (A2) ☐ Hydrogen Sulfide Odor (C1) ☐ Saturation (A3) ☐ Oxidized Rhizospheres on Living Roots (C3) ☐ Water Marks (B1) ☐ Presence of Reduced Iron (C4) ☐ Sediment Deposits (B2) ☐ Recent Iron Reduction in Tilled Soils (C6) ☐ Drift Deposits (B3) ☐ Thin Muck Surface (C7) ☐ Algal Mat or Crust (B4) ☐ Other (Explain in Remarks) ☐ Iron Deposits (B5) ☐ Inundation Visible on Aerial Imagery (B7) ☐ Water-Stained Leaves (B9) ☐ Aquatic Fauna (B13)		<u>Secondary Indicators (minimum of two required)</u> ☐ Surface Soil Cracks (B6) ☐ Sparsely Vegetated Concave Surface (B8) ☐ Drainage Patterns (B10) ☐ Moss Trim Lines (B16) ☐ Dry-Season Water Table (C2) ☐ Crayfish Burrows (C8) ☐ Saturation Visible on Aerial Imagery (C9) ☐ Stunted or Stressed Plants (D1) ☒ Geomorphic Position (D2) ☐ Shallow Aquitard (D3) ☐ Microtopographic Relief (D4) ☐ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u>X</u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u>X</u>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: No indicators of wetland hydrology present.		

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: DP5-NWI

Tree Stratum (Plot size: <u>30</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Fraxinus pennsylvanica</u>	<u>20</u>	<u>Yes</u>	<u>FACW</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A) Total Number of Dominant Species Across All Strata: <u>10</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50.0%</u> (A/B)																
2. <u>Celtis occidentalis</u>	<u>15</u>	<u>Yes</u>	<u>FACU</u>																	
3. <u>Acer rubrum</u>	<u>15</u>	<u>Yes</u>	<u>FAC</u>																	
4. <u>Liquidambar styraciflua</u>	<u>20</u>	<u>Yes</u>	<u>FAC</u>																	
5. <u>Diospyros virginiana</u>	<u>5</u>	<u>No</u>	<u>FAC</u>																	
6. <u>Liriodendron tulipifera</u>	<u>10</u>	<u>No</u>	<u>FACU</u>																	
7. _____	_____	_____	_____																	
85 = Total Cover																				
50% of total cover: <u>43</u>		20% of total cover: <u>17</u>																		
Sapling/Shrub Stratum (Plot size: <u>15</u>)																				
1. <u>Ligustrum sinense</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>	Prevalence Index worksheet: <table style="width: 100%;"> <tr> <td style="width: 50%;">Total % Cover of:</td> <td style="width: 50%;">Multiply by:</td> </tr> <tr> <td>OBL species _____</td> <td>x 1 = _____</td> </tr> <tr> <td>FACW species _____</td> <td>x 2 = _____</td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = _____</td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = _____</td> </tr> <tr> <td>Column Totals: _____ (A)</td> <td>_____ (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = _____</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species _____	x 1 = _____	FACW species _____	x 2 = _____	FAC species _____	x 3 = _____	FACU species _____	x 4 = _____	UPL species _____	x 5 = _____	Column Totals: _____ (A)	_____ (B)	Prevalence Index = B/A = _____	
Total % Cover of:	Multiply by:																			
OBL species _____	x 1 = _____																			
FACW species _____	x 2 = _____																			
FAC species _____	x 3 = _____																			
FACU species _____	x 4 = _____																			
UPL species _____	x 5 = _____																			
Column Totals: _____ (A)	_____ (B)																			
Prevalence Index = B/A = _____																				
2. <u>Liquidambar styraciflua</u>	<u>5</u>	<u>Yes</u>	<u>FAC</u>																	
3. <u>Juniperus virginiana</u>	<u>5</u>	<u>Yes</u>	<u>FACU</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
20 = Total Cover																				
50% of total cover: <u>10</u>		20% of total cover: <u>4</u>																		
Herb Stratum (Plot size: <u>5</u>)																				
1. <u>Smilax rotundifolia</u>	<u>10</u>	<u>Yes</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u>Problematic Hydrophytic Vegetation</u> ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2. <u>Allium vineale</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
20 = Total Cover																				
50% of total cover: <u>10</u>		20% of total cover: <u>4</u>																		
Woody Vine Stratum (Plot size: <u>30</u>)																				
1. <u>Lonicera japonica</u>	<u>10</u>	<u>Yes</u>	<u>FACU</u>	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody Vine – All woody vines greater than 3.28 ft in height.																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
10 = Total Cover																				
50% of total cover: <u>5</u>		20% of total cover: <u>2</u>																		
Hydrophytic Vegetation Present? Yes <u> </u> No <u> X </u>																				
Remarks: (Include photo numbers here or on a separate sheet.) 50% of dominant vegetation is FAC or wetter.																				

SOIL

Sampling Point: DP5-NWI

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-10	7.5YR 5/4	100						
10-16	7.5YR 5/4	90	7.5YR 4/6	10	C	M	Loamy/Clayey	Distinct redox concentrations

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :
☐ Histosol (A1)	☐ Polyvalue Below Surface (S8) (MLRA 147, 148)	☐ 2 cm Muck (A10) (MLRA 147)
☐ Histic Epipedon (A2)	☐ Thin Dark Surface (S9) (MLRA 147, 148)	☐ Coast Prairie Redox (A16)
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (MLRA 136)	☐ (MLRA 147, 148)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Piedmont Floodplain Soils (F19)
☐ Stratified Layers (A5)	☐ Depleted Matrix (F3)	☐ (MLRA 136, 147)
☐ 2 cm Muck (A10) (LRR N)	☐ Redox Dark Surface (F6)	☐ Red Parent Material (F21)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Dark Surface (F7)	☐ (outside MLRA 127, 147, 148)
☐ Thick Dark Surface (A12)	☐ Redox Depressions (F8)	☐ Very Shallow Dark Surface (F22)
☐ Sandy Mucky Mineral (S1)	☐ Iron-Manganese Masses (F12) (LRR N,	☐ Other (Explain in Remarks)
☐ Sandy Gleyed Matrix (S4)	☐ MLRA 136)	
☐ Sandy Redox (S5)	☐ Umbric Surface (F13) (MLRA 122, 136)	³ Indicators of hydrophytic vegetation and
☐ Stripped Matrix (S6)	☐ Piedmont Floodplain Soils (F19) (MLRA 148)	wetland hydrology must be present,
☐ Dark Surface (S7)	☐ Red Parent Material (F21) (MLRA 127, 147, 148)	unless disturbed or problematic.

Restrictive Layer (if observed):		Hydric Soil Present? Yes ☐ No ☒	
Type: _____	Depth (inches): _____		

Remarks:
This data form is revised from Eastern Mountains and Piedmont Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 8.0, 2016.
No indicators of hydric soils present.

Attachment C: Photopage (Photographs 1-7)



Photograph 1. View of Perennial Stream A, facing upstream.



Photograph 2. View of Perennial Stream B, facing upstream.



Photograph 3. View of Perennial Stream C, facing downstream.



Photograph 4. View of Wetland CC, facing west; which is also representative of Wetland BB.



Photograph 5. View of Wetland DD, facing southeast.



Photograph 6. View of Wetland EE, facing northwest.



Photograph 7. View of Wetland FF, facing east.

Attachment D: Jurisdictional Determination Letter



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, CHARLESTON DISTRICT
1835 ASSEMBLY STREET ROOM 865B-1
COLUMBIA, SOUTH CAROLINA 29201

COPY

OCT 25 2018

REPLY TO
ATTENTION OF:

Regulatory Division

Mr. Sean Martin
Carolina Wetlands Services
550 East Westinghouse Blvd
Charlotte, North Carolina 28273

Dear Mr. Martin:

This letter is in response to your request for a Preliminary Jurisdictional Determination (PJD) (SAC-2018-00547) received in our office on March 23, 2018, for a 10.8-acre site located west of Zimmerman Drive, Fort Mill, York County, South Carolina (Latitude: 35.062421 °N, Longitude: 81.002408 °W). A PJD is used to indicate the approximate location(s) and boundaries of wetlands and/or other aquatic resources that are presumed to be waters of the United States on a site pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344) and/or navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 1899 (RHA) (33 U.S.C. § 403).

The site in question is shown on the enclosed map entitled "Jurisdictional Boundaries, 7a and 7b," prepared by CWS, Inc. Based on an on-site inspection, a review of aerial photography, topographic maps, National Wetlands Inventory maps, soil survey information, SCDNR LiDAR, and Wetland Determination Data Forms, it has been concluded that the boundaries shown on the referenced map are a reasonable approximation of the aquatic resources found within the site that are presumed to be subject to regulatory jurisdiction of the Corps of Engineers. The site in question contains approximately 0.225 acres of federally defined wetlands and approximately 0.095 acres or 2,073 linear feet of other aquatic resources that are presumed to be waters of the United States that are subject to regulatory jurisdiction under Section 404 of the CWA.

You are cautioned that the boundaries of the delineated wetlands and/or other aquatic resources that are presumed to be subject to regulatory jurisdiction of the Corps of Engineers shown on the enclosed depiction are approximate and subject to change.

By providing this PJD, the Corps of Engineers is making no legally binding determination of any type regarding whether jurisdiction exists over the particular aquatic resource(s) in question. In this regard, this PJD is not a definitive determination of the presence or absence of areas within the Corps of Engineers' jurisdiction, and, therefore, it does not have an expiration date. A PJD is "preliminary" in the sense that a recipient of a PJD can later request and obtain an Approved Jurisdictional Determination (AJD) for a definitive, official determination that there are, or that there are not, jurisdictional aquatic resources on a site, including the identification of the geographic limits of the jurisdictional aquatic resources. In order for a definitive determination of jurisdiction to be provided, you must submit a request for an AJD.

You should be aware that a permit from this office may be required for certain activities in the areas identified as wetlands and/or other aquatic resources that are presumed to be subject to regulatory jurisdiction of the Corps of Engineers, and these areas may be subject to restrictions or requirements of other state or local government entities. A PJD may be used as the basis of a permit decision; however, for purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a PJD will treat all aquatic resources that would be affected in any way by the permitted activity on the site as jurisdictional. If you intend to request an AJD in the future, you are advised not to commence work in these wetlands and/or other aquatic resources that are presumed to be jurisdictional prior to receiving the AJD. Enclosed is a Preliminary Jurisdictional Determination Form describing the areas in question and clarifying the option to request an AJD.

Please note that this is a PJD, and as such is not an appealable action under the Corps of Engineers' administrative appeal procedures defined at 33 CFR 331. If a permit application is forthcoming as a result of this PJD, a copy of this letter, as well as the map should be submitted as part of the application. Otherwise, a delay could occur in confirming that a PJD was performed for the proposed project area.

It should also be noted that some or all of these areas may be regulated by other state or local government entities. Specifically, you are encouraged to contact the South Carolina Department of Health and Environmental Control to determine the limits of their jurisdiction.

This PJD has been conducted for the purpose of identifying the approximate location(s) of aquatic resources that are presumed to be subject to regulatory jurisdiction of the Corps of Engineers on the particular site identified in this request. This PJD may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

Enclosed are two copies of the Preliminary Jurisdictional Determination Form signed by our office. Please sign both copies, retain one copy for your records and return one signed copy to this office in the enclosed self-addressed envelope within 30 days of receipt of this letter.

In all future correspondence concerning this matter, please refer to file number SAC-2018-00547. A copy of this letter is being forwarded to certain State and/or Federal agencies for their information. If you have any questions concerning this matter, please contact Jordan E. Jessop, Project Manager, at (803) 253-3400.

Sincerely,



Leslie L. Parker
Watershed Manager

Enclosures:

Preliminary Jurisdictional Determination Form

Notification of Appeal Options

Self-addressed envelope

"Jurisdictional Boundaries, 7a and 7b"

Copies Furnished:

Mr. Ron Pompey

York County

P.O. Box 148

York, South Carolina 29745

South Carolina Department of

Health and Environmental Control

Bureau of Water

2600 Bull Street

Columbia, South Carolina 29201

Appendix E – Inspection Log and Reports

SWPPP Inspection Log			
Name of Construction Site		Location of Construction Site	
Date of Inspection	Inspector Name	Does Inspection Report require maintenance of installed BMPs?	
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No

SWPPP Inspection Log (Continued)			
Date of Inspection	Inspector Name	Does Inspection Report require maintenance of installed BMPs?	
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No
		☐ Yes	☐ No

Appendix E – Rainfall Log and Reports

SWPPP Rainfall Records (January - June)										Year:	
January	Rainfall	February	Rainfall	March	Rainfall	April	Rainfall	May	Rainfall	June	Rainfall
1		1		1		1		1		1	
2		2		2		2		2		2	
3		3		3		3		3		3	
4		4		4		4		4		4	
5		5		5		5		5		5	
6		6		6		6		6		6	
7		7		7		7		7		7	
8		8		8		8		8		8	
9		9		9		9		9		9	
10		10		10		10		10		10	
11		11		11		11		11		11	
12		12		12		12		12		12	
13		13		13		13		13		13	
14		14		14		14		14		14	
15		15		15		15		15		15	
16		16		16		16		16		16	
17		17		17		17		17		17	
18		18		18		18		18		18	
19		19		19		19		19		19	
20		20		20		20		20		20	
21		21		21		21		21		21	
22		22		22		22		22		22	
23		23		23		23		23		23	
24		24		24		24		24		24	
25		25		25		25		25		25	
26		26		26		26		26		26	
27		27		27		27		27		27	
28		28		28		28		28		28	
29		29		29		29		29		29	
30				30		30		30		30	
31				31				31			

SWPPP Rainfall Records (July - December)											Year:
July	Rainfall	August	Rainfall	September	Rainfall	October	Rainfall	November	Rainfall	December	Rainfall
1		1		1		1		1		1	
2		2		2		2		2		2	
3		3		3		3		3		3	
4		4		4		4		4		4	
5		5		5		5		5		5	
6		6		6		6		6		6	
7		7		7		7		7		7	
8		8		8		8		8		8	
9		9		9		9		9		9	
10		10		10		10		10		10	
11		11		11		11		11		11	
12		12		12		12		12		12	
13		13		13		13		13		13	
14		14		14		14		14		14	
15		15		15		15		15		15	
16		16		16		16		16		16	
17		17		17		17		17		17	
18		18		18		18		18		18	
19		19		19		19		19		19	
20		20		20		20		20		20	
21		21		21		21		21		21	
22		22		22		22		22		22	
23		23		23		23		23		23	
24		24		24		24		24		24	
25		25		25		25		25		25	
26		26		26		26		26		26	
27		27		27		27		27		27	
28		28		28		28		28		28	
29		29		29		29		29		29	
30		30		30		30		30		30	
31		31				31				31	

Appendix G

Additional Site Logs and Records

SWPPP Pre-Construction Conference Attendance Log

[illegible]

SWPPP Pre-Construction Conference Attendance Log (Continued)

[illegible]

<i>SWPPP Contractor & Sub-Contractor Log</i>		
Name of Construction Site		Location of Construction Site
Company/Individual Name	Work Responsibilities	
1.)		
Start Date:		
Completion Date:		
2.)		
Start Date:		
Completion Date:		
3.)		
Start Date:		
Completion Date:		
4.)		
Start Date:		
Completion Date:		
5.)		
Start Date:		
Completion Date:		
6.)		
Start Date:		
Completion Date:		
7.)		
Start Date:		
Completion Date:		
8.)		
Start Date:		
Completion Date:		
9.)		
Start Date:		
Completion Date:		
10.)		
Start Date:		
Completion Date:		

SWPPP Contractor & Sub-Contractor Log (Continued)		
11.)		
Start Date:		
Completion Date:		
12.)		
Start Date:		
Completion Date:		
13.)		
Start Date:		
Completion Date:		
14.)		
Start Date:		
Completion Date:		
15.)		
Start Date:		
Completion Date:		
16.)		
Start Date:		
Completion Date:		
17.)		
Start Date:		
Completion Date:		
18.)		
Start Date:		
Completion Date:		
19.)		
Start Date:		
Completion Date:		
20.)		
Start Date:		
Completion Date:		
21.)		
Start Date:		
Completion Date:		

SWPPP Modification Log			
Name of Construction Site		Location of Construction Site	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	

SWPPP Modification Log (Continued)

Name of Construction Site		Location of Construction Site	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	
Type of Modification		Description of Modification	Location of Modification
☐ Major ☐ Minor			
Start Date:			
Completion Date:			
Reason for Modifications:		Approved/Implemented By:	

SWPPP Soil Stabilization Log

Name of Construction Site		Location of Construction Site	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	

SWPPP Modification Log (Continued)

Name of Construction Site		Location of Construction Site	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	
Type of Stabilization		Description of Stabilization	Location of Stabilization
☐ Final ☐ Temporary			
Initiate Date:			
Completion Date:			
Additional work proposed for this area:		Inspection Frequency for Stabilized Area:	

Appendix H

Construction General Permit SCR100000

A copy of the NPDES General Permit for Stormwater Discharges from Construction Activities (SCR100000) can be found at the following address:

<http://www.scdhec.gov/environment/water/swater/docs/CGP-permit.pdf>

Appendix C



October 25, 2022

Lisa Hagood
York County
PO Box 148
York, SC29745

RE: Stockbridge Trunk Sewer, York County
NPDES Coverage Number: SCR10ZBP3

Dear Lisa Hagood:

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 **YORK 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 **October 25, 2022**. This project's general permit coverage number is **SCR10ZBP3**. The total disturbed area for this site is **3.15 acres**.

An as-built survey(s), signed and sealed by a S.C. Licensed Land Surveyor or Professional Engineer, should be submitted to **YORK 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 **YORK 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:

Midlands EA Lancaster
2475 DHEC Road
Lancaster, SC29720
803-285-7461

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

S.C. Department of Health and Environmental Control

2600 Bull Street, Columbia, SC 29201 (803) 898-3432 www.scdhec.gov

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 **YORK COUNTY**; the Department must be notified in writing by **YORK 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 803-898-1291.

Sincerely,



Ryan Twitty
Stormwater Permitting Section

CC: Robert Notte, Dewberry Engineers Inc.
Midlands EA Lancaster

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.



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)

For Official Use Only

File Number: _____
Permit Number: **SCR10** _____
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 #: **SCR10ZBP3**
FILE #: _____
DATE ISSUED: **10-25-2022**
BY: **Aym R. Ditty**

Date: **07/22/2022**

Project/Site Name: **Stockbridge Trunk Sewer**

County: **York**

(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 York County** **MS4 Operator York 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: **57-6000418**

A. Primary Permittee Name: **York County**

Mailing Address: **PO Box 148** City: **York** State: **SC** Zip: **29745**

Phone: **803-818-5733** Fax: _____ Email Address: _____

B. Contact /ODSA Name (If different from above OR if owner is a company): **Lisa Hagood, PE**

Mailing Address: **PO Box 148** City: **York** State: **SC** Zip: **29745**

Phone: **803-818-5733** Fax: _____ Email Address: **Lisa.Hagood@Yorkcountygov.com**

C. Property Owner Name (If different from above): **See below**

Mailing Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ Email Address: _____

III. Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) Preparer Information ☐ Change of Information

A. C-SWPPP Preparer Name: **Robert "Skip" Notte**

B. Registered Professional ☒ Engineer ☐ Landscape Architect ☐ Tier B Land Surveyor **S. C. Registration #: 28814**

C. Company/Firm Name: **Dewberry Engineers Inc.** **S. C. COA #: 4602**

Mailing Address: **9300 Harris Corners Parkway, STE 220** City: **Charlotte** State: **NC** Zip: **28269**

Phone: **704-625-5088** Fax: _____ Email Address: **snotte@dewberry.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.) **Blowing Rock Cove and Zimmerman Drive**

City/Town (if in limits): _____ Zip Code: _____

Latitude: **35° 06' 01" N** Longitude: **- 81° 00' 36" W** (Source): ☐ GPS ☒ Web Site: **DHEC GIS**

Tax Map Number (s) (List all): **See Attached**

- C. Is this site located on **Indian Land**? ☐ Yes
- D. **Proposed Start Date:** 10/01/2022 **Proposed Completion Date:** 09/31/2023
- E. **Disturbed Area** (nearest tenth of an acre): 3.15 **Total Area** (acres): 3.15
- 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 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.
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: <u>Unnamed Tributary to Torrence Branch</u>	<u>0'</u>	<u>FW</u>
b. Next Nearest: <u>Torrence Branch</u>	<u>~1,300'</u>	<u>FW</u>
c. Coastal Zone ONLY: Coastal Receiving Water (CRW): _____		<u>Not Applicable</u>
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	<u> </u> Ac
b. Non-jurisdictional wetlands	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	<u> </u> Ac
c. Other Water(s): <u>Jurisdictional Streams</u>	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No	<u> </u> Ac <u> </u> Feet
d. Coastal Zone ONLY: Direct Critical Area	☐ Yes ☒ No	☐ Yes ☐ No	☐ Yes ☒ No	<u> </u> Ac <u> </u> 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	<u>None</u>	<u>Wastewater Construction Permit 41848-WW</u>
b. USACOE 404 Permit or 401 Certification	<u>None</u>	
c. SCNW Permit If applied for or issued, identify Date applied for or issued: _____	<u>None</u>	☐ 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 <u>most current</u> 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 d, SUPPORT" impairment(s) affected by the pollutant(s) identified in c.
Nearest DHEC WQMS(s) RL-13088	Corresponding Waterbody Lake Wylie	☒ Yes ☐ No	ECOLI	☐ Yes ☒ No
		☐ 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: 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?
R-13088	☐ Yes ☒ No		☐ 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: no for f, this 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 the design on 2-300 et seq. (if applicable), and in accordance with the terms and conditions of SCR100000." (This should be the person identified in Section III).

Robert "Skip" Notte

Printed Name of C-SWPPP Preparer

28814

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 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."

Ron Pompey

Printed Name of Primary Permittee

York Assistant County Engineer

Title/Position

Signature of Primary Permittee

Date Signed

5/10/2022

NPDES CGP FEE SCHEDULE A

(All Counties EXCEPT Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper)

The schedule should be attached to DHEC Form 2617. Do not send payment in window envelope. **DO NOT MAIL CASH.** DHEC will notify the Project Owner/ Operator if the submitted check or credit card payment cannot be processed. **The review clock will start when acceptable payment is received.**

1. Identify (✓) the Project Review Type(s)

Enter NPDES Coverage Fee of \$125 in the right-hand column if <u>any</u> of the following project/review types apply to this application. Proceed to Item 2.	(✓)	NPDES Coverage Fee
a. Project or LCP (Item IV.G) that will ultimately disturb one (1) acre or more Note: If your project will ultimately disturb less than one (1) acre <u>AND</u> is <u>NOT</u> a part of a Larger Common Plan, coverage under SCR100000 is <u>not</u> required; see http://www.scdhec.gov/administration/library/d-2628.pdf (Notification Form for Sites Disturbing Less Than 1-Acre Not Part of a Larger Common Plan, Non-Coastal Counties)	☒	\$ <u>125</u> .00
b. New Owner/Operator (Transfer of Ownership)/Company Name Change (\$125 NPDES Coverage fee is required by the Department for Transfers of Ownership and Company Name Changes)	☐	
c. Unpermitted Project or Late Notification	☐	
d. MS4 Project Review (Item I.A and I.B) (MS4 Project Review (Item I.A and I.B) (\$125 pay Department thru MS4 Reviewer))	☒	
e. Other (Specify): _____	☐	

2. Determine the Project Review Fees

PROJECT OR LCP THAT WILL ULTIMATELY DISTURB ONE (1) ACRE OR MORE	Review Fees
a. Enter the disturbed area (Item IV.E) for this project. Proceed to Items 2.b and 2.c.	3.2 (✓) (Nearest tenth of an acre)
b. Will this project or LCP (Item IV.G) ultimately disturb more than 1.0 acres?	☒ Yes ☐ No
c. Is this project exempt from S.C. Reg. 72-300 et seq.?	☐ Yes ☒ No
1. If this project will not ultimately disturb more than 1.0 acre and is not part of an LCP, your project is automatically covered under this permit and the NPDES coverage fee and review fee are not required. See the BOW-SPWS for "Less Than 1-Acre of Land Disturbance - Non-Coastal Counties".	
2. If this project will ultimately disturb more than 1.0 acre, proceed to Item 2.d.	
d. Enter the project review fees (based on \$100/disturbed area) in the right-hand column. (Multiply the disturbed area (Item 2.a) by \$100/disturbed area). If the disturbed area for this project (Item 2.a) totals 20.0 acres or more, enter \$2000 in the right-hand column. Review fees cannot exceed \$2000 for a project.	\$ _____ .00

3. Total Required Fees Add the values in the right-hand columns of Items 1 and 2.d. Proceed to Item 4.

(The Department will not review this project until all required fees are received).	\$ <u>125</u> .000

4. Identify the Method of Payment:

☐ Payment by Check:

Attach a signed and dated check payable to S.C. DHEC to the front of this Fee Schedule.
Please note that all checks must be less than 30 days old and must be for the entire required fees.

☒ Payment by Credit Card: (Check here if you wish to pay via credit card using the on-line payment system).

The Department will contact you to provide instructions and the invoice number necessary for online payment.
Please provide an e-mail address where the invoice number may be sent: Lisa.Hagood@Yorkcountygov.com

For official use only: Invoice Number _____

STOCKBRIDGE TRUNK SEWER**YORK COUNTY STORMWATER PROJECT INFORMATION RECORD ADDITIONAL INFORMATION****DRAINAGE CREEKS:** Unnamed Tributary to Torrance Branch Creek**TAX MAP NUMBERS:**

N o.	T AX MA P ID	W O N E R NAME	DEED BOOK K	DEED P AGE	PLATT B OOK	PLATT PAGE
1	6460000102	CALATLANTIC GROUP INC	17846	83	1 1	323
2	0101041	CASTELLI ALEX & MARIA AP, ID	17126	229	B245	6
3	6460101042	PEECHER DAVID & MOLLY	16977	439	D46	10
4	60101047	HEATHER SANCHEZ	19230	229	D26	3
5	6460101079	YORK COUNTY S C	2865	340	B244	2
6	6460101080	BRANER TOMMALEE H	8927	129	C291	1
7	6460101081	GAULT LAURA L & TIMOTHY W	15786	223	B244	2
8	6460101082	HAN MULI	19661	312	C387	8
9	6500000036	CULP DAVID A	15970	259	43	131
10	6500000674	PLANTATION AT FORT MILL I LLC	15368	34	E355	2
11	6500000677	YORK COUNTY	13955	159		
12	6500101076	HAWKS CREEK HOME OWN ERS	17341	160	E228	10
13	6500101097	HAWKS CREEK HOMEOWNERS	17341	160	E235	1
14	500101099	HAWKS CREEK HOMEOWNERS	17341	160	E242	9
15	6500101159	HAWKS CREEK HOMEOWNERS	17341	160	E267	6
16	6500101174	HAWKS CREEK HOMEOWN ERS	17341	160	E284	9
17	6500101196	HAWKS CREEK HOMEOWNERS	17341	160	E363	4
18	6500101197	HAWKS CREEK HOMEOWNERS	17341	160	E363	4
19	6500102037	GHD BROOKS CREEK LLC	15214	38	164	73
20	6500102062	GHD BROOKS CREEK LLC	15214	38	164	73

Soil Information:

- HaB, HaC, HeB, PaE2, PhD

FEMA Maps:

- 45091C0192E
- 45091C0211F
- 45091C0203E
- 45091C0185E

SC NAD 1983 State Plane Coordinates:

West Most Manhole (MH-1): X: 1174253.21

Y: 1998524.52

East Most Manhole (MH-31):	X: 1175849.26	Y: 2001036.00
South Most Manhole (MH-36)	X: 1174313.51	Y: 1999889.01
North Most Manhole (MH-14)	X: 1175495.39	Y: 1999721.32

Parcel	Property Owner	E-Mail	Mailing Address	Phone Number
101	PLANTATION AT FORT MILL I LLC / BERKLEY HALL CONST		500-D State St. Greensboro, NC 27405	Plantation at Fort Mill, LLC (Ty Vanfossen, District Manager) Mike Murray (owner): 336-420-3378 Jeremy Westbrook (head of construction): 336-451-9413 Office Phone: 803-228-0532
102	DAVID A. CULP	mike@bhdcllc.net jeremy@bhdcllc.net	854 Palm Cove Dr. Orlando, FL 32835	404-462-2233
103	HAWKS CREEK HOMEOWNERS ASSOCIATION INC		130 Ben Casey Dr, Suite 100 Fort Mill, SC	Jennifer Payne of Kuester Management Group Phone: 803-802-0004
104	HAWKS CREEK HOMEOWNERS ASSOCIATION INC		SEE 103	Russ Kral of EXP Realty Phone: 980-288-4404
105	HAWKS CREEK HOMEOWNERS ASSOCIATION INC		SEE 103	Dennis Lynch Phone: 704-605-1001
106	HAWKS CREEK HOMEOWNERS ASSOCIATION INC		SEE 103	SEE 103
107	HAWKS CREEK HOMEOWNERS ASSOCIATION INC		SEE 103	SEE 103
108	GHD BROOKS CREEK LLC		1330 Sunday Dr, Suite 105 Raleigh, NC 27607	Greenhawk Development – Brooks Creek, LLC. Jeff White Office Phone: 919-861-2929 Cell Phone: 919-422-5741
109	WILLIAM E. & SHALEEN R. BEMUS JNT TNTS W/ ROS		1162 Blowing Rock Cove Fort Mill, SC 29708	803-627-9696(Shaleen)
110	CHARLES & TOMMALEE BRANER (Tammy)		1129 Blowing Rock Cove Fort Mill, SC 29708	803-280-4571
111	LAURA L. & TIMOTHY W. GAULT JNT TNTS W/ ROS		1125 Blowing Rock Cove Fort Mill, SC 29708	937-470-7977 (Tim) 803-530-5649 (Laura)
112	DAVID & MOLLY PEECHER JNT TW/ ROS		1132 Blowing Rock Cove Fort Mill, SC 29708	713-397-6217 (David)
113	ALEX & MARIA APARECID DIAS DA COSTA CASTELLI		1126 Blowing Rock Cove Fort Mill, SC 29708	917-385-1446 (Maria) Office Phone: 803-547-2233 (Carl @U-Haul) Home Phone: 803-548-1231
114	CARL J. WALKER, III LIVING TRUST & BARBARA D. WALKER		2026 Gold Hill Rd. Fort Mill, SC 29715	

NPDES CGP FEE SCHEDULE B

(ONLY for Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper Counties)

Submit for N Co fees to DHEC.

The schedule should be attached to DHEC Form 2617. Do not send payment in any envelope. **DO NOT MAIL CASH.** DHEC will the Project Owner/ Operator if the check or credit card payment cannot be processed. The review clock will start when acceptable ment is re ect is deemed consistent Zone Ma ment Plan.

1. Identify the Project/Review Types

with the S.C. Coastal nage

(NOTE: You may ONLY select Item 1.a OR 1.b BELOW). Enter NPDES coverage fee of \$125 in the right-hand column if of the foll review es to this cation. Proceed to Item 2.	(√)	NPDES Coverage Fee(s)
a. Project or LCP that is located within 1/2 mile of CRW (Item V.A) that will ultimately disturb more than 0.5 acres (If select a, do not select b)	☐	\$ _____.00
b. Project or LCP that is NOT located within 1/2 mile of CRW (Item V.A) that will ultimately disturb one acre or (If select b, do not select a	☐	
c. New Owner/Operator (Transfer of Ownership)/Company Name Change 125 NPDES Covera fee is ed the De for Transfers of Ow. and Name	☐	
d. U ermitted Ongoing Project or Late Notification	☐	
e. MS4 Project Review (Item I.A and I.	☐	
f. Other (Specify): B)	☐	

2. Determine the Project Review Fees (Review fees cannot exceed \$2000 for a project).

NOTE: COM PLETE ITEM 2.a BELOW. COMPLETE HER SEC TION 3 OR SECTION 4.

a. Enter the disturbed area (Item IV. E) for this ect. Proceed to Item 3 OR Item 4. (nearest tenth of an acre)	DO NOT COMPLETE BOTH SECTIONS.
3. PROJECT OR LCP LOCATED WITHIN 1/2 MILE OF A CRW ITEM V.A	Review Fees
a. Will this project or LCP (Item IV.G) ultimately disturb more than 0.5 acres?	(√) Yes ☐ No ☐
b. Is this r ect e from S. C. Reg. 72-300 et s ?	es No ☐
1. If this project will NOT ultimately disturb more than 0.5 acres and is not part of an LCP, your project is automatically covered under this permit and the NPDES coverage fee and review fee are not required. See section 1.3.1.B. See the BOW-SPWS for "Less Than 1-Acre of Land Disturbance - Coastal Counties".	
2. If this or LCP will ultimately disturb more than 0.5 acres, proceed to Item 3.c.	

c. Enter the project review fees (based on \$100/ disturbed acre) in the right-hand column. (Multiply the disturbed area (Item 2.a.) by \$100/disturbed area). If the disturbed area for this project (Item 2.a.) totals 20.0 acres or more, enter \$2000 in the ri -hand column. Review fees cannot exceed \$2000 for projec Proceed to item 3.d	\$ _____.00
d. Total Required Fees (Coastal Project located WITHIN 1/2 mile of a CRW (Item V.A)	\$ _____.00
Add the values in the right-hand columns of Items 1 and 3.c. (The Department will not review this project until all required fees are receive . Proceed to Item 5.	

4. PROJECT OR LCP NOT LOCATED WITHIN 1/2 MILE OF A CRW (ITEM V.A)	(√)	Review Fees
a. Will this ect or LCP (Item IV.G) ultimate ly disturb one (1) acre or more?	Yes ☐ No ☐	
b. Is this proje ex empt from S. C. Reg. 72-300 et seq?	Yes ☐ No ☐	
1. If this project will NOT ultimately disturb one (1) acre or more, and is not part of an LCP, coverage under SCRT100000 is NOT required; see the BOW-SPWS for "Less Than 1-Acre of Land Disturbance - Coastal Counties".		
2. If this projec t or LCP will ultimately disturb one (1) acre or more, proceed to Item 4.c.		

c. Enter the project review fees (based on \$100/ disturbed acre) in the right-hand column. (Multiply the disturbed area (Item 2.a.) by \$100/disturbed area). If the disturbed area for this project (Item 2.a.) totals 20.0 acres or more, enter \$2000 in the right-hand column. Review fees cannot exceed \$2000 for a projec Proceed to item 4.d.	\$ _____.00
d. Total Required Fees (Coastal Project NOT located WITHIN 1/2 mile of a CRW (Item V.A)	\$ _____.00
Add the values in the right-hand columns of Items 1 and 4.c. (The Department will not review this project until all required fees are received). Proceed to Item 5.	

5. Identify the Method of Payment: ☐ Payment by Check: (Attach a signed and dated check payable to S.C. DHEC to the front of this fee schedule. All checks must be less than 30 days old and must be for the entire amount of required fees). ☐ Payment by Credit Card: (Check here if you wish to pay via credit card using the on-line payment system). The Department will contact you via e-mail to provide instructions and the invoice number necessary for online payment. Please provide an e-mail address where the invoice number may be sent:

For official use only: Invoice Number

Instructions for Completing the Notice or Intent (NOI)

If you are uncertain whether you need to obtain coverage under the NPDES General Permit for Stormwater Discharges from Construction Activities, SCR100000 (CGP), if you cannot access the websites listed on the NOI and instructions, or if you have any other questions, contact the Stormwater Permitting Section (SWP) at (803) 898-4300 or Coastal Stormwater Permitting Section (CSWP) at (843) 953-0200. Projects located in the S.C. Coastal Zone (SCCZ—Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper counties) are reviewed by CSWP. Please see the Bureau of Water, Stormwater Permitting website (BOW-SPWS): <http://www.scdhec.gov/environment/water/swater/> for guidance and additional information regarding the CGP.

Who Must File a NOI:

- If S.C. Department of Transportation (SCDOT) is the Primary Permittee (Owner/ Operator), this NOI form (Form 2617) should not be used.
- The Owner/ Operator of a single project or larger common plan for development or sale (LCP—see item IV.G of instructions) that will ultimately disturb 1 acre or more (all counties).
- In the SCCZ, the Owner/Operator of a single project or LCP that is located within ½ mile of a coastal receiving water (CRW) (See item V.A of the instructions) and will ultimately disturb more than 0.5 acres.
- See the BOW-SPWS for "Less Than 1-Acre of Land Disturbance - Non-Coastal Counties" and "Less Than 1-Acre of Land Disturbance - Coastal Counties".

Where to File:

See the BOW-SPWS for a current list of the areas that are reviewed by Municipal Separate Storm Sewer System (MS4) operators and entities that have delegated review authority. For projects in these areas, the initial submittal should be made to the MS4 operator; if initial submittal is made to DHEC for projects in these areas, the review process may be delayed. Please contact the appropriate entity for additional information and requirements; for example, the MS4 operator may require that a different application form be submitted. If a project crosses jurisdictional boundaries (e.g., sewer line in Greenville County and the city of Mauldin), then submittals to all appropriate MS4 operators, delegated entities, and DHEC must be coordinated.

Projects Located in the SCCZ	All Other Areas
S.C. DHEC—Bureau of Water Coastal Stormwater Permitting Section 1362 McMillan Ave., Suite 400 Charleston, S.C. 29405	S.C. DHEC—Bureau of Water Stormwater Permitting Section 2600 Bull Street Columbia, SC 29201-1708

Initial Submittal Package

Submittal Package for SWP and CSWP:

- When DHEC performs a full technical review, you must include the original, signed NOI form, appropriate fee schedule (A or B) with required fees, one (1) copy of the Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP), and one (1) copy of all other supporting documentation with the initial submittal. For projects in the non coastal counties disturbing greater than or equal to 1 acre and less than or equal to 2 acres, one (1) copy of the C-SWPPP and one (1) copy of supporting documentation can be submitted with the initial submittal. In the SCCZ, applications for Coastal Zone Consistency certification are to be filed with requests for NPDES construction coverage and will then be routed internally to the Office of Ocean and Coastal Resource Management (OCRM) for review. OCRM submittal requirements can be located at: <http://www.scdhec.gov/environment/ocrm/czc.htm>
- When a regulated MS4 or entity implementing Regulation 72-300 performs the technical review, you must include a copy of the MS4 approved NOI form or MS4 approved application, the \$125 NPDES fee, and one (1) copy of the MS4 approval. In the SCCZ, applications for Coastal Zone Consistency certification are to be filed with requests for NPDES construction coverage and will then be routed internally to OCRM for review.
- For projects ultimately disturbing more than 1 acres, the checklist must be completed and attached when DHEC reviews your C-SWPPP. In the SCCZ, for projects ultimately disturbing more than 0.5 acres and located within ½ mile of a CRW, the checklist must be completed and attached. See BOW-SPWS for the most current version of the checklist. If this project will NOT ultimately disturb more than 0.5 acres (Coastal Counties) or more than 1.0 acre (Non-Coastal Counties) AND is not part of an LCP, your project is automatically covered under this permit and the NPDES coverage fee and review fee are not required. See the BOW-SPWS for "Less Than 1-Acre of Land Disturbance - Coastal Counties AND "Less Than 1-Acre of Land Disturbance - Non-Coastal Counties.
- For Modification projects where DHEC performs a technical review, see Section I of the instructions and Form B. Complete the applicable sections of the NOI Form. Complete the Form B Checklist. Submit an original, signed NOI form, appropriate fee schedule (C) with required fees, one (1) copy of SWPPP revisions, and one (1) copy of all other supporting documentation, including necessary engineering calculations. No review clock is required for Modification reviews.

Authorization to discharge is granted based on the timeframes specified in the table below. For project sites located in the SCCZ, the timeframes provided below do not commence until a Coastal Zone Consistency determination has been issued for the site.

Review Type	Allotted Review Time Frame
Regulated MS4 or entity implementing Regulation 72-300	7 business days of DHEC receipt of a complete NOI and fee payment.
DHEC (when construction site is subject to State C-SWPPP reviews)	20 business days of DHEC receipt of a complete NOI and fee payment.

S. C. Coastal Zone (SCCZ) Requirements:

For projects that are located within ½ mile of a CRW and involve greater than 0.5 acres of land disturbance, a registered engineer, landscape architect, or Tier B surveyor must prepare, amend when necessary, certify, and stamp the C-SWPPP as required and allowed by the qualified individual's respective act and regulations. Regulation 72-307(C)(5)(g) establishes additional requirements for projects located in the SCCZ. The additional water quality measures are outlined in Chapter III, Section XIII of the South Carolina Coastal Zone Management Program, as refined available at <http://www.scdhec.gov/environment/ocrm/czmp.htm>

Fee Schedules:

Make sure to answer all applicable questions on the appropriate Fee Schedule. **Complete Fee Schedule A for Non-Coastal projects; Schedule B for Coastal projects. Attach Form A, as required, for Transfer of Ownership. Attach Form B for major modifications to a prior approved project with Fee Schedule C if DHEC reviews your modification.**

Office Mechanics and Filing:

The original NOI form for projects located outside of MS4 areas and supporting documentation will be kept in the Central Office files (hard copy or digitized copy) in accordance with the Retention Schedule.

Date: Enter today's date.

Project/Site Name: The Project/ Site Name should be a unique or distinguishing name (e.g., not Proposed Subdivision).

NOTE: DHEC must be notified in writing if the Project/ Site Name changes.

County: If the project is in multiple counties, list the county in which the majority of the site is located. If part of the project is in the **SCCZ**, then list the coastal county in which the majority of the site is located and submit the project to **CSWP**; see the "Where to File" section. List the other counties in which the site is located in the C-SWPPP.

Prior Approved NPDES Permit Number (Major Modification or Change of Information Only): Provide the NPDES permit number (SCR number) or File Number previously assigned to the project or LCP.

Expedited Review Program (ERP): For additional information about ERP, see the ERP website <http://www.scdhec.gov/environment/water/swater/expeditedReview.htm>. DHEC will notify the Project Owner/ Operator if the project is selected for review in the ERP. There are additional required fees for participation in this program; these ERP fees should not be submitted until DHEC has notified the Project Owner/ Operator that the project was selected for participation in the ERP. **In the SCCZ, please note that projects impacting Geographic Areas of Particular Concern (GAPCs) and/or wetlands may not be eligible for participation. Consult OCRM staff.**

I. **Notice of Intent (NOI) Application Type(s)** (See Section 2.4 of CGP for submission deadlines and notification requirements)

A. **Project (Application) Type** - Select **ALL** applicable application types that best describe your project or application. Section 2 of the Construction General Permit (CGP) may be reviewed for further information on each type of application listed in this section. As an example, if your project is one that is a new startup, then "New Project" should be selected. If your project is a new startup that will be located in Beaufort County, that will also be expedited, then "New Project", "OCRM Project Review", and "Expedited Review Program" should each be selected to describe your application. **To determine if the project design is considered to be above regulatory requirements or Low Impact Development, see the "Expedited Review Standard Operating Procedures" document.** If **none** of the application types listed in this section apply or clearly define the intent of your project, select "Other" and provide specific details that clearly describe the intent of your NOI application.

NOTE: DHEC must be notified in writing within fourteen (14) business days of a new Owner (person, lending institution, government institution, etc.) taking title to or ownership of a prior approved ongoing NPDES construction project/site. A new Property Owner must complete all applicable sections of Form A (Transfer of Ownership) and submit this form to the Department or respective MS4 with the NOI application. Written notification is also required when the Owner or Developer's company name changes for a prior approved construction permit.

NOTE: Major Modifications allowed by the Department are listed in Section 3.1.7 of the CGP. If your project is a major modification, complete Form B, Fee Schedule C, and applicable sections of the NOI per directions identified on Form B. Please note that Section V (Waterbody Information) of the prior approved NOI must be reviewed for changes prior to submitting any modification request to the Department. If changes have occurred, identify as Change of Information on the NOI form and provide the revised information in this section. Attach a detailed Narrative and revised C-SWPPP documents to the major modification request.

A. **MS4 Reviewer and MS4 Operator** - If this project is located inside a Municipal Separate Storm Sewer System (MS4) and must be reviewed and approved by a MS4 entity prior to submission to DHEC, then select "MS4 Project Review" as application type in Item A and provide the names of the entities that will perform the review and the MS4 Operator. Urbanized area boundary maps are available at <http://cfpub.epa.gov/npdes/stormwater/urbanmapresult.cfm?state=SC>. See the following website for information about MS4s: <http://www.scdhec.gov/environment/water/swnsms4.htm>. Note: Some MS4s have increased their review jurisdiction boundaries beyond the original urbanized area map. Please confirm with the appropriate MS4 regarding review jurisdiction.

II. Primary Permittee Information

Identify whether the Primary Permittee is a person or a company. If a company, identify if it is a lending institution or government entity. Provide the Employer Identification Number (EIN) as established by the U.S. Internal Revenue Service for the company. **The EIN is commonly referred to as the taxpayer ID. If the company does not have an EIN (e.g., single member LLC, sole proprietorship). DO NOT list a Social Security number**

- A. Primary Permittee Name** – Provide the complete, legal name of the person or entity (company) that will be the Primary Permittee (Owner/Operator, O/O) for the project. If a person, provide the Title or Position. If a company, provide the complete, legal name of the company. Do not list the D/B/A (Doing Business As) name. **NOTE: If S.C. Department of Transportation (SCDOT) is the O/O, this NOI form (Form 2617) should NOT be used.** Provide the complete mailing address of the person/company identified in II.A as the Primary Permittee.
- B. Contact/ODSA Name** – Complete if different from II.A or O/O is a company. Provide the complete legal name of the person identified as the Contact or Operator of Daily Site Activities (ODSA) for the project. This can be someone other than the person that has signatory authority for the company. Often the Contact person is also referred to as the ODSA. Provide the complete mailing address for the person, other than the permittee, the Department may contact. This address can be different from the mailing address entered for the
- C. Property Owner Name** – If different from II.A or B, list the complete, legal name of the current Property Owner(s) of the site. Enter the complete mailing address for the Property Owner. **NPDES coverage will be issued to the Primary Permittee identified in Section II.A, not the Property Owner, unless same entity.** If there are multiple Property Owners, attach additional sheets with all information requested in Section II.C.
- III. Comprehensive Stormwater Pollution Prevention Plan (C-SWPPP) Preparer Information**
- A. C-SWPPP Preparer Name** – Provide the name of the C-SWPPP Preparer for this project.
- B. Registered Professional** – Identify whether the C-SWPPP Preparer is a Registered South Carolina Professional Engineer, Tier B Surveyor, or Landscape Architect. For projects disturbing more than 2 acres, the C-SWPPP preparer must be one of the listed professionals or federal government employee as described in Title 40, Chapter 22, and as required and allowed by the qualified individual's respective act and regulations. In the **SCCZ**, projects that are located within ½ mile of a CRW and that involve greater than 0.5 acres of land disturbance, the C-SWPPP preparer must be one of the listed professionals or federal government employee as described in Title 40, Chapter 22, and as required and allowed by the qualified individual's respective act and regulations.
- C. Company/Firm Name** - Provide the complete, legal name of the company and S.C. Certificate of Authorization (S.C. COA number). Enter the complete mailing address. DHEC may contact the C-SWPPP Preparer via email. See the following websites for information about COA requirements for Landscape Architecture firms <http://www.dnr.sc.gov/land/LandscapeArch/LALicense.html> and Engineering and Surveying firms <http://www.llr.state.sc.us/POL/Engineers/>. Enter N/A for S.C. COA if the firm is not required to have a COA.
- IV. Project/Site Information**
- A. Type of Construction Activity (ies)** - Select **ALL** activity types that best describe the development proposed for the site. "Institutional" includes schools and other publicly owned projects, except linear projects. "Site Preparation" includes clearing, grubbing, and grading only; no new impervious areas should be proposed if this activity type is selected. If none describe the development, then select "Other" and list the activity.
- B. Site Address/Location** - List the site address. If the site address is unknown, list the road name(s) on which the site is located, the nearest intersection, or other detailed description of the site location. List a city/town only if the site is within the city/ town limits. List zip code (if known). Provide the latitude/longitude and tax map numbers. See the following website for assistance in obtaining latitude/ longitude coordinates: http://www.epa.gov/tri/report/siting_tool/index.htm. Latitude (from 32° to 35°) and longitude (-78° to -83°) should be for the center of the site. Minutes (') and seconds (") should be from 0 to 59. Identify the lat/long data source.
- C. Indian Lands** – Identify if this site is located on Indian lands.
- D. Proposed Start Date/Completion Date** – Provide proposed project start and completion dates.
- E. Disturbed Area/Total Area** - Enter the disturbed area for the project and the total area for the site. The disturbed areas must be **rounded to the nearest tenth of an acre**. For subdivisions, if the exact build-out is not known, the disturbed area can be estimated using the following equation.
Disturbed area= 2(Maximum Footprint of House)(# of lots) + Road/ Right-of-Way areas + Other easements/ disturbance. **NOTE: Provide written notification if the actual disturbed area exceeds the disturbed area on the approved NOI.**
- F. Modification Only: Change to Disturbed Area** – If your modification to a prior approved project will increase or decrease the disturbed area, complete this section and see Section I of the Instructions. Enter the current approved disturbed area and proposed increase (+) or decrease (-) to the disturbed area. If no change, enter 0.0. Enter the new total disturbed area (after change). Round each entry to the nearest tenth of an acre.
- G. Larger Common Plan for Development or Sale (LCP)** - The plan in LCP is "broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating construction activities may occur on a specific plot." [63 Federal Register No. 128, July 6, Page 6 1998, p. 36491] For example, if master calculations have been prepared and/ or submitted for an entire site, then all phases and parcels at that site would be considered part of an LCP. If the site is part of a subdivision, industrial park, commercial park, etc., then it is considered to be part of an LCP. List a unique, distinguishing LCP/ Overall Development name. This name should not reference a specific phase. This LCP/ Overall Development name should also be listed on all NOIs for future projects that are part of this LCP, including subsequent phases. Check the box if this is the first phase of the LCP. List the previous state permit/ file number and previous NPDES coverage number if applicable. **(DO NOT enter SCR100000).** If not known, contact the Department for assistance.

- H. Flooding Problems** – Identify whether flooding problems exist on the site, or downstream or adjacent to the site. If yes, provide detailed explanation of the extent and impact in your C-SWPPP. **NOTE:** All C-SWPPP applications must include a Floodway Map/FEMA Flood Insurance Map (See Checklist) with an outline of the project boundary on the map. **NOTE:** The Department does not regulate the placement of fill in floodplains. Contact local city or county official.
- I. Active S. C. DHEC Warning office/Notice to Comply/Notice of Violation** – Select yes if DHEC has issued a Warning Notice, Notice to Comply or Notice of Violation for the site or any site within the LCP. Provide additional information about the Notice (e.g., Order number) and a copy of correspondence with DHEC regarding the Notice in your C-SWPPP.
- J. State and Federal Environmental Permits or Approvals** – List relevant state and federal permits applied for. See §122.21(f) of S.C. Regulation 61-9 <http://www.scdhec.gov/environment/water/regs/r61-9.pdf> for a list of permits, approvals, and programs that should be considered. If inaccurate, NPDES coverage may be invalid.
- K. Waiver(s)** - Identify any waivers requested for your project or construction site. Provide details and required justifications in the C-SWPPP.

V. Waterbody Information

A. Receiving Waterbody(s) (RWB) Information

1. The **Nearest** receiving waterbody (RWB) is the nearest Waters of the State (WoS). See definition in §122.2 of S.C. Regulation 61-9 - <http://www.scdhec.gov/environment/water/regs/r61-9.pdf> to which the site's stormwater discharges will drain. The nearest RWB must be listed in reference to a named waterbody, if the RWB is unnamed. For example, if the site's stormwater discharges drain to a stream on the site, then the nearest RWB would be the stream. If the stream is not named, then determine the nearest named waterbody (e.g., Grove Creek) into which the stream will flow and list the nearest RWB as a tributary to the named waterbody (e.g., Tributary to Grove Creek). Then, the **Next Nearest** named RWB would be Grove Creek. If the site's stormwater discharges drain to multiple waterbodies, then list all such waterbodies; attach additional sheets, if necessary.
 2. Provide the **distance**, in feet to each receiving waterbody.
 3. Provide the **classification** for each named waterbody. See S.C. Regulation 61-69 <http://www.scdhec.gov/environment/water/regs/r61-69.pdf> for a list of classifications of waterbodies within S.C. If the nearest RWB is unnamed, then search the document for the nearest named RWB. If the nearest, named RWB is not listed, then continue searching the document for the next, named waterbody, proceeding downstream from the site. For example, a site in Anderson County drains to a tributary of Hornbuckle Creek, then to Hornbuckle Creek, then to Middle Branch, and then to Brushy Creek/ Big Brushy Creek. First, search the document for Hornbuckle Creek, then Middle Branch, then Brushy Creek. Because there are 3 listings for Brushy Creek, the next, named waterbody (Saluda River) must be determined. Note that the county for this record for Brushy Creek is listed as Pickens because the headwaters of Brushy Creek are in Pickens County. The classification of the tributary to Hornbuckle Creek is "FW—Freshwaters".
 4. **SCCZ Only:** Provide the **Coastal Receiving Water (CRW)** to which the site's stormwater discharges will drain. This distance is used to determine permitting requirements. Coastal Receiving Water is defined as a receiving water body as defined in the *Policies and Procedures of the South Carolina Coastal Zone Management Program*, updated July 1995. This includes all regularly tidally influenced salt and fresh water marsh areas, all lakes or ponds which are used primarily for public recreation or a public drinking water supply, and other water bodies within the coastal zone, excluding wetlands, swamps, ditches and stormwater management ponds which are not contiguous via an outfall or similar structure with a tidal water body.
 5. Provide the distance, in feet to the CRW. **Classification of RWBs is not applicable for CRW.**
- B. Waters of the U. S. /State Information** (See Section 2.6.2 thru 2.6.6 of the CGP)
1. Complete the "On the site?" column for items a-d. If yes is selected for that column, then the next 3 columns must be completed. If there are other waters of the U.S./ State (WoS) on the site not listed in items a and b (e.g., stream, river, lake, pond), then list those in item c. Jurisdictional wetlands are under ACOE jurisdiction.
 2. **Delineation** means identification by U.S. Army Corps of Engineers (USACOE) or wetlands consultant. Also, see the checklist for information about delineation requirements. If there are WoS within 100' of the disturbed area that were not delineated/identified, then explain this in the narrative; this includes WoS that are not on the project site but are within 100' of the disturbed area. **For Direct Critical Area in the SCCZ, delineation means identification by OCRM or wetlands consultant. OCRM staff may require identification of Direct Critical Area by OCRM staff as part of its Coastal Zone Consistency review.**
 3. **Impacts** - If construction activities will occur in and/ or will impact WoS, then select yes for "Impacts?"
 4. **Amount of Impacts** - List the amount of impacts to WoS. Provide an additional, separate plan sheet that shows all WoS on the site and the impacted areas. If there are proposed impacts to WoS, please contact USACOE (866-329-8187) and S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section (803-898-4300) to determine additional requirements before submitting this NOI. **In the SCCZ, also contact S.C. DHEC OCRM Wetlands Section (843-953-0200). Please note that it is the Project Owner/ Operator's responsibility to ensure that all WoS are shown and identified in the C-SWPPP. See Sections 2.6**
 6. **If yes for impacts in B.3, describe each impact and activity, and list all permits** (e.g., U.S. Army Corps of Engineers (USACOE) Nationwide Permit, DHEC General Permit) and certifications that have been applied for or obtained for each impact. Describe the activity(s), whether the impact is permanent or temporary, and any other relevant information. Provide a copy of all permits and certifications for and correspondence with USACOE and DHEC for the impacts. Include all plats referenced in the permits or correspondence.

C. S. C. Navigable Waters (SCNW) Information

1. **Are SCNW on the site?** See <http://www.scdhec.gov/environment/water/navwater.htm> for the definition of SCNW and other information related to SCNW. Or, contact S.C. DHEC Water Quality Certification, Standards & Wetlands Programs Section at (803) 898-4300 for assistance determining the navigability of the waters on your site or with questions related to SCNW. **If yes to C.1**, list the **name of the SCNW**. If the SCNW is not named, then provide a description that references the nearest, named waterbody (e.g., tributary to Grove Creek). **If no to C.1**, do not complete questions C.2 thru C.3 of this section.
2. If yes to C.1 and construction activities proposed by your project will cross over or occur in, under, or thru the SCNW, describe SCNW activities (e.g., road crossing, sub-aqueous utility line, temporary or permanent structures, etc.). This includes temporary and permanent crossings with roads, utility lines, etc.
3. Identify permits providing SCNW Activity(ies) coverages for your site.
 - a. Identify proposed activities covered under a DHEC General Permit or other DHEC permit. Identify permit number(s) and corresponding activities covered under each. See the following website for a list of DHEC General Permits for activities in some SCNW: <http://www.scdhec.gov/environment/water/docs/gp/gp.xls>. See the "Notes" column to determine what types of activities are covered under each permit.
 - b. Identify **USACOE 404 Permit or 401 Certification** issued for the site. Identify permit number(s) or certification(s) and corresponding activities covered under each.
 - c. If applicable, identify the date the **SCNW permit** was applied for. Identify whether the permit applied for will cover ALL activities listed in C.2 of some activities listed in C.2. List covered activities.
 - d. If a **SCNW permit** has NOT already been applied for or issued for all of the activities in SCNW for this site, then those activities and conditions can be addressed during the review of the C-SWPPP, and a separate State Navigable Waters permit is not required. **Provide an additional plan sheet with plan and profile views (drawn to scale) of SCNW and associated activities; include activities description on the plan sheet.**

D. Impaired Waterbodies Information (Section 3.2.12)

NOTE: The TMDL, 303(d), and Non-Point Source water quality tool is a mapping system showing detailed information on WQMS locations, water quality status, and much more. The tool is available at the following website along with instructions for using the tool: <http://www.scdhec.gov/environment/water/tmdl/>.

In the SCCZ, list the nearest upstream and downstream DHEC WQMS(s) and corresponding waterbody(ies). Additionally, shellfish stations only monitor for Fecal coliform bacteria. Include both the nearest shellfish monitoring station(s) and full WQMS(s) on the NOI for both upstream and downstream locations when shellfish monitoring stations are present. If a shellfish monitoring site is not present then you only need to list the full WQMS(s). When a shellfish monitoring station is present, everything but Fecal coliform bacteria needs to be assessed at the full WQMS(s). Shellfish monitoring stations begin with numbers and full WQMS(s) begin with letters.

1. 303(d) Listed Impaired Waterbodies

- a. List the **nearest SCDHEC Water Quality Monitoring Station(s)** to which the site's construction stormwater discharges will drain and its **corresponding waterbody**. See the following website for the most current 303(d) List for Impaired Waters and related information: <http://www.scdhec.gov/environment/water/tmdl/>. **NOTE: DHEC has determined that construction SW discharges are expected to contain pollutants causing the following impairments: TURBIDITY, BIO (Macroinvertebrate), TP (Total Phosphorus), TN (Total Nitrogen), Chlorophyll-a, and FC (Fecal coliform) in Shellfish Harvesting Waters in the SCCZ.** Carefully evaluate whether the site's construction SW discharges will contain any pollutants causing other impairments not explicitly listed above. You should also consider previous land uses at the site in answering this question. For example, if the previous land use was a copper processing facility and the impairment at the nearest WQMS is copper, then you should carefully evaluate whether the site's construction SW discharges would contain copper.
- b. Identify whether this **WQMS is listed on the most current 303(d) List**. The 303(d) list is available in Microsoft Excel and Adobe Reader formats. WQMS locations are available for each watershed at the website provided in 1.a as well using the **TMDL, 303(d), and Non-Point Source water quality tool**. To search the 303(d) list to determine whether a WQMS is listed, select "Edit" from the top toolbar of your web browser. Then, select "Find". Enter the WQMS exactly as listed on the map and hit enter. **If none of the WQMS(s) are found, then select "No" and proceed to item V.D.2 (TMDL Impaired Waterbodies). If any of the WQMS(s) are found, then select "Yes" and proceed to item c.**
- c. **If yes for b**, list the impairment(s) or pollutants identified as cause(s) of the impairment (see last column labeled "CAUSE") for the WQMS(s) and proceed to item d.
- d. Identify whether the site's stormwater discharges contain any pollutants causing the impairment(s). **If no for d, proceed to item V.D.2 (TMDL Impaired Waterbodies). If yes to d and the receiving water is listed on the most current 303(d) List of Impaired Waters** for a sediment or a sediment-related parameter, BIO (macroinvertebrate), turbidity, Total Phosphorous, Total Nitrogen, Chlorophyll-a, or Fecal coliform in Shellfish Harvesting Waters in the SCCZ. You must carefully evaluate all selected BMPs and their performance to ensure that the construction site's Stormwater discharges will not contribute to or cause a violation of water quality standards. **If yes for d and the disturbed area is less than 25 acres**, include an evaluation of the Best Management Practices (BMPs) proposed for the site as described in Section 3.2.12.B(I) of the CGP in the C-SWPPP. **If yes for d and the disturbed area is greater than or equal to 25 acres**, then provide a written qualitative and quantitative assessment of the BMPs proposed in the C-SWPPP for the site as

described in section 3.2.12.B(II) of the CGP. For more information on this subject, please see the DHEC publication entitled "Antidegradation for Activities Contributing to NonPoint Source Pollution to Impaired Waters." This publication can be downloaded at the following DHEC WEB site www.scdhec.gov/eac/water/pubs/antidegnps.pdf

- e. **If yes to d, list the "USE" support impairment (AL, FISH, REC, SHELLFISH) affected by the pollutant or impairment listed in item c.**
 - f. **If yes for d, will use of the BMPs proposed for your project ensure the stormwater discharges leaving the site will NOT contribute to or cause further water quality standard violations for the impairment(s) listed in c? NOTE: If your answer to item f is NO, this site is NOT eligible for coverage under the CGP. You may contact the Department to determine if an individual permit application is necessary or you may revise your project to include appropriate Best Management Practices, controls, and procedures to bring your discharge into compliance**
- 2. TMDL Impaired Waterbodies**
- a. List the **nearest SCDHEC water quality monitoring station(s)** to which the site's construction stormwater discharges will drain. List WQMS identified in part V.D.1.a of this table.
 - b. Identify whether a TMDL is listed for this WQMS. NOTE: See the following website for a list of all WQMS with Approved S.C. Total Maximum Daily Loads (TMDLs): <http://www.scdhec.gov/environment/water/tmdl/>. Select "Approved SC TMDLs", then select "Sites Covered Under an Approved TMDL and Corresponding WQ Attainment Status". Select "Edit" from the top toolbar. Then, select "Find". Enter the WQMS exactly as listed and hit enter.
If a WQMS is NOT found, then select "No." Stop and proceed to Section VI. If a WQMS is found, then select "Yes" and proceed to item c.
 - c. **If yes for b, identify and list the impairment(s) or pollutants listed as CAUSE(S) of the impairment (see 7th column labeled "CAUSE") and proceed to item d. If the WQMS(s) is impaired for more than one parameter, then the WQMS will be listed multiple times on successive rows.**
 - d. **If yes for b, identify whether the standard has been ATTAINED for the impairment(s). NOTE: See the 8th column labeled "USE SUPPORT" to determine if the standard has been attained for each impairment for each WQMS. "FULLY SUPPORTED" means the standard has been attained for the impairment listed in the "CAUSE" column. "NOT SUPPORTED" means that the standard has NOT been attained for that impairment. If no for d (the standard has NOT been attained (NOT SUPPORTED) for all impairments for all WQMS(s)), proceed to item e. If yes for d (the standard has been attained for all impairments for all WQMS(s)), proceed to Section VI.**
 - e. Identify whether the site's stormwater discharges contain any pollutants causing the impairment(s). **If no for e, proceed to Section VI. If yes for e, proceed to f.**
 - f. **If yes for e, are your discharges consistent with the assumptions and requirements of the TMDL(s)? NOTE: If your answer to item f is NO, this site is NOT eligible for coverage under the CGP. You may contact the Department to confirm that adherence to a C-SWPPP that meets the requirements of the CGP will be consistent with the TMDL. Where a TMDL has not specified a WLA applicable to construction stormwater discharges, but has not specifically excluded these discharges, adherence to a C-SWPPP that meets the requirements of the CGP will generally be assumed to be consistent with the approved TMDL. If the TMDL specifically precludes such discharges, the site is not eligible for coverage under the CGP.**

VI. Signatures and Certifications **DO NOT SIGN IN BLACK INK!** The NOI must have original signatures unless the application being submitted to DHEC is one approved by an MS4.

C-SWPPP Preparer - The same registered professional must sign and seal the NOI form, C-SWPPP, calculations, and supporting documentation.

Primary Permittee - If the Primary Permittee or Project Owner/ Operator is a company, print the name of the person who is signing the NOI for the Owner/ Operator. A person with signatory authority for the Owner/ Operator must sign the application. The C-SWPPP Preparer cannot sign the application for the Owner/ Operator. The C-SWPPP, all reports, including monthly reports, and any information requested by DHEC must be prepared under the direction or supervision of a person with signatory authority for the Owner/ Operator or a duly authorized representative.

See below for a summary and §122.22 of S.C. Reg. 61-9 (Appendix C of the CGP) for complete information about signatory authority requirements.

- Corporation: A responsible corporate officer (e.g., president, vice-president, certain managers)
- Partnership or Sole Proprietorship: A general partner or the proprietor, respectively
- Municipality, State, Federal or Other Public Agency: Principal executive officer or ranking elected official.



CONTRACTOR CERTIFICATION FORM
For Coverage(s) Under South Carolina
NPDES General Permit For
Stormwater Discharges From Construction Activities SCR100000

(Maintain As Part of On-Site SWPPP)

Date: _____

A. Project Information

1. NPDES Coverage No.: SCR _____ State Permit (Tracking) No.: _____
2. Project/Site Name (As Approved by Department): _____
3. Owner/Operator Name: _____

B. Contractor Information

1. Name: _____ Title/Position: _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Company Name (As Applicable): _____
Phone: _____ Email Address: _____
2. Describe Construction-Related Responsibilities & Activities (Home construction, site grading, utility line installation, etc.): _____

C. Contractor Certification Statements & Agreement: *(Read the Contractor Certification statements below (in entirety) and provide date and signature of agreement below).* See Section 122.22 of S.C. Reg. 61-9 for signatory authority requirements. **DO NOT SIGN IN BLACK INK!**

"I certify by my signature below that I or I (on behalf of my company and its contractors and agents), as the case may be,

- (a) Understand, accept, and will adhere to the provisions of the Stormwater Pollution Prevention Plan (SWPPP) as it pertains to the portion of the project I am or my company is responsible for, and as required by the coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges From Construction Activities SCR100000 issued to the Owner/Operator of the construction activity with whom I am or my company is under contract to perform construction related professional services;*
- (b) Am legally accountable to the SC Department of Health and Environmental Control (DHEC), under the authorities of the Clean Water Act and the SC Pollution Control Act, to ensure compliance with the terms and conditions of the SWPPP applicable to my or my company's portion of the project;*
- (c) Must comply with the terms and conditions of the Construction General Permit (CGP), will adhere to applicable standards and stormwater erosion control practices established in the SWPPP and in the Best Management Practices (BMP) manual at all times while performing work at the project site, and agree to implement corrective actions identified by the qualified inspector during a site inspection; and*
- (d) Understand that DHEC enforcement actions may be taken against any specific or combination of permittees and contractors if the terms and conditions of the SWPPP are not met.*

Therefore, having understood the above information, I am signing this certification as contractor to the aforementioned NPDES general permit."

Printed Name of Contractor _____

Title/Position _____

Signature of Contractor _____

Date Signed _____

Termination of Contractor Certification Agreement: DO NOT SIGN IN BLACK INK!

(When your land-disturbing activities at this site have been completed, sign and date below). After this date, you may not perform any land-disturbing activities at this site unless you sign a new contractor certification agreement).

Signature of Contractor _____

Date Signed _____

CONTRACTOR CERTIFICATION FORM

NPDES Coverage No.: SCR _____

State Permit (Tracking) No.: _____

Project/Site Name: _____

C. Contractor Certification Statements:

All contractors performing any land disturbing activity at a construction site must be certified and listed in the On-Site SWPPP (OS-SWPPP) in order to work on the site. *Read the Certification statements below (in entirety) and provide date and signature of agreement below.*

"I certify by my signature below that I or I (on behalf of my company and its contractors and agents), as the case may be,

- (a) Understand, accept, and will adhere to the provisions of the Stormwater Pollution Prevention Plan (SWPPP) as it pertains to the portion of the project I am or my company is responsible for, and as required by the coverage under the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges From Construction Activities SCR100000 issued to the Owner/Operator of the construction activity with whom I am or my company is under contract to perform construction related professional services;*
- (b) Am legally accountable to the SC Department of Health and Environmental Control (DHEC), under the authorities of the Clean Water Act and the SC Pollution Control Act, to ensure compliance with the terms and conditions of the SWPPP applicable to my or my company's portion of the project;*
- (c) Must comply with the terms and conditions of the Construction General Permit (CGP), will adhere to applicable standards and stormwater erosion control practices established in the SWPPP and in the Best Management Practices (BMP) manual at all times while performing work at the project site, and agree to implement corrective actions identified by the qualified inspector during a site inspection; and*
- (d) Understand that DHEC enforcement actions may be taken against any specific or combination of permittees and contractors if the terms and conditions of the SWPPP are not met.*

Therefore, having understood the above information, I am signing this certification as contractor to the aforementioned NPDES general permit."

C. CONTRACTOR CERTIFICATION AGREEMENTS

(Sheet 1)

NPDES Coverage No.: SCR _____
Project/Site Name: _____

State Permit (Tracking) No.: _____

Please print legibly and complete all spaces on the form. *If you are an approved Blanket Utility Provider, you do not need to sign this form, but you must submit a copy of your Annual Blanket NOI registration information to the Owner/Operator.* Abbreviate if necessary and submit the completed form to the Owner/Operator. (When your land-disturbing activities at this site are complete, sign and date the termination agreement below. After this date, you may *not* perform any land-disturbing activities at this site unless you sign a new contractor certification agreement). **Additional certification agreement pages may be attached as necessary. DO NOT SIGN IN BLACK INK!**

Contractor Information:

Name: _____ Title/Position: _____
Company Name (As Applicable) _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Email Address: _____

Contractor Certification (Signature of Agreement): Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Termination of Contractor Certification Agreement: Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Contractor Information:

Name: _____ Title/Position: _____
Company Name (As Applicable) _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Email Address: _____

Contractor Certification (Signature of Agreement): Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Termination of Contractor Certification Agreement: Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Contractor Information:

Name: _____ Title/Position: _____
Company Name (As Applicable) _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Email Address: _____

Contractor Certification (Signature of Agreement): Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Termination of Contractor Certification Agreement: Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

C. CONTRACTOR CERTIFICATION AGREEMENTS
(Company Certifications)
(Sheet 2)

Use this sheet for certification agreements of contractors, subcontractors, etc. employed by the Contracting Company identified below ONLY. If you do not work for the company listed below, do not sign this sheet. If you are an approved Blanket Utility Provider, you do not need to sign this form, but you must submit a copy of your Annual Blanket NOI registration information to the Owner/Operator.

Abbreviate if necessary and submit the completed form to the Owner/Operator. (When your land-disturbing activities at this site are complete, sign and date the termination agreement below. After this date, you may *not* perform any land-disturbing activities at this site unless you sign a new contractor certification agreement). **Additional certification agreement pages may be attached as necessary.** Please print legibly and complete all spaces on the form. **DO NOT SIGN IN BLACK INK!**

NPDES Coverage No.: SCR _____ State Permit (Tracking) No.: _____
Project/Site Name: _____

Contracting Company Information:

Company Name _____
Mailing Address: _____ City: _____ State: _____ Zip: _____
Phone: _____ Email Address: _____

Contractor Information:

Contractor Name: _____ Title/Position: _____

Contractor Certification (Signature of Agreement): Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Termination of Contractor Certification Agreement: Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Contractor Name: _____ Title/Position: _____

Contractor Certification (Signature of Agreement): Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Termination of Contractor Certification Agreement: Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Contractor Name: _____ Title/Position: _____

Contractor Certification (Signature of Agreement): Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Termination of Contractor Certification Agreement: Provide date and signature. **DO NOT SIGN IN BLACK INK!**

Signature of Contractor

Date Signed

Instructions for Completing the Contractor Certification Form

If you are uncertain whether you need to obtain coverage under the NPDES General Permit for Stormwater Discharges From Construction Activities SCR100000 (CGP), if you cannot access the websites listed in these instructions, or if you have any questions, contact the Bureau of Water Stormwater Permitting Section at (803) 898-4300 or the Coastal Stormwater Permitting Section at (843) 953-0200. Please see the Bureau of Water, Stormwater Permitting website (<http://www.scdhec.gov/stormwater>) for guidance and additional information.

Who Must Complete a Contractor Certification Form

Contractors (who are not Permittees or Annual Blanket Utility providers), employed by a Primary or Secondary Permittee of a construction project or site, must complete a Contractor Certification Form before performing any land-disturbing activities at the construction site. Contractor Certification Forms do not require Department approval, however, this form must be signed, dated, and submitted by each contractor to the Owner/Operator prior to commencement of land-disturbing activities by the contractor.

General Guidance for this Form

Are there Other Requirements for Contractors Completing this form?

Contractors completing this form must also attend a pre-construction conference, and sign and date a Pre-Construction Conference Certification Agreement for each project or construction site where they will be performing construction activities. Contractors *cannot work at a construction site until they sign this certification form and document attendance at the Pre-Construction Conference held for the project or construction site. See Section 4.1 of the 2012 CGP for additional information.*

What Does This Certification Mean?

Upon signing this certification, the contractor is accountable to DHEC to ensure the terms and conditions of the approved Stormwater Pollution Prevention Plan (developed for the respective construction project or site) and the Construction General Permit (CGP) are implemented and adhered to in the respective area(s) of the plan where each contractor and/or company signing this form will be performing work. Each contractor becomes subject to DHEC enforcement actions if permit conditions are not met. *See Sections 2.2.3 and 2.3.2 of the 2012 CGP for additional information.*

Should the Owner/Operator Retain This Form?

The Owner/Operator of the construction site must retain completed Contractor Certification Forms with the approved On-Site SWPPP. This form must be retained for at least three years from the date permit coverage expires or is terminated.

Instructions for Completing this Form

Please print legibly and complete all spaces on the form. Abbreviate if necessary to stay within the space allowed for each item and submit the completed form to the Owner/Operator for the specific project or construction site listed in Section A.

Section A - Project Information

Provide all requested information. Enter the date, NPDES coverage number, and Tracking No. provided by the Department for the approved SWPPP. Enter the official or legal name of the project or site, as approved by the Department. If this project is for an individual lot or group of lots, provide the lot number(s). Provide the name of the Owner/Operator.

Section B –Contractor Information

Provide your legal name and title/position. As applicable, provide the legal (formal) name of the company, firm, public organization, or any other entity (you are employed by or represent) on whose behalf you will be performing contractor construction activities. Provide **your** mailing address, telephone and e-mail address. Briefly describe construction-related duties and responsibilities you or your company will perform for this project at the construction site.

Section C – Contractor Certification Statements & Agreement

Read the certification statements (in entirety). Provide your printed name and title or position. Date and sign the certification agreement. Return the signed and dated form to the Owner/Operator. **DO NOT SIGN IN BLACK INK.** Sheets 1 and 2 are formatted for multiple contractor signatures. Sheet 2 is ONLY for signatures within a specific company. Each may be copied as necessary. Sign and date the Termination of Contractor Certification Agreement when the services you provide for this project are complete. Return the signed and dated form to the Owner/Operator for record retention as a part of the On-Site SWPPP (OS-SWPPP).

Appendix D

Volz, Christian

From: Swartz, Jonathan M CIV USARMY CESAC (USA) <Jonathan.M.Swartz@usace.army.mil>
Sent: Monday, September 14, 2020 11:48 AM
To: Volz, Christian
Subject: RE: Stockbridge Trunk Sewer

[CAUTION] External Email. Do NOT click links or open attachments unless expected. Please use the "Phish Alert" button to report all suspicious emails.

Mr. Volz,

If you will not be impacting (placing fill material within a water of the US) any waters of the US you will not need authorization from the Corps.

It is my understanding this project will only involve one crossing of a stream, which will be accomplished using a horizontal directional drilling method with bore pit outside of any waters of the US.

If any impacts to waters of the US are anticipated you are encouraged to contact the Corps as soon as possible.

Best regards,

Jonathan Swartz
U.S. Army Corps of Engineers
Project Manager/Regulatory Specialist
Northwest Branch
South Carolina
Desk phone: 803-253-3906
Cell phone: 803-260-5536
Jonathan.M.Swartz@usace.army.mil

Due to the current situation involving COVID-19, I am currently teleworking. I will generally be available via e-mail and my mobile phone. Please be advised that response time may be delayed due to remote network connectivity and an increased volume of virtual meetings. Thanks in advance for your patience.

-----Original Message-----

From: Volz, Christian <cvolz@Dewberry.com>
Sent: Monday, September 14, 2020 11:06 AM
To: Swartz, Jonathan M CIV USARMY CESAC (USA) <Jonathan.M.Swartz@usace.army.mil>
Subject: [Non-DoD Source] FW: Stockbridge Trunk Sewer

Mr. Swartz,

Were you able to review the below request? If it is easier, I can contact you via phone if you can provide a good number.

Thanks,

Christian S. Volz, PE, LEED AP
Senior Project Manager
Dewberry
9300 Harris Corners Parkway, Ste 220
Charlotte, NC 28269

704.631.5207 (p)
704.680.8860 (c)
704.509.9937 (f)

Blockedwww.dewberry.com

-----Original Message-----

From: Volz, Christian
Sent: Wednesday, August 19, 2020 4:25 PM
To: jonathan.m.swartz@usace.army.mil
Subject: FW: Stockbridge Trunk Sewer

Good afternoon Mr. Schwartz,

My firm has designed a the replacement of approximately 938 LF of 8" and 3,210 LF of 12" and 775 LF of 16" ductile iron gravity sewer for York County, SC. Per the below, our York County Environmental reviewer, Chris Weaver, has told us the rules regarding impacts to streams require that the stream itself be encroached upon that as long as we are clear of the top-of-bank for intermittent streams, it is not considered an impact but wanted me to contact you to confirm the approach. Can you please reply with confirmation or if you would be interested in seeing the plans? We have one jack and bore under an intermittent stream with the pits outside those areas.

Thanks,

Christian S. Volz, PE, LEED AP
Senior Project Manager
Dewberry
9300 Harris Corners Parkway, Ste 220
Charlotte, NC 28269

704.631.5207 (p)
704.680.8860 (c)
704.509.9937 (f)

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-----Original Message-----

From: Weaver, Chris <Chris.Weaver@yorkcountygov.com>
Sent: Thursday, July 30, 2020 4:56 PM
To: Volz, Christian <cvolz@dewberry.com>
Subject: RE: Stockbridge Trunk Sewer

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I would encourage you to send the data to the Corps, even if just for confirmation of the results and approach. If they say that it is not necessary, we can continue the review without their input.

Let me know if you have any reservations about proceeding this way.

Thanks'

Chris Weaver

Sent via the Samsung Galaxy S9, an AT&T 5G Evolution capable smartphone

Chris Weaver, EI, CFM, CSPR
Environmental Compliance Plans Examiner
York County Government

Office:803-909-7226

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<Blocked<http://www.yorkcountygov.com/>>

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----- Original message -----

From: "Volz, Christian" <cvolz@Dewberry.com>
Date: 7/30/20 4:29 PM (GMT-05:00)
To: "Weaver, Chris" <Chris.Weaver@yorkcountygov.com>
Subject: RE: Stockbridge Trunk Sewer

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Should be good. In my notes, I had written that needing to send the information to the Corps was contingent on the interpretation of the impact, so I'll just note its not necessary in the response letter as well, unless you tell me otherwise.

Thanks again,

Christian S. Volz, PE, LEED AP
Senior Project Manager
Dewberry
9300 Harris Corners Parkway, Ste 220
Charlotte, NC 28269

704.631.5207 (p)
704.680.8860 (c)
704.509.9937 (f)

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-----Original Message-----

From: Weaver, Chris <Chris.Weaver@yorkcountygov.com>
Sent: Thursday, July 30, 2020 4:26 PM
To: Volz, Christian <cvolz@Dewberry.com>
Subject: RE: Stockbridge Trunk Sewer

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Great! Let me know if you need anything else to help you resubmit.

-Chris

Sent via the Samsung Galaxy S9, an AT&T 5G Evolution capable smartphone

Chris Weaver, EI, CFM, CSPR
Environmental Compliance Plans Examiner
York County Government

Office:803-909-7226

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----- Original message -----

From: "Volz, Christian" <cvolz@Dewberry.com>
Date: 7/30/20 4:24 PM (GMT-05:00)
To: "Weaver, Chris" <Chris.Weaver@yorkcountygov.com>
Cc: "Hayes, Adam" <ahayes@Dewberry.com>
Subject: RE: Stockbridge Trunk Sewer

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Chris,

Thank you for the clarification. We'll revise the permits to show no impact and resubmit.

Thanks,

Christian S. Volz, PE, LEED AP
Senior Project Manager
Dewberry
9300 Harris Corners Parkway, Ste 220
Charlotte, NC 28269

704.631.5207 (p)
704.680.8860 (c)
704.509.9937 (f)

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-----Original Message-----

From: Weaver, Chris <Chris.Weaver@yorkcountygov.com>
Sent: Thursday, July 30, 2020 4:20 PM
To: Volz, Christian <cvolz@Dewberry.com>
Subject: RE: Stockbridge Trunk Sewer

[CAUTION] External Email. Do NOT click links or open attachments unless expected. Please use the "Phish Alert" button to report all suspicious emails.

Hey Christian,

I have been meaning to get back with you regarding your question for some time. I apologize for the delay.

The rules regarding impacts to streams require that the stream itself be encroached upon. So long as you stay clear of the top-of-bank, it is not considered an impact.

Let me know if this does not fully address the comment/question and we can discuss further.

I hope you have a great afternoon!

Thanks,

Chris Weaver

Sent via the Samsung Galaxy S9, an AT&T 5G Evolution capable smartphone

Chris Weaver, EI, CFM, CSPR
Environmental Compliance Plans Examiner
York County Government

Office:803-909-7226

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----- Original message -----

From: "Volz, Christian" <cvolz@Dewberry.com>
Date: 7/30/20 4:13 PM (GMT-05:00)
To: "Weaver, Chris" <Chris.Weaver@yorkcountygov.com>

Subject: Stockbridge Trunk Sewer

WARNING: The email below is from an EXTERNAL source. Ensure you trust this sender before clicking on any links or attachments.

Chris,

Just following up on the Stockbridge comments you had. After our call, you stated you were going to check with your supervisor regarding the status of the impacts to the waters of the state. Can you please advise if this was done and what the result was? We addressed all of the other comments are ready to resubmit.

Thanks,

Christian S. Volz, PE, LEED AP
Senior Project Manager
Dewberry
9300 Harris Corners Parkway, Ste 220
Charlotte, NC 28269

704.631.5207 (p)
704.680.8860 (c)
704.509.9937 (f)

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Appendix E



PLANNING & DEVELOPMENT SERVICES

York County, SC
LAND DEVELOPMENT DIVISION

July 25, 2022

Ron Pompey
York County Engineering
PO Box 148
York, SC 29754

Subj: NOTICE OF APPROVAL

STORMWATER MANAGEMENT AND SEDIMENT & EROSION CONTROL PLAN

SITE NAME: Stockbridge Trunk Sewer

ADDRESS: Blowing Rock Cove and Zimmerman Drive

**TAX MAP # 6500000674, 6500000036, 6500101174, 6500101196, 6500101159, 6500101099,
6500000046, 6460101047, 6460101080, 6460101081, 6460101042, 6460101041, 6460000003**

LAND DISTURBANCE PERMIT # 20-00182

Dear Mr. Pompey,

Stormwater Compliance has reviewed the Stormwater Management and Sediment Control Plan (SMSCP) for the subject project. We find the plan to be acceptable and in general compliance with *Chapter 152 – Stormwater Management and Sediment Control* of the York County Code of Ordinances, and hereby issue this Notice of Approval. Please note that this Notice of Approval gives notice of the requirement under § 152.032 of the York County Code of Ordinances of the County's right-of-entry for the purpose of inspection to insure compliance with the approved plan. Additionally, please note that Sect. 3.1.1.A of the South Carolina *NPDES General Permit for Stormwater Discharges from Construction Activities* (NPDES Construction General Permit) requires that a hard copy of the approved SMSCP and plans bearing the York County approval stamp must be reasonably available on the job site.

You must receive the NPDES General Construction Permit for the project before the Pre-construction Meeting can be scheduled and the preliminary land disturbance be issued. The NPDES Construction General Permit will be issued separately by the South Carolina Department of Health and Environmental Control (SCDHEC). You are obligated to become familiar with all the requirements and conditions of this permit in order to achieve compliance.

Once you have received your NPDES Construction General permit, **please email the inspector listed below to schedule a Pre-Construction Meeting for this project.** All email requests should have the site name in the subject line. This meeting will occur on-site with you, the inspector listed below, the contractor, the site engineer, and your construction inspector. Your preliminary land disturbance permit will be issued at the Pre-construction Meeting. This land disturbance permit must be posted at the job site prior to beginning the appropriate land disturbance. *No land disturbance may occur prior to the land disturbance permit being issued and posted.*

York Co. Stormwater Compliance Inspector	Inspector's Email
Michael Jennings, CEPSCI	michael.jennings@yorkcountygov.com

Following the Pre-construction Meeting, your assigned inspector will be required to conduct an inspection of installed perimeter erosion control measures before issuing the Final Land Disturbance Permit. *The Final Land Disturbance Permit must be obtained before any grading work can take place.*

Should the plans require revisions for any reason, you must contact our office in writing prior to performing any additional construction work; Plan revisions may require additional review and approval. Following the commencement of this project, if the Stormwater Management and Sediment Control Plans are determined to be inadequate to meet the requirements of the Ordinance, York County may require plan revisions, additional permitting, and implementation to insure compliance with the Ordinance.

Note: Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations, and rules. This approval does not supersede any other permit or approval. You are responsible for obtaining approvals from other County, State, and Federal Departments of Agencies. Stormwater Compliance review and approval does not guarantee nor imply subdivision, zoning, or building and codes review or approval.

Sincerely,



Christine S. Taylor, CSPR, CFM, CEPSCI
Plan Reviewer/Stormwater
Land Development Division

cc: Robert S. Notte, P.E., snotte@dewberry.com
cc: Ashley Hill, Development Coordinator, ashley.hill@yorkcountygov.com

Appendix F

Wastewater Construction Permit

Bureau of Water



PROJECT NAME: STOCKBRIDGE TRUNK SEWER	COUNTY: YORK
LOCATION: STARTS AT THE EX. STOCKBRIDGE COMMONS PUMP STATION AND CONTINUES WEST TO THE HAWKS CREEK PS TO ALONG THE STREAM TO ZIMMERMAN ROAD TO PALMETTO WEST PS ALONG THE STREAM TO THE PROPOSED REGIONAL PUMP STATION	

PERMISSION IS HEREBY GRANTED TO: YORK COUNTY GOVERNMENT
PO BOX 148
YORK SC 29745

for the construction of a sanitary sewer system in accordance with the construction plans, specifications, design calculations and the Construction Permit Application signed by Robert Notte, Registered Professional Engineer, S.C. Registration Number: 28814.

PROJECT DESCRIPTION: Installation of approximately 938 LF-8", 3,210 LF-12", and 775 LF-16" DIP gravity sewer lines, 39 manholes, and all necessary appurtenances to connect to Stockbridge Regional Pump Station followed by demolition of four existing pump stations (Stockbridge Commons, Hawks Creek, Brook Springs and Palmetto West).

TREATMENT FACILITY: This project will connect to ROCK HILL CITY OF (NPDES permit SC0020443) but will not contribute any new flow.

STANDARD CONDITION:

NOTE: 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. This is a permit for construction only and does not constitute DHEC approval, temporary or otherwise, to place the system in operation. An Approval to Place in Operation is required and can be obtained following the completion of construction by contacting the LANCASTER EQC OFFICE at 803-285-7461. Additional permits may be required prior to construction (e.g., Stormwater).

SPECIAL CONDITIONS:

1. All construction/materials for this project must conform to the Standard Specifications for YORK COUNTY.
2. This project is approved with zero wastewater flow. Any future development that proposes to tie onto this system must first be approved by this Department.
3. Final operational approval for this project shall not be granted until the final operational approval is granted for the system to which this project will connect (Stockbridge Regional Pump Station, permit number 41840-WW).

PERMIT NUMBER:	41848-WW
ISSUANCE DATE:	June 04, 2019
EXPIRATION DATES:	Construction must be completed and the Approval to Place in Operation granted prior to June 04, 2022 or this permit will expire.

Douglas B. Kinard, P.E., Director
Drinking Water Protection Division

MPM

Appendix G



United States
Department of
Agriculture

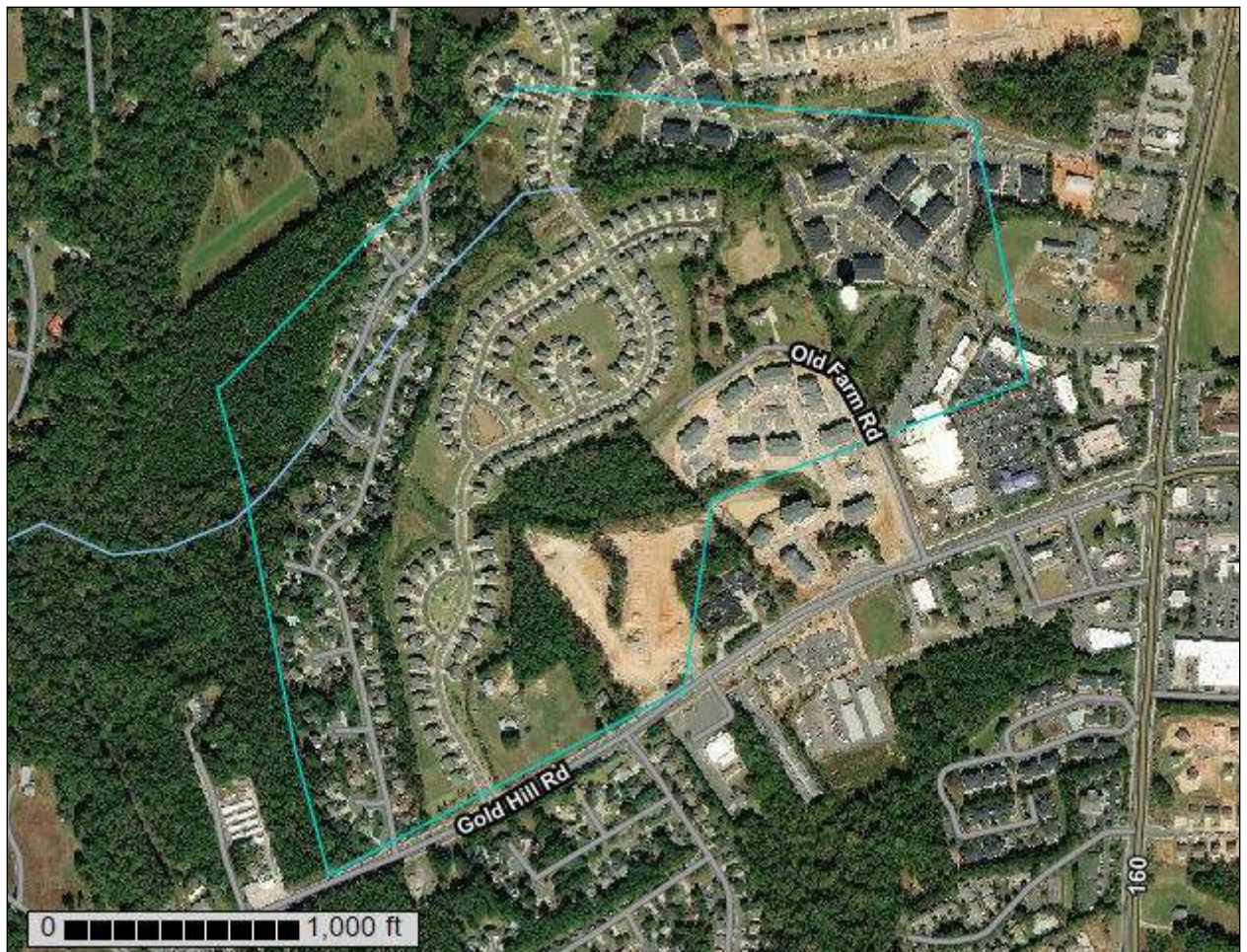
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for **York County, South Carolina**

Stockbridge Trunk Sewer



April 14, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

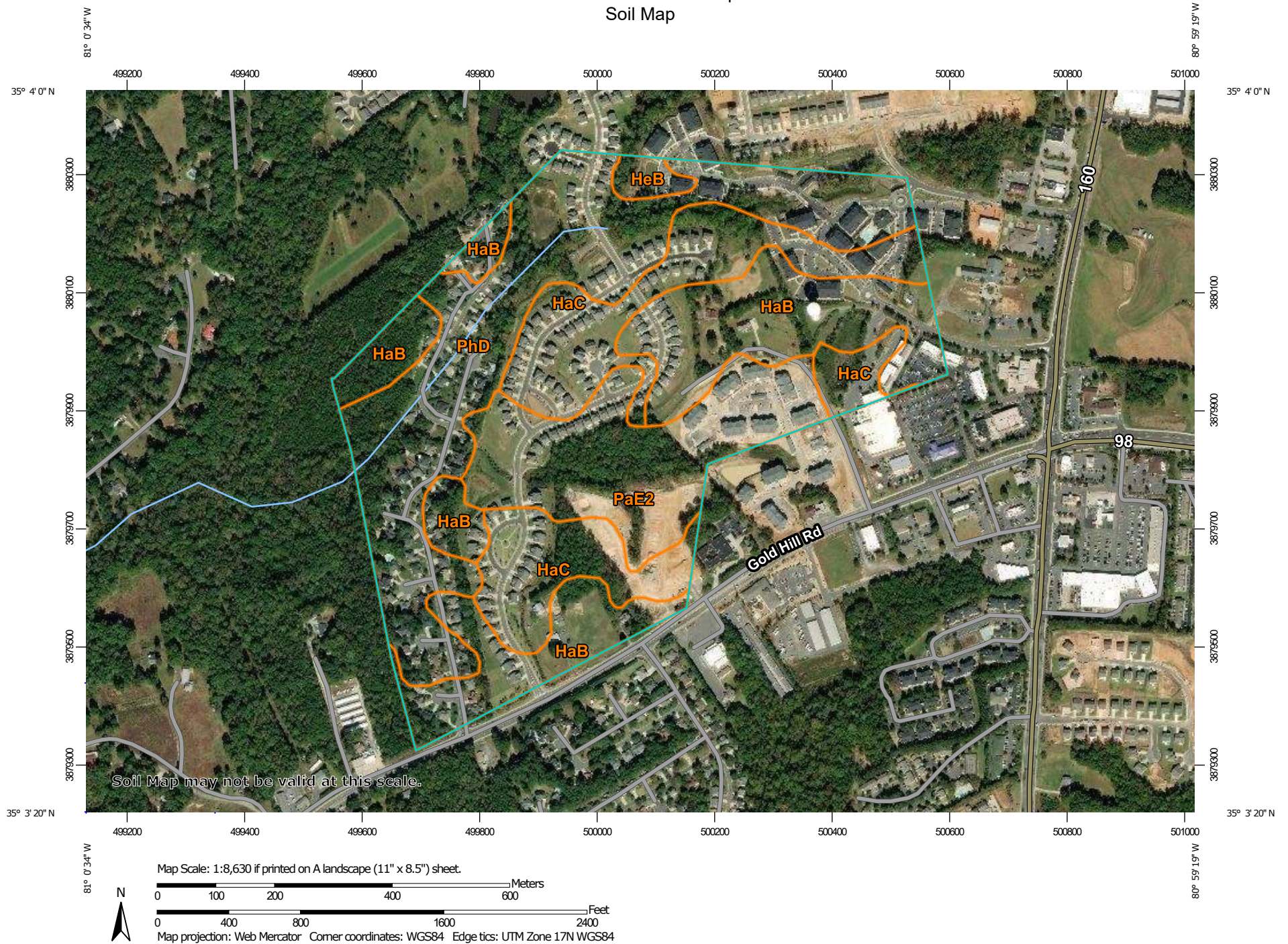
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



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MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: York County, South Carolina
Survey Area Data: Version 16, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 23, 2014—Nov 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HaB	Hard Labor sandy loam, 2 to 6 percent slopes	41.4	26.9%
HaC	Hard Labor sandy loam, 6 to 10 percent slopes	34.7	22.6%
HeB	Helena sandy loam, 2 to 6 percent slopes	1.9	1.2%
PaE2	Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded	26.9	17.5%
PhD	Pacolet-Hard Labor complex, 10 to 15 percent slopes	48.6	31.7%
Totals for Area of Interest		153.6	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

York County, South Carolina

HaB—Hard Labor sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2lq1v
Elevation: 250 to 600 feet
Mean annual precipitation: 42 to 55 inches
Mean annual air temperature: 51 to 72 degrees F
Frost-free period: 202 to 249 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Hard labor and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hard Labor

Setting

Landform: Interfluves
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from gneiss and/or residuum weathered from granite

Typical profile

A - 0 to 10 inches: sandy loam
BE - 10 to 15 inches: sandy clay loam
B - 15 to 45 inches: clay
BC - 45 to 80 inches: clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Helena

Percent of map unit: 10 percent

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Landform: Interfluves

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

HaC—Hard Labor sandy loam, 6 to 10 percent slopes

Map Unit Setting

National map unit symbol: 2lq1w

Elevation: 250 to 980 feet

Mean annual precipitation: 42 to 55 inches

Mean annual air temperature: 51 to 72 degrees F

Frost-free period: 202 to 249 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Hard labor and similar soils: 80 percent

Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hard Labor

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Residuum weathered from granite and/or residuum weathered from gneiss

Typical profile

A - 0 to 10 inches: sandy loam

BE - 10 to 15 inches: sandy clay loam

B - 15 to 45 inches: clay

BC - 45 to 80 inches: clay loam

Properties and qualities

Slope: 6 to 10 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 30 to 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Helena

Percent of map unit: 12 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

Cecil, moderately eroded

Percent of map unit: 8 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope, shoulder

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

Hydric soil rating: No

HeB—Helena sandy loam, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2lq1x

Elevation: 250 to 600 feet

Mean annual precipitation: 42 to 55 inches

Mean annual air temperature: 51 to 72 degrees F

Frost-free period: 202 to 249 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Helena and similar soils: 86 percent

Minor components: 14 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Helena

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope, shoulder, summit

Landform position (three-dimensional): Interfluve, side slope

Down-slope shape: Convex

Across-slope shape: Linear

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Parent material: Residuum weathered from gabbro and/or residuum weathered from granite and/or residuum weathered from gneiss and/or residuum weathered from schist

Typical profile

A - 0 to 7 inches: sandy loam
BE - 7 to 12 inches: sandy clay loam
B - 12 to 38 inches: clay
BC - 38 to 80 inches: sandy clay loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Hard labor

Percent of map unit: 14 percent
Landform: Interfluves
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

PaE2—Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2vy5z
Elevation: 200 to 1,630 feet
Mean annual precipitation: 40 to 69 inches
Mean annual air temperature: 50 to 66 degrees F
Frost-free period: 180 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Pacolet, moderately eroded, and similar soils: 90 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pacolet, Moderately Eroded

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Residuum weathered from granite and/or residuum weathered from gneiss

Typical profile

Ap - 0 to 7 inches: sandy clay loam

Bt - 7 to 28 inches: clay

BC - 28 to 44 inches: sandy clay loam

C - 44 to 80 inches: loam

Properties and qualities

Slope: 15 to 25 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e

Hydrologic Soil Group: C

Hydric soil rating: No

Minor Components

Bethlehem

Percent of map unit: 5 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

Saw, very rocky

Percent of map unit: 3 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

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Across-slope shape: Convex

Hydric soil rating: No

Poindexter

Percent of map unit: 2 percent

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

PhD—Pacolet-Hard Labor complex, 10 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2lq34

Elevation: 250 to 600 feet

Mean annual precipitation: 42 to 55 inches

Mean annual air temperature: 51 to 72 degrees F

Frost-free period: 202 to 249 days

Farmland classification: Not prime farmland

Map Unit Composition

Pacolet and similar soils: 55 percent

Hard labor and similar soils: 35 percent

Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pacolet

Setting

Landform: Interfluves

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Convex

Across-slope shape: Linear

Parent material: Residuum weathered from granite and/or residuum weathered from gneiss

Typical profile

A - 0 to 6 inches: sandy loam

B - 6 to 38 inches: clay

BC - 38 to 80 inches: sandy clay loam

Properties and qualities

Slope: 10 to 15 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)

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Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Hard Labor

Setting

Landform: Interfluves
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Residuum weathered from granite and/or residuum weathered from gneiss

Typical profile

A - 0 to 10 inches: sandy loam
BE - 10 to 15 inches: sandy clay loam
B - 15 to 45 inches: clay
BC - 45 to 80 inches: clay loam

Properties and qualities

Slope: 10 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Helena

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

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